ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S2, p. 1

Question(s):

Enbridge states that “an increasing amount of renewable natural gas (RNG) and hydrogen are also being transported by the gas system.”

a) Please provide the percent of energy (not volume) throughput in Enbridge’s gas system that was RNG and the percent that was hydrogen for each of the past five years (2018 through 2022).

b) Please provide Enbridge’s forecast of the percent of energy (not volume) throughput that will be RNG and the percent that will be hydrogen for each year from 2023 through 2032. Please explain what this forecast is based upon.

Response:

a) Please see Table 1.

Table 1
Hydrogen and RNG Energy Throughput

Year	Legacy Company	Hydrogen Percent of Energy of Total Market	RNG Percent of Energy of Total Market
		(a)	(b)
2018	Union Only (1)	-	0.007%
2019	Union Only (1)	-	0.009%
2020	EGD & Union	-	0.008%
2021	EGD & Union	0.00002%	0.025%
2022	EGD & Union	0.00016%	0.032%

Note:
(1) The total market data for EGD is not available prior to 2020.

b) Hydrogen and RNG throughput in Enbridge Gas's system for 2023 to 2032 will depend on potential policy and demand growth. Enbridge Gas does not have a forecast for this throughput.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S2, p. 2

Question(s):

Enbridge states that the highest hourly flow on its system last year was 8507 10^3m^3/hr at 9 a.m. on January 22, 2022.

a) Please clarify whether this was for the hour ending 9 a.m. (i.e., 8 to 9 a.m.) or for the hour beginning 9 a.m. (i.e., 9 to 10 a.m.) or something else (please explain).

b) Did this peak hourly flow occur at design load conditions? If not, what is Enbridge's best estimate of what the peak hourly flow would have been under design conditions? Please explain how this estimate is developed.

c) What is Enbridge's best estimate of the fraction of that hourly demand that was from residential customers? Please explain how Enbridge defines a "residential customer" in its response. For example, does it include multifamily buildings with central heating systems or hot. Please also estimate the number of residential housing units associated with the portion of peak hourly demand that Enbridge estimates is "residential".

d) What is Enbridge's best estimate of what peak hourly flow for residential customers would have been under design conditions.

e) Please provide the total amount of residential gas sales in 2022, using the same definition as used in responding to part "b" of this question.

Response:

a) It is the hour ending 9 a.m.

b) Enbridge Gas notes that there is an error in the evidence at Exhibit 1, Tab 10, Schedule 2, page 2. The date on which the most recent winter peak (highest hourly flow measured during the winter) occurred was January 20, 2022, not January 22, 2022, as shown.

The peak hour flow recorded on January 20, 2022 was not at design temperature however it corresponds to several design conditions including morning peak and interruptible customers off. The peak hourly flow predicted for the winter of 2021/2022 was 11,031 $10^3/m^3/hr$. This hourly flow was predicted using the hourly demand process provided at Exhibit 4, Tab 2, Schedule 3 page 59.

c) Approximately one third of the peak hourly firm load through the distribution system is from residential customers. A residential customer is one that is assigned a residential rate. This may or may not include multifamily buildings and depends on how the building is serviced, i.e. a single meter for combined needs of the building or individual meters for each unit. There are approximately 3.4 million residential units associated with the peak.

d) The peak hourly flow predicted for winter 2021/2022 was 11,031 $10^3/m^3/hr$. Using the approximate residential ratio provided in part c) gives a residential peak hour flow of 3,640 $10^3m^3/hr$.

e) Enbridge Gas's 2022 actual total residential annual volumes were 8,288,826 10^3m^3 and of that 8,143,656 10^3m^3 was system supply or sales service volumes.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S2, p. 5

Question(s):

Enbridge discusses the role of natural gas generation in the supply of electricity to Ontario, including the fact that gas-fired power plants supplied 22-31% of electricity during the top ten peak demand periods.

a) What was the total amount of natural gas consumed by gas-fired power plants during the top ten peak demand periods referenced by Enbridge?

b) What was the total annual volume of gas consumed for electric power generation in Ontario in each year from 2018 to 2022?

c) What percent of Enbridge's total gas throughput was for gas-fired power plants in each year from 2018 to 2022?

d) What fractions of annual natural gas consumption and demand at time of electricity system peak demand at Ontario gas-fired power plants is taken through Enbridge's distribution system (vs. taking it directly from gas transmission/transportation system)?

e) Please provide any information available on the location of proposed new gas plants in Ontario and indicate whether they will be served by EGI and whether by existing distribution infrastructure or require new facilities.

Response:

a) The total amount of natural gas consumed by natural gas fired power plants during the top ten peak hour electricity demand periods for 2021 was 10,095,825 m^3.

b-c) The total annual volume of gas consumed by natural gas fired power generation in Ontario and the percentage of natural gas fired power generation compared to Enbridge Gas's total gas throughput for 2018 to 2022 is provided in Table 1.

Table 1
Ontario Natural Gas Fired Power Generation Annual Consumption

Line No.	Year	Natural Gas Fired Power Generation Annual Volumes (10^3m^3)	Percentage of Natural Gas Fired Power Generation Compared to Infranchise Throughput (%)
		(a)	(b)
1	2018	1,281,947	4.8%
2	2019	1,360,530	5.3%
3	2020	1,441,266	5.3%
4	2021	1,854,931	7.2%
5	2022	2,689,360	9.7%

d) Table 2 provides the fraction of Enbridge Gas's historical hourly demand associated with power generation serviced through Enbridge Gas's distribution or transmission systems for the top-ten electricity peak hour demand periods of 2021.

Table 2
Ontario Natural Gas Fired Power Generation, Percentage of Hourly throughput via Distribution or Transmission systems

Line No.	Date	Hour	Percentage of hourly throughput via Enbridge Gas Distribution system (%)	Percentage of hourly throughput via Enbridge Gas Transmission system (%)
1	8/9/2021	17	14%	29%
2	8/11/2021	17	7%	27%
3	8/12/2021	18	9%	26%
4	8/19/2021	17	38%	28%
5	8/23/2021	17	38%	26%
6	8/24/2021	17	12%	31%
7	8/25/2021	17	10%	32%
8	8/26/2021	15	11%	31%
9	8/29/2021	17	9%	30%
10	6/28/2021	18	12%	30%

Table 3 provides the fraction of Enbridge Gas's 2021 annual power generation consumption during the top-ten electricity peak hour demand periods served through Enbridge Gas's distribution or transmission systems.

Table 3

Ontario Natural Gas Fired Power Generation, Percentage of Annual Consumption during Electric Peak Demand via Distribution or Transmission systems

Line No.	Particulars	Consumption during Electric Peak Demand (10^3m^3)	Annual Consumption (10^3m^3)	Percentage
		(a)	(b)	(c)
1	Power Generation via Distribution	33,731	499,169	6.8%
2	Power Generation via Transmission	127,207	1,355,762	9.4%
3	Total - Power Generation	160,938	1,854,931	8.7%

e) All inquiries related to incremental distribution service, including those pertaining to open IESO procurements, are considered consumer requests which are afforded confidential treatment under the OEB’s GDAR rule. For additional information, the IESO maintains a list of successfully qualified applicants for active procurements on their public website (www.ieso.ca).

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ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S3 p. 2

Question(s):

Enbridge provides estimates of its 2021 Scope 1, 2 and 3 emissions.

a) What are the boundaries for the estimate of fugitive emissions in Scope 1? Are they just emissions from Enbridge's distribution system or do they include emissions associated with leaks in the transportation to the Enbridge distribution system?

b) For the Scope 3 emissions estimate, does Enbridge assume that every cubic meter of methane delivered to its customers' meters are combusted and turned into carbon dioxide (and other byproducts)? Or does it assume that a portion of methane delivered to customers' meters are either leaked or emitted into homes and businesses as a result of incomplete combustion? If leaks, incomplete combustion or other sources of methane emissions on customers' side of their meters are included, how were they estimated? What assumptions were used and what are the sources of those assumptions?

c) In Table 1 Enbridge describes Scope 3 as "Emissions from combustion of natural gas by the Company's end use customers." Did Enbridge limit its Scope 3 emissions estimates to just combustion of its product by its end use customers? Or did also capture upstream emissions from the extraction, production and delivery of methane to its distribution system? If it included only combustion effects, please explain why?

d) Please provide all of Enbridge's assumptions and calculations of Scope 3 emissions.

e) Does Enbridge believe that Table 1 captures all lifecycle emissions associated with the extraction, production, movement and consumption of the gas it distributes? If so, please explain. Note that by "lifecycle" emissions we are referring to an accounting analogous to (i.e., the buildings and industry analogue to) the categories of emissions captured by the Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) model developed by the U.S. Department of Energy's Argonne National Laboratory (see:

https://www.energy.gov/eere/bioenergy/articles/greet-greenhouse-gases-regulated-emissions-and-energy-use-transportation).

Response:

a) Scope 1 GHG emissions, which include combustion, fugitive and vented emissions, result directly from Enbridge Gas's operations, including storage and transmission operations, as well as distribution operations. Emissions upstream and downstream of Enbridge Gas's system are not included in Scope 1.

b) Enbridge Gas used the emissions factor provided in the Guideline for Quantification, Reporting and Verification of Greenhous Gas Emissions[1] to calculate Scope 3 emissions from combustion of natural gas by the Company's end use customers. Incomplete combustion is considered in the emission factor and, therefore, included within Enbridge Gas's Scope 3 emissions; however, leaks after the meter set are not included.

c) Enbridge Gas's Scope 3 emissions provided at Exhibit 1, Tab 10, Schedule 3, page 2, only include combustion of natural gas by end-use customers. Enbridge Gas began reporting natural gas distribution emissions as a requirement of Ontario's Cap and Trade Program and the Company has continued to report Scope 3 emissions voluntarily, despite cancelation of Cap and Trade. Upstream emissions from the extraction, production and transportation of natural gas have not historically been reported due to the difficulty in tracking the origin of the natural gas the Company distributes and the limited transparency on upstream pipelines.

d) The total natural gas distribution and in-franchise transportation customer volumes in 2021 were 25,773 million m^3. For 2021 emissions, the emission factor 1.874 tCO_2e/m^3 was used.[1]

$$25{,}773 \text{ million } m^3 \times 1.874\ tCO_2e/\text{million } m^3 \div 1{,}000{,}000 = 48.3 \text{ million } tCO_2e$$

e) No, Enbridge Gas does not believe Table 1 captures all lifecycle emissions of natural gas. It does not capture emissions from extraction, production and transportation of natural gas which occurs upstream of Enbridge Gas's operations.

[1] Ontario Ministry of the Environment and Climate Change. (2017, November). Guideline for Quantification, Reporting and Verification of Greenhouse Gas Emissions. Table 20-3 and Table 20-4. https://prod-environmental-registry.s3.amazonaws.com/2018-01/013-1457_d_Guide.pdf.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S4 p. 4

Question(s):

Enbridge states that its forecast was not adjusted to address future energy efficiency codes and standards. Would Enbridge agree that any such future codes and standards would almost certainly lead to reductions in (rather than increases in) average gas consumption? If not, what changes could lead to increases in gas consumption?

Response:

Enbridge Gas agrees that future building codes and standards are likely to require greater levels of energy efficiency in buildings and may lead to a decrease in average gas consumption; however, the introduction of hydrogen into Enbridge Gas's system with its lower energy content by volume, may conversely lead to an increase in average gas use consumption.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S4 p. 4

Question(s):

Enbridge states that it has not made adjustments to its average use forecast to reflect impacts of blending of hydrogen, as blending volumes are expected to be “minimal during the rate rebasing period.”

a) What levels of hydrogen blending has Enbridge tested to date? Please express the blending levels as hydrogen percentages (the percent of total delivered gas that would be hydrogen rather than methane) both by volume and by energy content.

b) What levels of hydrogen blending does Enbridge currently have plans to test? Please express the blending as hydrogen percentages (the percent of total delivered gas that would be hydrogen rather than methane) both by volume and by energy content.

c) What does Enbridge believe to be the highest feasible level of hydrogen blending with methane that could be delivered through its distribution system and consumed by its customers heating systems and other appliances without modifications or capital investments? 5% by volume? 10%? 20% Some other value? Please explain the basis for the response, with references provided.

Response:

a) As part of the hydrogen blending pilot Low-Carbon Energy Project (LCEP) Phase 1[1], Enbridge Gas has started injecting hydrogen up to 2% by volume in the blended gas area. A 2% by volume blend is equivalent to 0.66% by energy.

b) Enbridge Gas has intentions to file a leave to construct application with the OEB likely in late 2023 or early 2024 for which a higher blend may be proposed beyond

[1] EB-2019-0294.

the current maximum 2% by volume in Phase 1 of the LCEP. Please see Exhibit 4, Tab 2, Schedule 6, pages 15 to 16.

c) The Hydrogen Blending Grid Study (provided at Exhibit 4, Tab 2, Schedule 6, pages 16 to 18) will include the establishment of the system's baseline in its current state, understanding where and how much hydrogen can be accommodated, understanding hydrogen tolerance constraints, and understanding how to accept uniform maximum tolerable amounts of hydrogen to achieve the greatest reductions of GHG emissions in a safe and cost-effective manner. Evaluation of impacts on customer end use appliances will be a component of the study.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S4 p. 6, Table 2

Question(s):

a) What is the basis for the assumption that 10% fewer existing homes would convert to natural gas starting in 2030? Why would that trend not start before 2030?

b) Footnote 5 references Enbridge's 2019 and 2020 Residential Natural Gas End Use Survey.

   i. Please provide a copy of all summary data and reports regarding this survey, as well as the prior survey (the one completed immediately prior to 2019/2020) and any new survey completed since the 2019/2020 one.

   ii. If not included in the Residential Natural Gas End Use Survey, please provide Enbridge's best estimates of the fraction of its residential customers that have each of the following:

      1. Forced air gas furnace heating?
      2. Hydronic gas boiler heating?
      3. Gas water heating
      4. Gas cooking?
      5. Gas dryers?
      6. Central air conditioning?
      7. Window/room air conditioning?

c) On line 3 Enbridge states that it assumes that, starting in 2026, 10% of general service customers will replace gas equipment that reaches the end of its life with non-gas equipment.

   i. Does this apply to all forms of gas equipment – heating equipment, water heating equipment, cooking equipment, dryers, etc.? If not, what forms of equipment does it apply to?

ii. How does this 10% assumption compare to actual retention of customers' gas end use equipment today?

iii. Why does Enbridge assume that trends in retention of existing customers or existing customers' gas end use equipment will change sooner (2026) than the trend in gas conversions (no percentage change until 2030, per Table 2, line 2)?

Response:

a) The assumption that 10% fewer existing homes would convert to natural gas starting in 2030 is based on an assumption that converting homes are likely to be older, less energy efficient homes, heated by propane or oil systems that would require extensive energy retrofitting to be undertaken before heating with electricity would be considered a preferable option to natural gas. At the time of forecasting, mandates requiring extensive energy retrofits for existing homes were not in place and Enbridge Gas did not anticipate implementation of and compliance with a home energy retrofit mandate would occur prior to 2030.

b)

i. Please see Attachments 1 to 5 for the 2018, 2019, 2020, 2021, and 2022 Residential Single Family Natural Gas End Use studies. A 2018 report is available for the Union franchise area only.

ii. The following are included within the Residential Single Family Natural Gas End Use Study.

1. Forced air gas furnace heating: Please see page 7 of the 2022 Residential Single Family Natural Gas End Use Report, Attachment 5.

2. Hydronic gas boiler heating: Please see page 7 of the 2022 Residential Single Family Natural Gas End Use Report, Attachment 5.

3. Gas water heating: Please see page 13 of the 2022 Residential Single Family Natural Gas End Use Report, Attachment 5.

4. Gas cooking: Please see page 17 of the 2022 Residential Single Family Natural Gas End Use Report, Attachment 5.

5. Gas dryers: Please see page 20 of the 2021 Residential Single Family Natural Gas End Use Report, Attachment 4.

6. Central air conditioning: Please see page 18 of the 2022 Residential Single Family Natural Gas End Use Report, Attachment 5.

7. Window/room air conditioning: Please see page 18 of the 2022 Residential Single Family Natural Gas End Use Report, Attachment 5.

c)

i. This assumption was not specific to equipment types.

ii. Enbridge Gas measures the penetration of natural gas end use equipment in single family homes in the annual Residential Single Family Natural Gas End Use Study. This study shows that retention of natural gas equipment among customers is very stable overall over time. Among end uses tracked, there is some variation year over year, with a general trend of stable penetration in home heating, lower penetration in water heating, and higher penetration in some of the secondary appliances, all shown in Attachment 5 (as well as Attachments 1 to 4). The annual reports also show the number of applications customers have in their home, (which has changed slightly, but is affected by the questions asked in each year's survey), continues to be stable.

iii. The changing preferences towards use of natural gas equipment were assumed to occur earlier (2026) in existing natural gas customers as Demand Side Management (DSM) programming has been continuously available and promoted to Enbridge Gas customers for more than two decades, so these homeowners are more likely to consider or have already undertaken home energy efficiency improvements than existing homes that are not heated by natural gas. Non-gas homes likely require extensive energy efficiency retrofitting prior to being converted to electric heating as noted in response to part a).

Single Family Market Penetration Study

Natural Gas Appliances and Energy Conservation Intentions

2018 Annual Legacy Union Gas Results

Market Research & Analysis

uniongas

Background

Objectives

- Measure the penetration of natural gas appliances in the single family residential customer market;
- Determine awareness of Legacy Union Gas' energy conservation programs, and understand where customers turn to for more information; and
- Measure CO Alarm penetration and customer understanding of how the alarms operate (CO Alarm results reported separately)

Methodology

- Sponsor identified telephone interviews were fielded by NRG Research Group (n=1,217), with quotas across Union's 4 regions (Southwestern, Central, Eastern and Northern)
    - Starting in 2017, attached row/townhouses are included in the measurement (unless otherwise noted, these homes are included in the total result in this report)
- Final franchise-wide results are calculated based on true geographic proportions
- Survey screening requires that respondents reside in single family dwellings and are mainly responsible for making energy-related decisions for the home
- Telephone interviews were conducted over the November 13 – December 3, 2018 period
- Overall results yield a margin of error of +/-2.8% at the 95% confidence interval

Executive Summary

Natural Gas Penetration

- Natural gas remains the top choice for home heating and water heating.
- When asked to think about a new home, barring any other considerations, the majority of customers continue to choose natural gas, though (similar to previous years) a small proportion would choose alternate sources, such as geothermal or solar for home and water heating, respectively.
- There is some improvement (returning to 2016 levels after seeing a dip in 2017) in the prevalence of natural gas in secondary appliances.
- The preference for natural gas continues to be stronger than current penetration.

Ownership

- Furnace ownership is very high, especially for natural gas furnaces (89%), though in the case of future ownership, some show interest in renting (10%).
- Ownership of water heaters has increased very slowly over the last couple of years, but remains much lower than furnace ownership. Among those who are likely to replace their water heater in the next 2 years, interest in ownership is much stronger (64%) than current ownership (43%), though this varies by fuel source.

Furnace Efficiency

- The proportion of high efficiency furnaces has remained relatively stable over the last few years.
- Just over 1-in-6 customers do not know the efficiency level of their furnace (this has not changed much over the last decade) – customers who don't know are not likely to be aware of and act on the potential for upgrades.

Executive Summary

Other

- Newly measured in 2018:
    - 11% of customers indicate that they have a pool – 44% of pool owners use natural gas to heat their pool.
    - A relatively small (14%) proportion of customers have a source of backup power available – among those who do, most have a portable generator.
- There is a continued, though small, increase in Wi-Fi and Smart thermostats as customers upgrade from traditional programmable thermostats and non-programmable thermostats.

Energy Efficiency (EE) and DSM offerings

- The proportion of customers planning to make energy efficiency updates sits at 23% (similar to levels seen between 2014 and 2016).
- Awareness that Legacy Union Gas offers energy conservation programs had been improving over time, though in recent years it has continued to decline, and remains lower in some regions and among some specific demographics.
- Overall customer awareness of the HWP and HRR programs remains quite strong at 38% and 46%, respectively (similar to 2017).
    - Among those aware of the respective programs, 23% have participated in HWP and 27% in HRR.
- The internet continues to be the most important source of general energy efficiency information – highlighting the importance of digital marketing and strong website content.
- Among possible sources of information, customers tend to trust utilities/energy companies, and manufacturers of energy-efficient products and not-for-profit organizations more than government and media.

Overview of Natural Gas Appliances

- Natural gas penetration remains relatively consistent, with the large majority of homes continuing to use natural gas for home heating and water heating (though showing some directional decline for home heating)
- Secondary appliances see penetration return to 2016 levels

Natural Gas Appliance Penetration Rates

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
						Number of interviews	*1200*	*1201*	*1202*	*1205*	*1322*	*1217*
Home Heating	95%	96%	94%	94%	95%	95%	95%	96%	96%	95%	96%	**94%**
Water Heaters	88%	86%	87%	86%	83%	86%	85%	85%	86%	86%	83%	**82%**
Stoves/Cook tops	22%	23%	(--)	(--)	25%	24%	(--)	29%	26%	31%	29%	**31%**
Clothes Dryers	20%	21%	(--)	(--)	21%	19%	(--)	21%	20%	19%	17%	**19%**
Fireplaces	38%	40%	42%	40%	38%	38%	39%	38%	41%	44%	36%	**42%***
Outdoor Barbecues	22%	21%	(--)	(--)	24%	26%	(--)	27%	23%	26%	20%	**24%***
Pool Heater	(--)	(--)	(--)	(--)	(--)	(--)	(--)	(--)	(--)	(--)	(--)	**5%**

(--) = Penetration was not measured

2011-2014 results for Outdoor BBQs restated on full population base size for consistent comparison.
*/*Indicates result is significantly higher/lower at a 95% confidence level compared to 2017.

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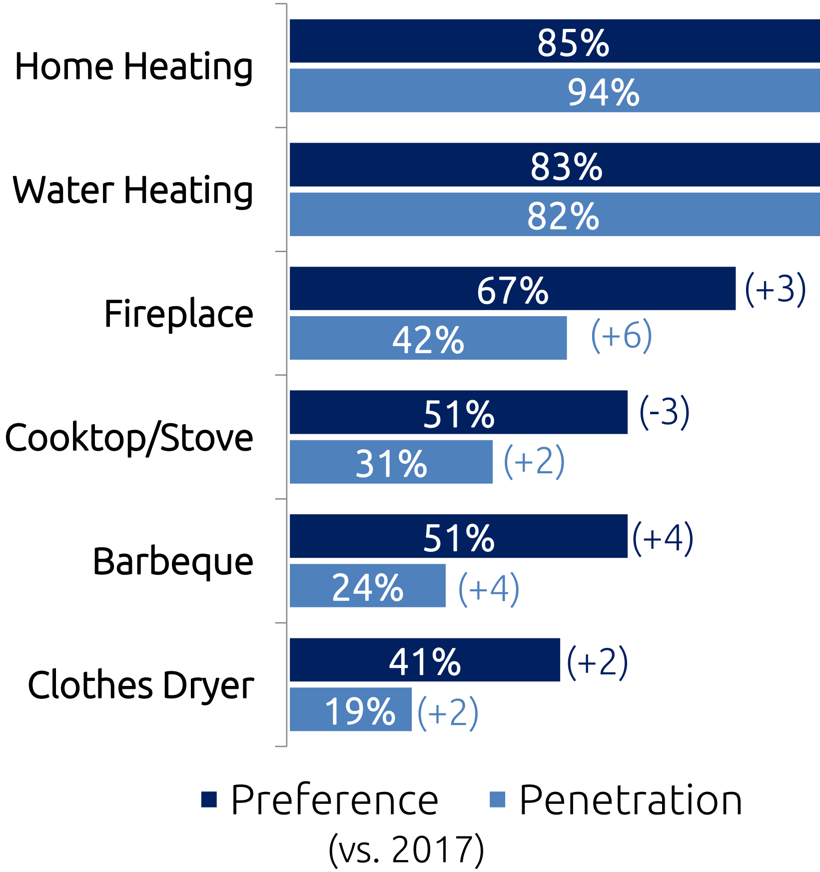
Penetration vs. Preference for Natural Gas

- Preference for natural gas shows some variation in results by appliance (down for cooktop/stoves, up for fireplaces and barbeques)
- With the exception of home and water heating, preference for natural gas appliances (absent other barriers or considerations) continues to be stronger than current penetration
- Geothermal and solar technologies have appeal for some customers, as it continues to be the second preferred option for home and water heating, respectively

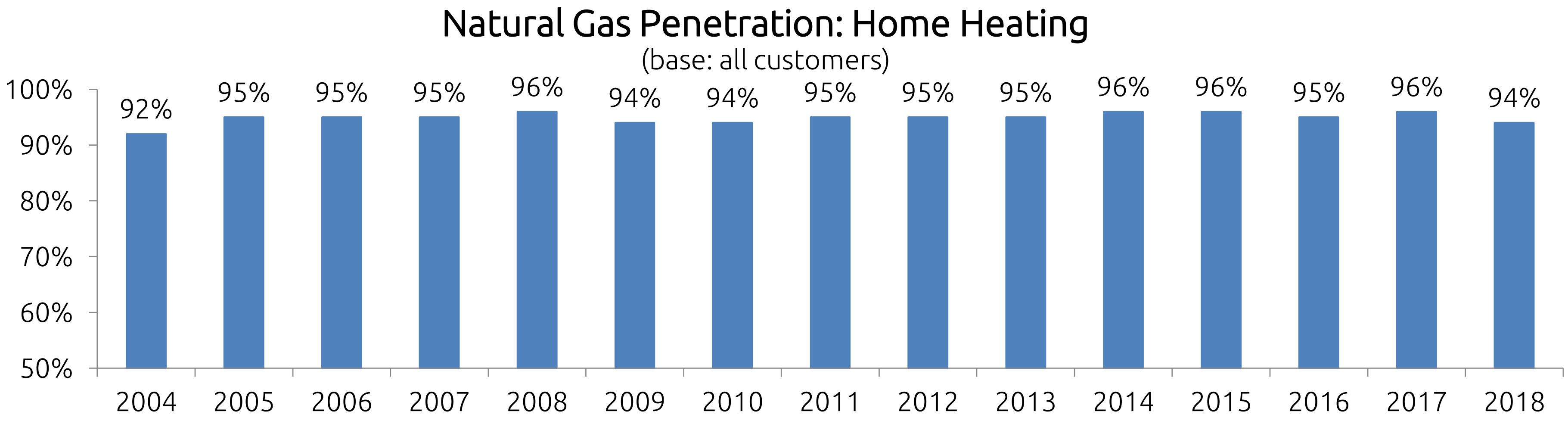


Second preferred option: geothermal (9%)

Second preferred option: solar (6%) and electricity (6%) – solar is especially popular among younger customers (13% among those 18-34)

Home Heating: Gas Adoption & Equipment

- The vast majority of Legacy Union Gas customers use natural gas for home heating, and have a forced air furnace installed (the few that don't tend to be in Northern Ontario)
- While most furnaces are owned, especially natural gas furnaces, some say they would consider renting their replacement furnace – currently, younger customers (age 18-34) are less likely to own (81%)



Heating Equipment (NG)	
Forced air	87%
Hydronic	4%
Space heaters	0%
Combination	2%
Don't Know	7%

Age of Furnace (all fuel types)	
5 years or less	43%
6 to 10 years	28%
11 to 20 years	21%
More than 20 years	5%
Don't Know	3%

18% have replaced their furnace in the last 2 years

Fuel of Original Furnace	
Natural Gas	85%
Electricity	9%
Oil	4%
Geothermal	1%
Don't Know	1%

12% are at least fairly likely to replace furnace in next 2 years

Fuel of New Furnace	
Natural Gas	93%
Electricity	5%
Propane	1%
Don't Know	1%

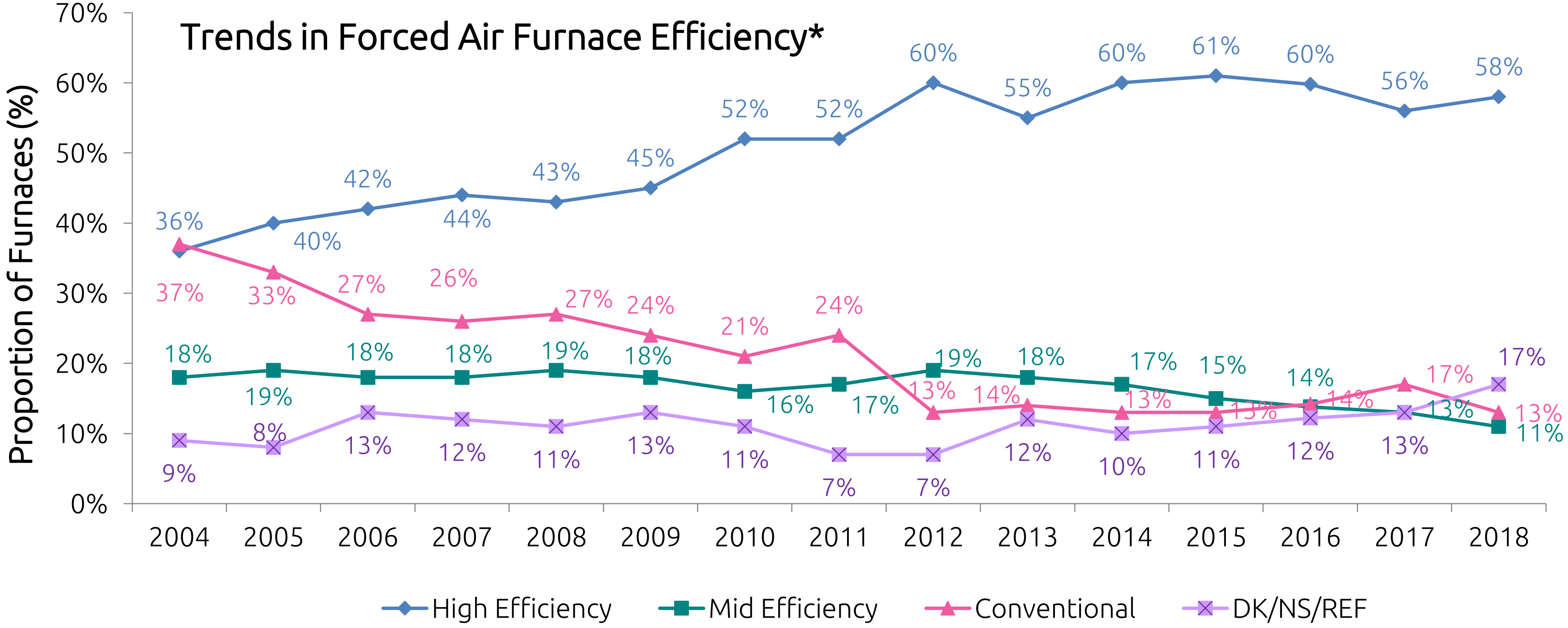
Current Furnace Ownership: 89% (natural gas), 79% (electric)

Future Furnace Ownership: 89% own, 10% rent

Home Heating: Furnace Efficiency

- Penetration of high efficiency furnaces shows continued softening in 2018
- 1-in-6 customers don't know the efficiency level of their furnace (among younger customers don't know is even higher at 35%)

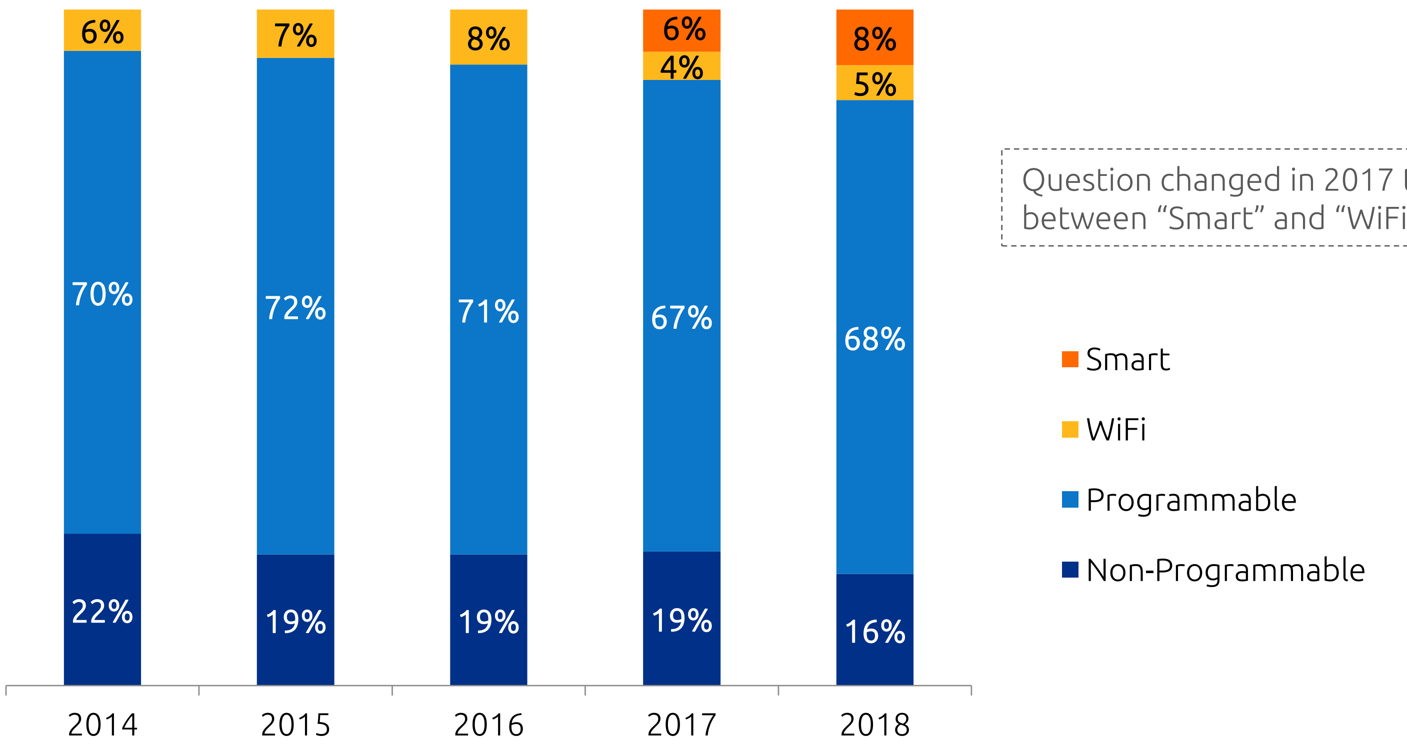
→ Customers who don't know are not likely to be aware of and act on potential upgrades



*Not adjusted for DK/NS/REF

Home Heating: Thermostats

- Non-programmable thermostats continue to be found among customers, especially in Northern (29%) and Eastern (20%) Ontario, among low income customers (22%) and in older homes (21%)
  → Opportunities to put in programmable thermostats continue to exist, especially for lower income households
- The proportion of Wi-Fi and Smart thermostats continue to grow, they are more common in Central Ontario (5%, 9%), in newer homes (7%, 12%), and are gaining popularity in the older age segments (11% of ages 55-64 have a Smart thermostat compared to 5% in 2017)



Question changed in 2017 to distinguish between "Smart" and "WiFi"

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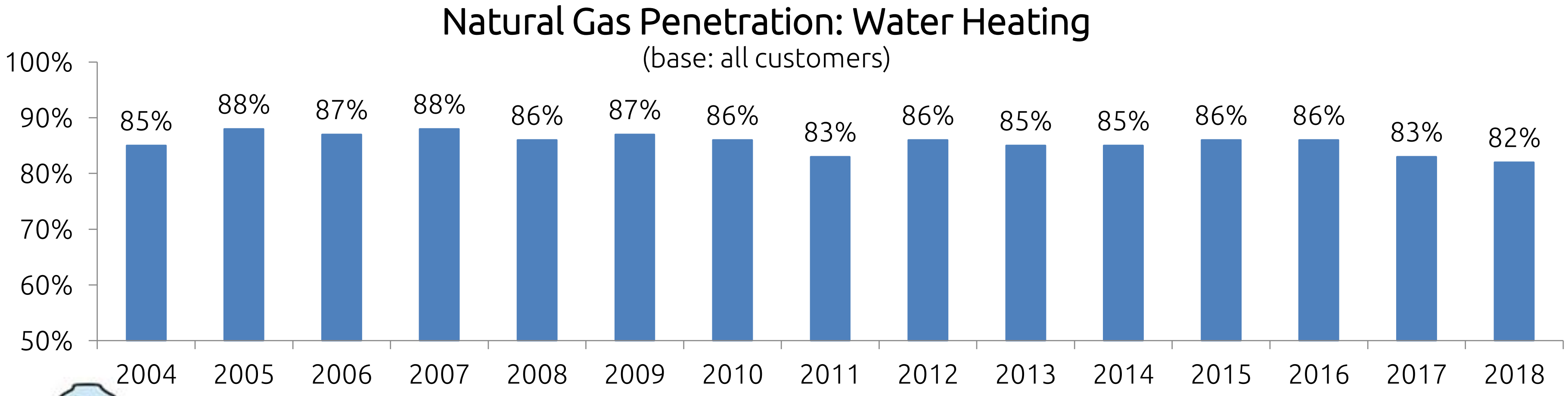
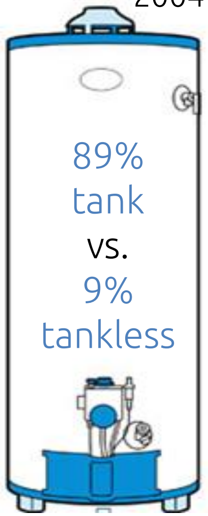
Water Heaters: Gas Adoption & Equipment

- Penetration of natural gas water heaters has been very consistent over the last decade
- Natural gas for water heating is less popular in Eastern (73%) and Northern (74%) Ontario compared to Central (86%) and Southwestern (82%) Ontario
- The proportion of tankless is up from 6% in 2017 (in 2016 it was 8%) – tankless continues to be more popular in Northern Ontario (16%)





Vent Type

Power Vent	37%
Standard Vent	25%
Direct Vent	18%
Other	3%
Don't Know	18%

Age of Water Heater (all)

5 years or less	52%
6 to 10 years	28%
11 to 15 years	10%
More than 15 years	4%
Don't Know	6%

12% are at least fairly likely to replace water heater in next 2 years

Fuel of New Water Heater

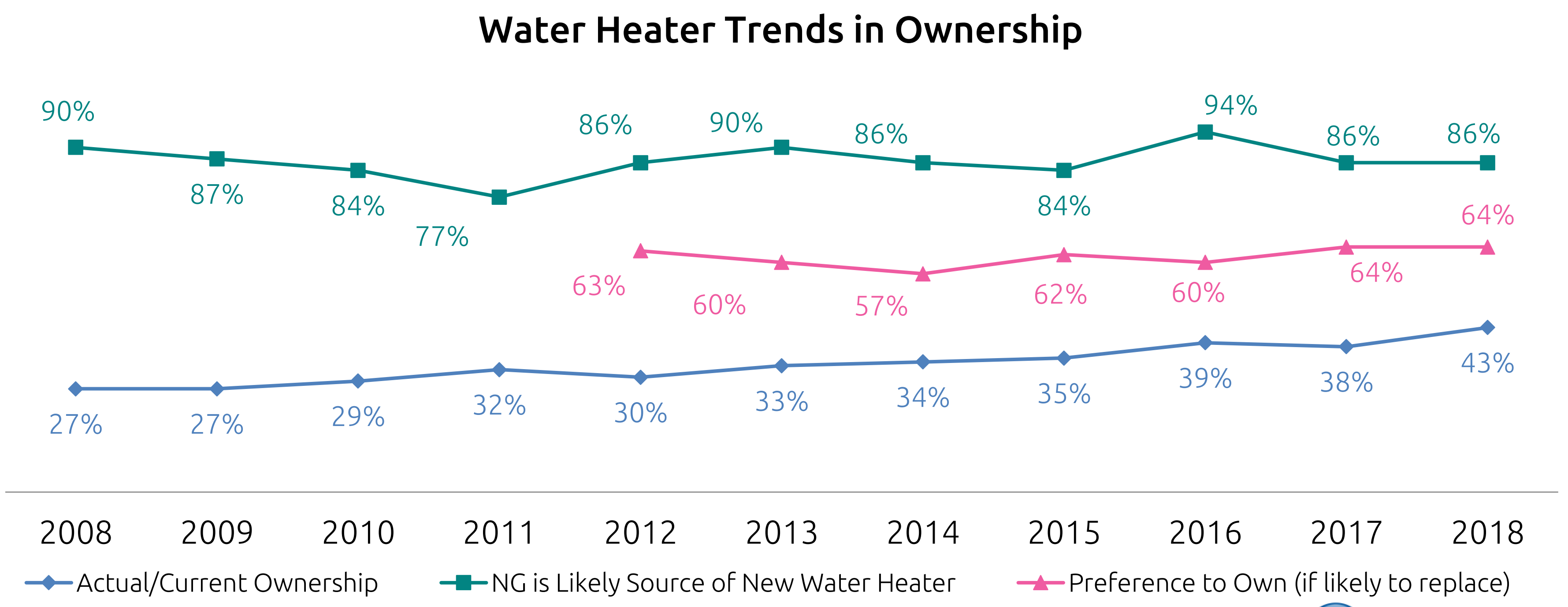
Natural Gas	86%
Electricity	7%
Solar	3%
Don't Know	4%

Current Water Heater Ownership: 43% total
39% (natural gas), 60% (electric)

Future Water Heater Ownership: 64% own, 32% rent

Water Heaters: Ownership

- The desired energy source for a new water heater is generally natural gas (86%)
- Future intentions continue to lean towards ownership as 64% plan to own and 31% plan to rent (5% don't know)
- While preference for ownership remains high, actual ownership continues to lag but is increasing slowly

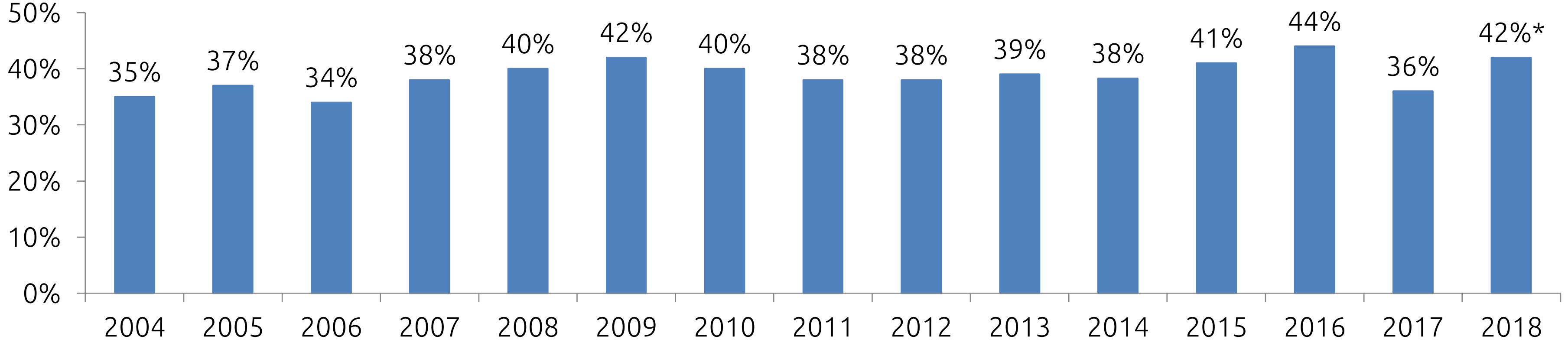


Fireplaces: Gas Adoption & Equipment

- Reported penetration of natural gas fireplaces is up in 2018 compared to 2017, and natural gas fireplaces continue to be popular among those who have a fireplace, or would like to install one

Natural Gas Penetration: Fireplaces

(base: all customers)



55% of households have a fireplace

- 78% have just one
- 22% have 2 or more

Fuel Type

78%

19%

11%

Age of Fireplaces (all)

About 2-in-5 (41%) fireplaces are less than 10 years old

10% are at least fairly likely to install a fireplace in next 2 years

Fuel of New Fireplace

Natural Gas	75%
Wood	12%
Electricity	10%
Don't Know	2%

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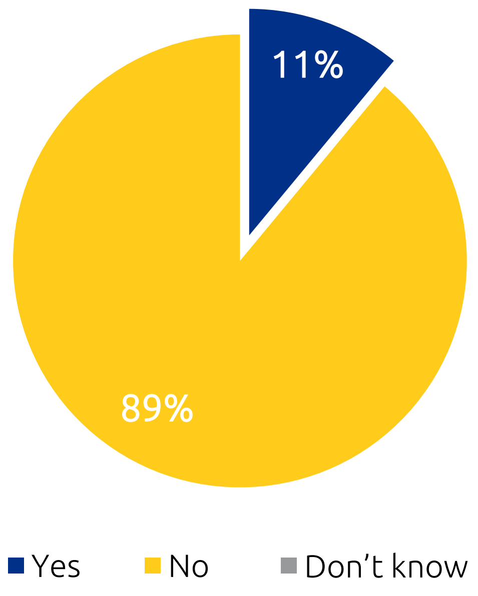
* Indicates result is significantly higher or lower at a 95% confidence level compared to 2017.

Pools: Gas Adoption & Equipment

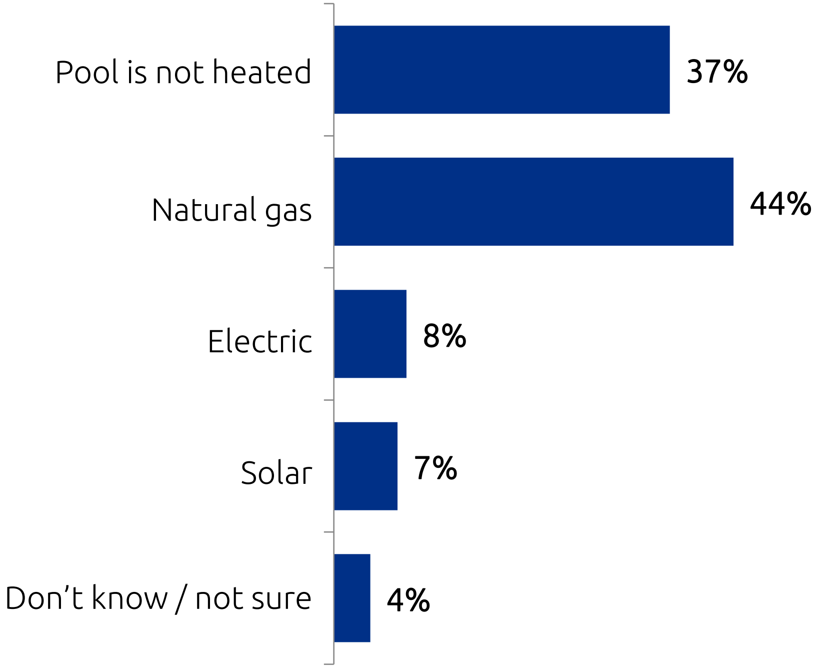
NEW IN 2018

- Pools are not as common in Northern Ontario (7%) as compared to other parts of the province
- In terms of heating, almost 1-in-2 pools in Southwestern Ontario is not heated, while pools in Central Ontario are more likely to be heated (58% have natural gas heaters)

Have a Pool
(base: all customers, n=1217)



Fuel Used to Heat Pool
(base: customers who have a pool, n=137)



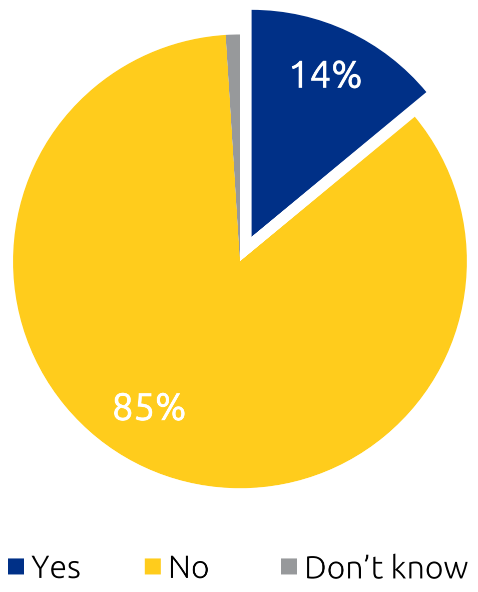
Q: Do you have a pool? Q: What fuel do you use to heat the pool?

Backup Power: Gas Adoption & Equipment

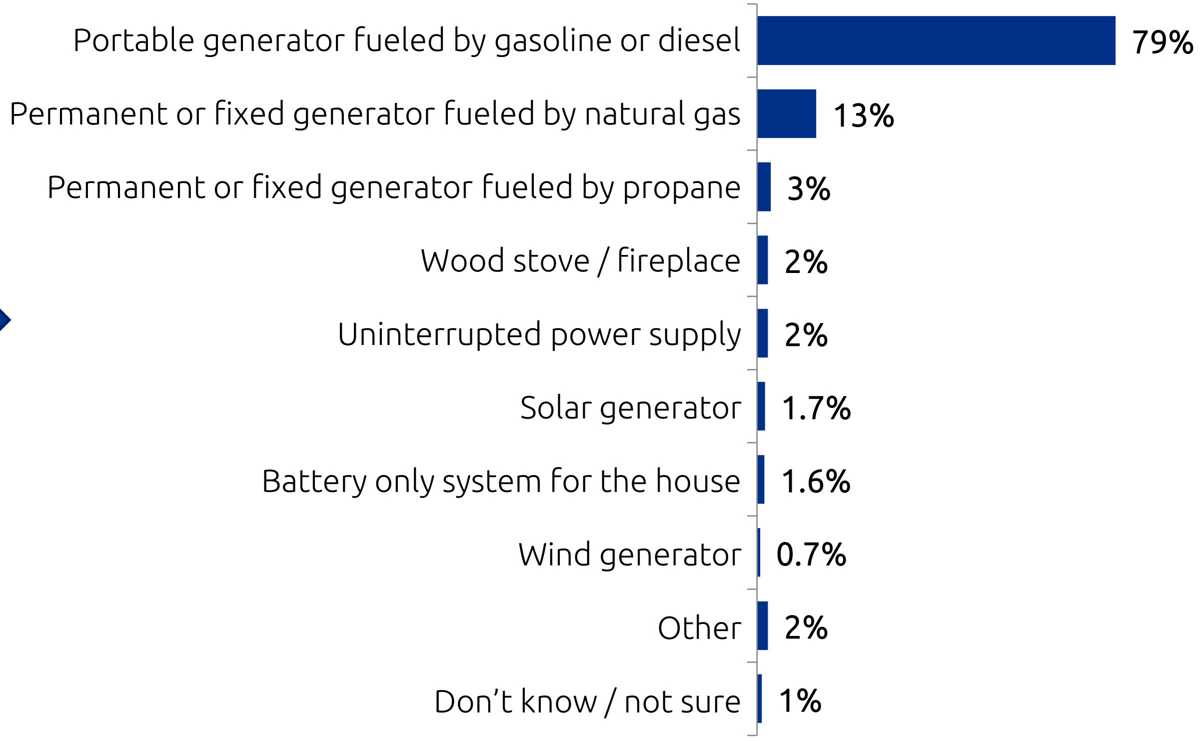
NEW IN 2018

- More homes in Northern Ontario have backup power (23%) compared to other regions, especially Central Ontario (9%)

Have a Source of Backup Power
(base: all customers, n=1217)



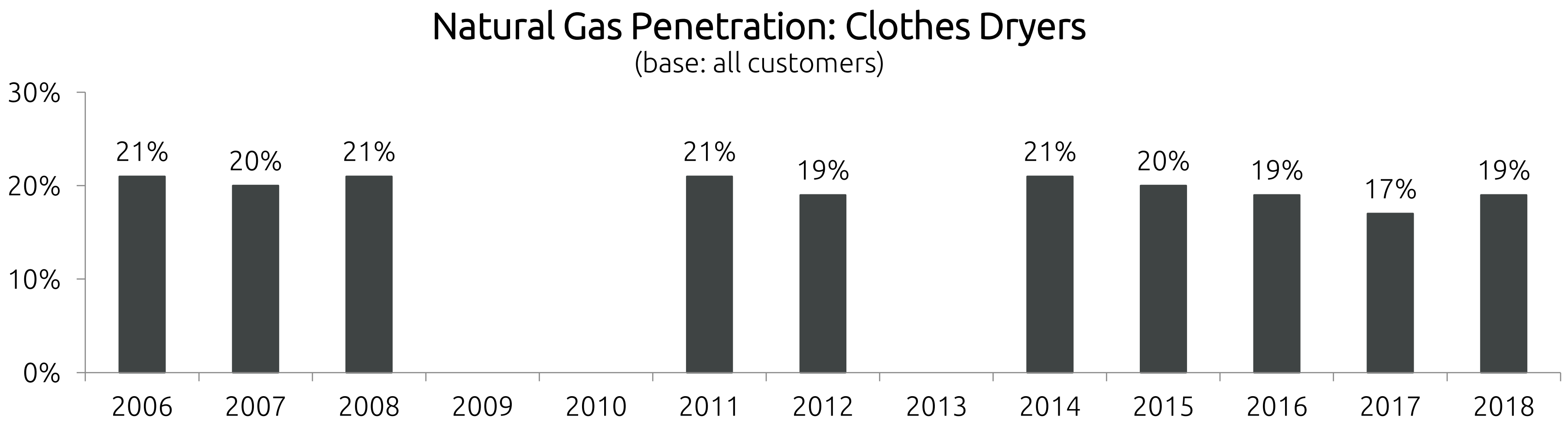
Type of Backup Power
(base: customers who have a source of backup power, n=171)



Q: Do you currently have a source of backup power at your house? Q: What type of backup power do you have at your home?

Clothes Dryers: Gas Adoption & Equipment

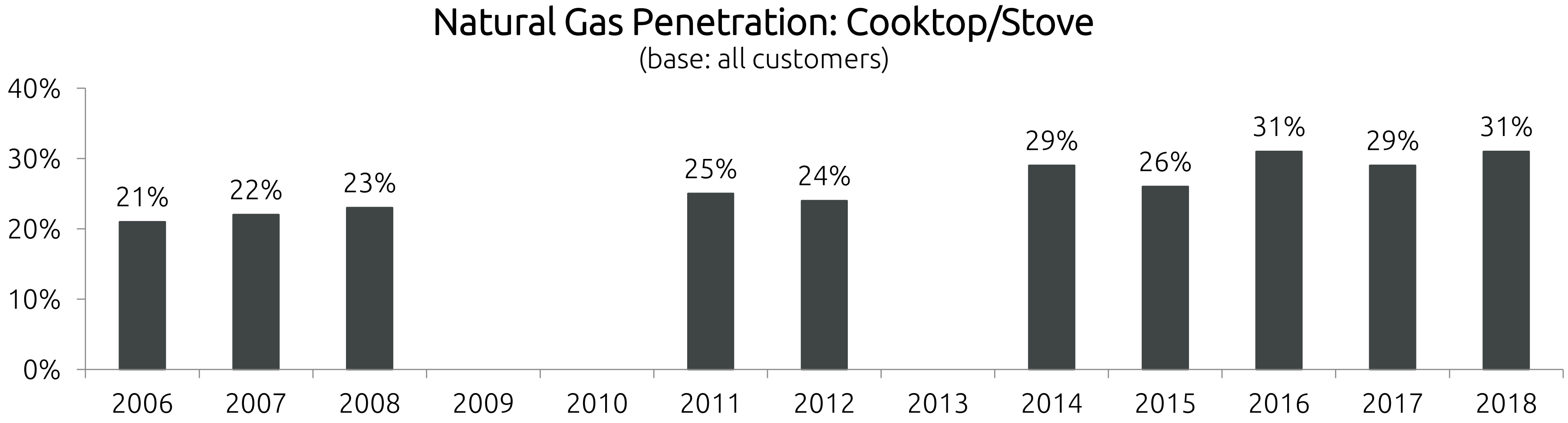
- Almost all single family homes have a clothes dryer (98%)
- Reported penetration of natural gas clothes dryers continues to soften
- Significantly more natural gas dryers are found in Southwestern (25%) and Central (19%) Ontario compared to Eastern (8%) and Northern (11%) Ontario



(blank) indicates penetration was not measured

Cooktop / Stove: Gas Adoption & Equipment

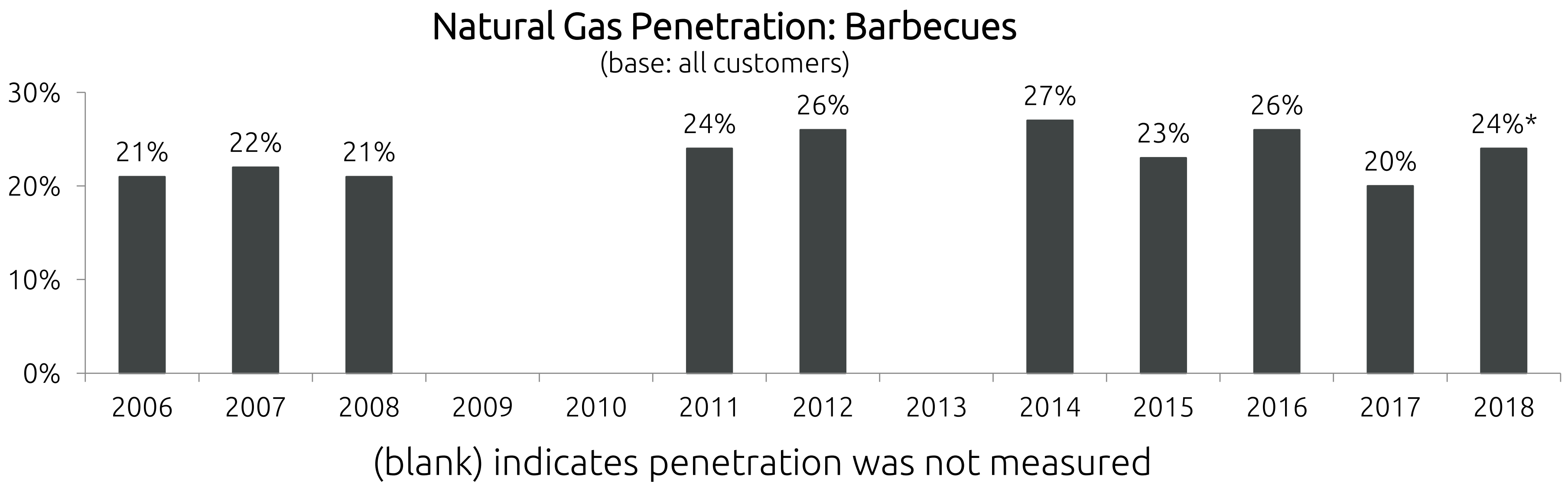
- Reported penetration of natural gas cooktops and stoves has been relatively stable over the last few years
- Natural gas cooktops/stoves continue to be more popular Southwestern and Central Ontario where more than 1-in-3 customers use natural gas for cooking (rather than Eastern and Northern Ontario where natural gas cooktops/stoves are less popular)



(blank) indicates penetration was not measured

Barbecues: Gas Adoption & Equipment

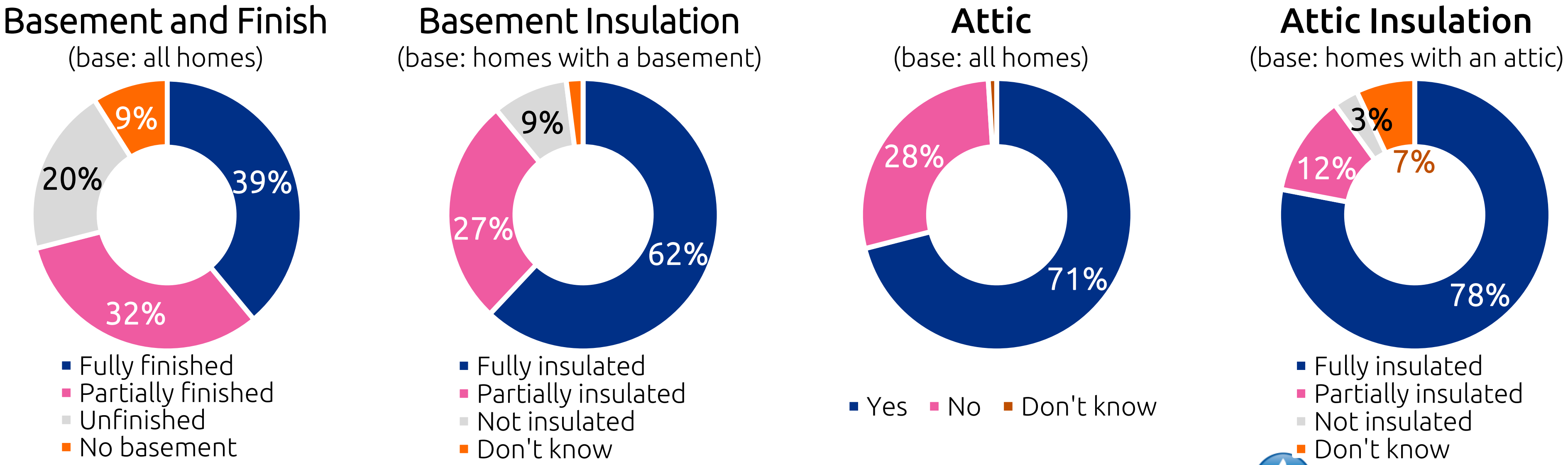
- Majority of single family homes have an outdoor barbecue (83%) – among them propane (64%) remains the most common fuel type, followed by natural gas (29%)
- Households with higher incomes ($100K+) are more likely to have a natural gas barbecue (35%), compared to lower income households ($40K or less, at 13%)



* Indicates result is significantly higher or lower at a 95% confidence level compared to 2017.

Basements and Attics: Insulation & Level of Finish

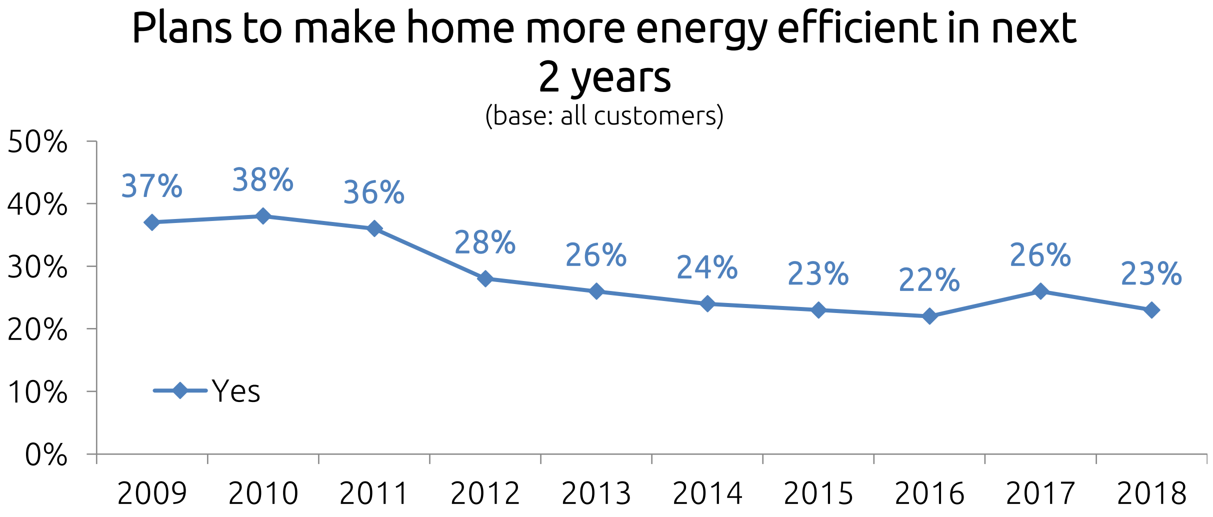
- Older homes are more likely to have partially insulated or uninsulated basements:
  - Before 1975: 34% partially, 14% uninsulated (up to 29% for homes built before 1950)
  - After 1975: 21% partially, 3% uninsulated
- Household income also appears to be a factor – among low income customers*: 28% have partially insulated basements (18% uninsulated), while 16% have partially insulated attics (4% uninsulated)
  → this represents customers who may be eligible for the Low Income Home Weatherization Program



* defined per the total household income and household size requirements for HWP

Home Energy Efficiency: Future Intentions

- 23% of customers intend to make their home more energy efficient in the next 2 years
  - This proportion is higher among customers in Northern Ontario (29%) and customers with homes built before 1950 (31%), with partially insulated (26%) or non-insulated basements (30%), as well as homes where annual gas usage was 2201-3000 m^3 (27%) and 3000 m^3 or more (29%)
  - Age is an important factor – younger customers are significantly more likely to be planning energy efficiency upgrades



	Age Group	Plans (% yes)
	18 – 34	44%
	35 – 54	29%
	55 – 64	19%
	65+	15%

Q: Do you have any plans to make your home more energy efficient within the next two years?

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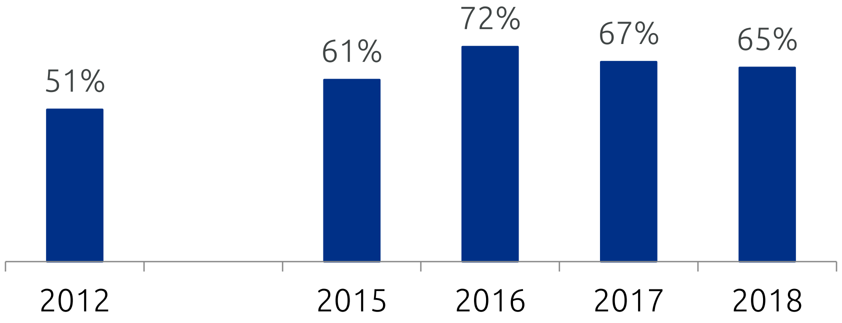
Home Energy Efficiency: Awareness of UG Offering EC/EE Programs

- Awareness that UG offers conservation and efficiency programs is at 2-in-3 customers, and is on a slight decline since 2016
  - Overall awareness is lower among those in Eastern and Northern Ontario, and among ages 18-34 (though this continues to improve and is up from 56% in 2017 and 53% in 2016)
  - Awareness is strong in South/West Ontario and among homeowners in older homes (built before 1950, 75%)

Aware that Union Gas offers Energy Conservation & Efficiency Programs

(base: all customers)



	Age Group	Aware (% yes)	Region	Aware (% yes)
	18 – 34	59%	Central	65%
	35 – 54	60%	Eastern	54%
	55 – 64	69%	Northern	56%
	65+	69%	South/West	73%

Q: Are you aware that Union Gas offers energy conservation & energy efficiency improvement programs & incentives to help residential customers like you to save money on their energy bills?

Home Energy Efficiency: Awareness of UG Programs

- Among those aware of HWP, 23% say they have participated in the program, while for HRR the same is true for 27% (4% of all customers indicated they have participated both programs)

Offerings Aware of … *(aided awareness)*

	Among customers aware of UG offerings	Among all customers
Free energy saving upgrades, such as insulation or water-saving products, for income-eligible customers Home Weatherization Program	59%	(38%)
Incentives and rebates towards energy saving renovations or equipment upgrades Home Reno Rebate Program	70%	(46%)
None of the Above	18%	(12%)

Previously Participated (NEW in 2018)

	Among customers aware of Program	Among all customers
	23%	(9%)
	27%	(13%)

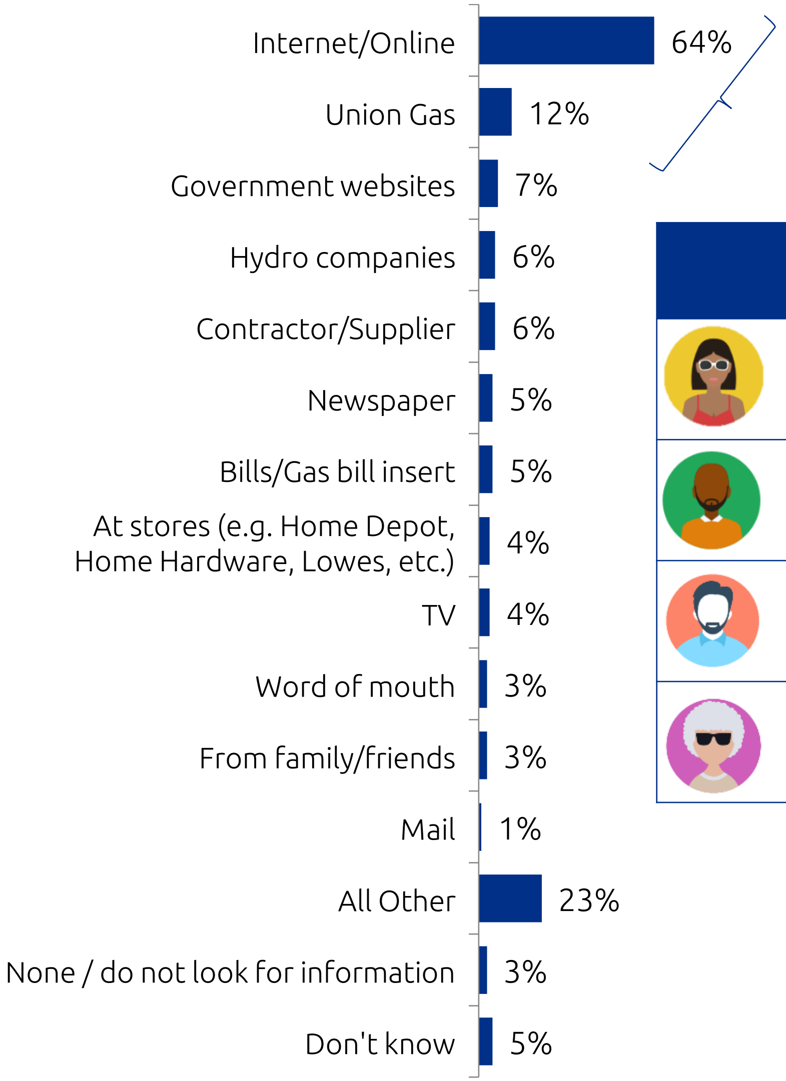
Q: Which of the following Union Gas energy conservation offerings are you aware of? Q: Have you ever participated in the …

Home Energy Efficiency: Sources of Information (unaided)

- Overwhelmingly, customers planning to make upgrades go online to look for information on energy efficiency
- Older customers are much more likely to look to Legacy Union Gas for information compared to their younger counterparts

Sources of Information

(base: all customers who plan to make their home more energy efficient, n=277)



Age Group	Internet / Online	Union Gas
18 – 34	69%	7%
35 – 54	74%	11%
55 – 64	65%	14%
65+	37%	17%

Q: Where do you look for energy efficiency information? IF NECESSARY: What sources do you consider?

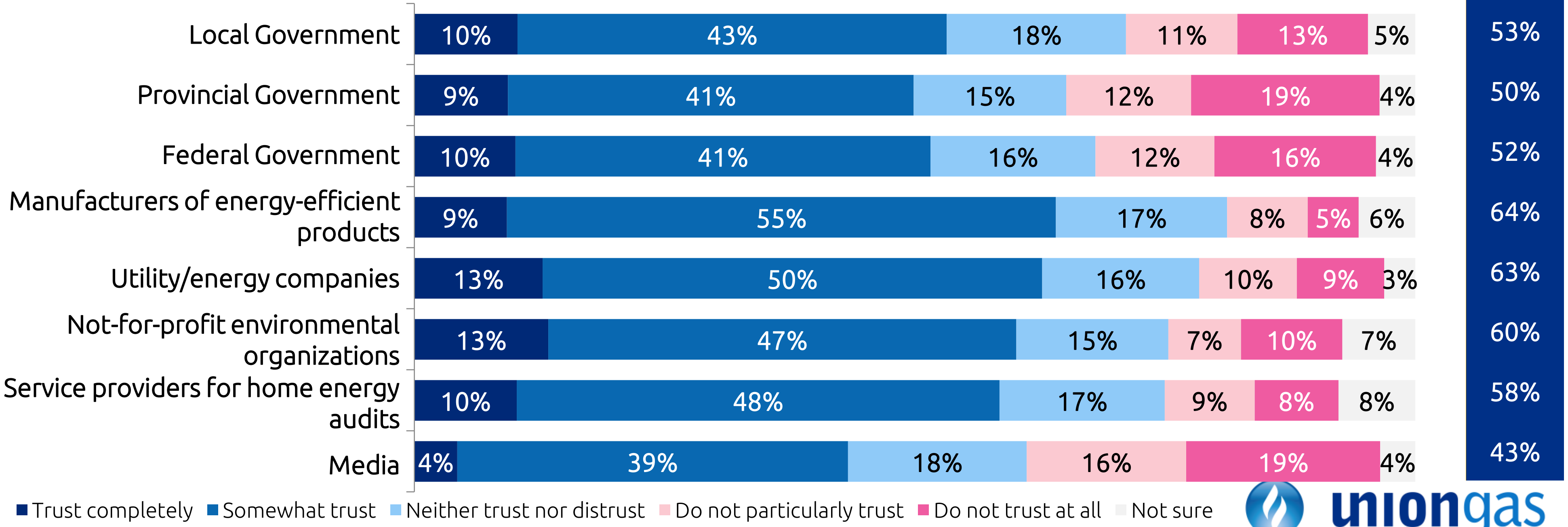
Trustworthy Sources of Information

NEW IN 2018

- Customers tend to trust manufacturers of energy-efficient products and utilities/energy companies most when it comes to delivering energy efficiency and conservation information
  - Younger customers (age 18-34) trust utilities/energy companies (76%, Top 2 Box) and manufacturers (73%, Top 2 Box) more than any other age category

How much trust do you have in each of the following groups as it relates to delivering information regarding energy conservation and efficiency …
(base: all customers, n=1217)

Completely + Somewhat (Top 2 Box)



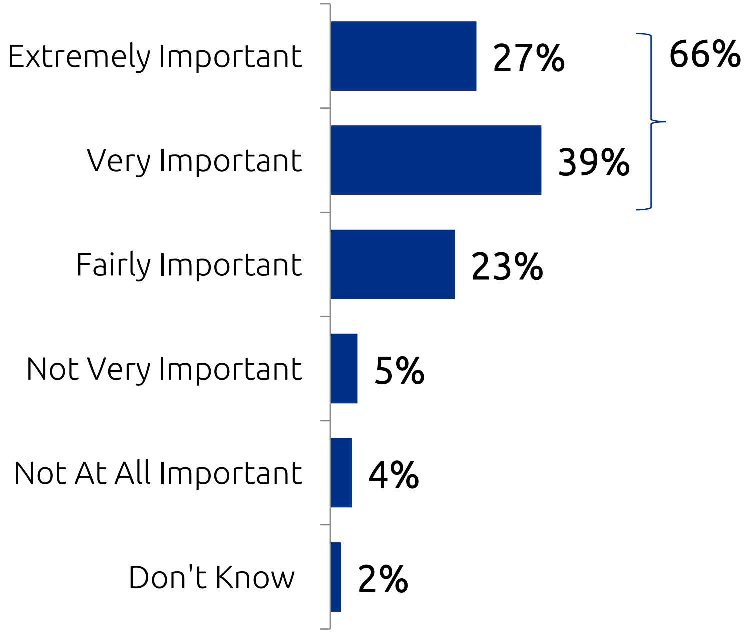
uniongas

Q: How much trust do you have in each of the following groups as it relates to delivering information regarding energy conservation and efficiency…?

Home Ratings – Purchase Process

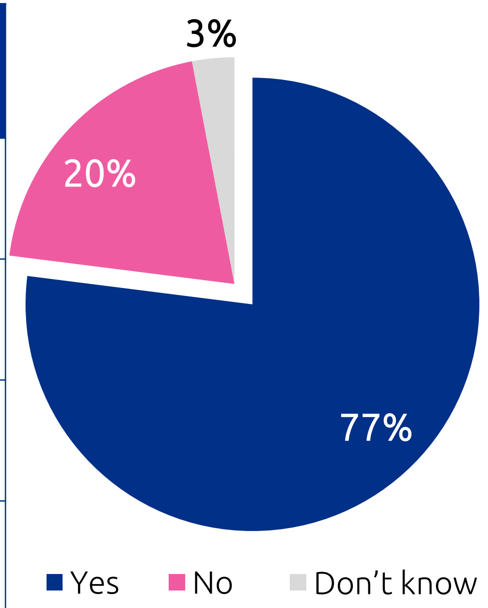
- Customers were asked to consider a scenario where they are looking to purchase a different home, and asked about home energy ratings:
  - 2-in-3 customers indicate that the home being Energy Star qualified is at least very important to them, and more than 3-in-4 indicate that they would like to know a home's "Energy Rating" prior to purchase
  - Results are the same as in 2017

Importance of a Home being Energy Star qualified (if purchasing a new home)
(base: all customers, n=1217)



Age Group	Importance Energy Star (T2B %)	Interest in Energy Rating
18 – 34	46%	83%
35 – 54	64%	81%
55 – 64	71%	81%
65+	72%	73%

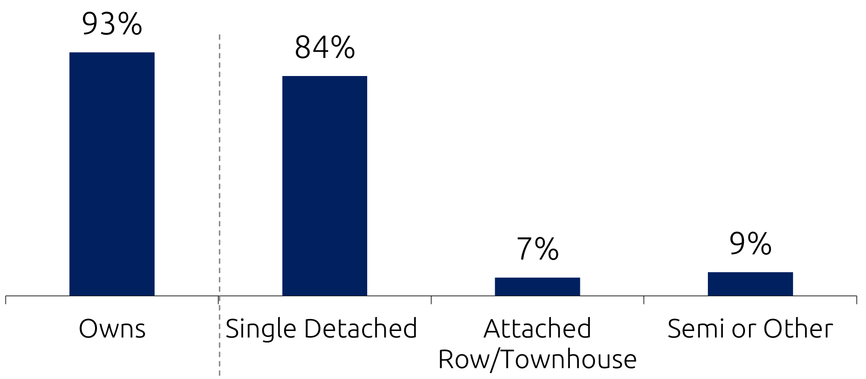
Interest in knowing Home's Energy Rating (if purchasing a new home)
(base: all customers, n=1217)



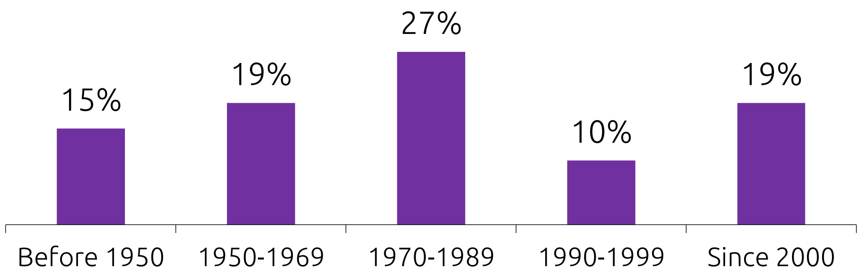
Q: In the event that you look to purchase a new home in the future, how important would it be that your new home is Energy Star qualified (or has an equivalent rating)? Q: In the event that you look to purchase a new home in the future, would you be interested in knowing the Energy Rating of a home, so you could compare homes prior to purchasing?

Demographics: House Characteristics

Home Ownership / Type of Home

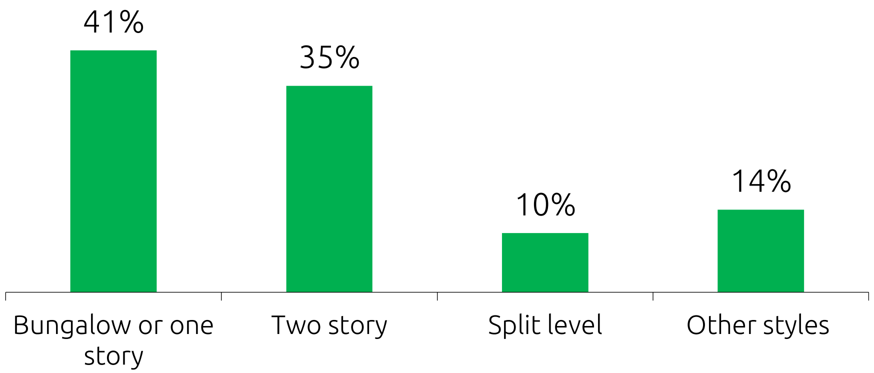


Age of Home

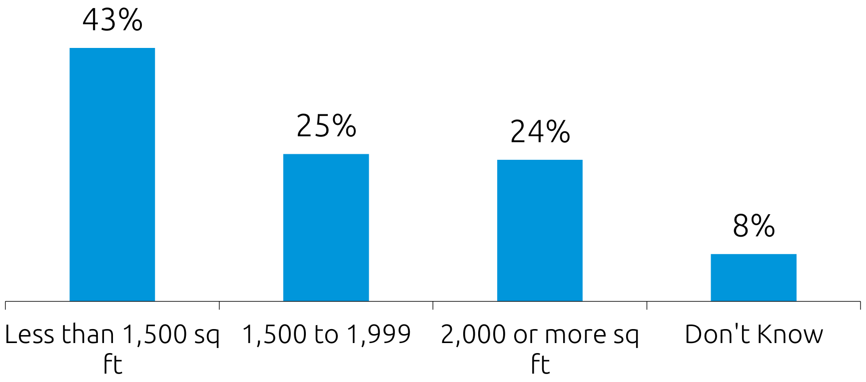


Average: 1971

Style of Home



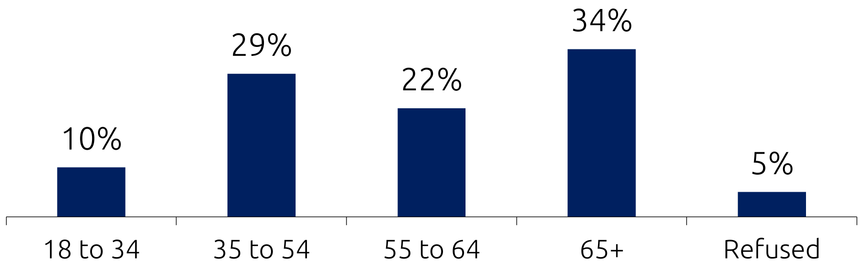
Size of Home



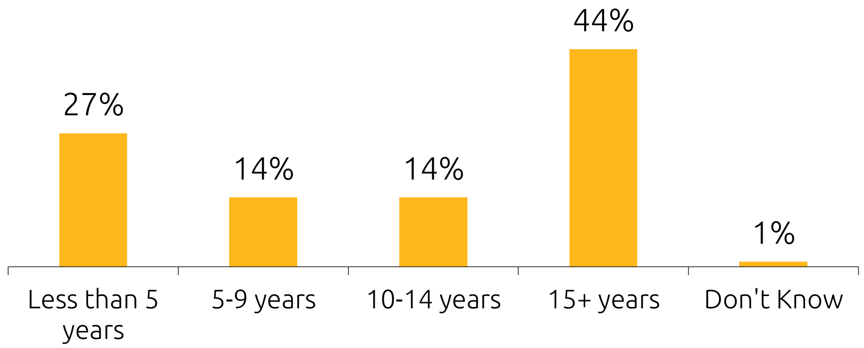
Average: 1691 sq ft

Demographics: Customer Characteristics

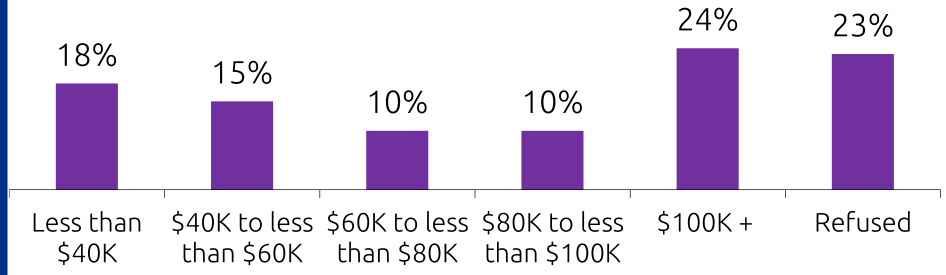
Age



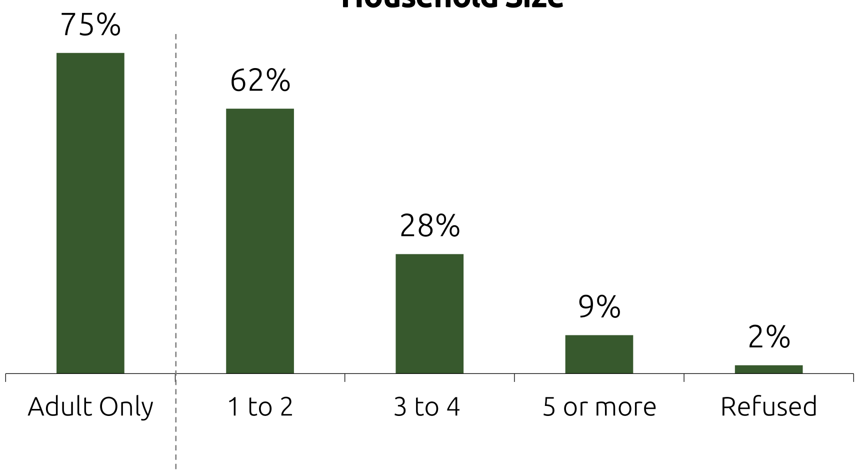
Length of Residence



Household Income



Household Size



Residential: Single Family Natural Gas End Use Study

2019 Annual Results

Legacy Union Gas and Legacy Enbridge Gas Distribution

ENBRIDGE
Life Takes Energy

Market Research & Analysis
Reported Summer 2020, Updated February 2023

Objectives

- To measure the penetration of natural gas appliances in the single family residential customer market;
- To understand customer perceptions of the levels of insulation in their home;
- To determine awareness of company energy conservation programs, and understand where customers turn to for more information.

Methodology

- Sponsor-identified telephone interviews were completed by Leger (formally NRG Research Group), between November 26 and December 19, 2019 with quotas across regions, which are defined as follows:

Legacy Union Gas (LUG) Regions		Legacy Enbridge Gas (LEG) Regions	
Central	Hamilton/Halton, Waterloo/Brantford	Toronto	DMA 01
Eastern	Eastern	Central-West	DMA 21, DMA 53
Northern	Northeast, Northwest	Central-East	DMA 35, DMA 45, DMA 47
South/West	London/Sarnia, Windsor/Chatham	Eastern	DMA 65
		Niagara	DMA 76

- Survey screening requires that respondents reside in single family dwellings and are mainly responsible for making energy-related decisions for the home.
- The total number of completed interview is 2,400 with 1,200 for each of LUG and LEG in total, and final franchise-wide results are calculated based on true geographic proportions.
- Overall results yield a margin of error of +/-2.8% at the 95% confidence interval.
- All historical results in this report are based on LUG interviews conducted in previous years, and historical comparisons are only available for LUG customers.
- Unless otherwise noted, results in this report are based on all customers (EGI, comprised of LUG and LEG combined).

Executive Summary (1 of 2)

ENBRIDGE
Life Takes Energy

Natural Gas Penetration

- Natural gas remains the top choice for home heating and water heating.
- When asked to think about a new home, barring any other considerations, most customers continue to choose natural gas, though (like previous years) a small proportion would choose alternate sources, such as geothermal or solar for home and water heating, respectively.
- The prevalence of natural gas in secondary appliances is very consistent between 2018 and 2019 for LUG customers – penetration of natural gas dryers and natural gas fireplaces is significantly lower among LEG customers.
- The preference for natural gas continues to be stronger than current penetration across appliances, suggesting that penetration could increase over time.

Ownership

- Furnace ownership continues to be very high, especially for natural gas furnaces (90%), though in the case of future ownership, some customers show interest in renting (8%).
- Ownership of water heaters remains steady over the last several years for LUG customers and is similar among LEG customers. It continues to remain much lower than furnace ownership. Among those who are likely to replace their water heater in the next 2 years, interest in ownership is much stronger (64% LUG, 56% LEG) than current ownership (42%).

Furnace Efficiency

- The proportion of high efficiency furnaces has remained relatively stable over the last few years, with a slight uptick in 2019.
- Just over 1-in-6 customers do not know the efficiency level of their furnace (this has not changed much over the last decade) – customers who don't know are not likely to be aware of and act on the potential for upgrades.
- There is a continued, though small, increase incidence of Wi-Fi and Smart thermostats as customers upgrade their thermostats; about 3-in-4 customers with a programmable or Wi-Fi/Smart thermostat actively program it to reduce energy consumption.

Executive Summary (2 of 2)

Insulation

- About 2-in-5 customers (41%) deem their house to be “well insulated” while about 8% indicate it is “poorly insulated” or “not insulated,” which varies by age of home.
- Just over 2-in-3 customers have an attic, which is “well” (57%) or “adequately” (30%) insulated. More customers (92%) have a basement, which is only fully finished for 46% of them. Similar levels of insulation are indicated for basements as for attics. Household income does appear to be a factor and with more insulation needs, this group represents customers who might be eligible for HWP.

Windows

- Just over half of customers have vinyl windows (52%), and windows that are likely double paned (80%).
- Half of customers have replaced (some) windows since moving in, among which most were ENERGY STAR certified (72%).

Energy Efficiency (EE) and DSM offerings

- The proportion of customers planning to make energy efficiency updates sits at 25% at the end of 2019.
- Awareness that LUG offers energy conservation programs sits at 69% (slightly up compared to 2017 and 2018) and at 54% among LEG customers – this varies by customer age group and region.
- Overall customer awareness of the HWP and HER programs remains quite strong at 31% and 41%, respectively (and for LUG customers specifically is very similar to 2018). Among those aware of the respective programs, 11% have participated in HWP and 19% in HER.
- The internet continues to be the most important source of general energy efficiency information – highlighting the importance of digital marketing and strong website content.
- Most customers indicate that knowing the ENERGY STAR rating of a home is important (71%) as well as knowing the Home Energy Rating prior to purchase (79%).

ENBRIDGE
Life Takes Energy

Overview of Natural Gas (NG) Appliances

- Year over year, natural gas use for all major appliances is unchanged except for home heating and barbecues both of which are up relative to 2018 (for LUG customers). Importantly, natural gas continues to be the dominate fuel for home and water heating.
- Differences across legacy franchises:
  - Natural gas for home heating is higher in LEG compared to LUG.
  - Use of natural gas for clothes dryers is significantly higher in LUG where use ranges from a high of 50% in the South/West to 29% in the Eastern Region. Natural gas fireplaces are also more common in the LUG franchise area.

Natural Gas Appliance Penetration Rates

	2014	2015	2016	2017	2018	2019		
			LUG			EGI	LUG	LEG
Home Heating	96%	96%	95%	96%	94%	96%	95%	97%*
Water Heater	85%	86%	86%	83%	82%	82%	80%	83%
Fireplace	38%	41%	44%	36%	42%	35%	38%*	33%
Cooktop/Stove	29%	26%	31%	29%	31%	30%	29%	30%
Barbecue	27%	23%	26%	20%	24%	24%	23%	24%
Clothes Dryer	21%	20%	19%	17%	19%	16%	20%*	13%
Pool Heater	(--)	(--)	(--)	(--)	5%	6%	5%	6%

(--) = was not measured

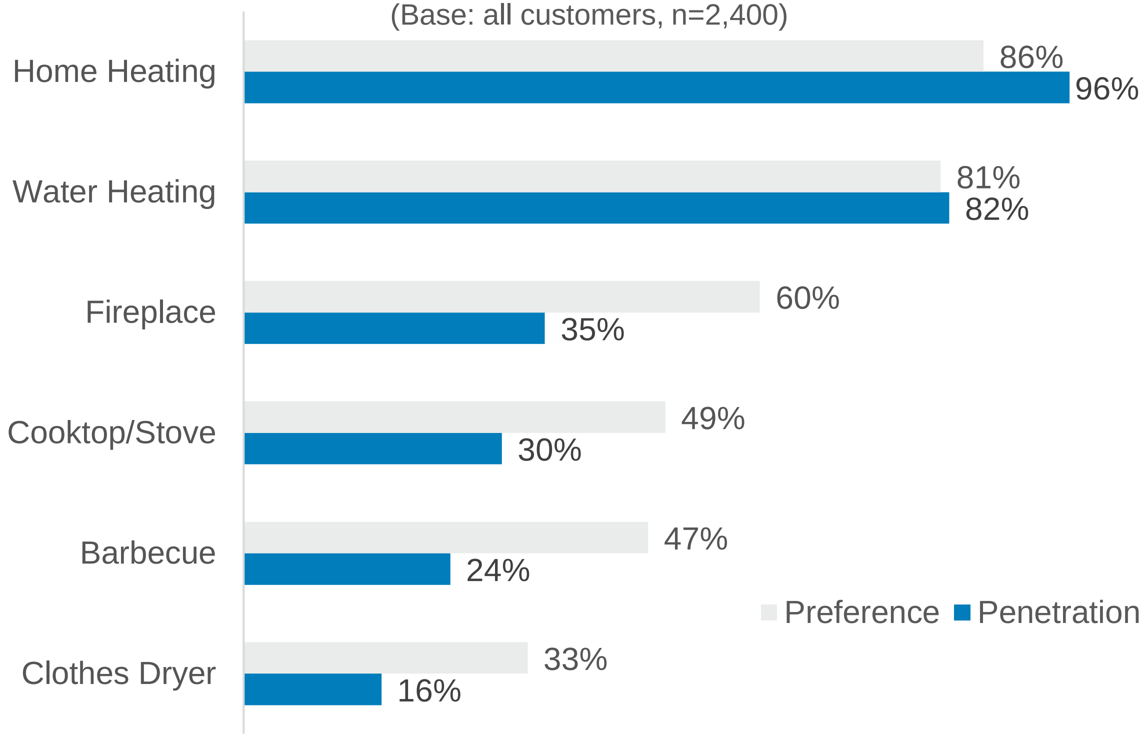
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers).

Penetration vs. Preference for NG Appliances

- Unlike home and water heating, preference for natural gas on secondary appliances (absent other barriers or considerations) remains stronger than current penetration levels.
- Legacy Union Gas customers have a markedly stronger preference for natural gas with water heating, fireplaces and especially clothes dryers.

Preference & Penetration

(Base: all customers, n=2,400)



Preferences by Legacy Utility

2019	LUG	LEG
Home Heating	86%	86%
Water Heating	84%*	80%
Fireplace	64%*	57%
Cooktop/Stove	51%	47%
Barbecue	48%	46%
Clothes Dryer	40%*	27%

* Indicates result is significantly higher at a 95% confidence level compared to the adjacent column

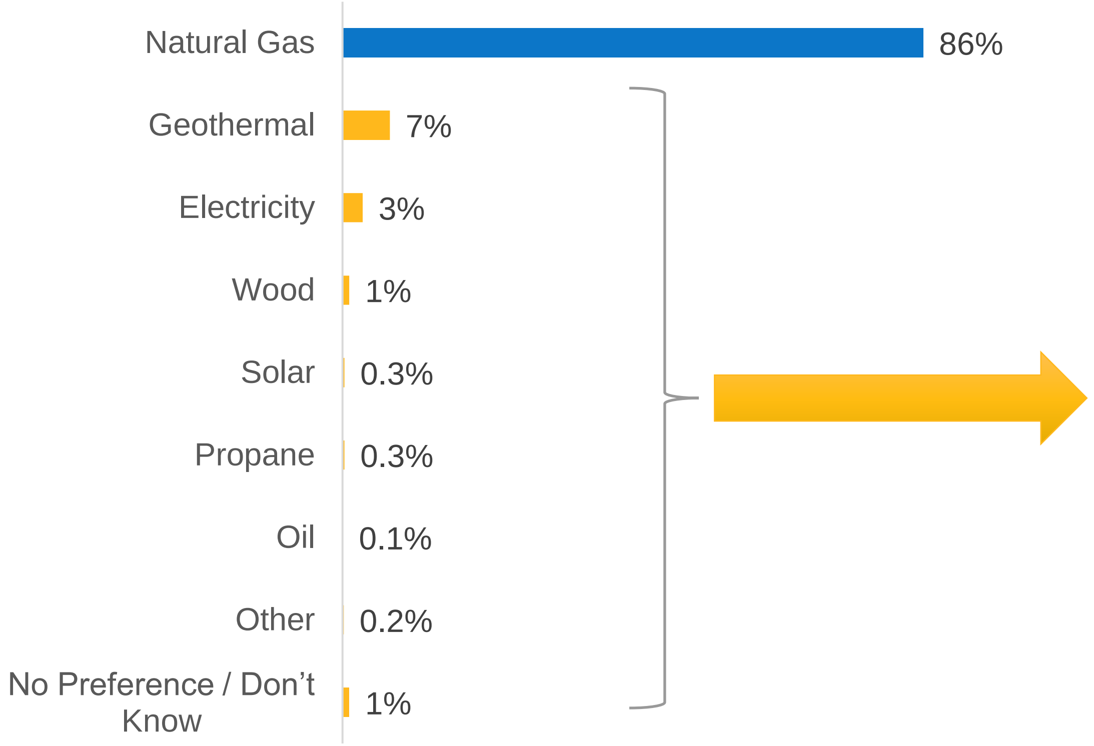
2019 Residential Single Family Natural Gas End Use Study

Home Heating: Preference

- Most customers (86%) would prefer natural gas for home heating in a new home, followed by geothermal (7%) and electricity (3%), which may include any number of systems.
- Key reasons for choosing an alternate fuel source include the perception that it is more environmentally friendly / energy efficient (especially for geothermal) and has lower operation costs. Also, electricity is considered to be safer by a number of customers.

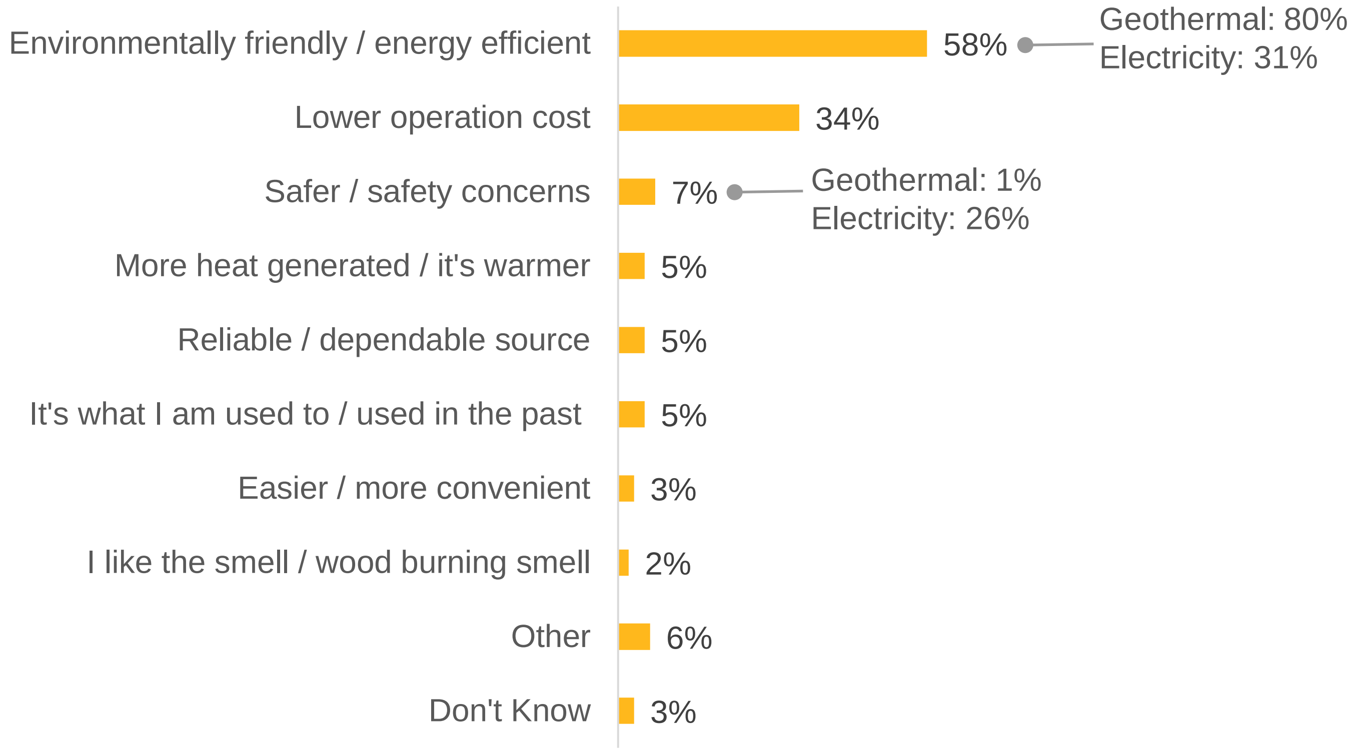
Preferred Fuel Source for Home Heating

(Base: all customers, n=2,400)



Reason for Preferred Fuel Source

(Base: all customers who did not choose natural gas, n=294)

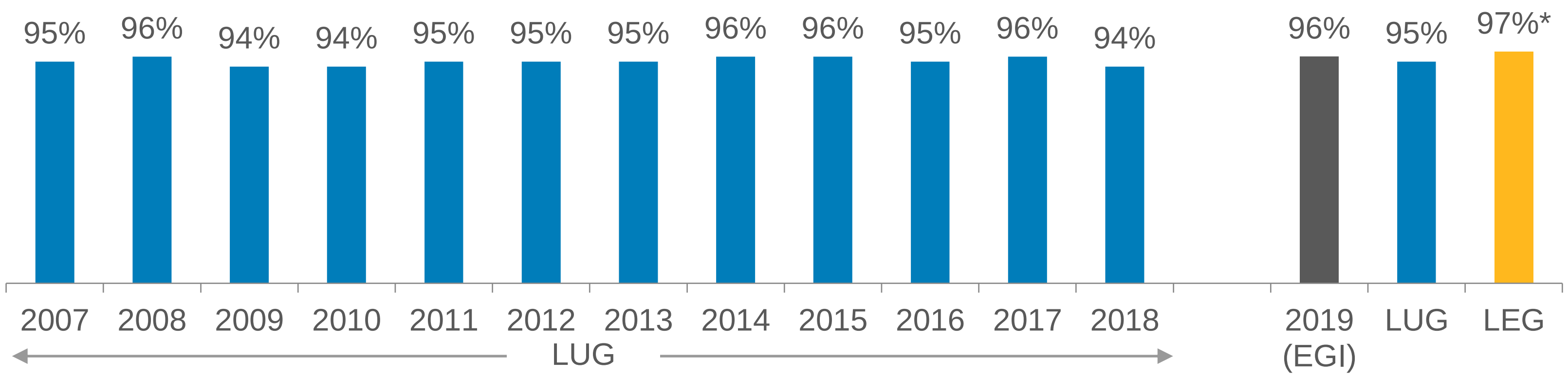


Home Heating: NG Adoption & Equipment

- Natural gas forced air furnaces continue to be the most used heating equipment across the franchise.
- Few furnaces older than 20 years exist, and a significant group of customers state that they have replaced their furnace in the past two years (they are slowly replacing their oil and propane furnaces with natural gas furnaces).

Natural Gas Penetration: Home Heating

(Base: all customers)



Type of Natural Gas Heating Equipment	
Forced Air	83%
Hydronic	5%
Space Heaters	0%
Combination	4%
Don't Know	7%

Type of Electric Equipment (n=67)	
Forced Air	55%
Baseboard	20%
Air Source Heat Pumps	4%
Other	10%
Don't Know	10%

Age of Forced Air Furnace (all fuels)	
5 years or less	44%
6 to 10 years	29%
11 to 20 years	20%
More than 20 years	4%
Don't Know	3%

43% of those who currently have a furnace that is less than 5 years old, have replaced it in the last 2 years (or 19% of the total)

59% of customers who replaced their furnace in the past 2 years and also had an air conditioner also replaced it at the same time

Fuel Source for Original (replaced) Furnace	
Natural Gas	89%
Electricity	4%
Oil	3%
Propane	0.5%
Don't Know	4%

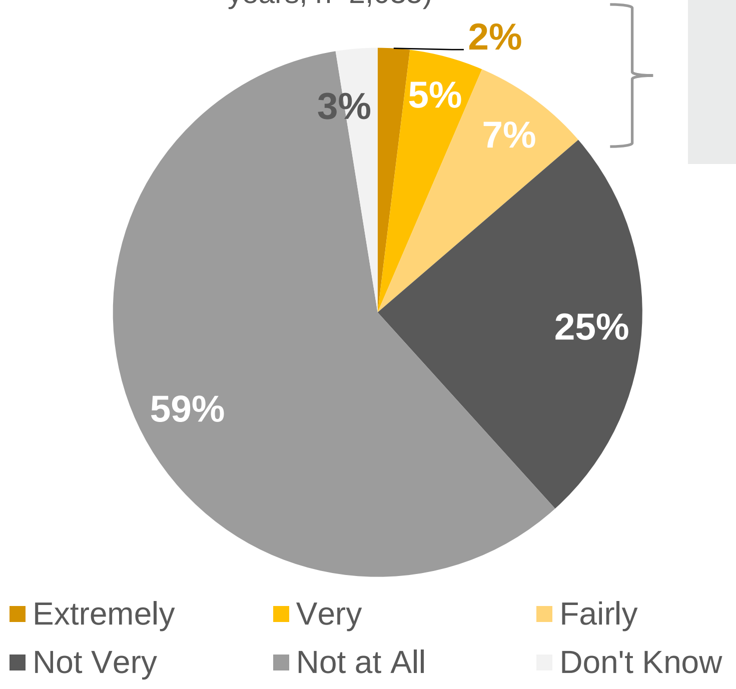
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers).

Home Heating: Furnace Replacement

- A small proportion of customers (14%) indicate that they are at least likely to replace their furnace in the next year because it is likely to break down or because they're looking to improve the efficiency level – most would get a natural gas furnace.

Likely to Replace Furnace in Next 2 Years

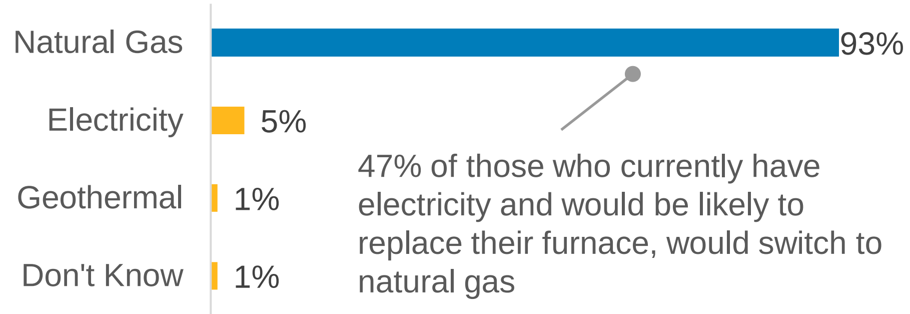
(Base: customers who have not replaced their furnace in the past 2 years, n=2,035)



14% at least fairly likely
LEG: 14%
LUG: 13%

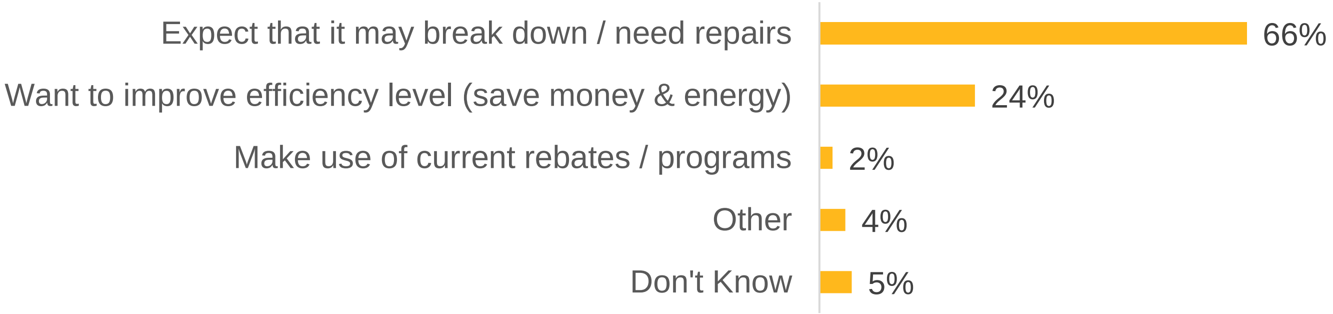
Fuel Source of New Furnace

(Base: customers who are at least fairly likely to replace their furnace n=279)



Reason For Replacing Furnace

(Base: customers who are at least fairly likely to replace their furnace n=279)



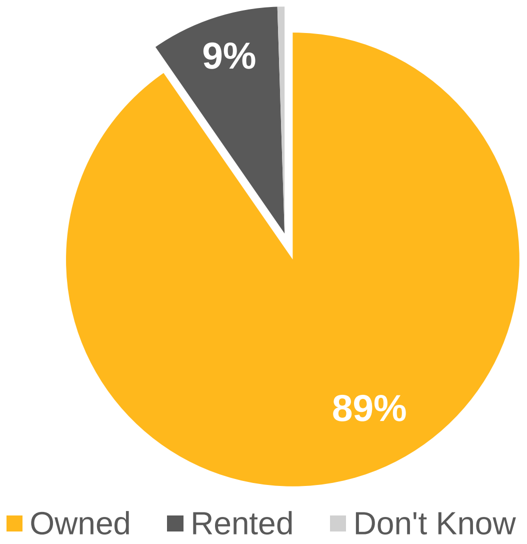
2019 Residential Single Family Natural Gas End Use Study

Home Heating: Furnace Ownership

- Most customers own their furnace (or heating system), and most customers who anticipate replacing their furnace or heating system in the future would continue to own it (rather than rent it).
- Rental rates are higher among those households that also rent the water heater (11%), in homes built since 1990 (11%), row/townhouses (26%), those with an income under $40K (13%), and younger (18-34) customers (13%).

Ownership of Current Furnace / Heating System

(Base: customers who use electricity, natural gas or oil for home heating, n=2,369)

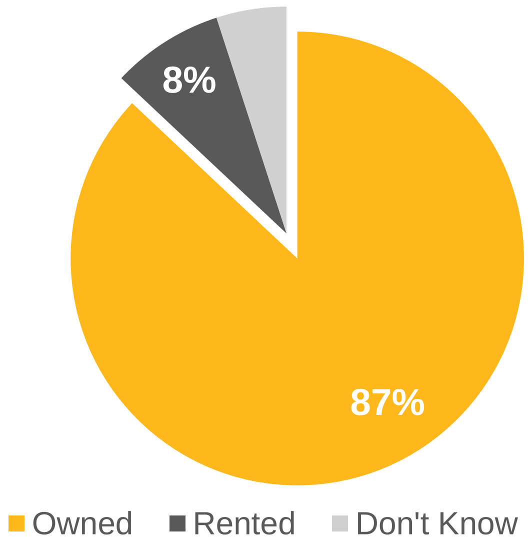


	Region	Owns (%)
LEG	Total LEG	**89%**
	Toronto	88%
	Central-West	89%
	Central-East	89%
	Eastern	92%
	Niagara	94%
LUG	Total LUG	**89%**
	Central	88%
	Eastern	93%
	Northern	86%
	South/West	92%

Among customers whose household income is $40K or less the ownership level is lower at 83% compared to their counterparts

Ownership of Replacement Furnace / Heating System

(Base: customers who are at least fairly likely to replace their furnace n=279)

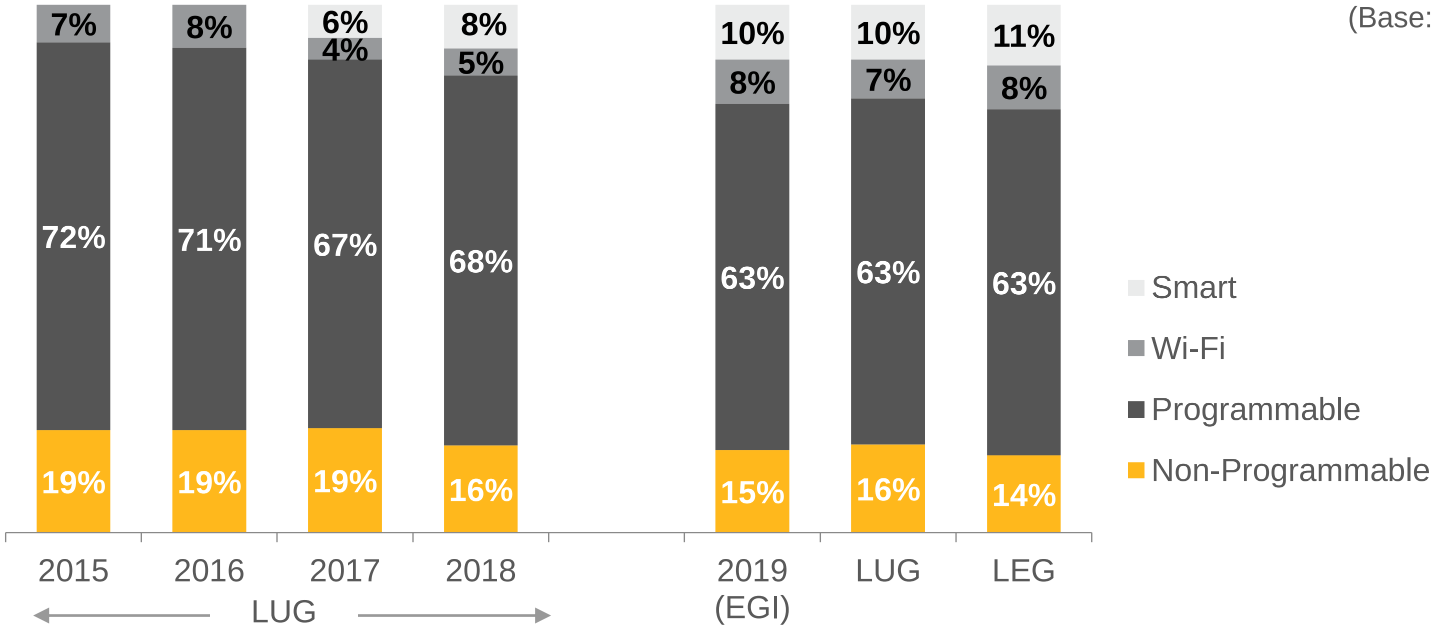


Home Heating: Thermostats

- Non-programmable thermostats occur disproportionately among customers in LUG's Northern Region (29%) and LEG's Toronto Region (21%), and in older (24%), smaller (20%), lower income (26%) senior (20%) occupied homes. Opportunities to upgrade thermostats continue to exist, especially for low-to-moderate income households.
- Wi-Fi and Smart thermostats continue to gain in popularity. They are more common in LUG's Central (19%) and LEG's Central-West Regions (23%), in newer homes (26%), and higher earning households (29%). They are also more common in households planning to make energy improvements 23% vs. 17%.

Type of Thermostat

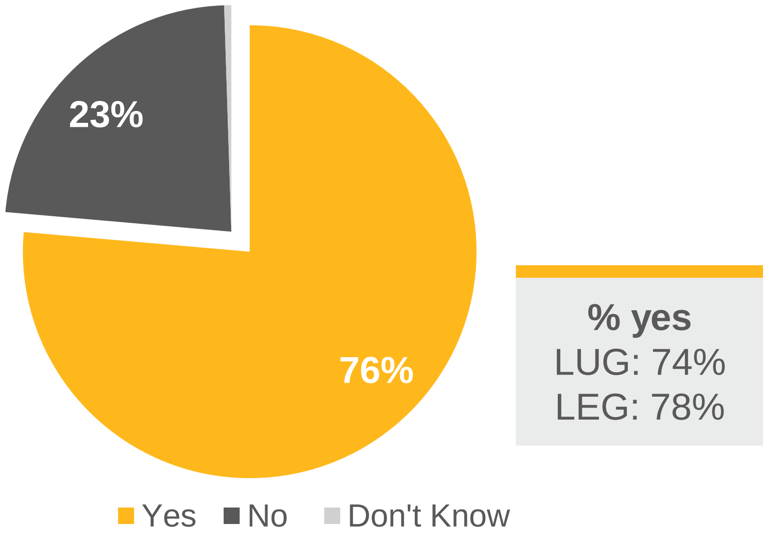
(Base: all customers, n=2,400)



Question changed in 2017 to distinguish between "Smart" and "Wi-Fi"

Actively program thermostat to help reduce energy use

(Base: all customers with Smart, Wi-Fi, or Programmable, n=1,954)

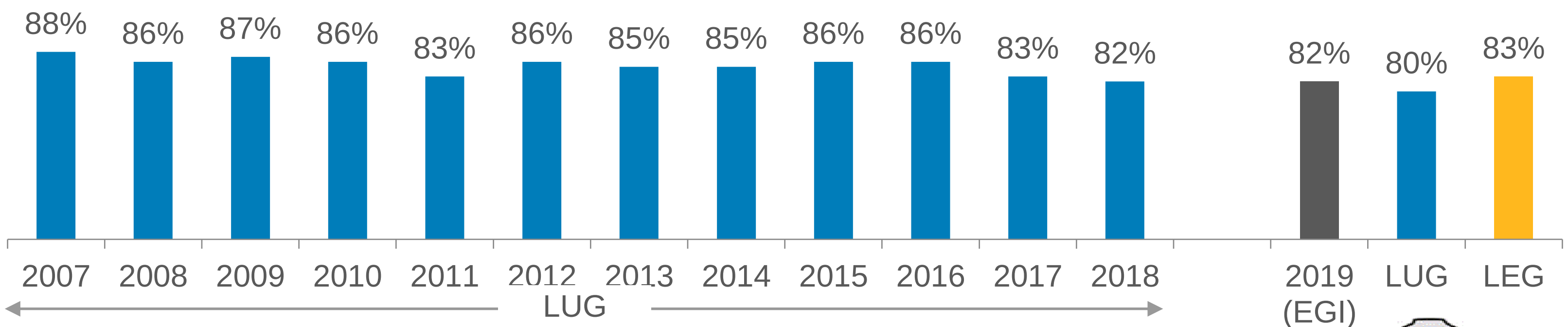


ENBRIDGE
Life Takes Energy

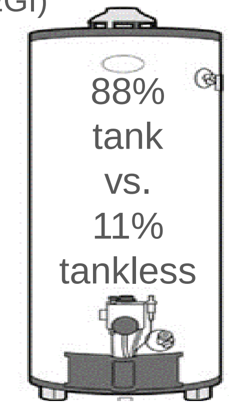
Water Heating: NG Adoption & Equipment

- Penetration of natural gas water heaters has dropped over the past decade among LUG customers. Natural gas use for water heating ranges from 69% LUG's Eastern Region to 83% in the Central Region (73%). There is less variability in LEG's franchise at 82% everywhere except for Niagara Region where it is 89%.
- The proportion of tankless water heaters continues to grow slowly up from 6% in 2017 to 11% in 2019.

Natural Gas Penetration: Water Heating
(Base: all customers)



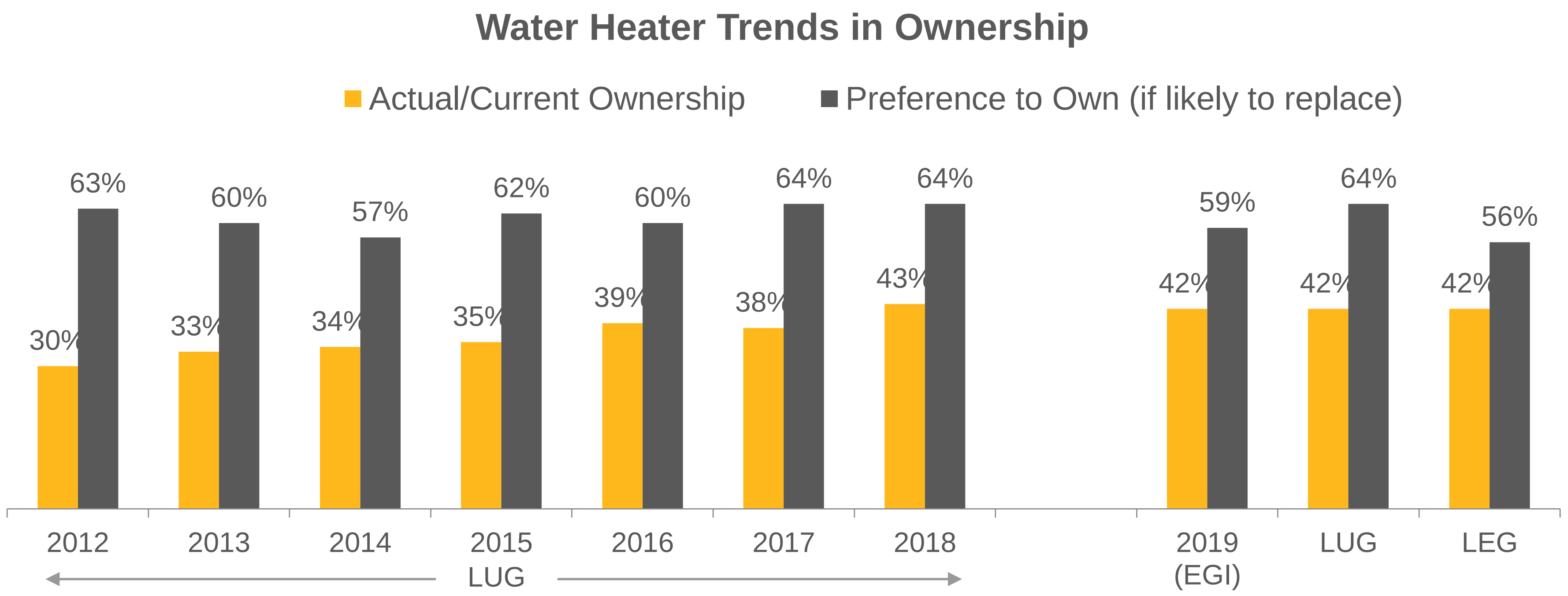
Age of Water Heater (all)	
5 years or less	49%
6 to 10 years	31%
11 to 15 years	10%
More than 15 years	5%
Don't Know	5%



	Region	Tankless (%)
LEG	**Total LEG**	**10%**
	Toronto	13%
	Central-West	8%
	Central-East	9%
	Eastern	9%
	Niagara	13%
LUG	**Total LUG**	**12%**
	Central	11%
	Eastern	13%
	Northern	15%
	South/West	11%

Water Heating: Ownership

- Current ownership is the same among LUG and LEG customers and is quite consistent for LUG over the last couple of years.
- Ownership tends be higher among customers who have an electric water heater compared to one that is fueled by natural gas.
- Future intentions continue to lean toward ownership - 59% plan to own. This ranges considerably across the franchise from 42% in LEG's Central-West region to 74% in LUG's Northern region.



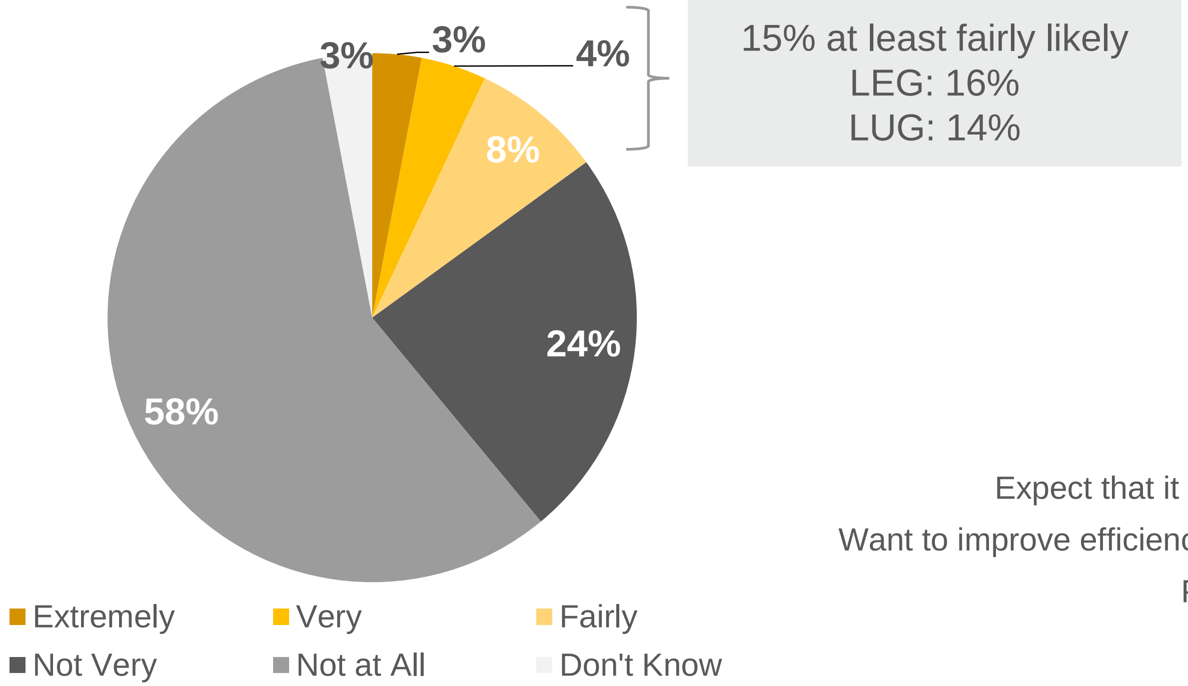
Owned % by type of water heater
Natural Gas: 39%
Electricity: 58%

Water Heating: Replacement

- Similar to furnaces, a small proportion of customers (15%) indicate that they are at least likely to replace their furnace in the next 2 years because it is likely to break down or because they're looking to improve the efficiency level – among them, most would get a natural gas water heater.

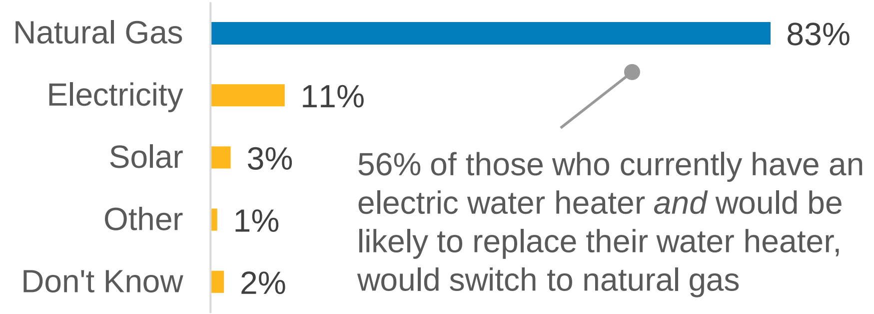
Likely to Replace Water Heater in Next 2 Years

(Base: customers who have a water heater and own their home n=2,179)



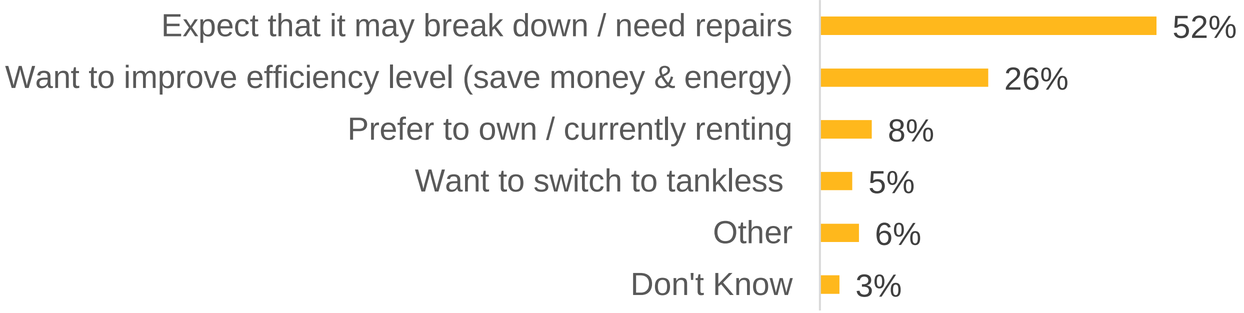
Fuel Source of New Water Heater

(Base: customers who are at least fairly likely to replace their water heater n=323)



Reason For Replacing Water Heater

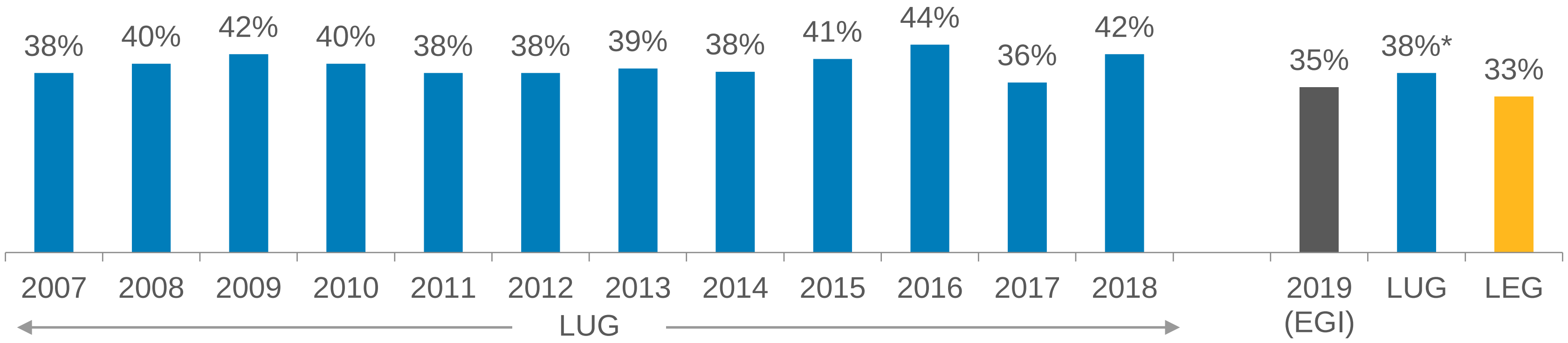
(Base: customers who are at least fairly likely to replace their water heater n=323)



Fireplaces: NG Adoption & Equipment

- Reported penetration of natural gas fireplaces is slightly down in 2019 for LUG customers, though higher than among LEG customers.
- Natural gas fireplaces continue to be popular among those who have a fireplace or would like to install one.

Natural Gas Penetration: Fireplaces
(Base: all customers)



8% are at least fairly likely to install a fireplace in the next 2 years

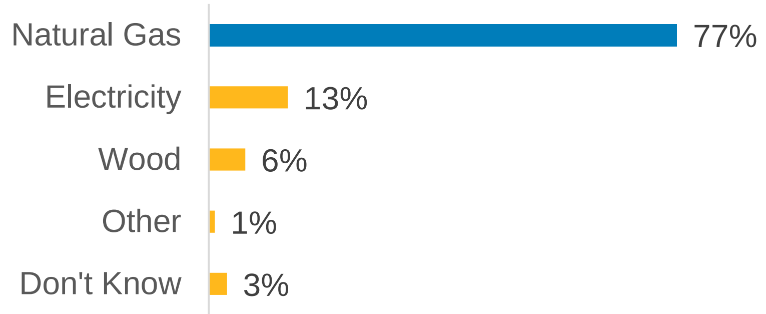
55% of households have a fireplace

- 78% have just one
- 22% have 2 or more

Fuel Type: 65% 32% 9%

Age of Fireplaces (all)
About 2-in-5 (40%) fireplaces are less than 10 years old

Fuel Source of New Fireplace
(Base: customers who are at least fairly likely to install a new fireplace, n=190)



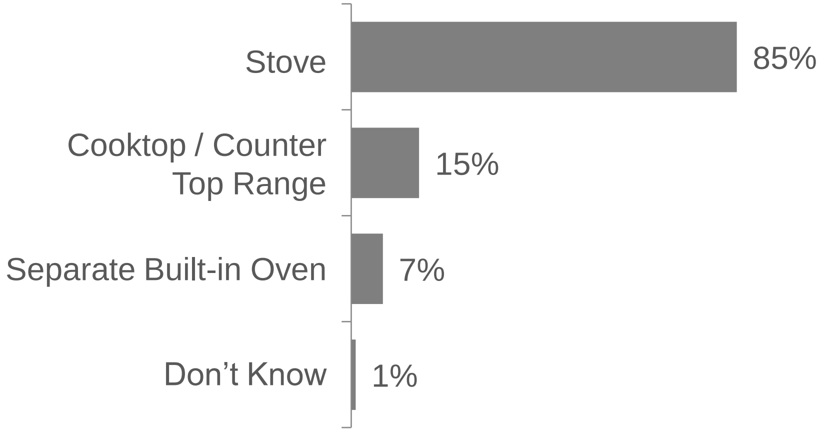
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers).

Cooking: NG Adoption & Equipment

- At 29%, penetration of natural gas for indoor cooking continues to be relatively stable.
- Both natural gas fuelled stoves and counter top ranges are the most prevalent in the highest earning (33%, 20%), largest (36%, 21%), newer homes (35%, 17%).
- Natural gas is perceived as a necessary component in high end kitchens. Emphasis on affordability in addition to quality may present an opportunity to broaden the appeal to a larger group.

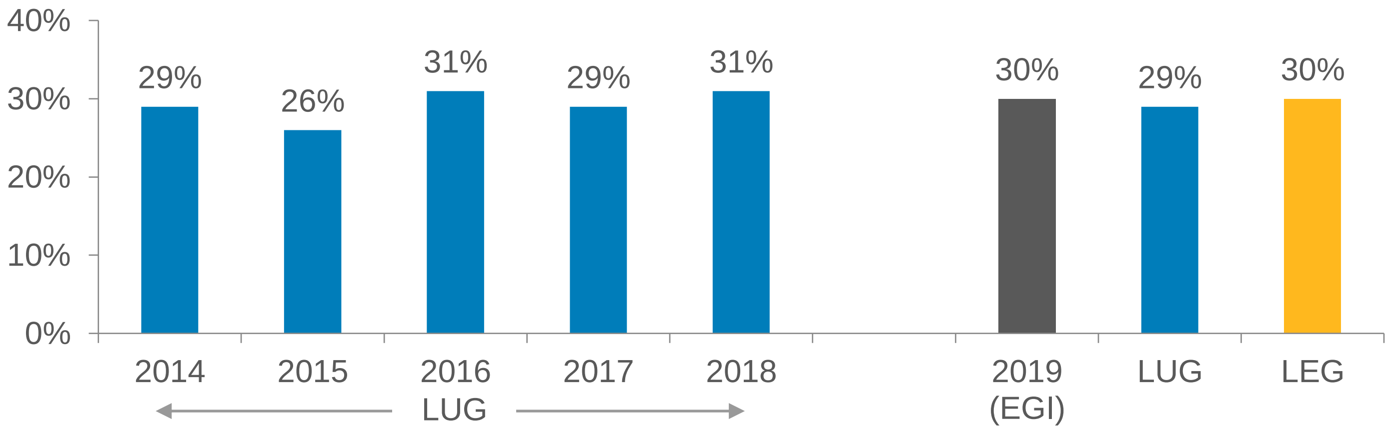
Type of Cooking Equipment (more than one response allowed)

(Base: all customers, n=2,400)



Natural Gas Penetration: Cooktop/Stove

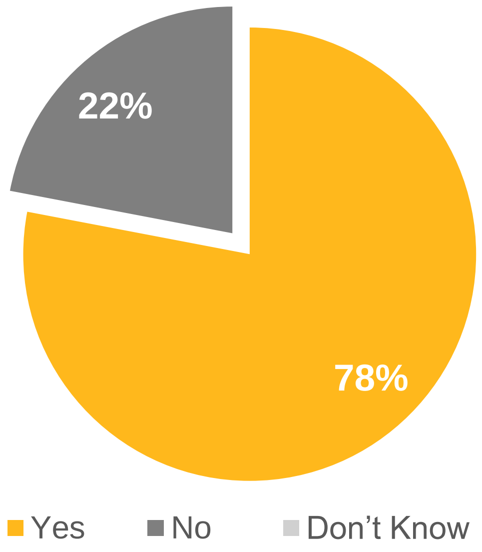
(Base: all customers)



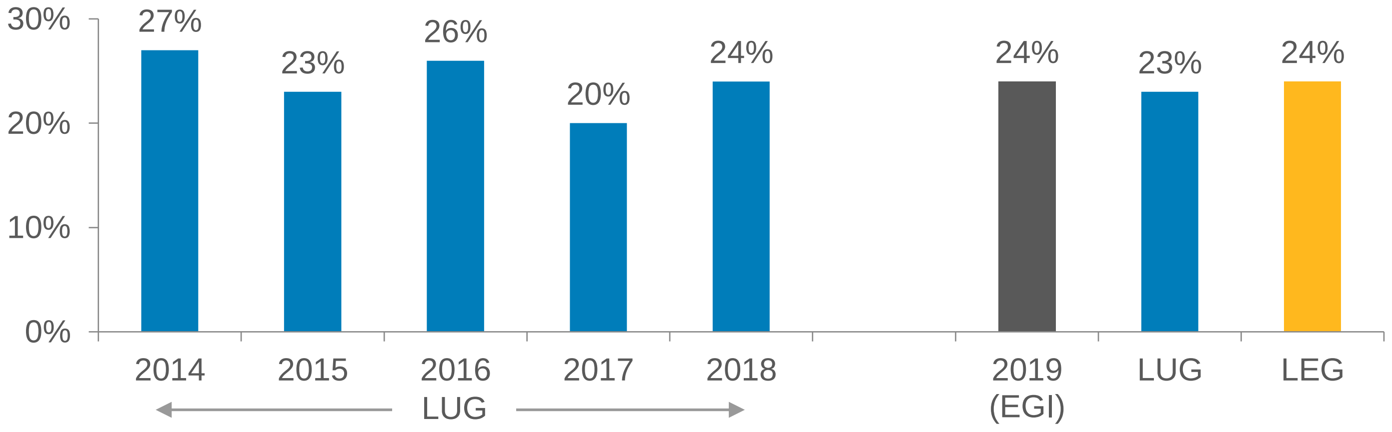
Barbecues: NG Adoption & Equipment

- The majority of single family homes have an outdoor barbecue (78%) – among them propane (64%) remains the most common fuel type, followed by natural gas (30%).
- Households with higher incomes ($100K+) are more likely to have a barbecue and to use natural gas to fuel it (90% ownership, among them 34% using natural gas), compared to lower income households. Just over 3-in-5 of those earning under $40K have a barbecue of which only 17% use natural gas.

Have a Barbecue
(Base: all customers, n=2,400)

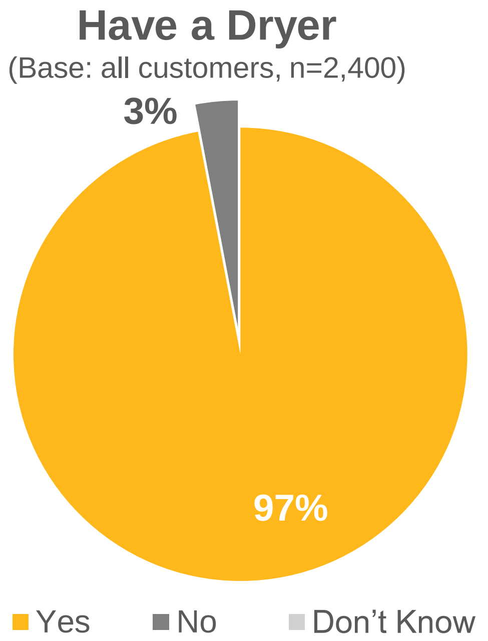


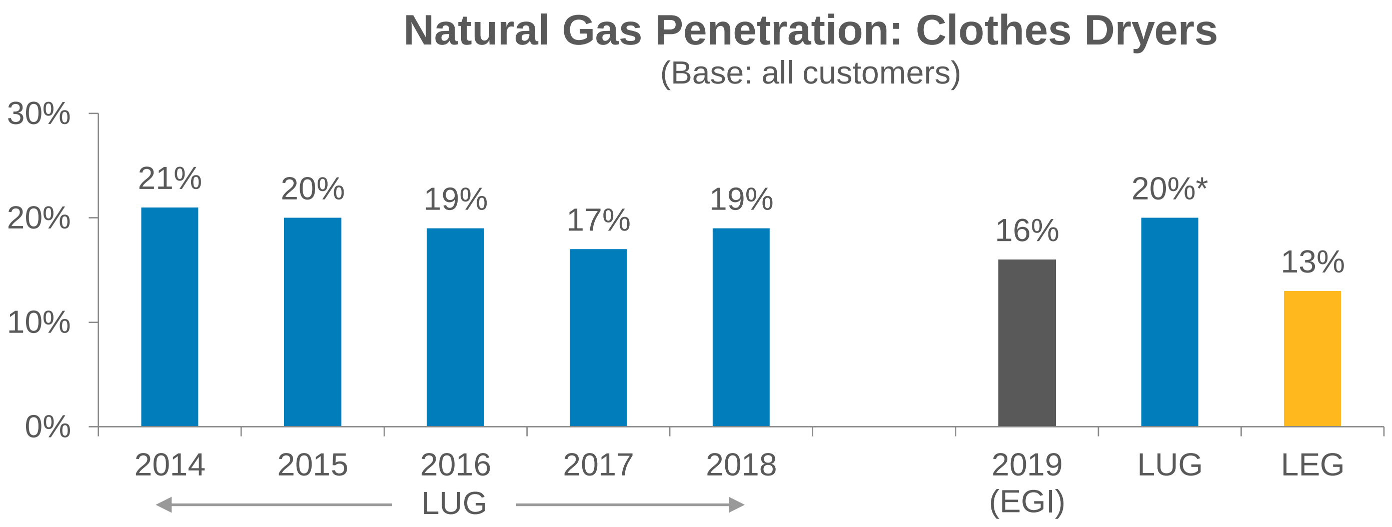
Natural Gas Penetration: Barbecues
(Base: all customers)



Clothes Dryer: NG Adoption & Equipment

- Almost all single family homes have a clothes dryer (97%) with electricity used most across the franchise (83%) followed by natural gas (17%), with significant differences between LUG and LEG.
- More dryers in LUG's South/West (27%) and Central (21%) and LEG's Niagara (23%) regions use natural gas.
- Households that own natural gas water heaters are more likely to have natural gas clothes dryers which suggests that for a sub-set of customers natural gas clothes dryers may be a desirable 'add on' tied more to psychographics than housing characteristics such as dwelling size or age.



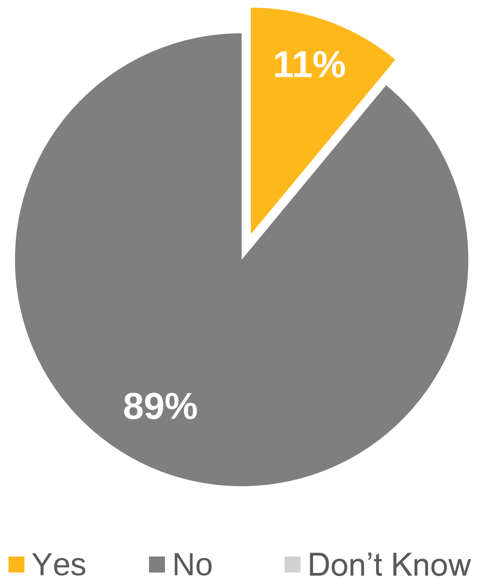


* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers).

Pools

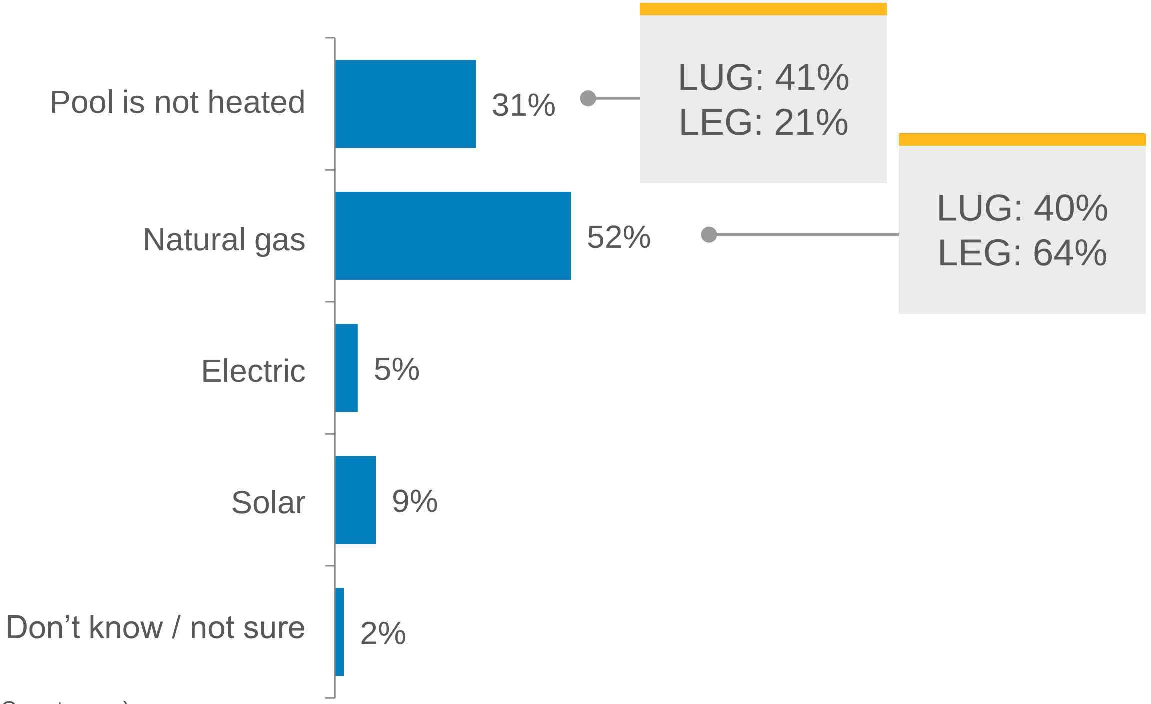
- Pools are not as common in Northern Ontario (7%), Toronto (4%) or in lower income households (8%).
- In terms of heating, pools located in LEG are more likely to be heated with than those in LUG with natural gas being the top fuel choice across the board.

Have a Pool
(Base: all customers, n=2,400)



	Region	Yes (%)
LEG	**Total LEG**	**9%**
	Toronto	4%
	Central-West	8%
	Central-East	15%
	Eastern	9%
	Niagara	16%
LUG	**Total LUG**	**13%***
	Central	12%
	Eastern	11%
	Northern	7%
	South/West	17%

Fuel Used to Heat Pool
(Base: customers who have a pool, n=261)



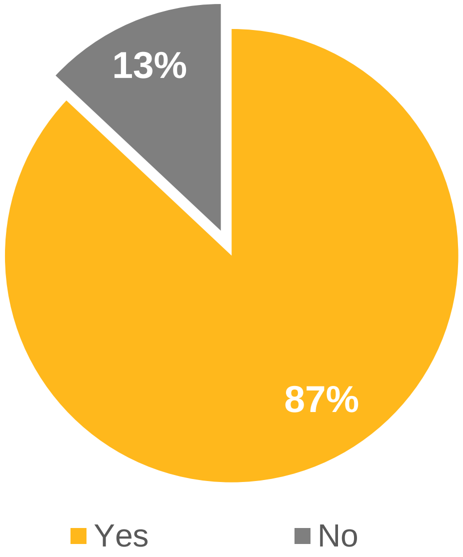
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers).

Air Conditioning

- There is considerable variation across the franchise ranging from 56% in LUG's Northern region to 93% in LEG's Central-West region in terms of whether a customer has air conditioning or not.
- Air conditioning is also significantly more common in newer houses with 96% of homes built since 1990 possessing air conditioning vs. only 71% of homes built before 1950. Proportions are similar by income with air conditioning in 92% of households earning at least $100K vs. 71% of households earning less than $40K.

Have Air Conditioning

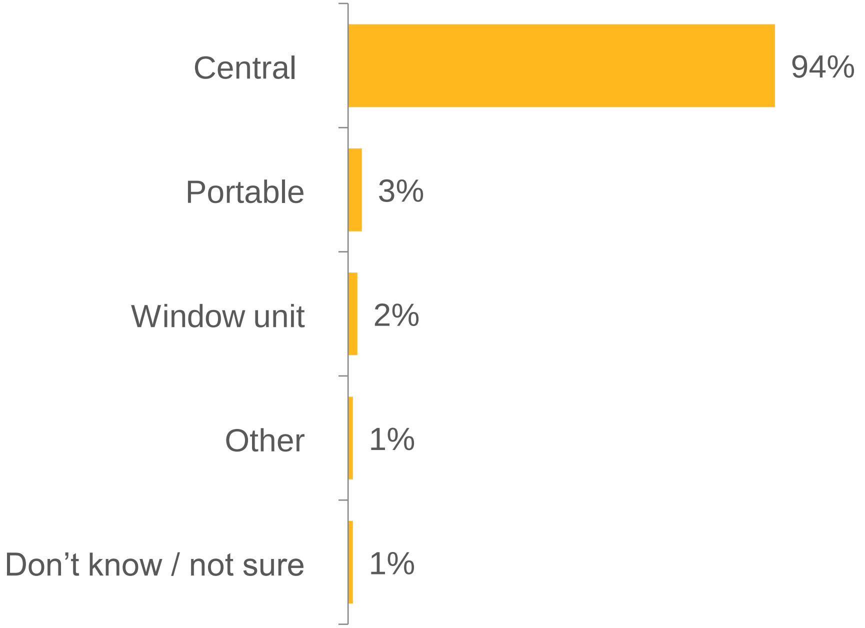
(Base: all customers, n=2,400)



	Region	Yes (%)
LEG	**Total LEG**	**90%***
	Toronto	90%
	Central-West	93%
	Central-East	91%
	Eastern	90%
	Niagara	85%
LUG	**Total LUG**	**82%**
	Central	86%
	Eastern	78%
	Northern	56%
	South/West	90%

Type of Air Conditioning

(Base: customers who have air conditioning, n=2,082)



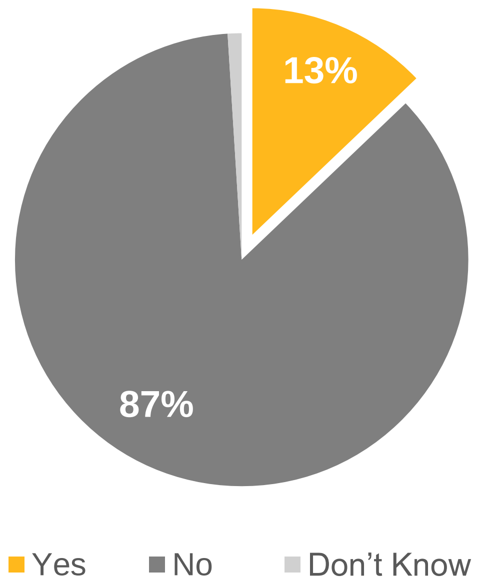
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers).

Backup Power

- More homes in Northern Ontario have backup power (19%) compared to all other regions, customers aged 55-64 are significantly more likely to have backup power relative to others (17%), as are those that use neither natural gas or electricity as their main home heating source (39%).

Have a Source of Backup Power

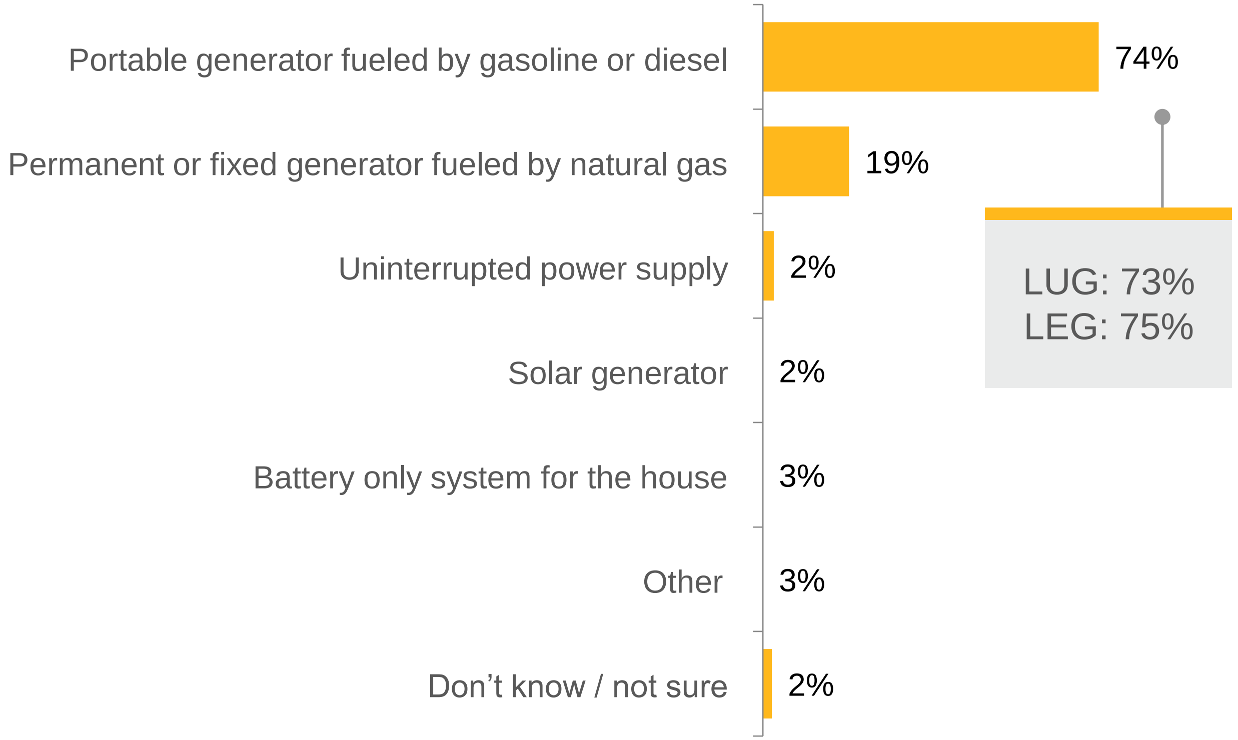
(Base: all customers, n=2,400)



	Region	Yes (%)
LEG	**Total LEG**	**12%**
	Toronto	11%
	Central-West	14%
	Central-East	10%
	Eastern	13%
	Niagara	11%
LUG	**Total LUG**	**14%**
	Central	11%
	Eastern	15%
	Northern	19%
	South/West	15%

Type of Backup Power

(Base: customers who have a source of backup power, n=306)

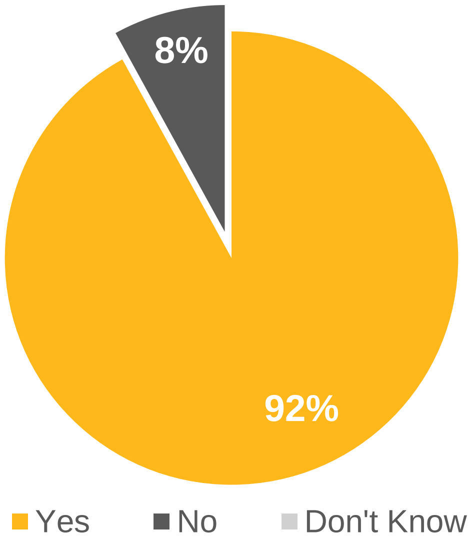


Insulation: Basement

- 92% of single family homes have a basement ranging from a low of 82% in LUG's South/West to a high of 97% in LEG's Toronto region. Across the franchise older homes are more likely to have poorly insulated or uninsulated basements (built before 1950: 13% poorly, 23% uninsulated, built after 1950: 5% poorly, 3% uninsulated).
- Household income also appears to be a factor – among low income customers 22% have poorly or uninsulated basements. This represents customers who may be eligible for the Home Winterproofing Program.

Have a Basement

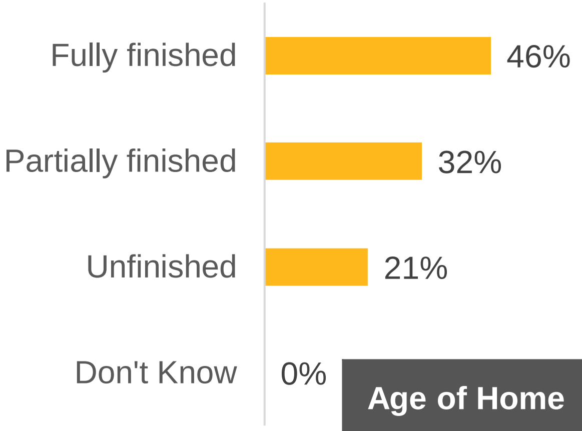
(Base: all customers, n=2,400)



% yes
LUG: 88%
LEG: 95%

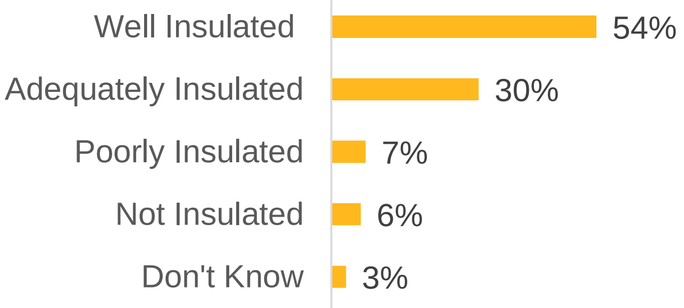
Level of Finish

(Base: customers who have a basement, n=2,216)



Level of Insulation

(Base: customers who have a basement, n=2,216)



Age of Home	Well (%)	Not (%)
Before 1950	35%	23%
1950-1969	49%	6%
1970-1989	59%	2%
1990-2019	64%	1%

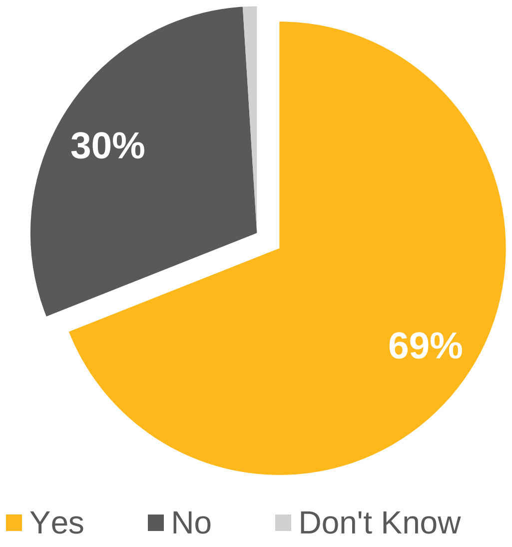
Household Income	Well (%)	Not (%)
Under $40K	43%	13%
$40K-$60K	49%	8%
$60K-$80K	55%	5%
$80K-$100K	53%	4%
$100K+	56%	6%

Q: Do you have a basement?; Q: Is your basement…?

Insulation: Attic

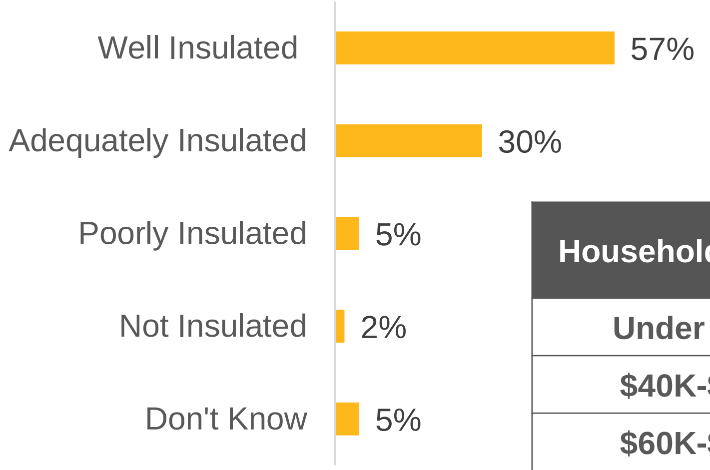
- Just over 2-in-3 single family homes have an attic ranging from a low of 61% in LEG's Toronto region to a high of 75% in LEG's Central-East region. Across the franchise, older homes are more likely to have poorly insulated or uninsulated attics.
- Household income also appears to be a factor – among low income customers more attics are poorly (7%) or not at all (3%) insulated, and a significant proportion don't know their insulation levels (as high as 12%), which represents customers who may be eligible for the Home Winterproofing Program.

Have an Attic
(Base: all customers, n=2,400)



% yes
LUG: 68%
LEG: 69%

Level of Insulation
(Base: customers who have an attic, n=1,646)



Age of Home	Well (%)	Not (%)
Before 1950	50%	6%
1950-1969	58%	1%
1970-1989	59%	1%
1990-2019	61%	1%

Household Income	Well (%)	Not (%)	Don't Know (%)
Under $40K	50%	3%	12%
$40K-$60K	54%	2%	5%
$60K-$80K	58%	2%	4%
$80K-$100K	61%	1%	6%
$100K+	56%	2%	3%

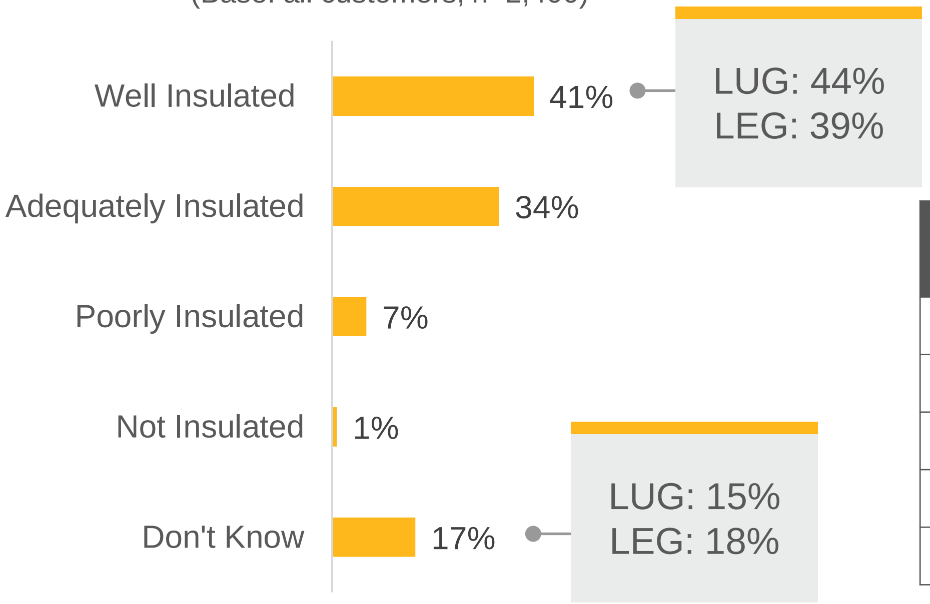
Q: Do you have an attic? Q: Is your attic …?

Insulation: Home and Exterior Wall

- Customers in LUG are significantly more likely to describe their home as being “well” insulated (44% vs. 39% LEG). Toronto customers are twice as likely as all others to say their home is ‘poorly’ insulated (15% vs. 7% total).
- Perceptions of insulation are polarized by the age of the house. Over half (55%) of homes built since 1990 are described as being ‘well’ insulated. Whereas “adequately” (35%), “poorly” (18%) or “not” (3%) are used with greater frequency to describe the insulation level in the oldest homes.
- Note, nearly 1-in-5 customers were unable to categorize the insulation level of their home.

Level of Home Insulation

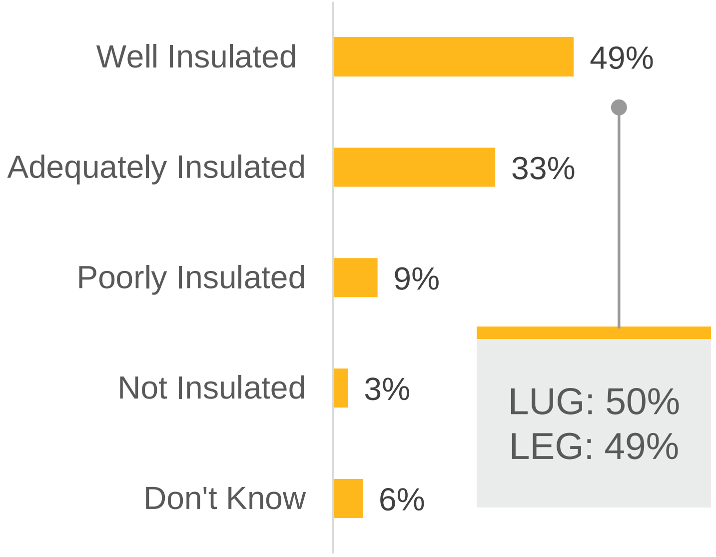
(Base: all customers, n=2,400)



Age of Home	Before 1950	1950-1969	1970-1989	1990-2019
Well	30%	29%	41%	55%
Adequate	35%	42%	39%	27%
Poor	18%	11%	6%	2%
Not	3%	1%	0%	0%
Don’t Know	13%	16%	14%	17%

Level of Exterior Wall Insulation

(Base: all customers, n=2,400)



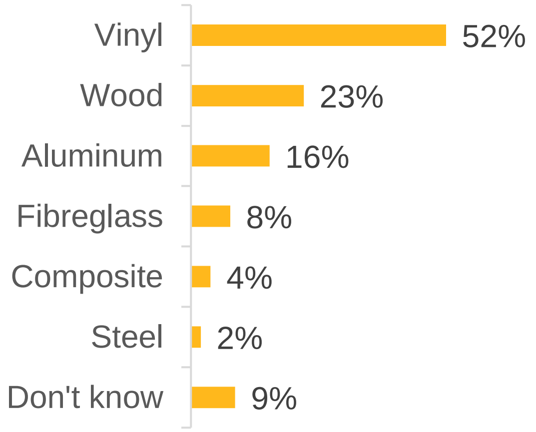
Q: How about your exterior, outside walls, are they…?; Q: Which best describes the insulation level of your home?

Windows

- Vinyl is the top window material across the franchise with notably higher use among LUG customers (LUG 55% vs. 50% LEG).
- Higher rates of aluminum (18%) and fibreglass (9%) in LEG are driven by the Toronto Region where use of these materials is much higher than the rest of the franchise.
- Customers in Toronto are more likely to have replaced windows since moving in than others (68% vs. 54% total).
- Note a significant number (19%) of customers were unable to answer if the replaced windows were Energy Star certified or not.

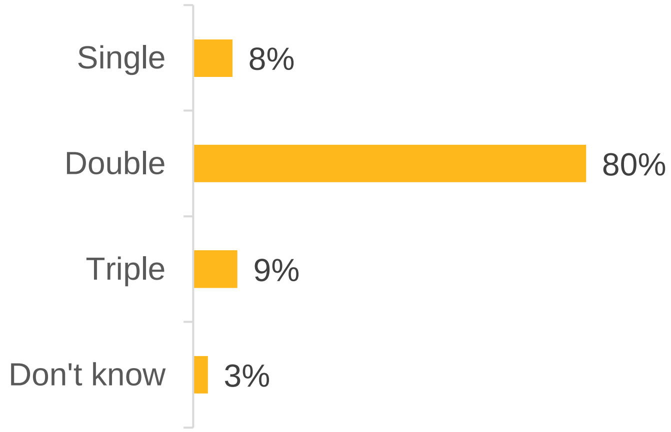
Window Material (multiple mentions)

(Base: all customers, n=2,400)



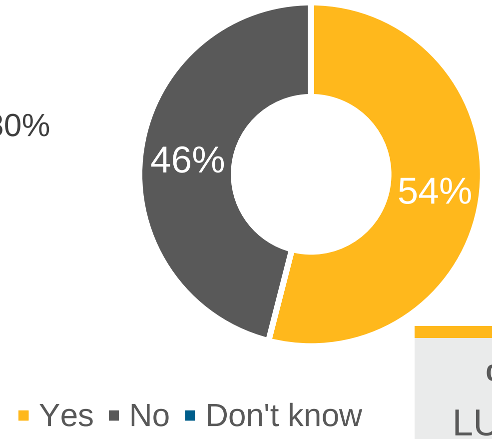
# of panes

(Base: all customers, n=2,400)



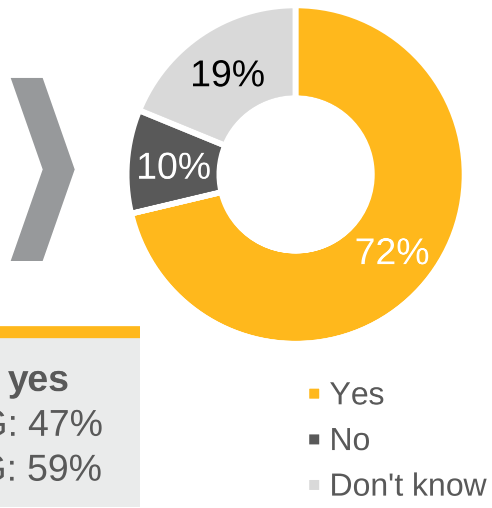
Replaced any Windows Since Moving in

(Base: all customers, n=2,400)



Were any Energy Star certified

(Base: all customers who replaced windows, n=1,293)



% yes
LUG: 47%
LEG: 59%

Q: What material are the window frames?; Q. How many panes of glass…?; Q. Since moving in have you replaced any windows?; Q. Are any Energy Star certified?

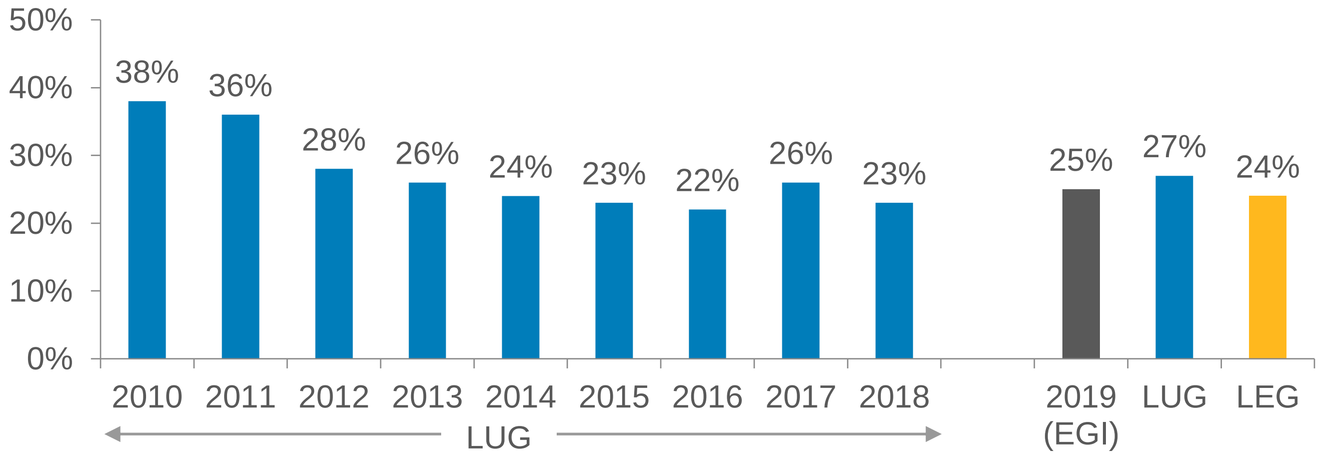
Energy Efficiency: Future Intentions

- One quarter (25%) of customers intend to make their home more energy efficient in the next 2 years.
- This intention is significantly higher among customers in LUG's Northern Region (38%) and among customers with homes built before 1950 (30%), though among customers with homes built between 1990-2019 just over 1-in-4 also indicate plans to make their home more energy efficient (26%).
- Younger, larger households are also significantly more likely to be planning energy efficiency upgrades.

Age of Home	Plans (% yes)
Before 1950	30%
1950-1969	23%
1970-1989	26%
1990-2019	26%

Plans to make home more energy efficient in next 2 years (% yes)

(Base: all customers, n=2,400)



Age Group	Plans (% yes)
18 – 34	43%
35 – 54	37%
55 – 64	22%
65+	13%

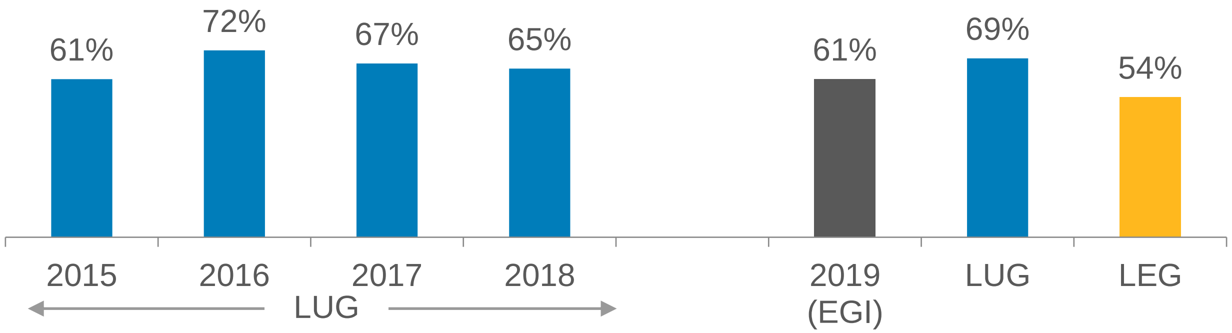
	Region	Plans (% yes)
LEG	**Toronto**	23%
	Central-West	26%
	Central-East	27%
	Eastern	18%
	Niagara	23%
LUG	**Central**	26%
	Eastern	27%
	Northern	38%
	South/West	24%

Q: Do you have any plans to make your home more energy efficient within the next two years?

Energy Efficiency: Awareness of Any Programs

- Awareness that LUG/LEG offers energy conservation and energy efficiency improvement programs and incentives is higher among those planning to make energy improvements than not (62% vs. 56%) and among those residing in LUG than LEG (69% vs. 54%).
- Awareness ranges from highest in LUG's South/West (72%) to lowest in LEG's Eastern Region (49%).
- Awareness is also strongest amongst older customers, though they're less likely to have plans to make their homes more energy efficient.

Aware that LUG/LEG offers Energy Conservation & Efficiency Programs
(Base: all customers, n=2,400)



	Age Group	Aware (% yes)
	18 – 34	57%
	35 – 54	58%
	55 – 64	60%
	65+	66%

	Region	Aware (% yes)
LEG	Toronto	54%
	Central-West	53%
	Central-East	58%
	Eastern	49%
	Niagara	54%
LUG	Central	70%
	Eastern	66%
	Northern	62%
	South/West	72%

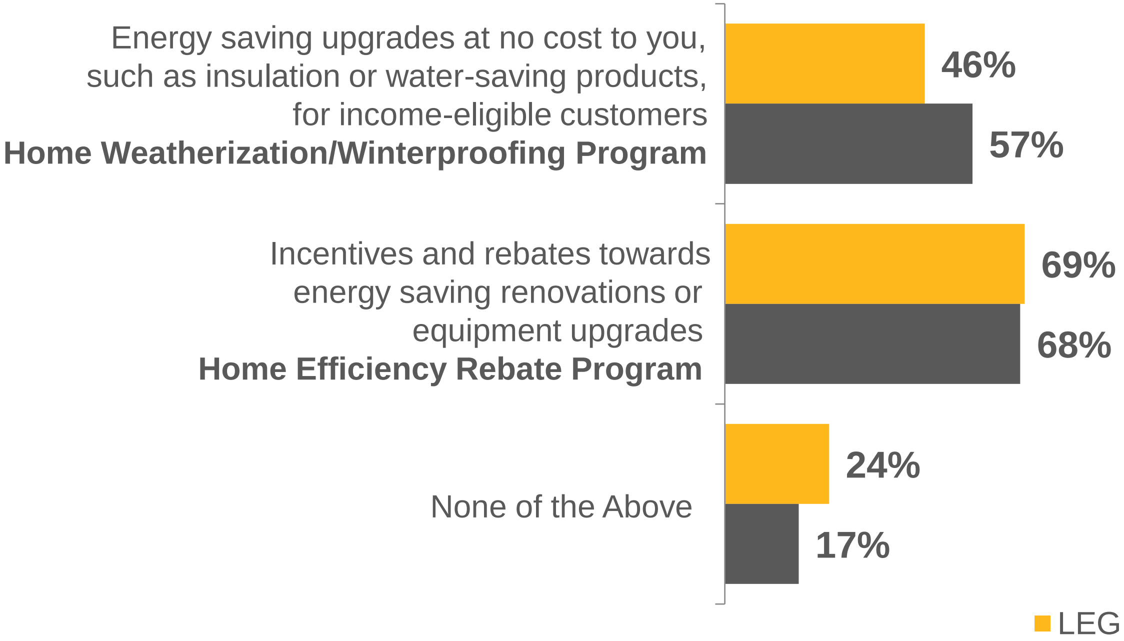
Q: Are you aware that Union Gas / Enbridge Gas offers energy conservation & energy efficiency improvement programs & incentives to help residential customers like you to save money on their energy bills?

Energy Efficiency: Awareness of Programs

- Awareness of the Home Winterproofing Program is at 31% across the franchise but is higher among LUG customers (39%) even though participation levels are about the same across legacy franchises.
- Overall Home Efficiency Rebate (HER) program awareness is 41%, and similar to HWP is significantly higher among LUG customers (as general awareness is higher), though reported uptake is slightly higher in LEG.

Offerings Aware of … *(aided awareness)*

Base: all customers aware that EGI offers programs

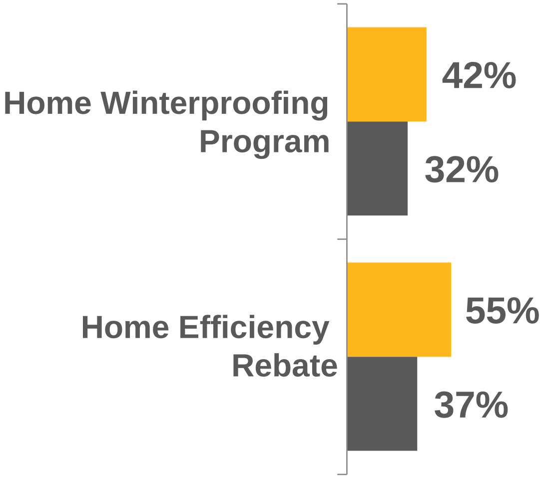


Base: all customers

Home Weatherization/Winterproofing Program	LEG: 25% LUG: 39% **EGI: 31%**
Home Efficiency Rebate Program	LEG: 37% LUG: 47% **EGI: 41%**
None of the Above	LEG: 13% LUG: 12% **EGI: 13%**

Previously Participated

Base: all customers aware of the specified program



HAP (Home Assistance Program offered by the IESO)

Base: all customers

Home Winterproofing Program	LEG: 11% LUG: 12% **EGI: 11%**
Home Efficiency Rebate	LEG: 20% LUG: 17% **EGI: 19%**
HAP (Home Assistance Program offered by the IESO)	LEG: 3% LUG: 4% **EGI: 4%**

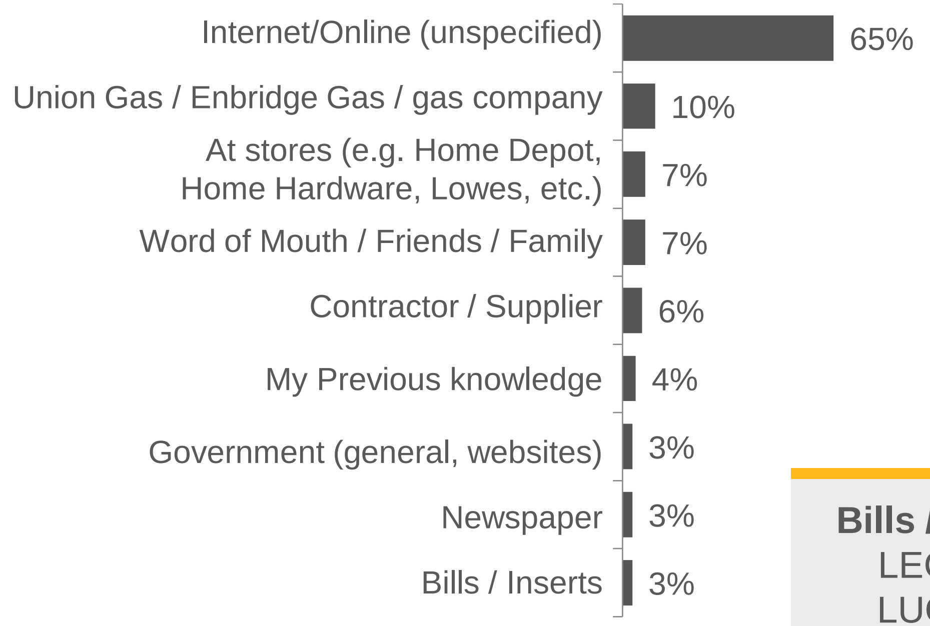
Q: Which of the following company energy conservation offerings are you aware of?; Q: Have you ever participated in the ...

Energy Efficiency: Sources of Information

- The majority of customers planning to make their home more energy efficient go online to look for information – senior-led households and lower income households do so at lower rates.
- Older customers are much more likely to look to the utility for information than their younger counterparts, while lower income households disproportionately look to friends, family and word of mouth recommendations.

Top Sources of Information (Unaided)

(Base: all customers who plan to make their home more energy efficient, n=607)



Bills / Inserts
LEG: 2%
LUG: 5%

Age Group	Internet / Online	From LEG/LUG
18 – 34	62%	12%
35 – 54	74%	10%
55 – 64	63%	8%
65+	50%	11%

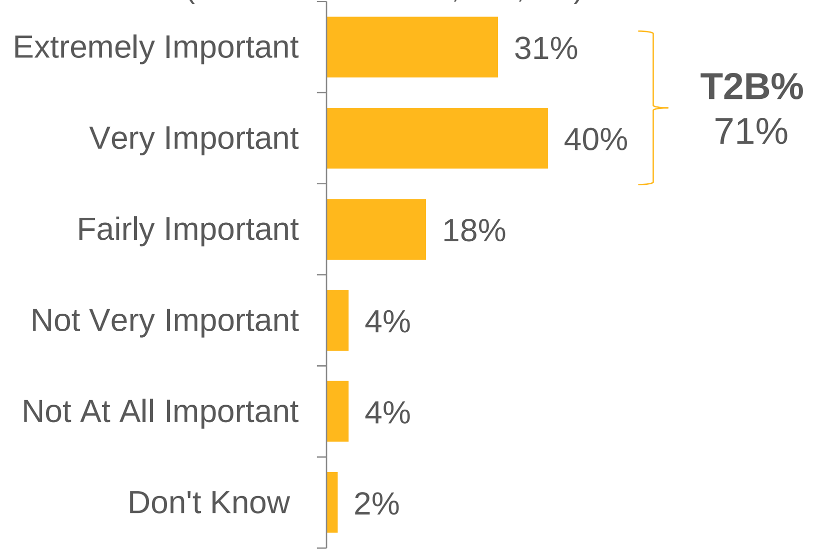
Q: Where do you look for energy efficiency information? IF NECESSARY: What sources do you consider?

Energy Efficiency: Home Ratings

- Customers were asked to consider a scenario where they are looking to purchase a different home, and asked about home energy ratings:
  - Most customers (71%) indicate that the home being ENERGY STAR qualified is “very” or “extremely” important to them, and 79% indicate that they would like to know a home’s “Energy Rating” prior to purchase.
  - Results have been consistent for the past two years in interest in Energy Rating, but the importance of ENERGY STAR among LUG customers has increased a bit, in particular amongst the youngest age group.

Importance of a Home being ENERGY STAR qualified (if purchasing a new home)

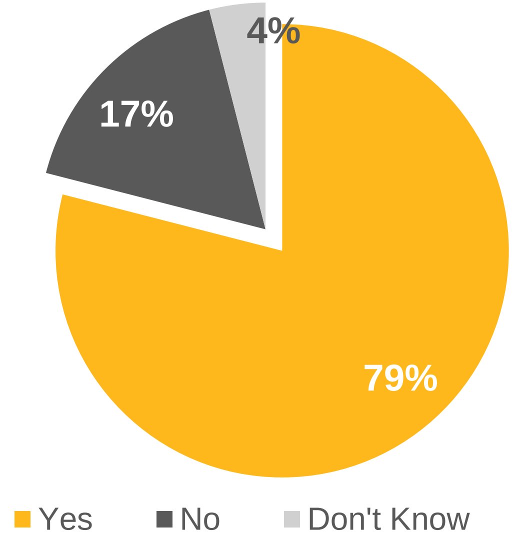
(Base: all customers, n=2,400)



Age Group	Importance Energy Star (T2B%)	Interest in Energy Rating
18 – 34	62%	81%
35 – 54	72%	84%
55 – 64	74%	82%
65+	72%	74%

Interest in knowing Home’s Energy Rating (if purchasing a new home)

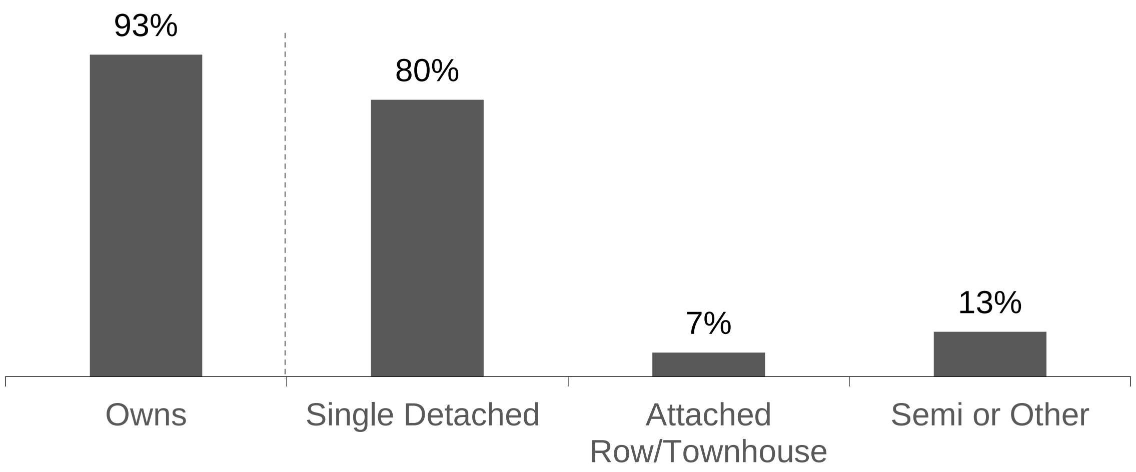
(Base: all customers, n=2,400)



Q: In the event that you look to purchase a new home in the future, how important would it be that your new home is Energy Star qualified (or has an equivalent rating)? Q: In the event that you look to purchase a new home in the future, would you be interested in knowing the Energy Rating of a home, so you could compare homes prior to purchasing?

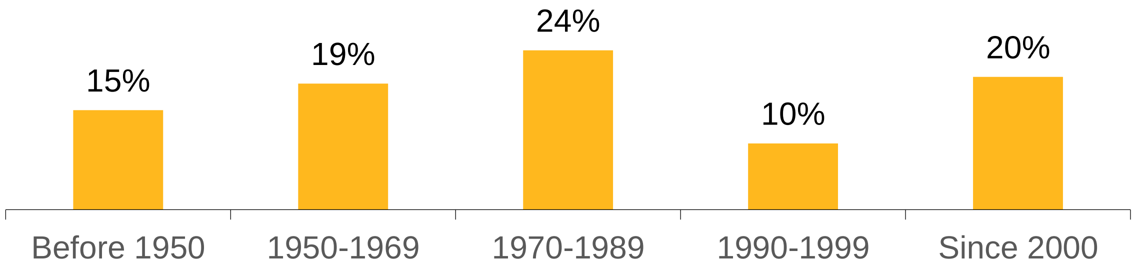
Demographics: House Characteristics (EGI)

Home Ownership   Type of Home

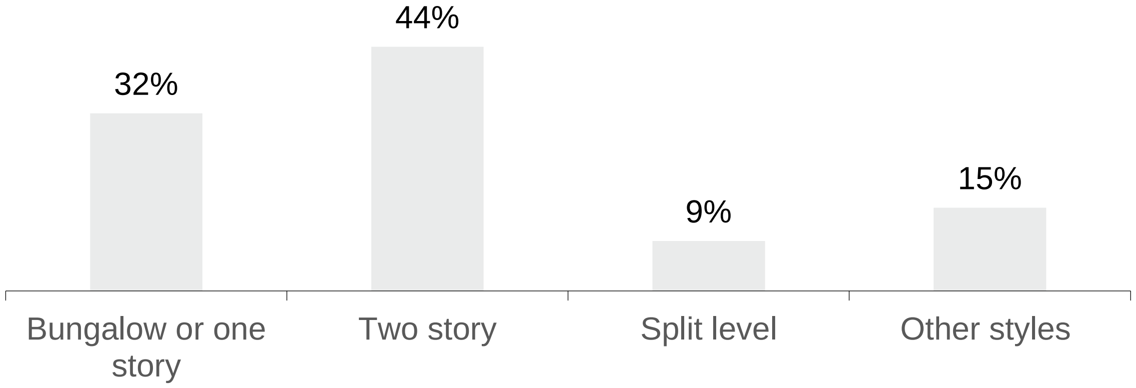


Age of Home

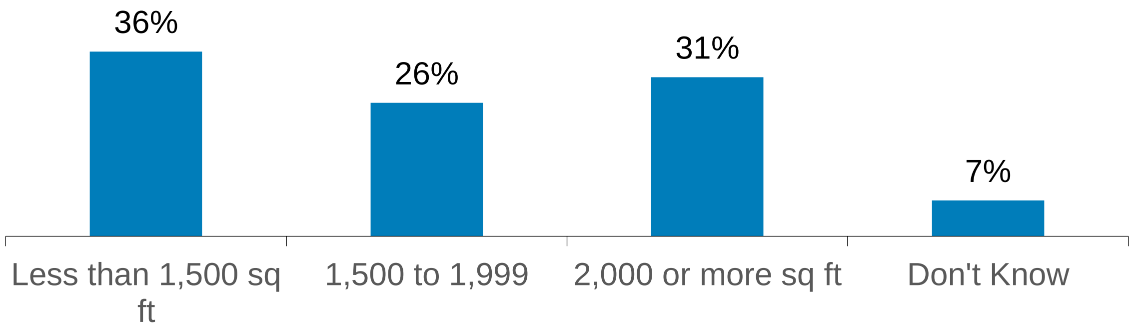
Average: 1972



Style of Home



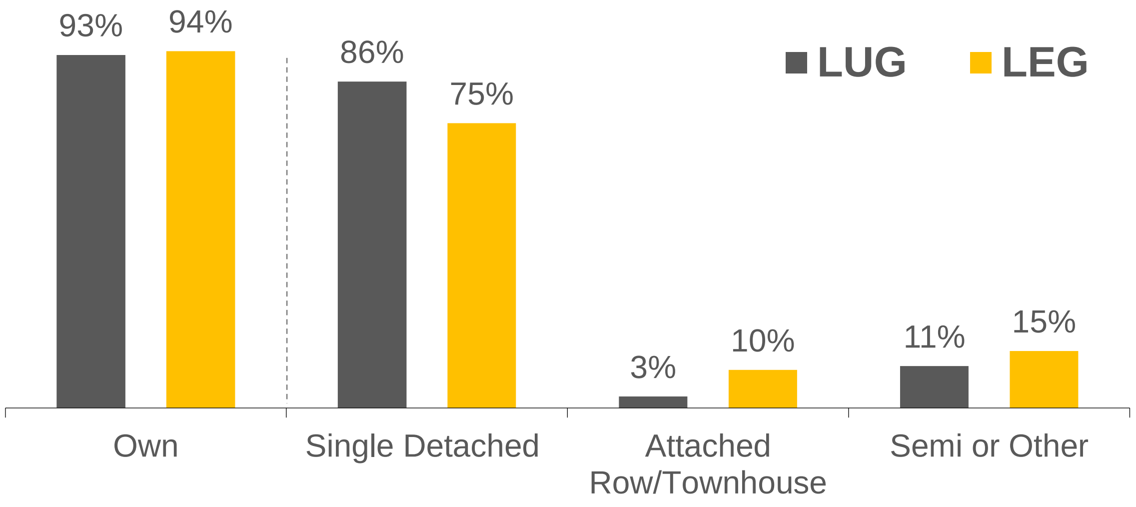
Size of Home



Demographics: House Characteristics (Legacy)

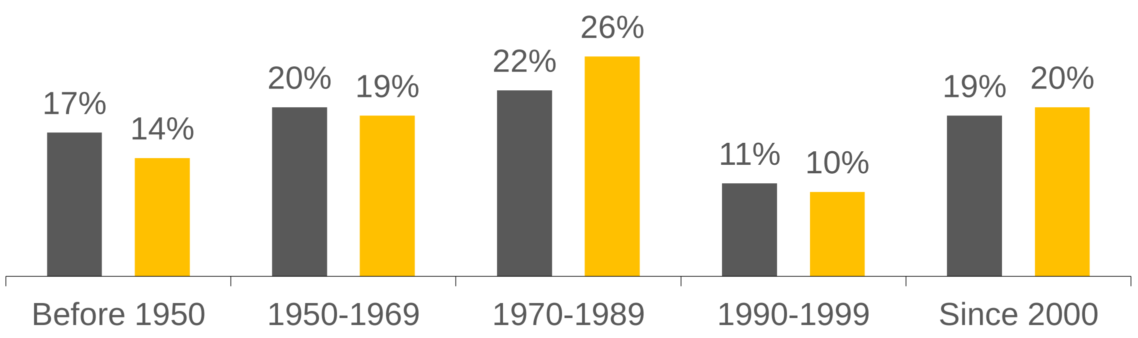
Home Ownership

Type of Home

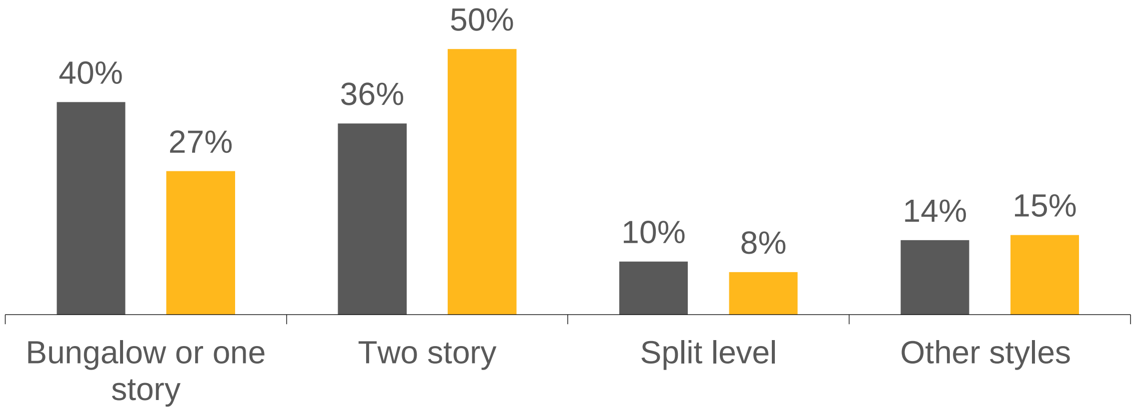


Age of Home

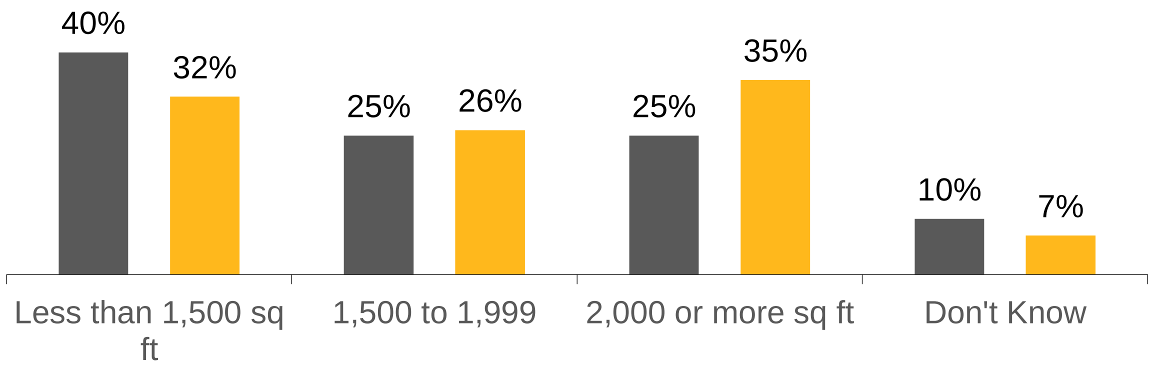
Average
LEG: 1974
LUG: 1970



Style of Home

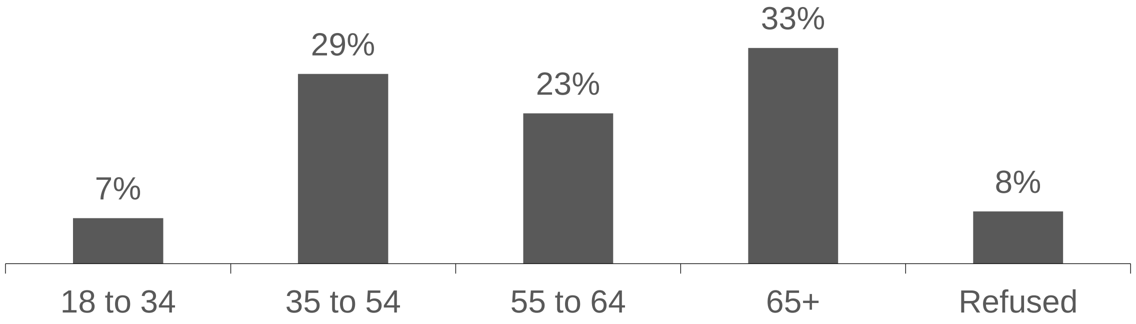


Size of Home

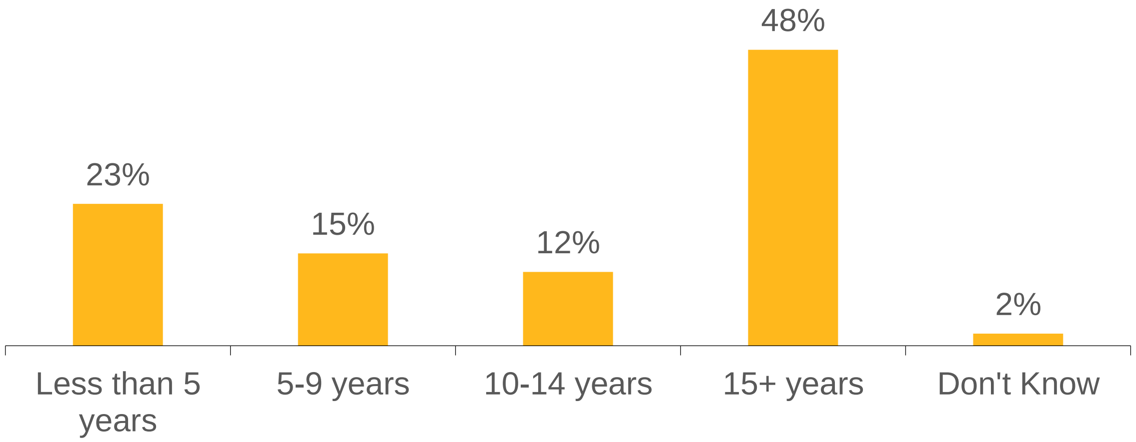


Demographics: Customer Characteristics (EGI)

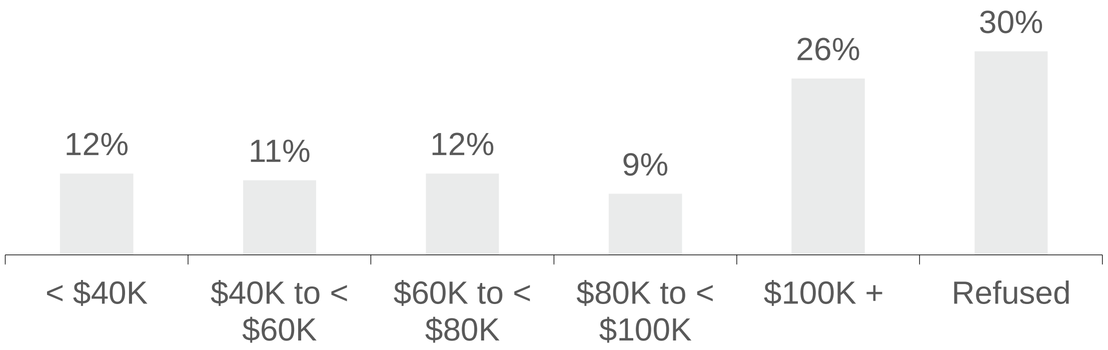
Age

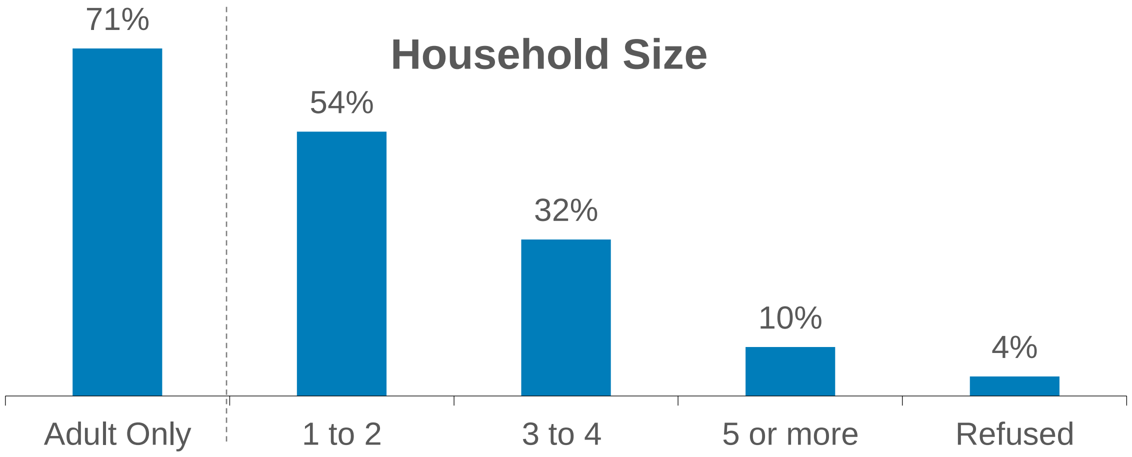


Length of Residence

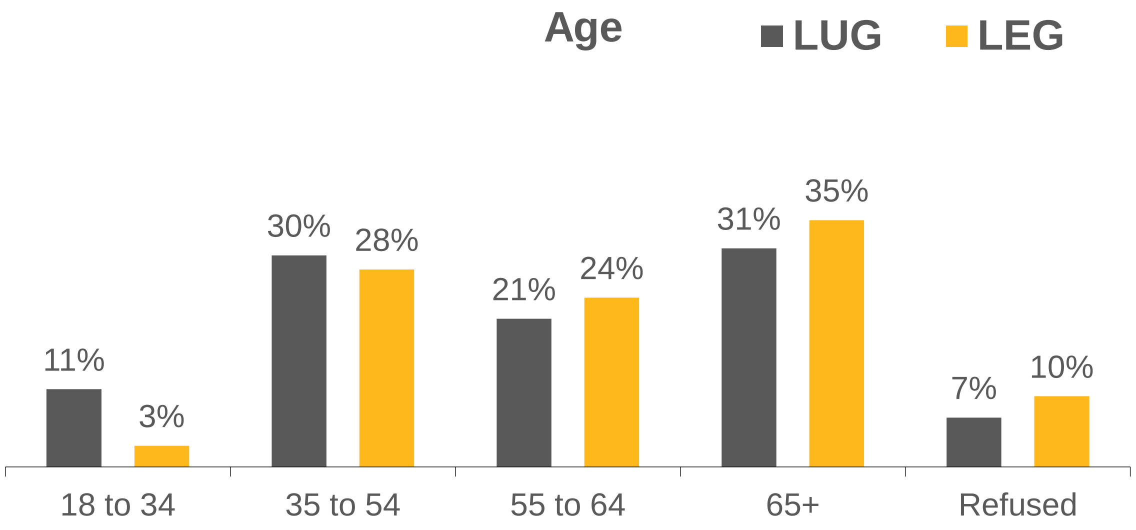


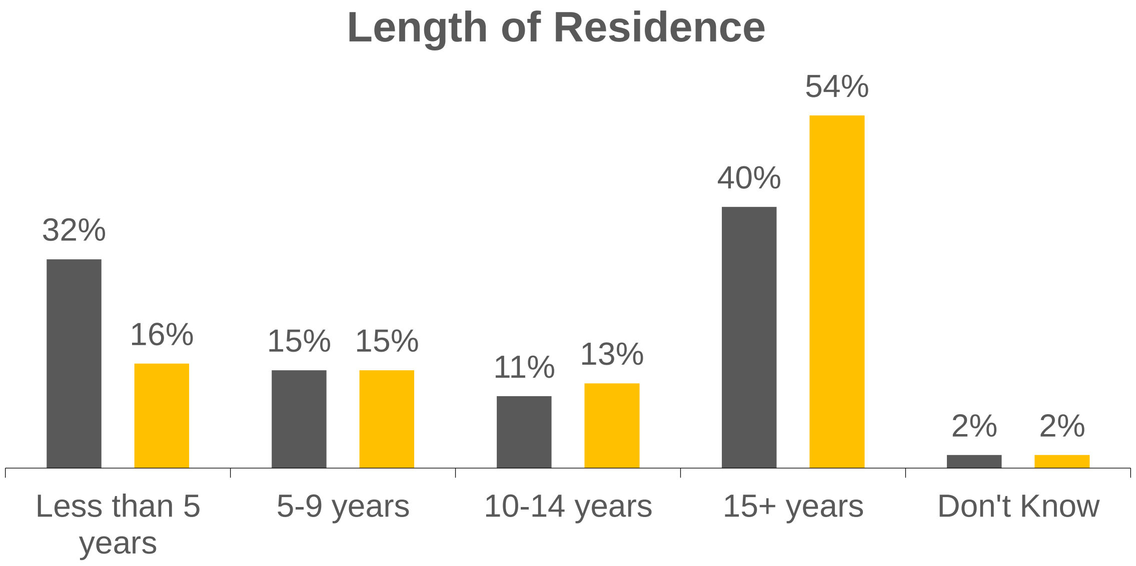
Household Income

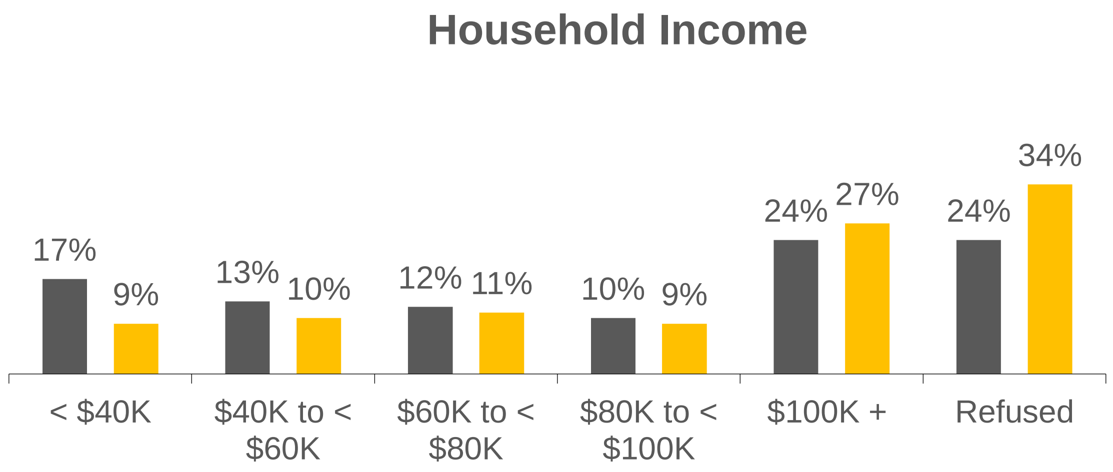


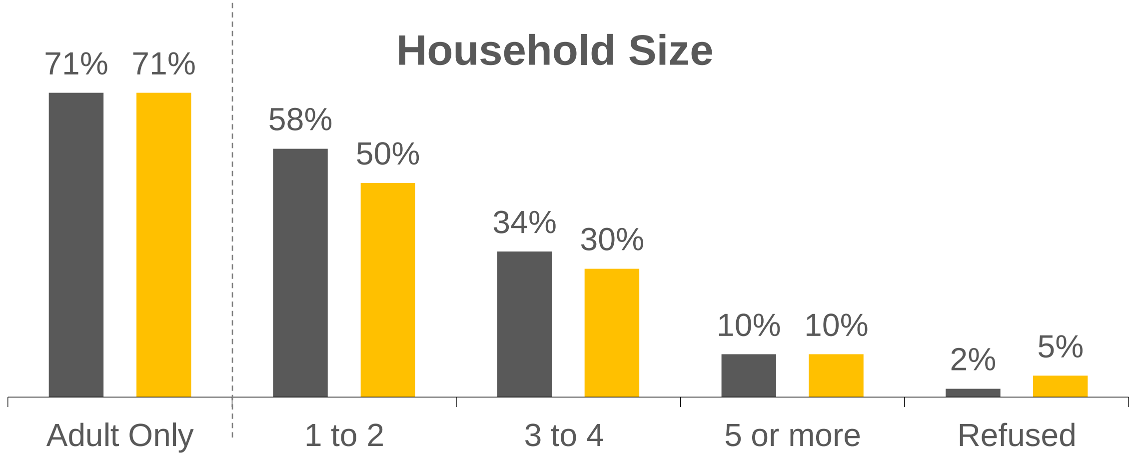


Demographics: Customer Characteristics (Legacy)









Appendix: Number of Natural Gas Applications

- Added to the report in February 2023
- The following applications were included:
  - Home Heating
  - Water Heating
  - Fireplaces (any number)
  - Stove (any number of cooktops / ranges)
  - BBQ
  - Clothes Dryer
  - Backup Power
  - Pool Heating

	Frequency	Percent
0 natural gas applications	21	1%
1 natural gas application	244	10%
2 natural gas applications	760	32%
3 natural gas applications	671	28%
4 natural gas applications	415	17%
5 natural gas applications	209	9%
6 natural gas applications	72	3%
7 natural gas applications	6	0%
8 natural gas applications	0	-
Total	2400	100%

Customers who indicated “don’t know” to any of the individual application questions are included in the base size, but not counted as having natural gas for that application.

2020 Residential Single Family Natural Gas End Use Study

2020 Annual Results

Legacy Union Gas and Legacy Enbridge Gas Distribution

Market Research & Analysis
Reported January 2021, Updated February 2023

Objectives

- To measure the penetration of natural gas appliances in the single family residential customer market;
- To understand customer perceptions of the levels of insulation in their home;
- To determine awareness of Enbridge Gas' energy conservation programs, and understand where customers turn to for more information.

Methodology

- Sponsor-identified telephone interviews were completed by Leger between November 16 and December 12, 2020.
- Interviews were completed with customers who reside in single family dwellings and are (mainly) responsible for making energy-related decisions for the home.
- The total number of completed interview is 2,400 with 1,200 for each of LUG and LEG in total, and final franchise-wide results are calculated based on true geographic proportions.
- Overall results yield a margin of error of +/-2.8% at the 95% confidence interval.
- Unless otherwise noted, results in this report are based on all customers (EGI, comprised of LUG and LEG combined).
- The regions reported in this report are defined as follows:

Region Name	Includes	
Northern	Northeast, Northwest	LUG
LUG Eastern	Eastern	LUG
LEG Eastern	DMA 65	LEG
GTA West & Niagara	DMA 76, DMA 53, DMA 21	LEG
Toronto	DMA 01	LEG
GTA East	DMA 35, DMA 45, DMA 47	LEG
Southeast	Waterloo/Brantford, Hamilton/Halton	LUG
Southwest	Windsor/Chatham, Sarnia/London	LUG

Executive Summary (1 of 2)

Natural Gas Penetration

- Natural gas remains the top choice for home heating and water heating, with natural gas water heating showing a slight uptick in 2020.
- When asked to think about a new home, barring any other considerations, most customers continue to choose natural gas, though a small, but growing, proportion would choose alternate sources, such as geothermal or solar for home and water heating, respectively.
- The prevalence of natural gas in secondary appliances is quite consistent over the last few years, with increases compared to last year for natural gas fireplaces and barbecues. Across secondary appliances some regional variation continues to exist.

Ownership

- Furnace ownership continues to be very high (89%), though rental rates are a bit higher among newer homes and among younger customers. Overall, in the case of future ownership, most customers intend to own (92%).
- Ownership of water heaters remains steady over the last several years for LUG customers and is similar among LEG customers. It continues to remain much lower than furnace ownership. Among those who are at least fairly likely to replace their water heater in the next 2 years, interest in ownership is much stronger (63%) than current ownership (43%).

Furnace Efficiency

- With a different approach to asking customers about the efficiency level of their furnace in 2020 we see a higher proportion of customers report that their furnace is high-efficiency.
- Still, a sizable group of customers do not know the efficiency level of their furnace (this has not changed much over the last decade) – customers who don't know are not likely to be aware of and act on the potential for upgrades.
- There is a continued increase in the proportion of customers who have a Smart Thermostat (23%) as customers upgrade their thermostats; about 1-in-3 customers with a programmable or Smart thermostat actively program it to reduce energy consumption.

Executive Summary (2 of 2)

Insulation

- About 2-in-5 customers (41%) deem their house to be “well insulated” while 6% indicate it is “poorly insulated” or “not insulated,” which varies by the age of the home. 15% of customers indicate that they don’t know the level of insulation for their home, while for draftiness the proportion of “don’t know” is much lower at 4%.
- While a third of customers whose home is not “well” insulated would not bother improving their insulation, another third would to “save money on utility bills” or to “increase comfort” in the home.

Energy Efficiency (EE) and DSM offerings

- The proportion of customers planning to make energy efficiency updates is down to 18% at the end of 2020 (down from 25% in 2019).
- Awareness that Enbridge Gas offers energy conservation programs sits at 67% among LUG customers and at 52% among LEG customers – this varies by customer age group and region.
- Overall customer awareness of the HWP and HER programs remains quite strong at 25% and 36%, respectively. Among all customers, 34% are aware of the rebates and discounts on a Smart Thermostat. Among those aware of the respective programs, 14% have participated in HWP and 27% in HER.
- Though decreasing over time, the internet continues to be the most important source of general energy efficiency information – highlighting the importance of digital marketing and strong website content. Contractor / supplier is being mentioned more often (up to 16% from 6% in 2019).

Overview of Natural Gas (NG) Appliances

- Year over year, natural gas use for all major appliances is mostly unchanged except for natural gas fireplaces and barbecues, which are both up compared to last year.
- Across legacy franchises natural gas for home heating is just slightly higher in LEG compared to LUG, and the use of natural gas for clothes dryers continues to be significantly higher in LUG.

Natural Gas Penetration Rates across Appliances

	2014	2015	2016	2017	2018	2019			2020		
			LUG			EGI	LUG	LEG	EGI	LUG	LEG
Home Heating	96%	96%	95%	96%	94%	96%	95%	97%*	96%	96%	97%
Water Heater	85%	86%	86%	83%	82%	82%	80%	83%	85%	83%	86%
Fireplace	38%	41%	44%	36%	42%	35%	38%*	33%	42%	43%	42%
Cooktop/Stove	29%	26%	31%	29%	31%	30%	29%	30%	31%	30%	32%
Barbecue	27%	23%	26%	20%	24%	24%	23%	24%	27%	28%	25%
Clothes Dryer	21%	20%	19%	17%	19%	16%	20%*	13%	15%	17%*	13%
Pool Heater	(--)	(--)	(--)	(--)	5%	6%	5%	6%		(--)	

(--) = was not measured

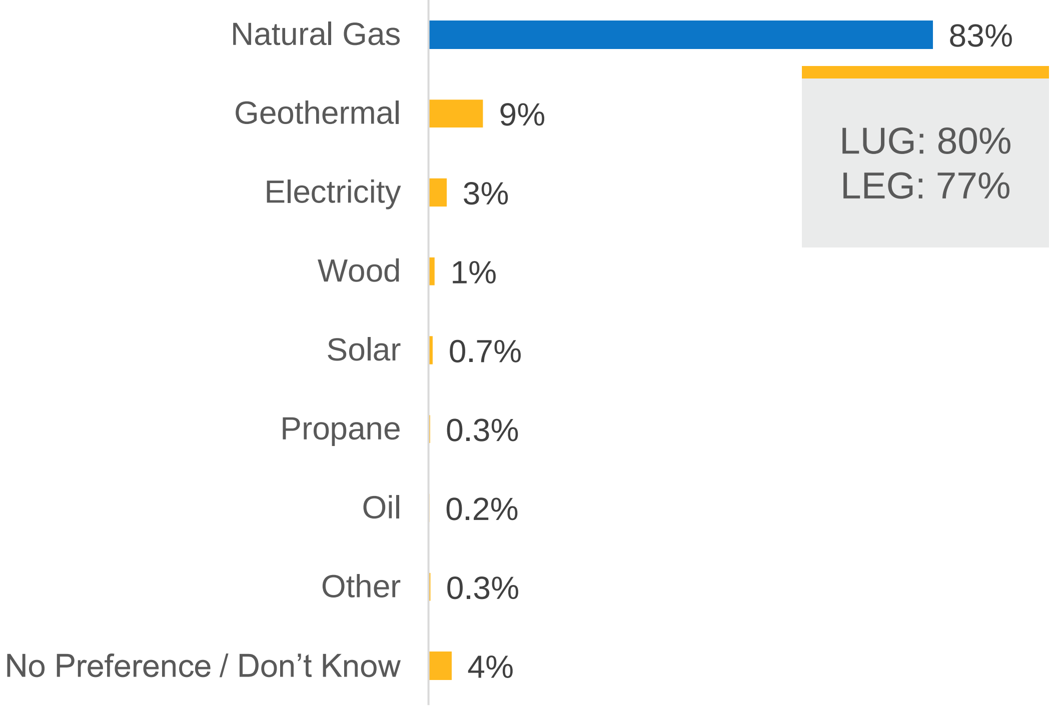
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Home Heating: Preference

- Most customers (83%) would prefer natural gas for home heating in a new home (down from 86% in 2019), followed by geothermal (9%) and electricity (3%). Preference for natural gas is strongest in the Southwest (88%), while lowest in the Toronto (79%) region.
- Key reasons for choosing an alternate fuel source include the perception that it is more environmentally friendly / energy efficient (especially for geothermal) and has lower operation costs. Also, electricity is deemed to be safer by some customers.

Preferred Fuel Source for Home Heating

(Base: all customers, n=2,400)



Reason for Preferred Fuel Source

(Base: all customers who indicated a preferred fuel source)

	Natural Gas (n=1,992)	Electricity (n=62)	Geothermal (n=204)
Lower operation cost	57%	17%	29%
Environmentally friendly / Energy efficient	26%	25%	68%
Easier / More convenient	22%	19%	4%
It is what I am used to / Used in the past	17%	13%	2%
Reliable / Dependable heat source/ Best option	9%	2%	4%
More heat generated / It's warmer	4%	5%	2%
Safer / Safety concerns	4%	5%	1%
It is what is available/ Preferred source not available	0%	0%	1%
Other	1%	4%	3%
DK/NA/Refused	4%	13%	5%

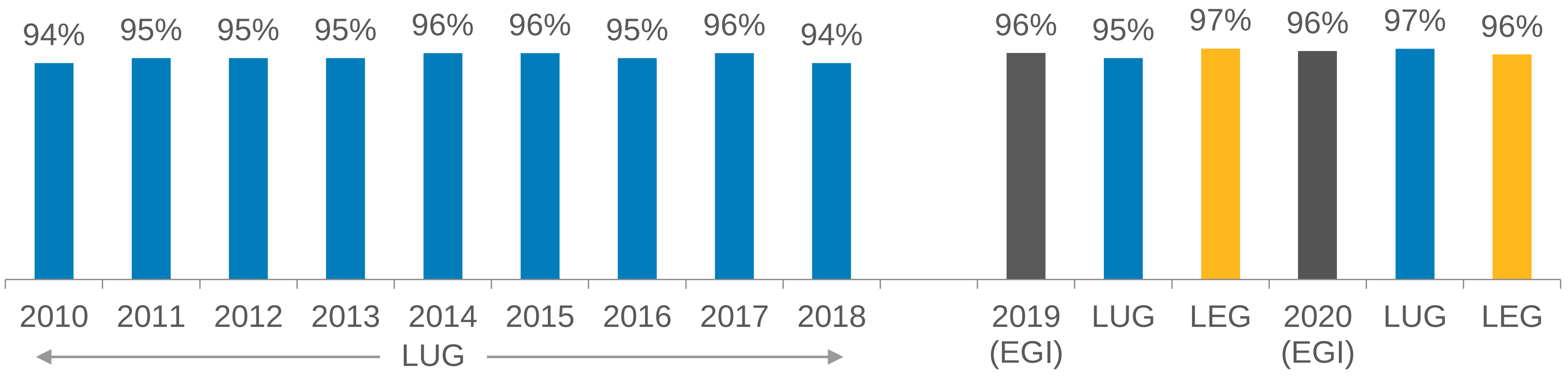
Q: I would now like you to assume that you are moving into a new home. Which energy source would you choose for each of the following? PRIMARY home heating Q: What would you say are your main reasons for choosing (insert choice) as your primary source for your home heating? (Total mentions)

Home Heating: NG Adoption & Equipment

- Natural gas forced air furnaces continue to be the most used heating equipment across the franchise.
- A sizable portion of customers are not aware of the specific type of heating equipment they have in their home (1-in-10 among those who heat with natural gas)
- Those who don't use natural gas for home heating may use electricity (3%) followed by only handfuls in the sample of customers who heat with wood, propane, or oil.

Natural Gas Penetration: Home Heating

(Base: all customers)



Type of Natural Gas Heating Equipment (n=2,297)	
Forced Air	83%
Hydronic	4%
Space Heaters	0%
Combination	2%
Hybrid or dual-fuel system of a forced air furnace and electric air source heat pump	1%
Don't Know	10%

Type of Electric Heating Equipment (n=61)	
Forced Air	54%
Baseboard Heaters	17%
Air Source Heat Pumps	0.4%
A hybrid or dual-fuel system of a forced air furnace and electric air source heat pump	0.4%
Electric boiler (radiator)	2%
Other	9%
Don't Know	17%

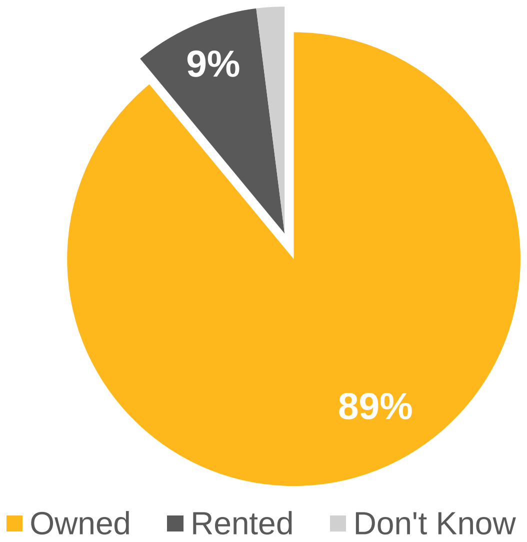
Q: What is the MAIN energy source for heating your home? Q: What type of **(PROPANE/NATURAL GAS/OIL)** furnace or heating system do you have? Q: What type of electric system are you using to heat your home?

Home Heating: Furnace Ownership

- Most customers own their furnace (or heating system), and most customers who anticipate replacing their furnace or heating system in the future would continue to own it (rather than rent it).
- Rental rates are higher among some customer groups, including households that also rent the water heater (12%), in homes built since 2000 (13%), those with incomes of $80K-$100K (14%) and among younger (18-34) customers (12%).

Ownership of Current Furnace / Heating System

(Base: customers who use electricity, natural gas or oil for home heating, n=2,363)

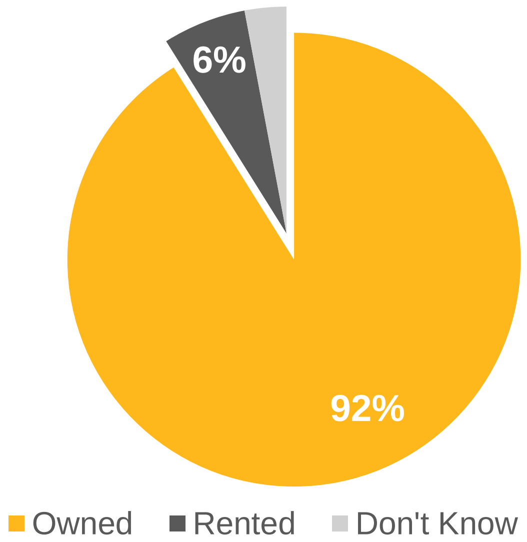


Region	Owns (%)
Northern	90%
LUG Eastern	89%
LEG Eastern	91%
GTA West & Niagara	87%
Toronto	89%
GTA East	89%
Southeast	88%
Southwest	93%*

Among younger customers (age 18-34) ownership level is lower at 85% compared to their counterparts, especially those age 55-64 (93%)

Ownership of Replacement Furnace / Heating System

(Base: customers who are at least fairly likely to replace their furnace n=258)



Q: Is your furnace or heating system owned or rented? Q: Is your replacement furnace or heating system most likely to be owned or rented?

* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Home Heating: Age and Efficiency Levels

- Most forced air furnaces are less than 10 years old (68%) with 2-in-5 of those whose furnace is less than 5 years old indicating that they replaced it in the last 2 years, with about half of those also replacing their air conditioner at the same time.
- The Northern region has a larger proportion of older furnaces, specifically those aged 16-20 years (15%) compared to the average (8%).
- When asked about furnace efficiency most indicated that their furnace is high efficiency, and with a change in the question this year (using the age of furnace as a starting point) this proportion is higher than in previous years and should be interpreted with caution.

Age of Forced Air Furnace (all fuels)	
5 years or less	39%
6 to 10 years	29%
11 to 20 years	23%
More than 20 years	4%
Don't Know	4%

40% of those who currently have a furnace that is less than 5 years old have replaced it in the last 2 years (or 13% of the total)

50% of customers who replaced their furnace in the past 2 years and also had an air conditioner also replaced it at the same time

Fuel Source for Original (replaced) Furnace	
Natural Gas	91%
Electricity	2%
Oil	4%
Other	1%
Don't Know	2%

92% of customers whose furnace is less than 10 years old indicate that their furnace is high-efficiency

66% of customers whose furnace is more than 10 years old indicate that their furnace is high-efficiency, among the remainder, 14% indicate having a mid-efficiency furnace and 15% a conventional furnace (5% indicate "don't know")

Forced Air Furnace Efficiency (natural gas)*	
High efficiency (over 90% efficiency)	82%
Medium efficiency	4%
Conventional (less than 75%)	4%
Don't Know	11%

Q:How old is your furnace? Q: Is this a high-efficiency furnace? IF NEEDED: it would likely have one or two plastic vent pipes (often white) that vent out a side wall. Q: What would you say the efficiency level of your furnace is? Would it be a high-efficiency furnace that vents through the side of the house, like dryer, but with a smaller plastic pipe? Q: Is it a furnace with a metal chimney coming up through the roof, such as a conventional furnace (which has a continuously lit pilot light) or a mid-efficiency furnace (which does not have a pilot light)?

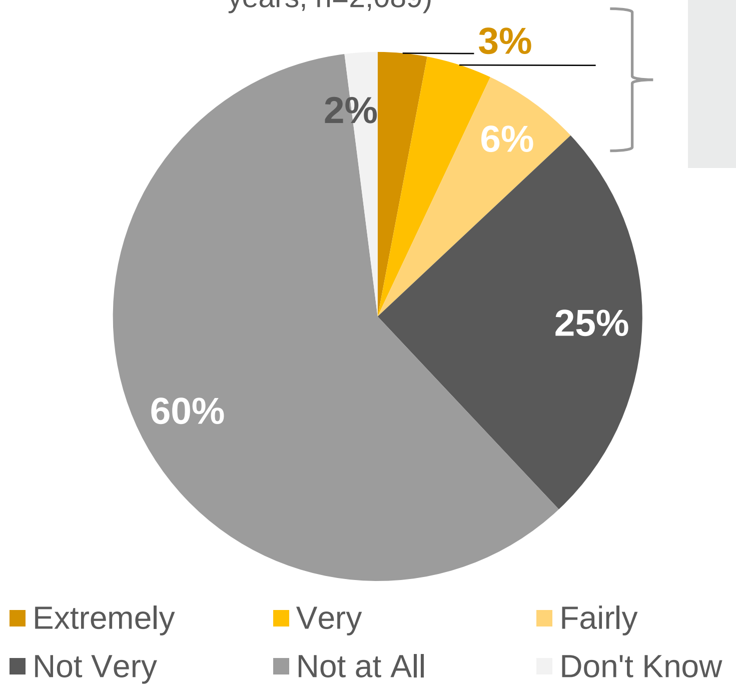
2020 Residential Single Family Natural Gas End Use Study

Home Heating: Furnace Replacement

- A small proportion of customers (12%) indicate that they are at least likely to replace their furnace in the next year because it is likely to break down – among them most would get a natural gas furnace.

Likely to Replace Furnace in Next 2 Years

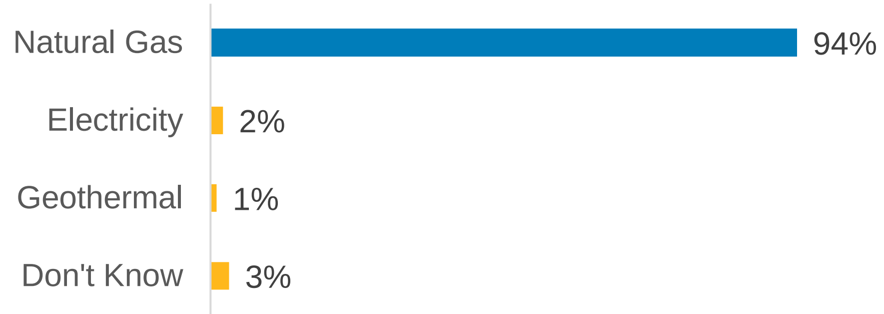
(Base: customers who have not replaced their furnace in the past 2 years, n=2,089)



12% at least fairly likely
LEG: 12%
LUG: 13%

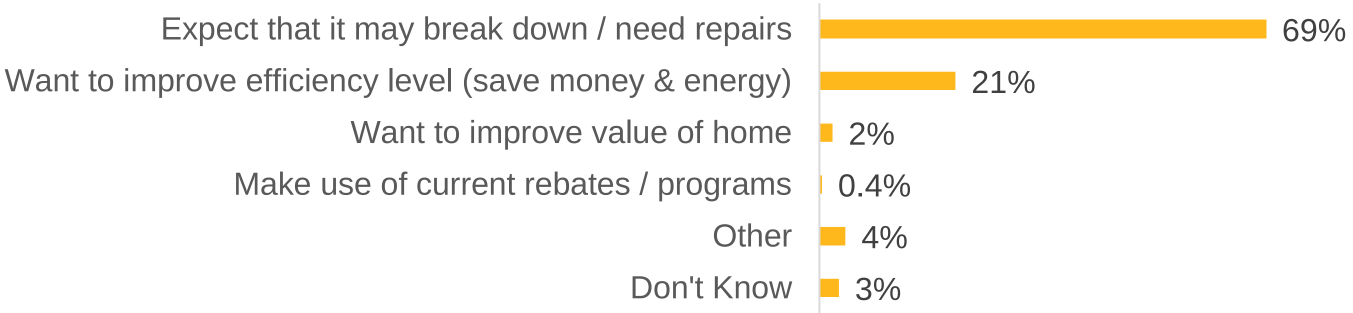
Fuel Source of New Furnace

(Base: customers who are at least fairly likely to replace their furnace n=258)



Reason For Replacing Furnace

(Base: customers who are at least fairly likely to replace their furnace n=258)



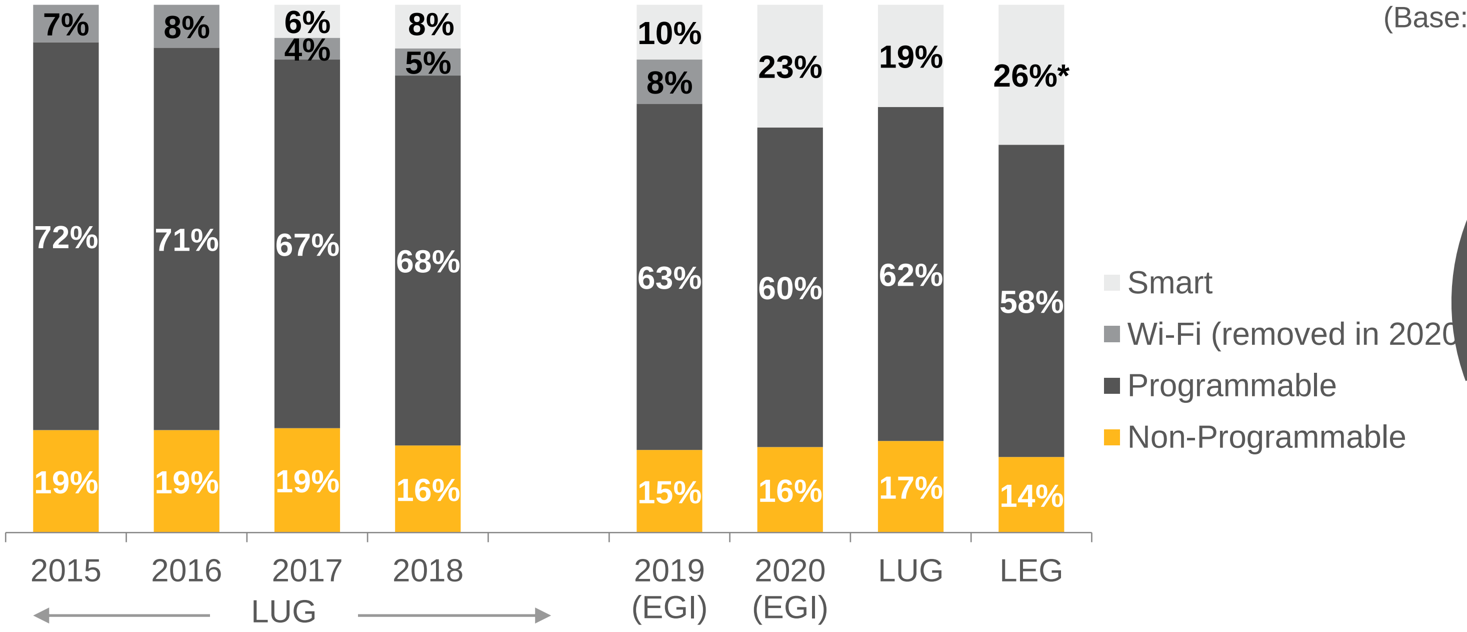
Q:How likely are you to replace the furnace or home heating system in the next 2 years? Q: Which energy source will the new furnace or heating system use? Q: What would you say is the main reason that you are fairly/very/extremely likely to replace your furnace or home heating system?

Home Heating: Thermostats

- Smart thermostats continue to gain in popularity. They are most popular in the GTA East area (30%), in newer homes (30%), and among higher earning households (41%), and younger customers (39%).
- Non-programmable thermostats appear disproportionately among customers in the Northern (27%) and Toronto (22%) regions, and in older (22%), smaller (20%), lower income (23%), and senior (22%) occupied homes. Opportunities to upgrade thermostats continue to exist, as well as opportunities to encourage customers to actively program their thermostats.

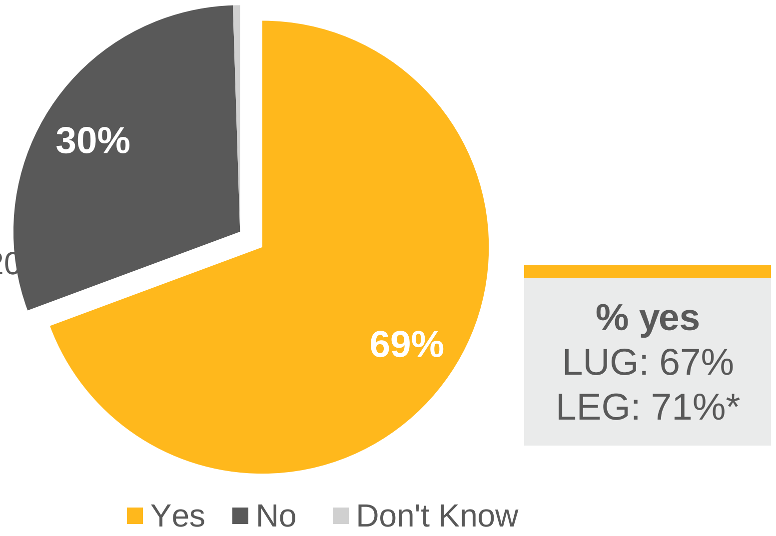
Type of Thermostat

(Base: all customers, n=2,400)



Actively program thermostat to help reduce energy use

(Base: all customers with Smart or Programmable thermostat, n=2,354)



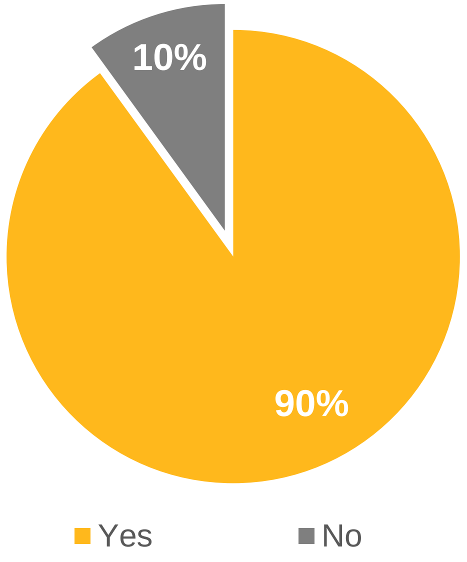
Q: Which of the following thermostats do you have? Q: Do you actively program your thermostat to help reduce your energy use? Response options changed in 2017, and again changed in 2020.

* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Air Conditioning

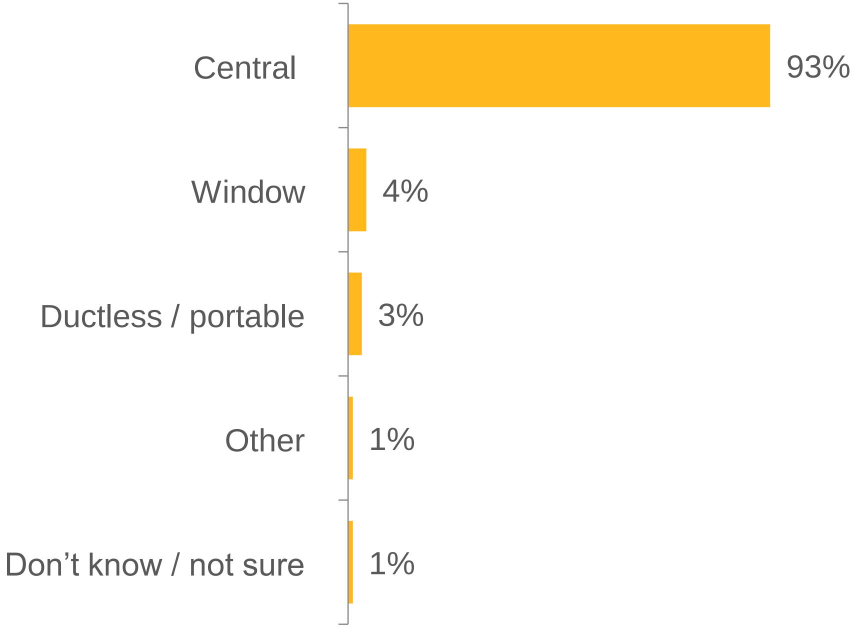
- There is considerable variation across the franchise ranging from 93% among LEG customers to 86% among LUG customers, and from 62% in the Northern region to 95% in the GTA East region in terms of whether a customer has air conditioning or not.
- Air conditioning is also significantly more common in newer houses with 98% of homes built since 2000 having air conditioning vs. only 75% of homes built before 1950. Proportions are similar by income with air conditioning in 98% of households earning at least $140K vs. 82% of households earning less than $40K.

Have Air Conditioning
(Base: all customers, n=2,400)



Region	Yes (%)
Northern	62%
LUG Eastern	85%
LEG Eastern	93%
GTA West & Niagara	93%*
Toronto	89%
GTA East	95%*
Southeast	91%
Southwest	93%

Type of Air Conditioning
(Base: customers who have air conditioning, n=2,158)



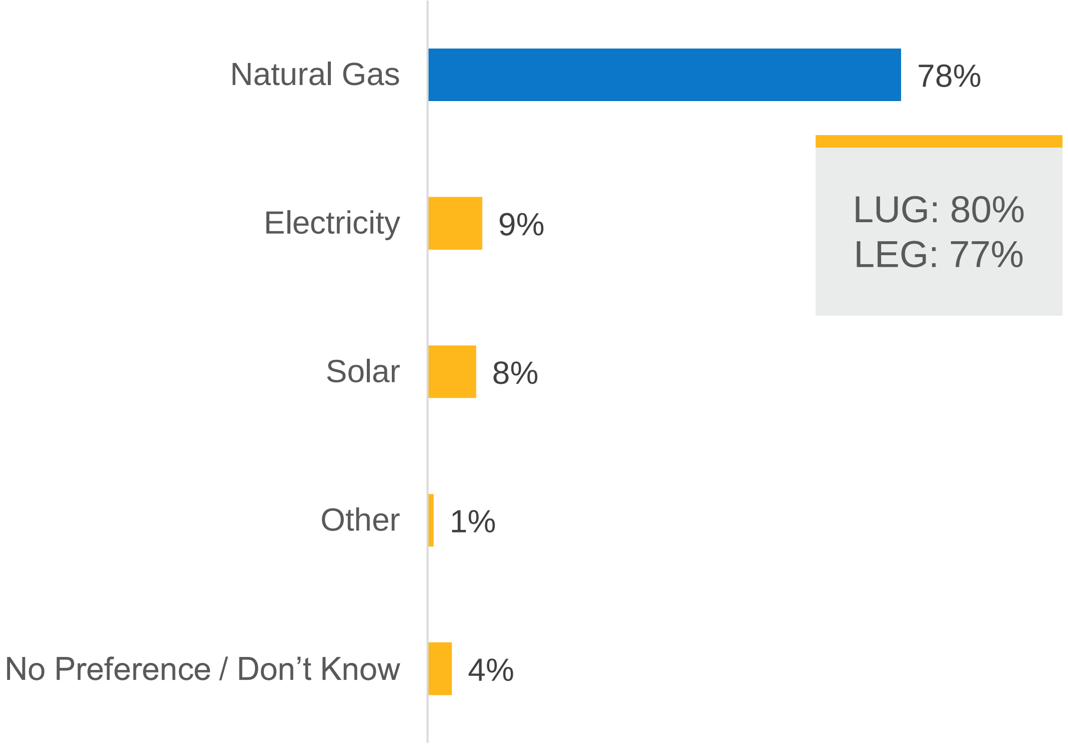
Q: Do you have air conditioning in your home? Q: Which of the following types of air conditioning do you use in your home?
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Water Heating: Preference

- Most customers (78%) would prefer natural gas for water heating in a new home (down from 81% in 2019), followed by electricity (9%) and solar (8%). The preference for natural gas is slightly higher among LUG customers, and regionally is highest in the Northern (86%) and Southwest (83%) regions.

Preferred Fuel Source for Water Heating

(Base: all customers, n=2,400)



Region	Natural Gas (%)
Northern	86%*
LUG Eastern	72%
LEG Eastern	76%
GTA West & Niagara	78%
Toronto	75%
GTA East	77%
Southeast	77%
Southwest	83%*

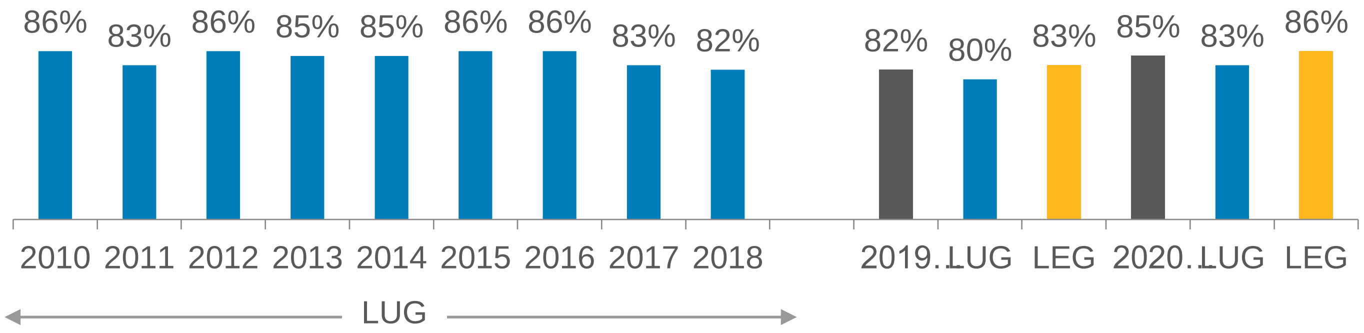
Q: I would now like you to assume that you are moving into a new home. Which energy source would you choose for each of the following? Water heater?
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

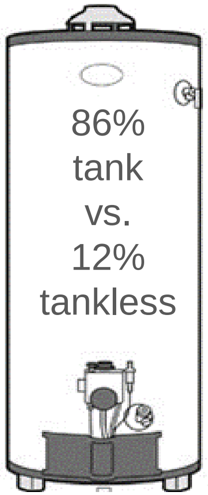
Water Heating: NG Adoption & Equipment

- Penetration of natural gas water heaters has dropped slightly over the past few years among LUG customers, though is a bit higher in 2020 compared to 2019. Natural gas use for water heating ranges from 70% in LUG's Eastern region to 89% in the Southwest and 88% in the GTA West and Niagara regions.
- The proportion of tankless water heaters continues to grow slowly up from 6% in 2017 to 11% in 2019, and 12% in 2020.

Age of Water Heater (all)	
5 years or less	50%
6 to 10 years	29%
11 to 15 years	10%
More than 15 years	4%
Don't Know	6%

Natural Gas Penetration: Water Heating
(Base: all customers)





Region	Tankless (%)
Northern	13%
LUG Eastern	14%
LEG Eastern	11%
GTA West & Niagara	8%
Toronto	15%
GTA East	14%
Southeast	11%
Southwest	14%

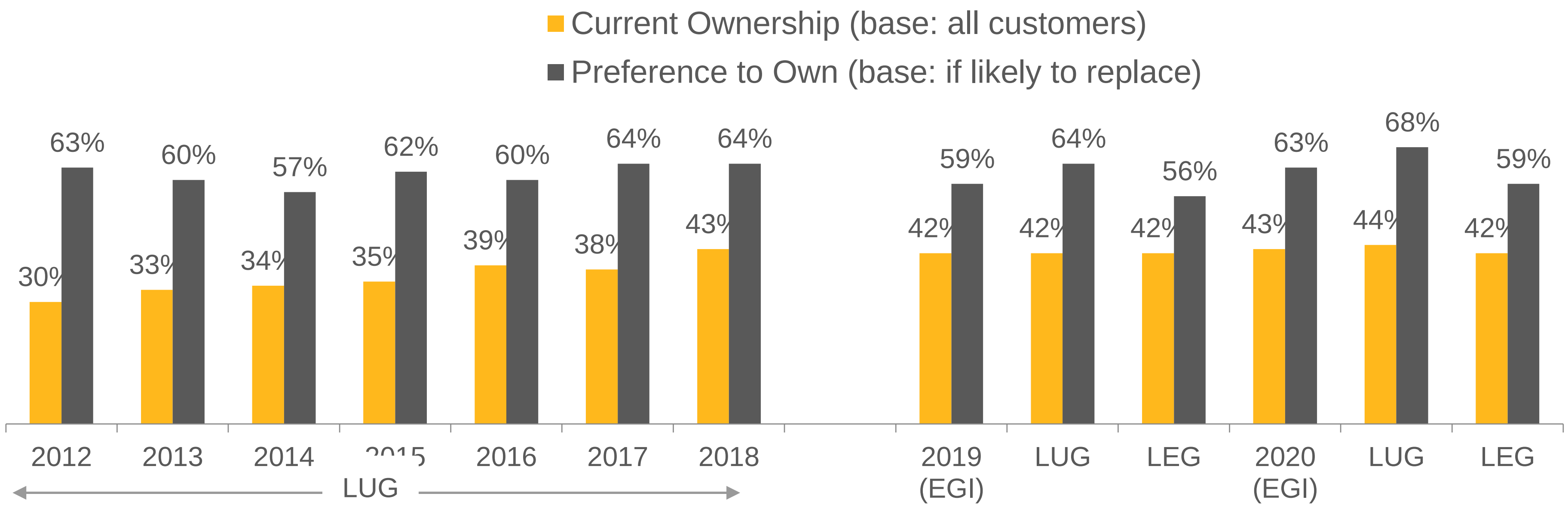
Q: What type of water heater do you have? Is it...? Q: How old is your water heater? Q: Does your water heater have a tank or is it tankless? IF NEEDED READ *Tankless water heaters are also called continuous or instantaneous water heaters.*

ENBRIDGE
Life Takes Energy

Water Heating: Ownership

- Current ownership is the same among LUG and LEG customers and is quite consistent for LUG over the last couple of years.
- Ownership tends be higher among customers who have an electric water heater compared to one that is fueled by natural gas.
- Future intentions continue to lean toward ownership - 63% plan to own, (68% among LUG customers and 59% among LEG customers).

Water Heater Trends in Ownership



Owned % by type of water heater
Natural Gas: 40%
Electricity: 54%

Q: Is your water heater owned or rented? Q: Is your replacement water heater most likely to be owned or rented?

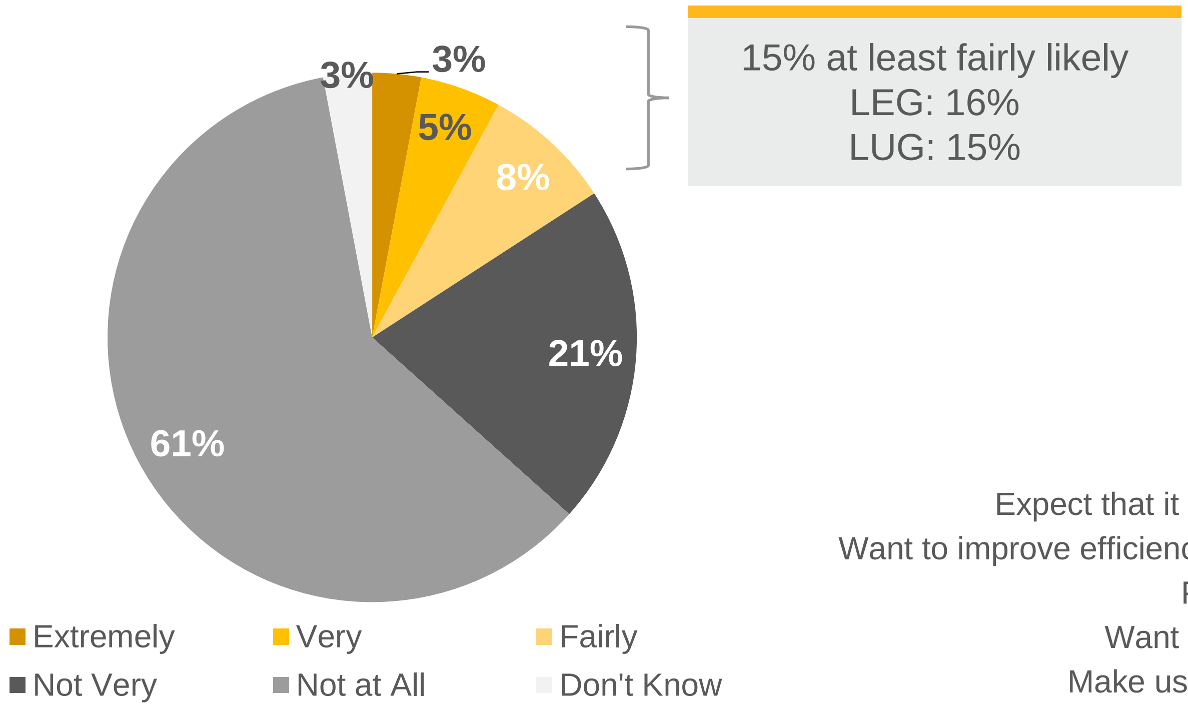
2020 Residential Single Family Natural Gas End Use Study

Water Heating: Replacement

- Similar to furnaces, a small proportion of customers (15%) indicate that they are at least likely to replace their water heater in the next 2 years because it is likely to break down or because they're looking to improve the efficiency level – among them, most would get a natural gas water heater.

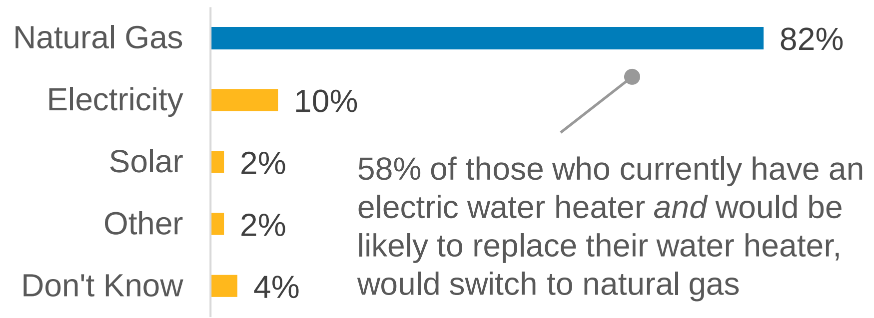
Likely to Replace Water Heater in Next 2 Years

(Base: customers who have a water heater and own their home n=2,210)



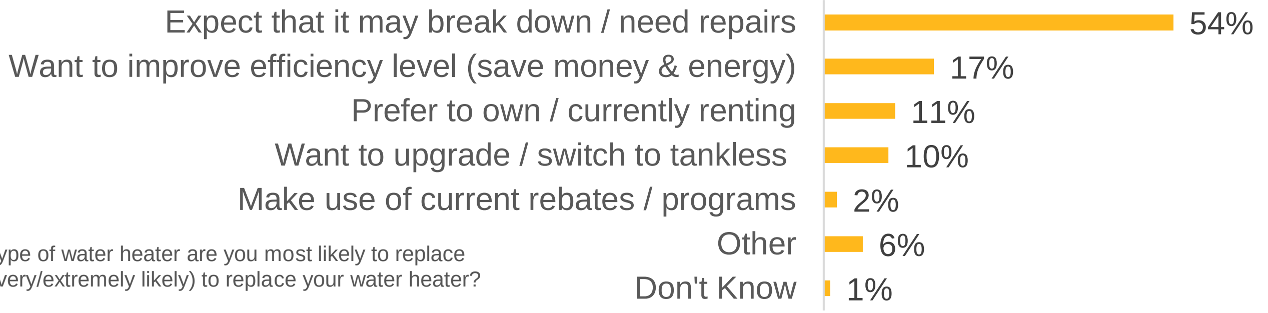
Fuel Source of New Water Heater

(Base: customers who are at least fairly likely to replace their water heater n=342)



Reason For Replacing Water Heater

(Base: customers who are at least fairly likely to replace their water heater n=342)



Q: How likely are you to replace your water heater in the next 2 years? Are you...? Q: What type of water heater are you most likely to replace your current water heater with? Q: What would you say is the main reason that you are (fairly/very/extremely likely) to replace your water heater?

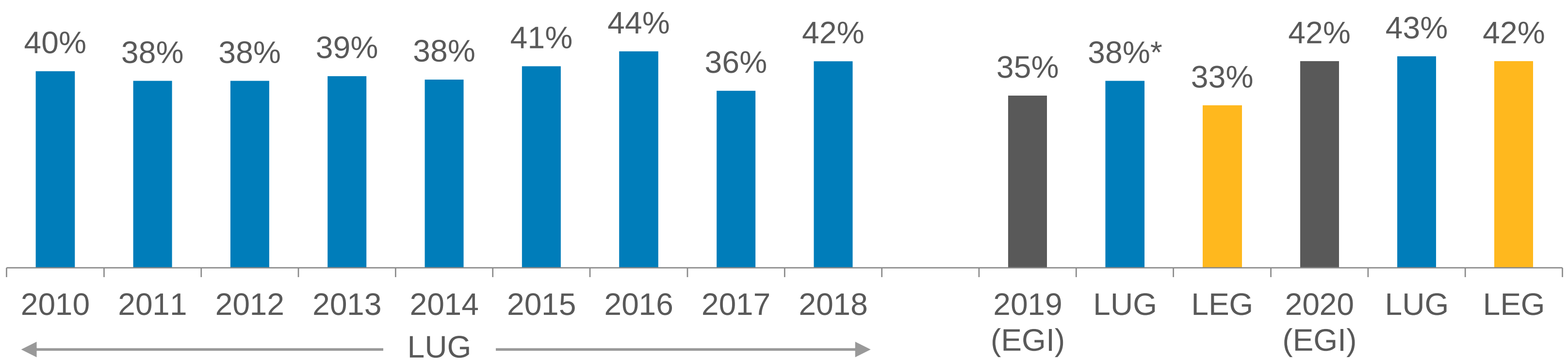
2020 Residential Single Family Natural Gas End Use Study

Fireplaces: NG Adoption & Equipment

- More LEG customers (62%) have fireplaces compared to LUG customers (53%). Natural gas fireplaces continue to be popular among those who have a fireplace or would like to install one (interest in electric fireplaces is increasing, up from 13% in 2019).
- Just over half of customers with a fireplace indicate that they use it for supplementary heating, while 1-in-3 indicate they use it for ambiance.

Natural Gas Penetration: Fireplaces

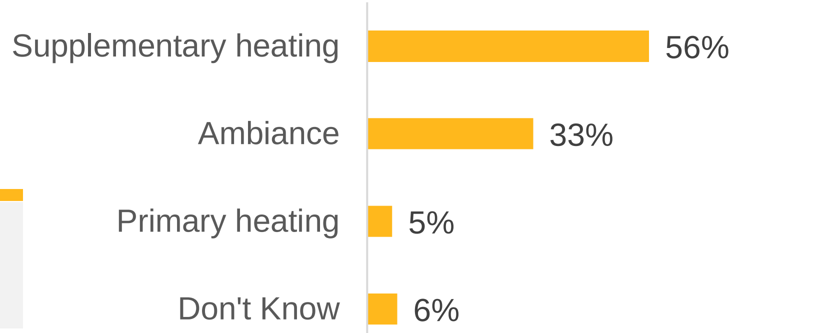
(Base: all customers)



8% are at least fairly **likely to install a fireplace** in the next 2 years, and among them 70% would install one that uses **natural gas**, 17% would use electricity and 7% would use wood as a fuel source

Use of Natural Gas Fireplace

(Base: customers who have natural gas fireplace, n=1,015)



59% of households have a fireplace

- 77% have just one
- 22% have 2 or more

Fuel Type: 72% 27% 8%

Age of Fireplaces (all)

1-in-3 (33%) fireplaces are less than 10 years old

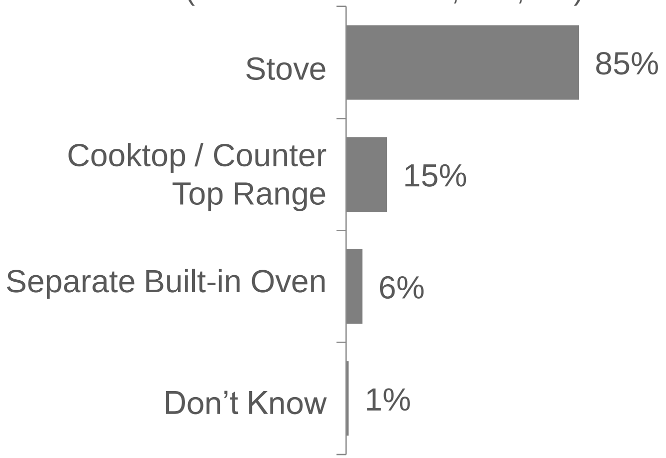
Q: Are there any indoor working fireplaces in your home? Q: How many indoor working fireplaces do you have in your home? Q: How old is (EACH)? Q: And which energy source does (EACH) use? Q: How likely are you to install an indoor fireplace in your home in the next 2 years? Are you... Q: And what type of indoor fireplace are you most likely to install? Q: Which of the following best describes how you use your natural gas fireplace(s)?

Cooking: NG Adoption & Equipment

- At 31%, penetration of natural gas for indoor cooking continues to be relatively stable. While similar across franchise areas, regionally differences exist, with the Northern (19%) and LUG Eastern (19%) regions being least likely to use natural gas for cooking while Toronto (42%) and the Southwest (39%) regions being most likely to.
- Both natural gas fuelled stoves and counter top ranges are the most prevalent in the highest earning households (37%, 57%), and the largest homes (in sq ft) (41%, 54%),

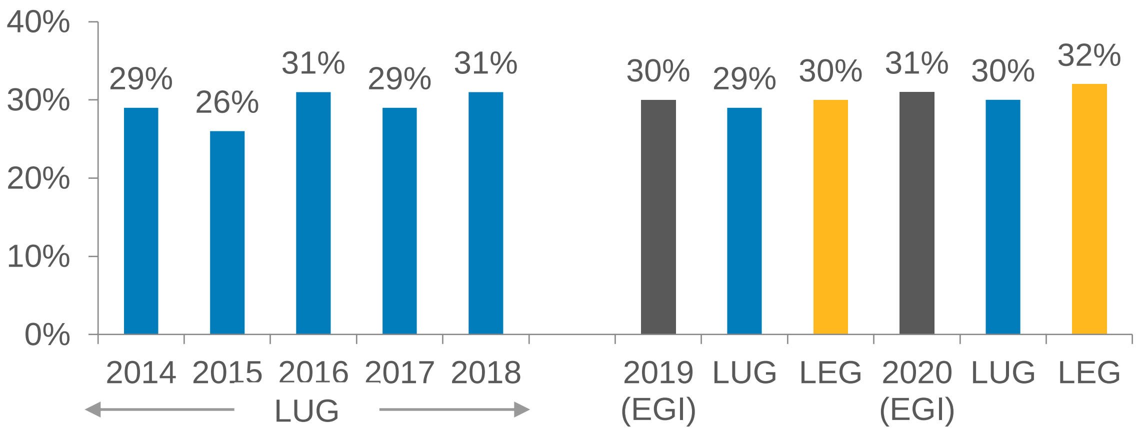
Type of Cooking Equipment (more than one response allowed)

(Base: all customers, n=2,400)



Natural Gas Penetration: Cooktop/Stove

(Base: all customers)



Region	Natural Gas (%)
Northern	19%
LUG Eastern	19%
LEG Eastern	23%
GTA West & Niagara	31%
Toronto	42%*
GTA East	28%
Southeast	30%
Southwest	39%*

Q: Do you have a stove, or do you have a cook top with a separate oven? *Q:* Is your (ITEM) fueled by natural gas or electricity?

* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

2020 Residential Single Family Natural Gas End Use Study

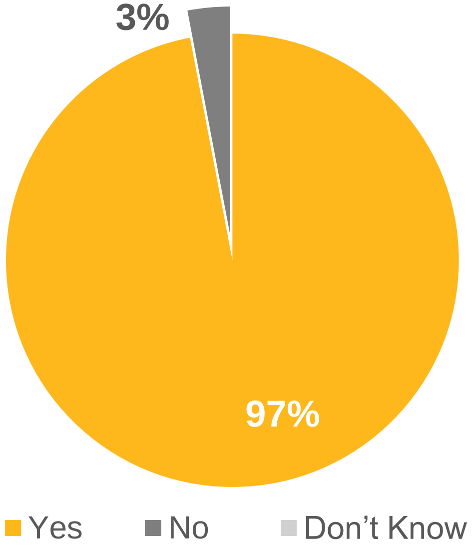
Clothes Dryer: NG Adoption & Equipment

- Almost all single-family homes have a clothes dryer (97%) with electricity being used by most across the franchise (85%) followed by natural gas (15%), with significant differences between LUG and LEG.
- Significantly more dryers in the Southwest region are fueled by natural gas compared to other regions.
- Households that own natural gas water heaters are more likely to have natural gas clothes dryers, while newer homes are less likely to have a natural gas dryer (11%) compared to older homes.

Region	Natural Gas (%)
Northern	9%
LUG Eastern	11%
LEG Eastern	8%
GTA West & Niagara	13%
Toronto	16%
GTA East	12%
Southeast	18%
Southwest	23%*

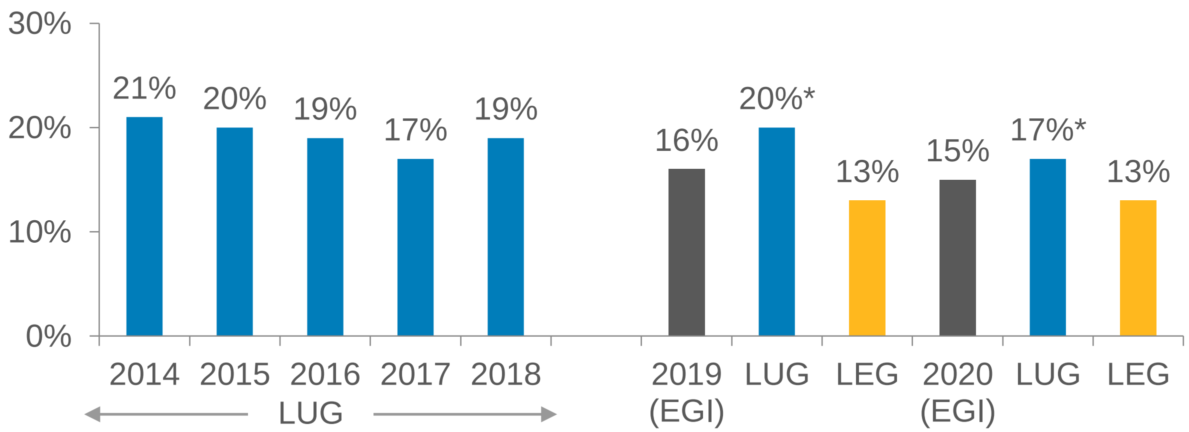
Have a Dryer

(Base: all customers, n=2,400)



Natural Gas Penetration: Clothes Dryers

(Base: all customers)



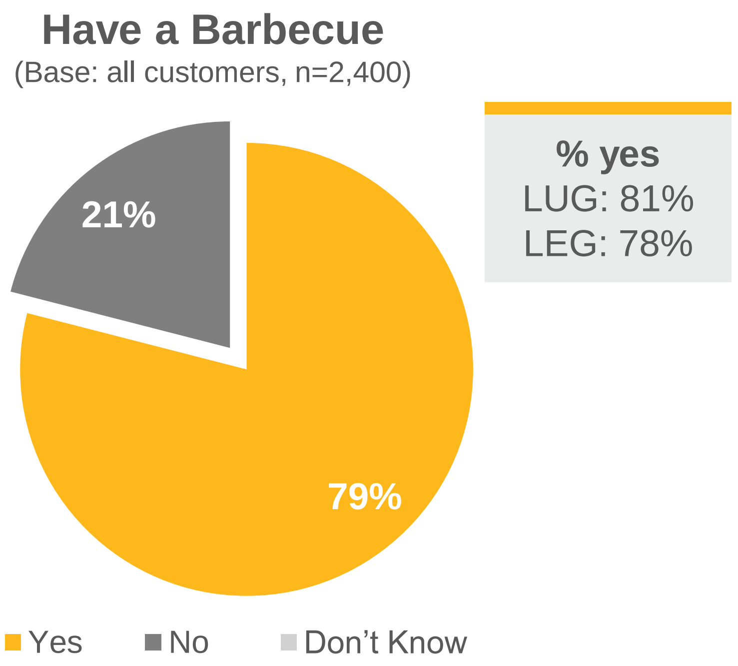
Age of Home	Natural Gas (%)
Before 1950	20%*
1950-1969	17%
1970-1989	15%
1990-1999	15%
2000-2020	11%

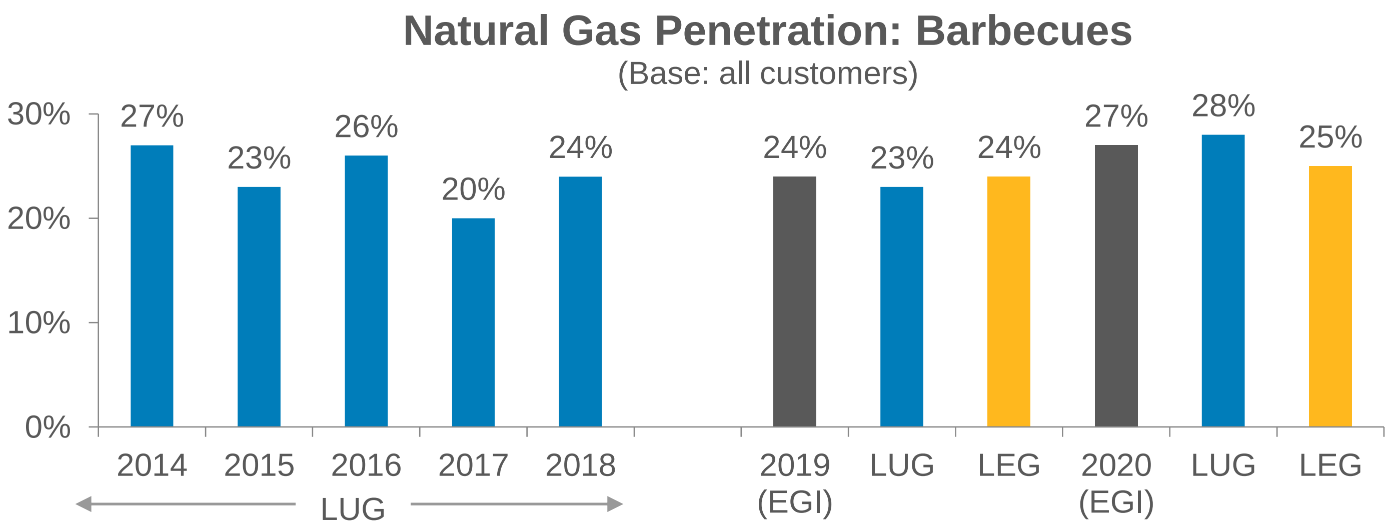
Q:Do you have a clothes dryer? Q: And is it a natural gas or an electric dryer?

* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Barbecues: NG Adoption & Equipment

- Most single-family homes have an outdoor barbecue (79%) – among them propane (61%) remains the most common fuel type, followed by natural gas (34%, up from 30% in 2019) and charcoal briquettes (5%).
- Households with higher incomes ($140K+) are more likely to have a barbecue and to use natural gas to fuel it (91% ownership, among them 46% using natural gas), compared to lower income households. Just over 2-in-3 of those earning under $40K have a barbecue of which only 27% use natural gas.





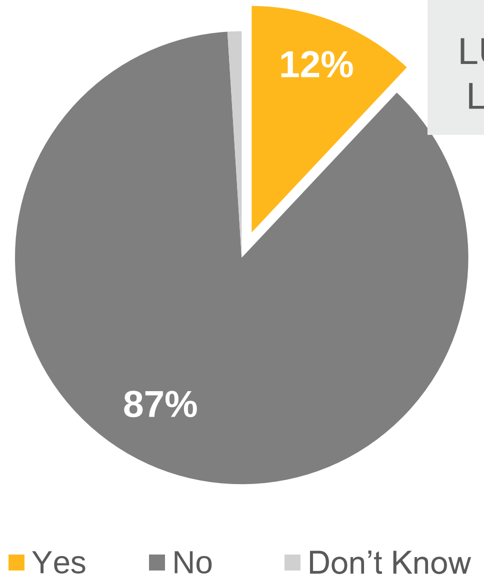
Q: Do you have an outdoor barbecue at your home? Please do not include any barbecues that are at the cottage, or ones that are used only for camping. Q: And is this barbecue fueled by ...?

Backup Power

- More homes in Northern Ontario have backup power (24%) compared to all other regions, especially Toronto (8%).
- Among sources of backup power, most customers use a portable generator fueled by gasoline or diesel, though the proportion of battery only systems for the house is slowly growing (up from 3% in 2019).

Have a Source of Backup Power

(Base: all customers, n=2,400)

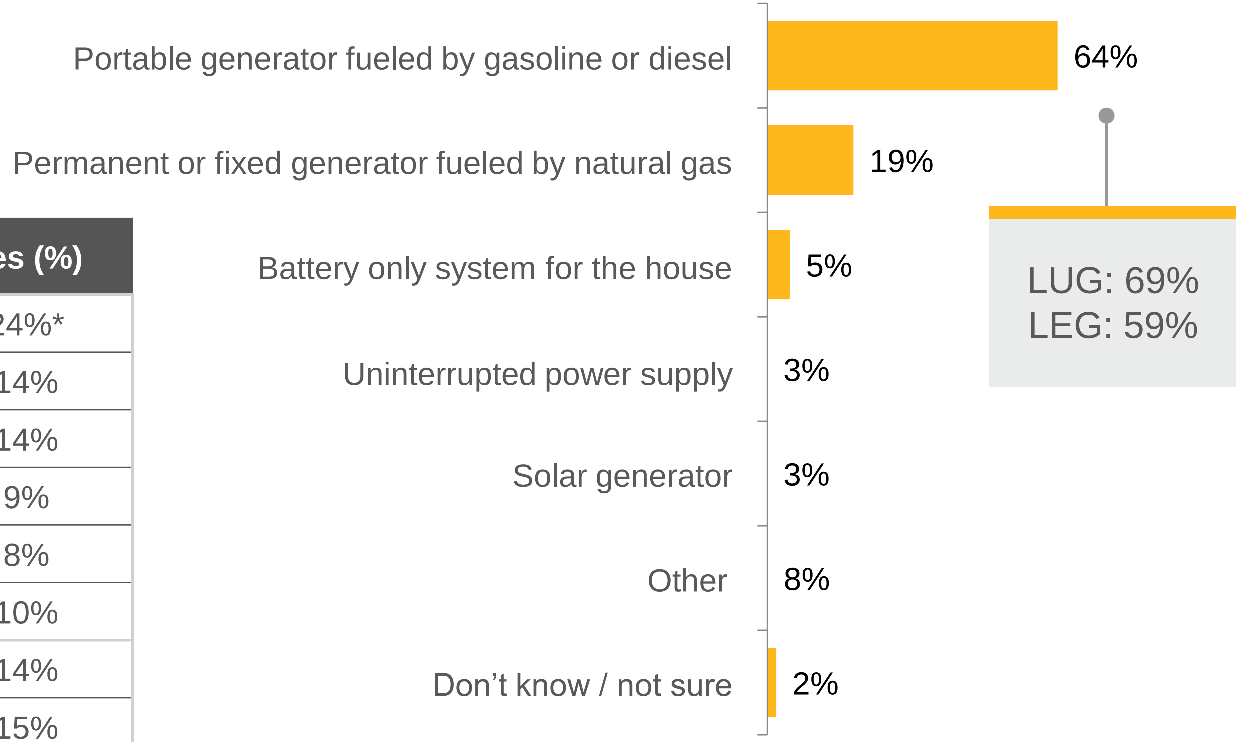


% yes
LUG: 16%*
LEG: 10%

Region	Yes (%)
Northern	24%*
LUG Eastern	14%
LEG Eastern	14%
GTA West & Niagara	9%
Toronto	8%
GTA East	10%
Southeast	14%
Southwest	15%

Type of Backup Power

(Base: customers who have a source of backup power, n=295)



Q: Do you currently have a source of backup power at your home? Q: What type of backup power do you have at your home?

* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

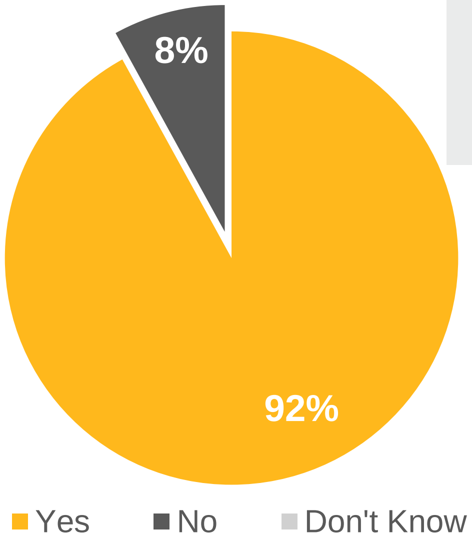
2020 Residential Single Family Natural Gas End Use Study

Insulation: Basement

- 92% of single-family homes have a basement ranging from a low of 83% in the Southwest to a high of 95% in LEG's Eastern region. Across the franchise, older homes are more likely to have poorly insulated or uninsulated basements.
- Household income also appears to be a factor – among low-income customers 15% have poorly or uninsulated basements. This represents customers who may be eligible for the Home Winterproofing Program.

Have a Basement

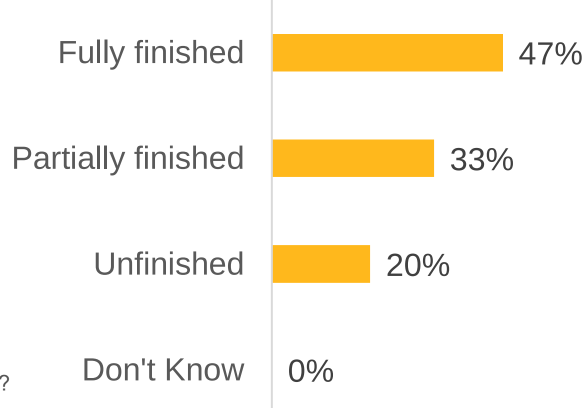
(Base: all customers, n=2,400)



% yes
LUG: 89%
LEG: 94%*

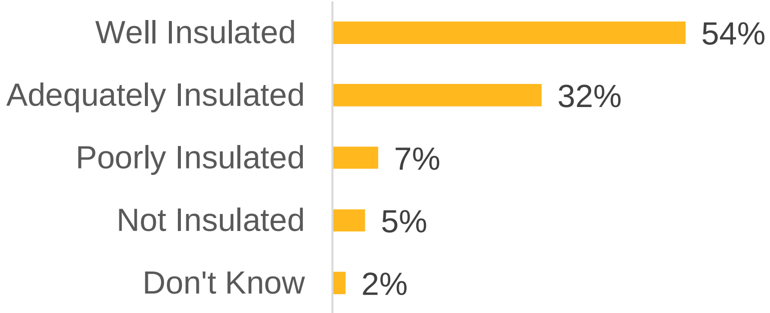
Level of Finish

(Base: customers who have a basement, n=2,212)



Level of Insulation

(Base: customers who have a basement, n=2,212)



Age of Home	Well (%)	Not (%)
Before 1950	35%	16%*
1950-1969	47%	4%
1970-1989	55%	2%
1990-1999	66%*	2%
2000-2020	66%*	2%

Household Income	Well (%)	Not (%)
Under $40K	43%	9%*
$40K-$80K	51%	7%
$80K-$100K	52%	7%
$100K-$140K	53%	4%
$140K+	61%*	1%

Q: Do you have a basement?; Q: Is your basement…?

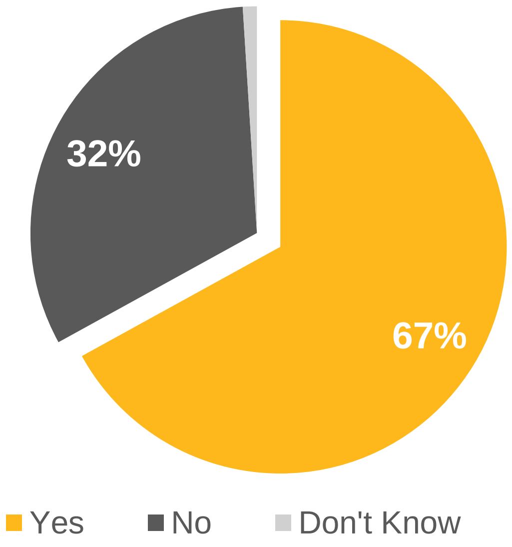
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Insulation: Attic

- Just over 2-in-3 single family homes have an attic ranging from a low of 52% in the Toronto region to a high of 75% in the Northern region. Across the franchise, older homes are more likely to have poorly insulated or uninsulated attics.
- Household income also appears to be a factor – among low-income customers more attics are poorly (5%) or not at all (1%) insulated, and a significant proportion don't know their insulation levels (as high as 10%, higher for attics than for basements), which represents customers who may be eligible for the Home Winterproofing Program.

Have an Attic

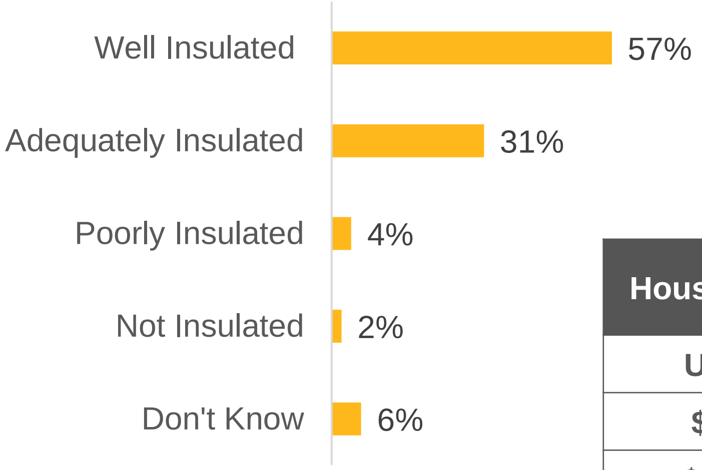
(Base: all customers, n=2,400)



% yes
LUG: 71%*
LEG: 65%

Level of Insulation

(Base: customers who have an attic, n=1,616)



Age of Home	Well (%)	Poorly (%)	Not (%)
Before 1950	55%	12%*	4%
1950-1969	56%	5%	1%
1970-1989	58%	2%	0%
1990-1999	56%	1%	2%
2000-2020	61%	2%	2%

Household Income	Well (%)	Not (%)	Don't Know (%)
Under $40K	55%	1%	10%
$40K-$80K	56%	1%	5%
$80K-$100K	52%	2%	4%
$100K-$140K	59%	1%	8%
$140K+	62%	2%	2%

Q: Do you have an attic? Q: Is your attic …?

* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

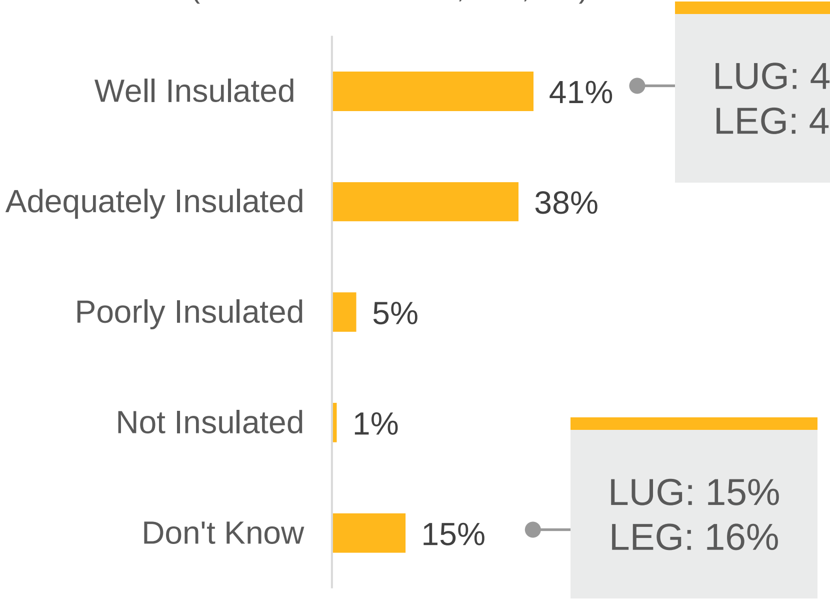
2020 Residential Single Family Natural Gas End Use Study

Insulation: Home and Exterior Wall

- Customers in LUG are significantly more likely to describe their home as being "well" insulated (43% vs. 40% LEG). Toronto customers are twice as likely as all others to say their home is 'poorly' insulated (13% vs. 5% total).
- Perceptions of insulation vary by the age of the home, where newer homes are more likely to be well-insulated compared to homes built before 1950, which sees 17% of customers indicating that their home is poorly insulated.
- Note that 15% of customers were unable to categorize the insulation level of their home.

Level of Home Insulation

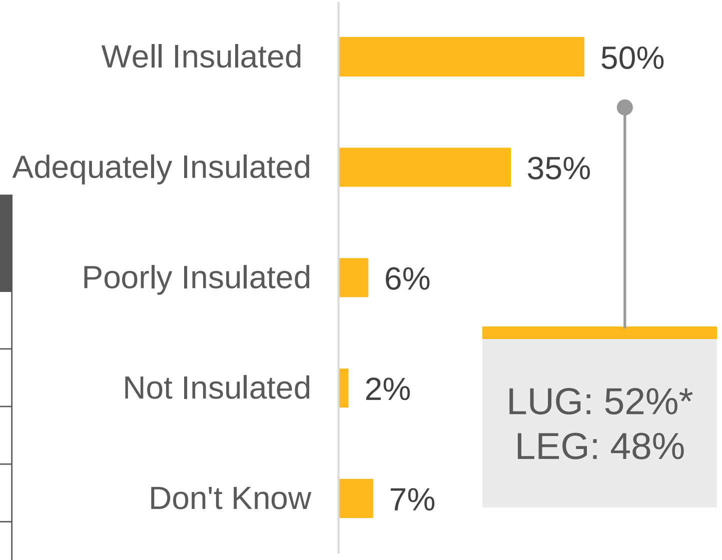
(Base: all customers, n=2,400)



Age of Home	Before 1950	1950-1969	1970-1989	1990-1999	2000-2020
Well	25%	35%	39%	49%*	61%*
Adequate	44%*	41%	45%*	34%	24%
Poor	17%*	8%*	3%	2%	0%
Not	2%*	1%	0%	0%	0%
Don't Know	12%	15%	13%	15%	15%

Level of Exterior Wall Insulation

(Base: all customers, n=2,400)



Q: How about your exterior, outside walls, are they…?; Q: Which best describes the insulation level of your home?

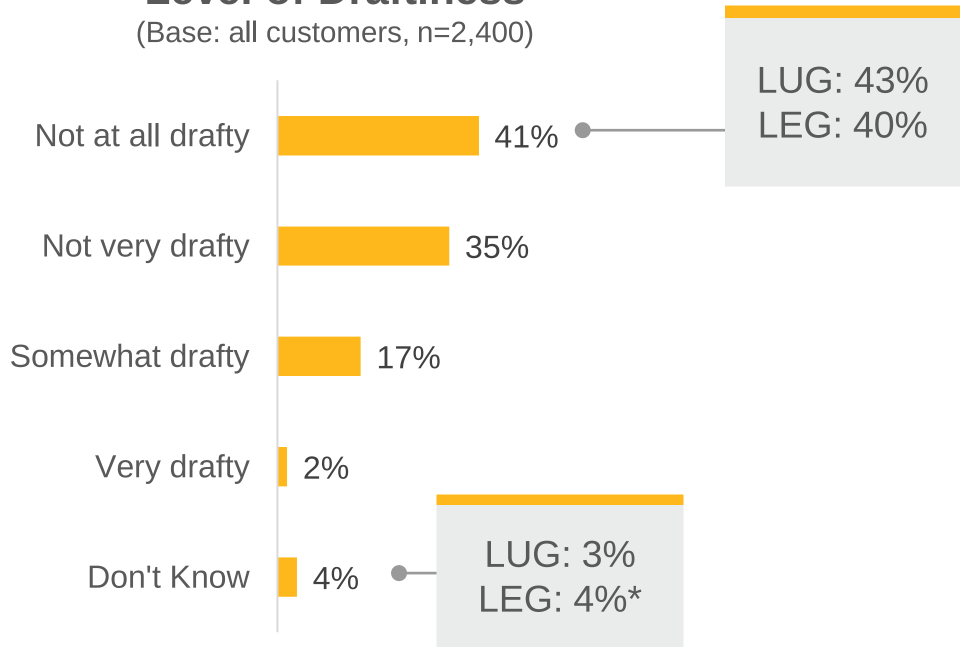
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Insulation: Level of Draftiness

- A new question about levels of draftiness was asked among customers in 2020, and very similar results are observed compared to customer perceptions of their home insulation. One key difference is that more customers were able to indicate the level of draftiness (don't know is 4%) compared to the level of insulation (don't know is 15%) in their home.
- Window frames and door frames are most commonly mentioned as areas of draftiness, with door frames especially being mentioned in the Northern region (56%) and upper floors / attic by customers in the LEG Eastern region (15%).

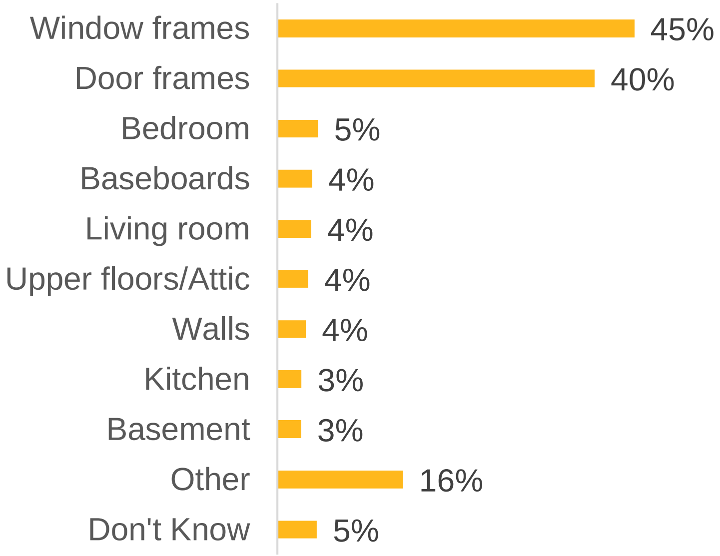
Level of Draftiness

(Base: all customers, n=2,400)



Areas of Draftiness

(Base: customers whose home is somewhat, or very drafty, n=475)



Q: How would you describe the level of draftiness in your home? Q: Where would you say the main areas of draftiness are in your home? (Total mentions)

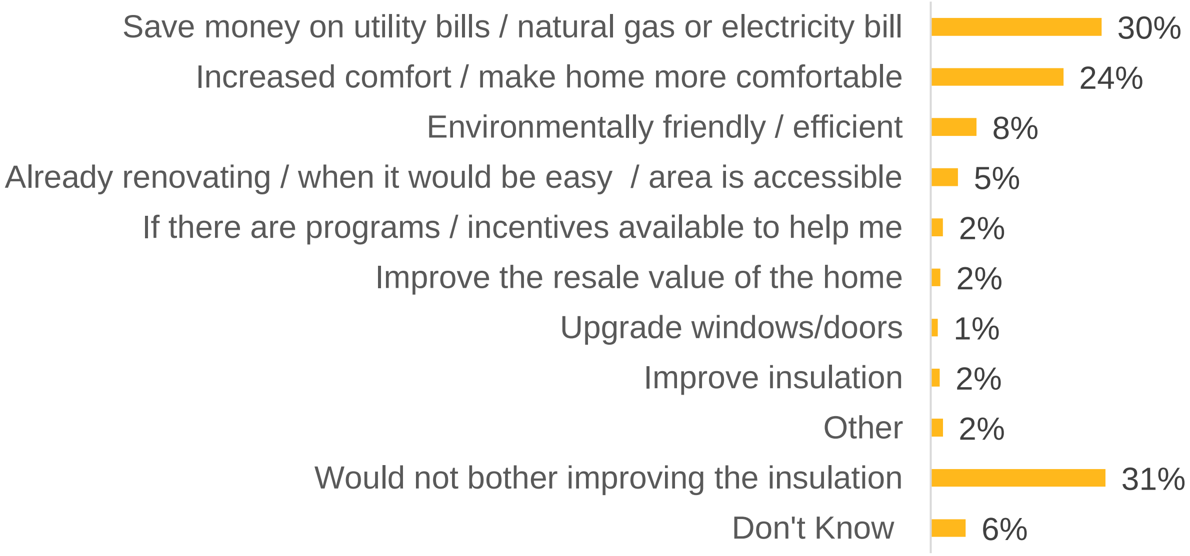
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Insulation: Motivations for Improving Insulation

- "Customers who indicated their home is not already “well” insulated were asked what would motivate them to improve their insulation. While almost a third indicated that they would not bother (nothing would motivate them), among the remainder, saving money on their utility bills was a key motivator, followed by increasing the comfort of their home.
- Increased comfort was mentioned significantly more often among women (26%), while saving money was mentioned more often among men (33%). Additionally, increased comfort was also mentioned more often among younger customers (age 18-34).

Motivation for Improving Insulation

(Base: customers who indicate that their home is not “well” insulated, n=1,372)



Q: What are the main reasons that you would improve the insulation in your home?

2020 Residential Single Family Natural Gas End Use Study

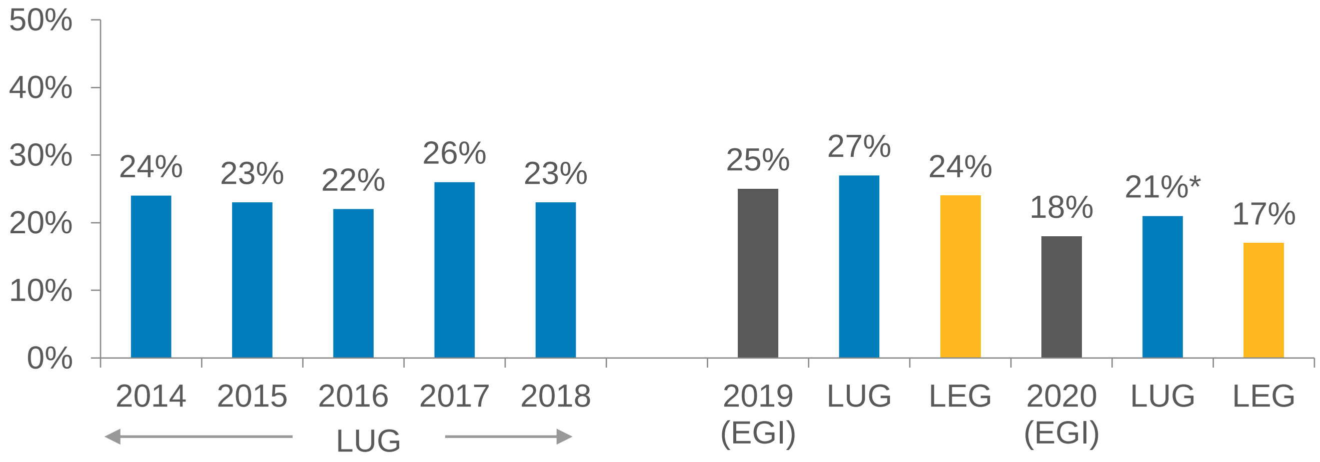
ENBRIDGE Life Takes Energy

Energy Efficiency: Future Intentions

- 18% of customers intend to make their home more energy efficient in the next 2 years, which is the lowest observed result in some time.
- This intention is significantly higher among customers in the Northern region (28%, though down from 38% in 2019) and among customers with homes built before 1950 (22%).
- Younger customers, and larger households (3+) with children (26%) are more likely to have plans to make their home more energy efficient.

Plans to make home more energy efficient in next 2 years (% yes)

(Base: all customers, n=2,400)



	Age Group	Plans (% yes)
	18 – 34	32%*
	35 – 54	24%*
	55 – 64	17%
	65+	10%

Region	Yes (%)
Northern	28%*
LUG Eastern	19%
LEG Eastern	17%
GTA West & Niagara	17%
Toronto	17%
GTA East	15%
Southeast	19%
Southwest	19%

Age of Home	Yes (%)
Before 1950	22%
1950-1969	20%
1970-1989	19%
1990-1999	19%
2000-2020	15%

Q: Do you have any plans to make your home more energy efficient within the next two years?

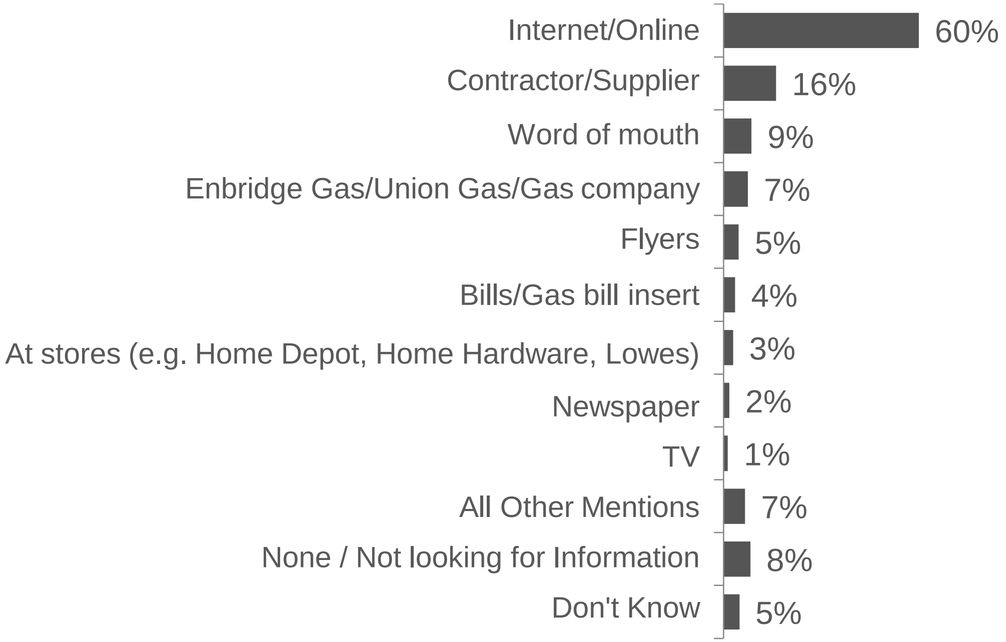
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Energy Efficiency: Sources of Information

- Most customers planning to make their home more energy efficient go online to look for information – senior-led households and lower income households do so at lower rates.
- Contractor/Supplier is mentioned more often this year (compared to 6% in 2019), while all other areas are mentioned less frequently (Internet/Online is down from 65% and Union Gas / Enbridge Gas / gas company is down from 10%).

Top Sources of Information (Unaided)

(Base: all customers who plan to make their home more energy efficient, n=438)



Age Group	Internet / Online	From LEG/LUG
18 – 34	66%	15%*
35 – 54	64%	7%
55 – 64	62%	6%
65+	45%	6%

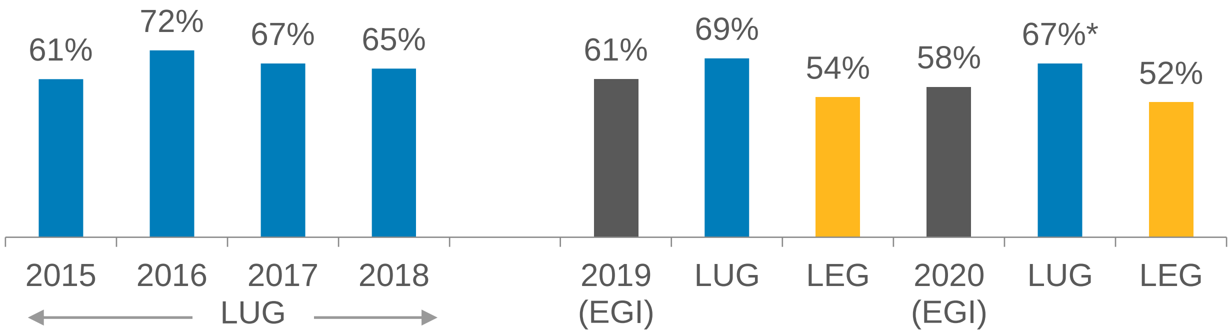
Q: Where do you look for energy efficiency information? IF NECESSARY: What sources do you consider?

* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Energy Efficiency: Awareness of Any Programs

- Awareness that Enbridge Gas offers energy conservation and energy efficiency improvement programs and incentives is significantly higher among LUG customers, and ranges from highest in the Southwest (73%) to lowest in several LEG regions (52%).
- Awareness is also stronger among customers aged 55-64, though they're not as likely to have plans to make their homes more energy efficient compared to their younger counterparts. Awareness is also higher among those whose homes are well insulated (63%) compared to those whose homes are adequately or poorly insulated, providing an opportunity for further marketing.

Aware that LUG/LEG offers Energy Conservation & Efficiency Programs
(Base: all customers, n=2,400)



	Age Group	Aware (% yes)
	18 – 34	55%
	35 – 54	56%
	55 – 64	63%*
	65+	58%

Region	Yes (%)
Northern	62%
LUG Eastern	55%
LEG Eastern	52%
GTA West & Niagara	52%
Toronto	52%
GTA East	53%
Southeast	67%*
Southwest	73%*

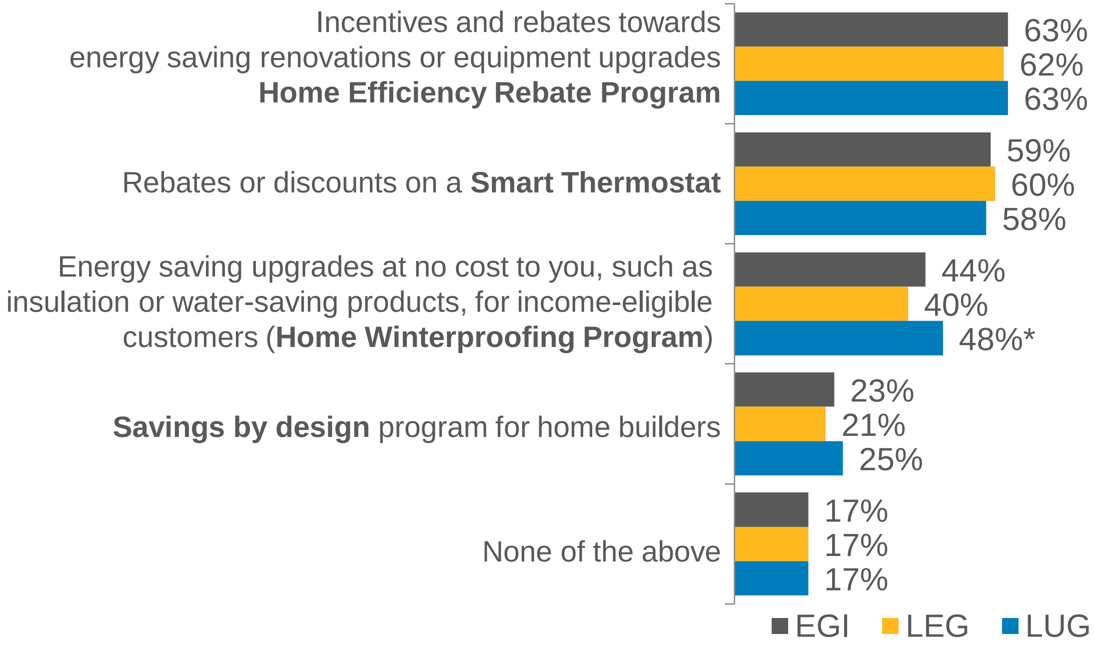
Q: Are you aware that Union Gas / Enbridge Gas offers energy conservation & energy efficiency improvement programs & incentives to help residential customers like you to save money on their energy bills?
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Energy Efficiency: Awareness of Programs

- Among those who are aware that Enbridge Gas offers programs, almost 2-in-3 are aware of the HER program, while just under 1-in-2 are aware of the HWP (more LUG customers are aware of this compared to LEG customers). Awareness of rebates or discounts on a Smart Thermostat follows just behind HER and is similar among LUG and LEG customers.

Offerings Aware of … *(aided awareness)*

(Base: all customers aware that EGI offers programs)

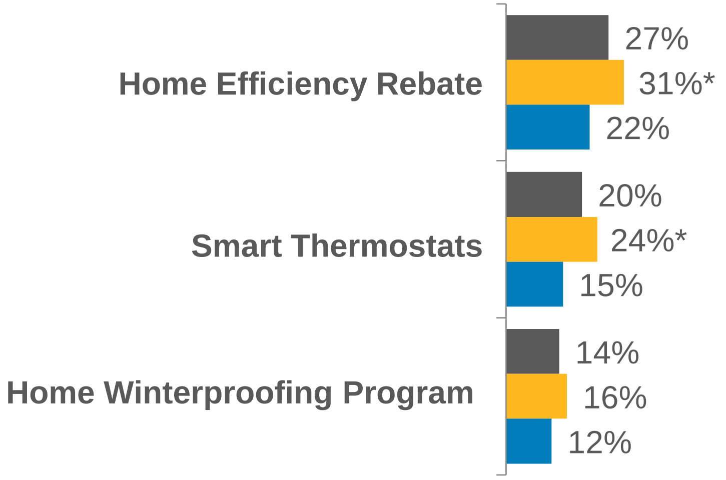


(Base: all customers)

EGI: 36%	LEG: 32%	LUG: 42%
EGI: 34%	LEG: 31%	LUG: 39%
EGI: 25%	LEG: 21%	LUG: 32%
EGI: 13%	LEG: 11%	LUG: 17%
EGI: 10%	LEG: 9%	LUG: 12%

Previously Participated (self-reported)

(Base: all customers aware of the specified program)



(Base: all customers)

EGI: 10%	LEG: 10%	LUG: 9%
EGI: 7%	LEG: 8%	LUG: 6%
EGI: 4%	LEG: 3%	LUG: 4%

HAP (Home Assistance Program offered by the IESO)

EGI: 6%	LEG: 6%	LUG: 5%

Q: Which of the following company energy conservation offerings are you aware of?; Q: Have you ever participated in the ...

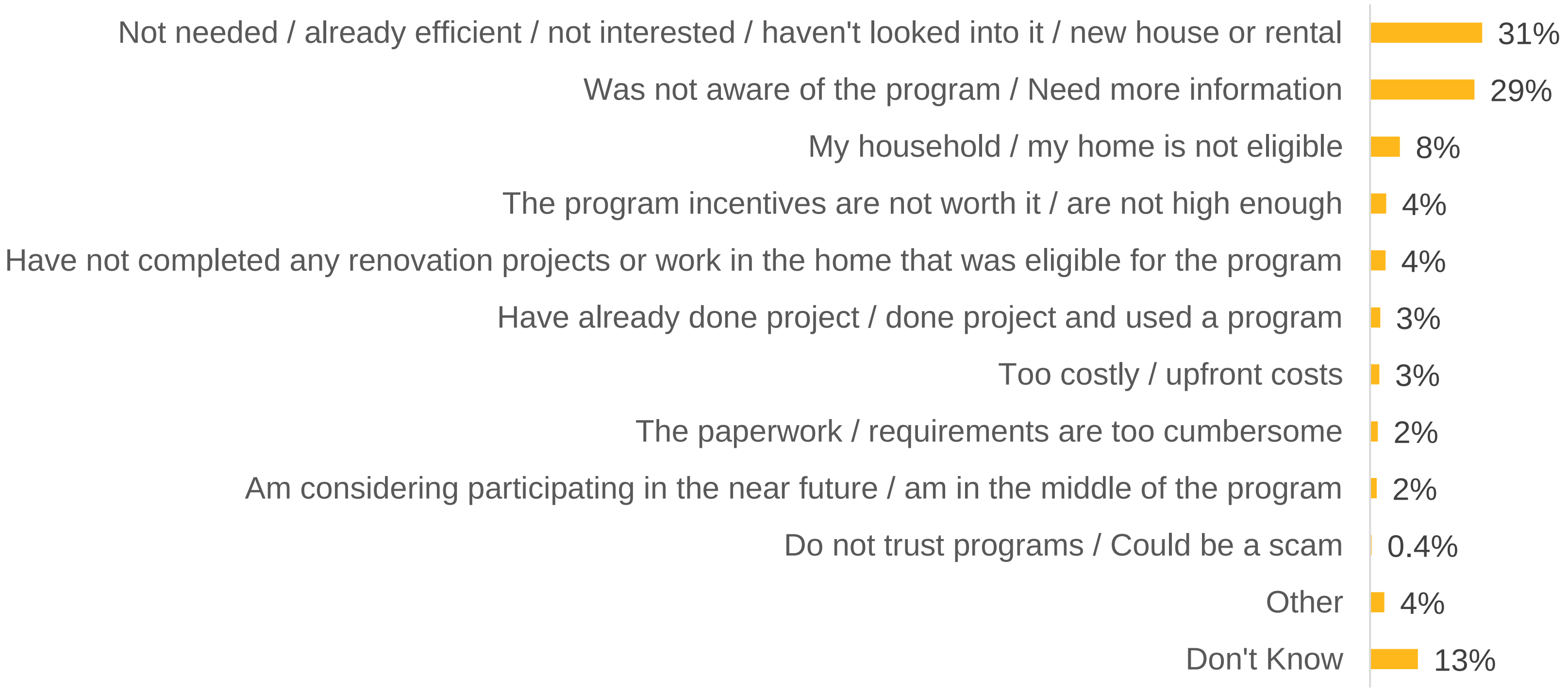
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Energy Efficiency: Reasons for not Participating

- Customers who were aware of Enbridge Gas' offerings but did not participate in any indicated that they did not need to do any work in the home, or were not interested. Others indicated that they were not fully aware of the program(s) or needed more information.

Reasons for Not Participating in Any Enbridge Gas Program

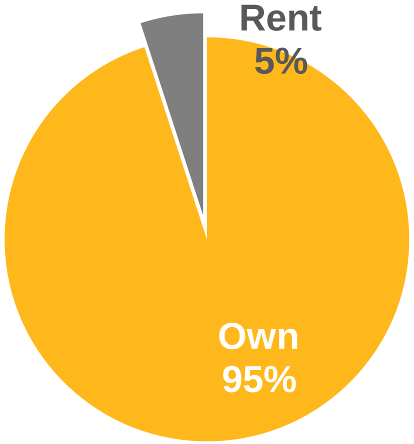
(Base: customers who are aware of any program but have not participated, n=1,710)



Q: What would you say are the main reasons that you have not participated in any of Enbridge Gas' energy conservation programs? (Total mentions)

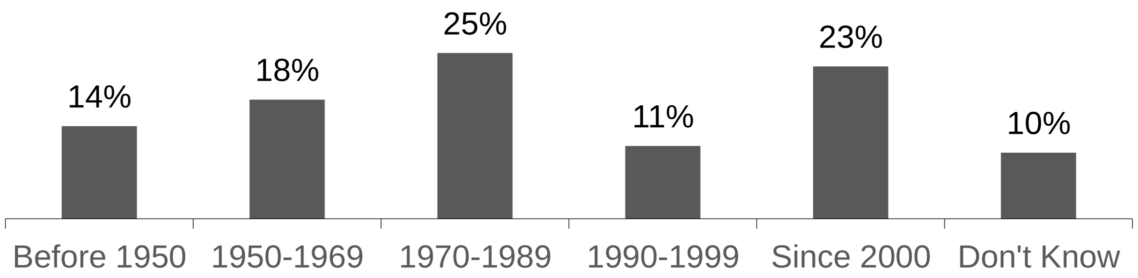
Demographics: House Characteristics (EGI)

Home Ownership

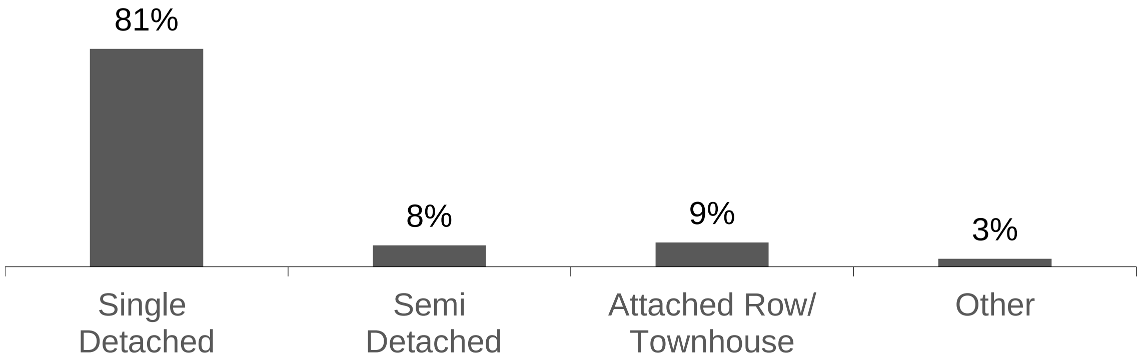


Age of Home

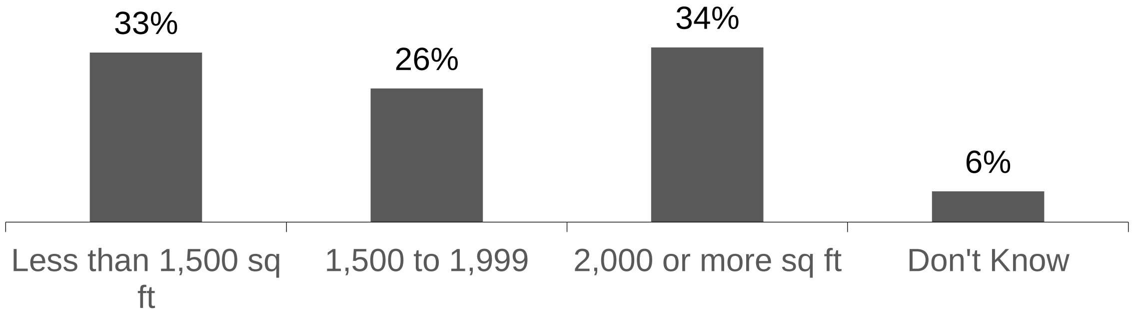
Average: 1974



Type of Home



Size of Home

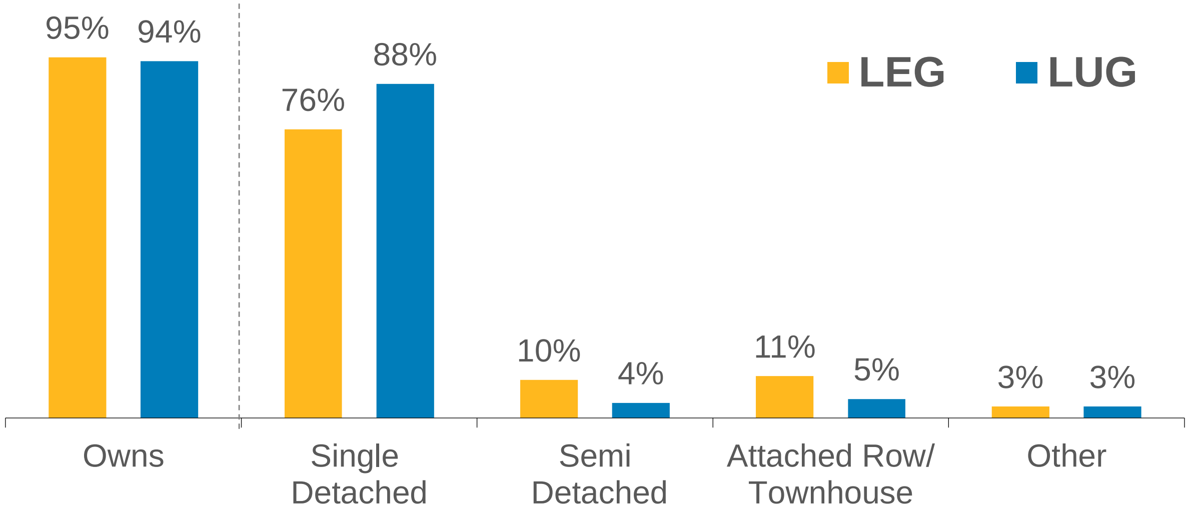


2020 Residential Single Family Natural Gas End Use Study

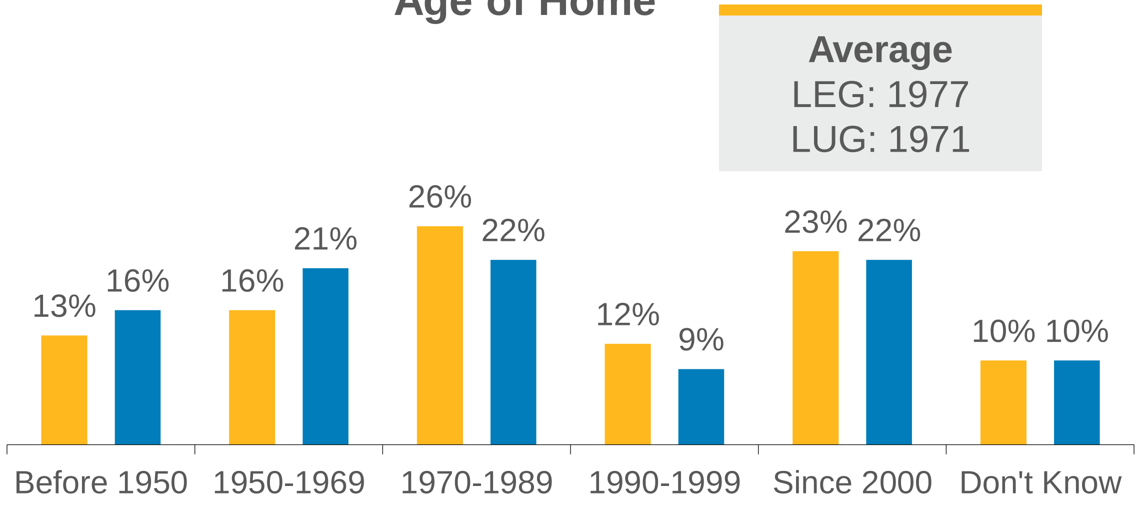
Demographics: House Characteristics (Legacy)

Home Ownership

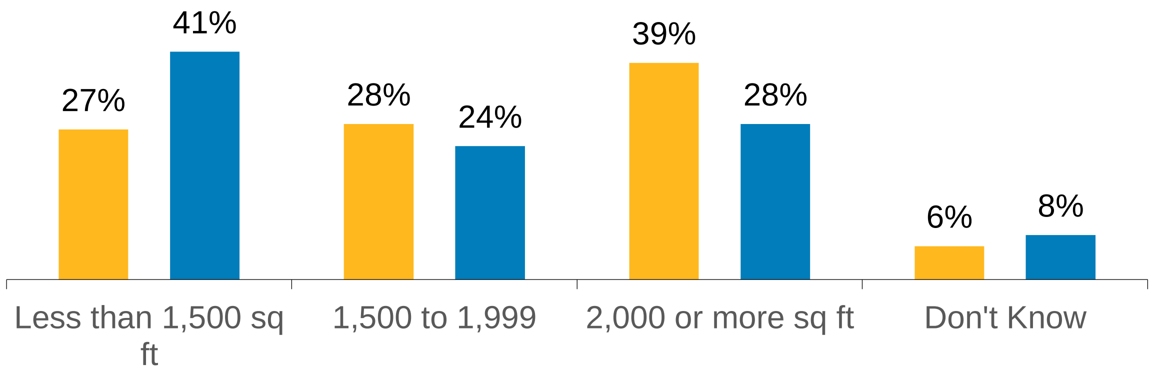
Type of Home



Age of Home



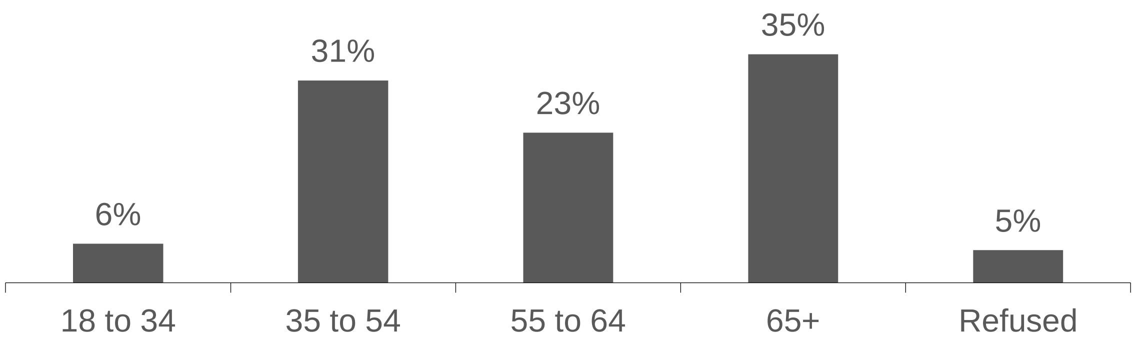
Size of Home



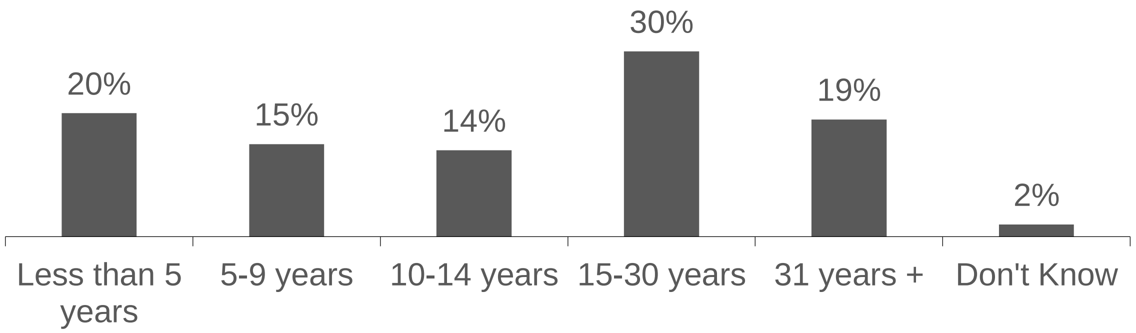
2020 Residential Single Family Natural Gas End Use Study

Demographics: Customer Characteristics (EGI)

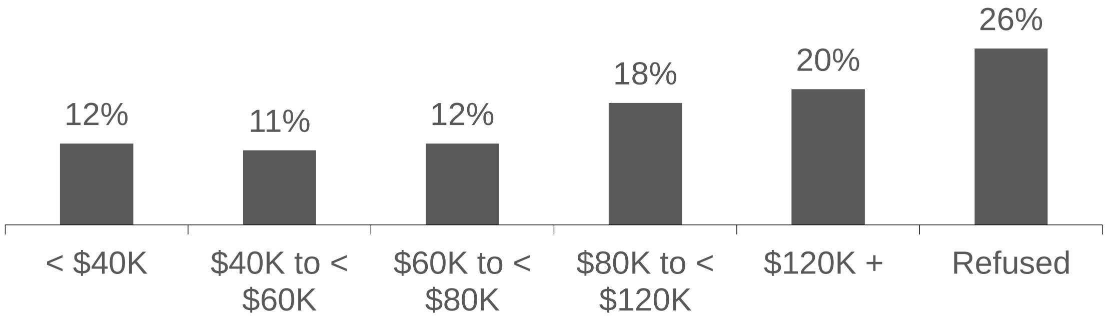
Age



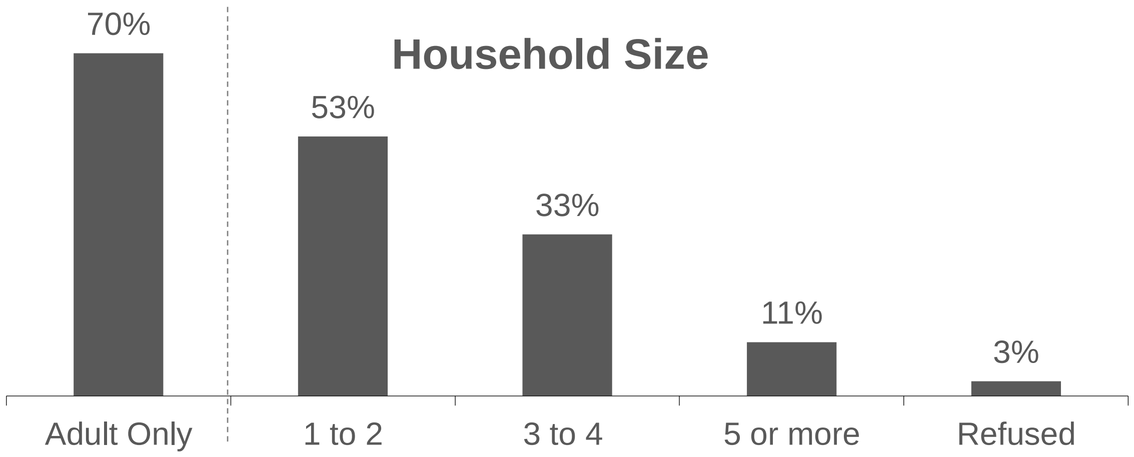
Length of Residence



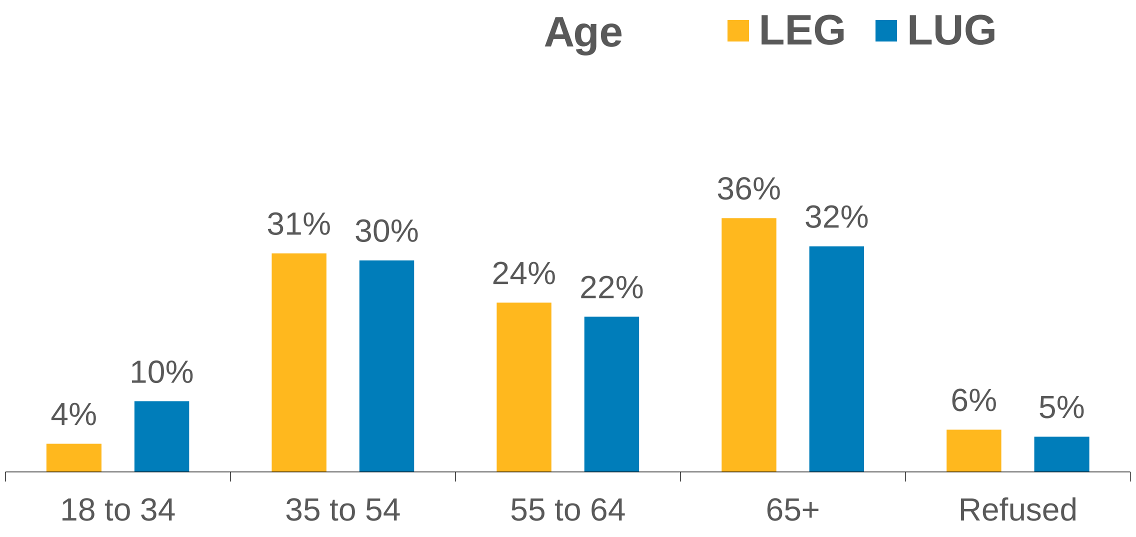
Household Income

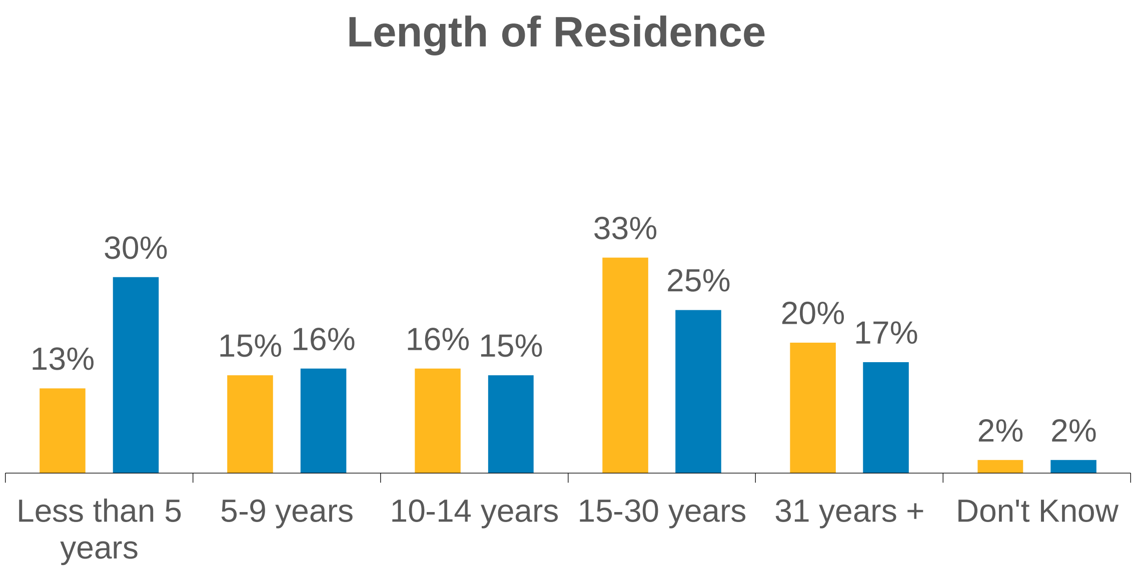


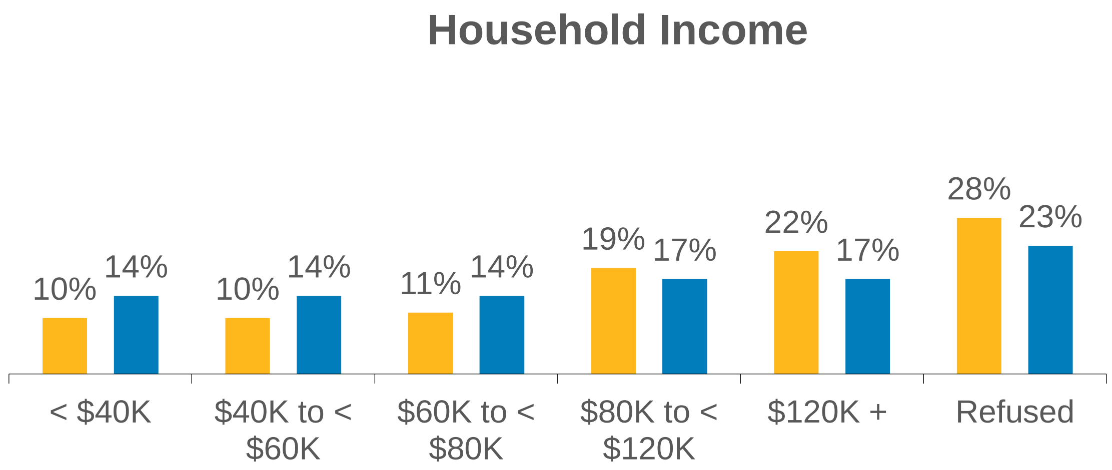
Household Size

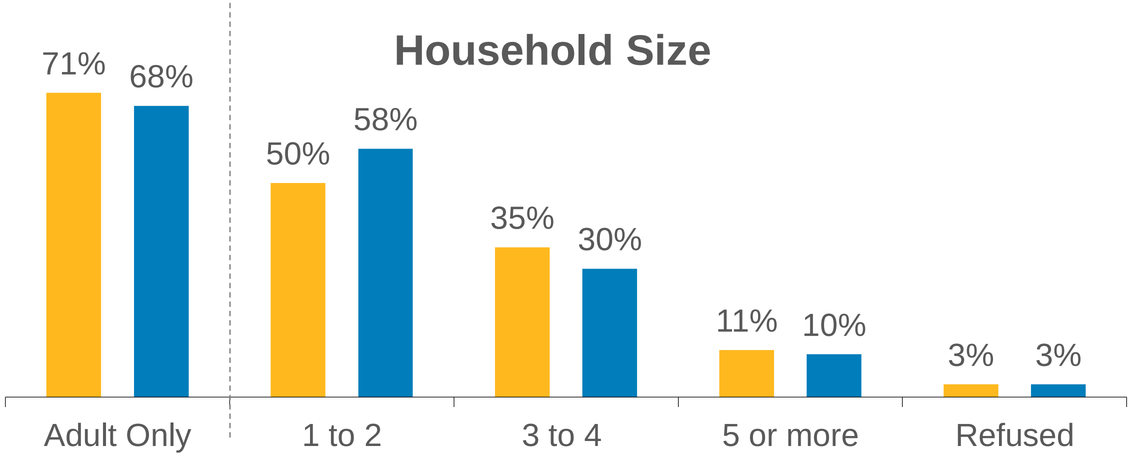


Demographics: Customer Characteristics (Legacy)









Appendix: Number of Natural Gas Applications

- Added to the report in February 2023
- The following applications were included:
  - Home Heating
  - Water Heating
  - Fireplaces (any number)
  - Stove (any number of cooktops / ranges)
  - BBQ
  - Clothes Dryer
  - Backup Power

	Frequency	Percent
0 natural gas applications	22	1%
1 natural gas application	216	9%
2 natural gas applications	747	31%
3 natural gas applications	684	28%
4 natural gas applications	442	18%
5 natural gas applications	207	9%
6 natural gas applications	78	3%
7 natural gas applications	6	0%
Total	2400	100%

Customers who indicated “don’t know” to any of the individual application questions are included in the base size, but not counted as having natural gas for that application.

2021 Residential Single Family Natural Gas End Use Study

2021 Annual Results

Customer & Market Insights
Updated February 2023

Objectives

- To measure the penetration of natural gas appliances in the single family residential customer market;
- To understand customer perceptions of the levels of insulation in their home;
- To determine awareness of Enbridge Gas' energy conservation programs, and understand where customers turn to for more information.

Methodology

- Sponsor-identified telephone interviews were completed by Leger between November 23 and December 17, 2021.
- Interviews were completed with customers who reside in single family dwellings and are (mainly) responsible for making energy-related decisions for the home.
- The total number of completed interviews is 2,404 with 1,200 for each of LUG and LEG in total, and final franchise-wide results are calculated based on true geographic proportions.
- Overall results yield a margin of error of +/-2.8% at the 95% confidence interval.
- Unless otherwise noted, results in this report are based on all customers (EGI, comprised of LUG and LEG combined).
- The regions reported in this report are defined as follows:

Region Name	Includes	
Northern	Northeast, Northwest	LUG
LUG Eastern	Eastern	LUG
LEG Eastern	DMA 65	LEG
GTA West & Niagara	DMA 76, DMA 53, DMA 21	LEG
Toronto	DMA 01	LEG
GTA East	DMA 35, DMA 45, DMA 47	LEG
Southeast	Waterloo/Brantford, Hamilton/Halton	LUG
Southwest	Windsor/Chatham, Sarnia/London	LUG

Executive Summary (1 of 2)

Natural Gas Penetration

- There was a statistically significant decrease in the penetration of natural gas heating and natural gas water heating in 2021 compared to the previous year. These trends should be monitored.
- When asked to think about a new home, barring any other considerations, most customers continue to choose natural gas, though a small, but growing, proportion would choose alternate sources, such as geothermal or solar for home and water heating, respectively.
- The prevalence of natural gas in secondary appliances is consistent over the last few years for cooktop/stove and clothes dryers. Fireplace and barbecue show signs of decrease. Across secondary appliances, some regional variation continues to exist.

Ownership

- Furnace ownership continues to be very high (84%), though an increasing trend in renting is observed. Renting is a bit more common among newer homes and among younger customers. Overall, in the case of future ownership, most customers intend to own (79%), but this is significantly lower compared to 2020 (92%).
- Ownership of water heaters remains steady over the last several years for LUG customers and is similar among LEG customers. It continues to remain much lower than furnace ownership. Among those who are at least fairly likely to replace their water heater in the next 2 years, interest in ownership is much stronger (69%) than current ownership (43%).

Furnace Efficiency

- A different approach to asking customers about the efficiency level of their furnace was introduced in 2020. A higher proportion of customers continue to report that their furnace is high-efficiency.
- A sizable group of customers do not know the efficiency level of their furnace (this has not changed much over the past decade) – customers who don't know are not likely to be aware of and act on the potential for upgrades.
- There is a continued increase in the proportion of customers who have a Smart Thermostat (27%), up from 23%, as customers upgrade their thermostats; about 2-in-3 customers with a programmable or Smart thermostat actively program it to reduce energy consumption.

Executive Summary (2 of 2)

Insulation

- About 2-in-5 customers (43%) deem their house to be "well insulated" while 7% indicate it is "poorly insulated" or "not insulated," which varies by the age of the home. A sizeable proportion of customers (14%) don't know the level of insulation for their home, but most are able to communicate the level of draftiness they experience in their home.
- About 1-in3 customers whose home is not "well insulated" would improve insulation to "save money on utility bills", while 26% would do so to increased comfort. Another 22% of customers would not bother improving their insulation.

Energy Efficiency (EE) and DSM offerings

- The proportion of customers planning to make energy efficiency updates returned to the 2019 level (26%) at the end of 2021 (18% in 2020 and 25% in 2019).
- Awareness that Enbridge Gas offers energy conservation programs sits at 64% among LUG customers and at 52% among LEG customers – this varies by customer age group and region.
- Overall, customer awareness of the HWP and HER programs remains strong at 21% and 31%, respectively. Among all customers, 29% are aware of the rebates and discounts on a Smart Thermostat. Among those aware of the respective programs, 16% have participated in HWP, 25% in HER and 20% in Smart Thermostat.
- Though decreasing over time, the internet continues to be the most important source of general energy efficiency information – highlighting the importance of digital marketing and strong website content. "Direct from Enbridge Gas" accounts for 10% of the mentions as an energy efficiency information source.

Overview of Natural Gas (NG) Equipment

- Comparing 2021 to 2020, the penetration of natural gas is down directionally for home heating, water heaters, indoor fireplaces and barbecues. The penetration of natural gas clothes dryers and cooktops/stoves remains unchanged.
- Natural gas for home heating is just slightly higher in LUG compared to LEG, and the use of natural gas for clothes dryers continues to be significantly higher in LUG.

Natural Gas Penetration Rates across Appliances

	2014	2015	2016	2017	2018	2019	2020			2021		
			LUG			EGI	EGI	LUG	LEG	EGI	LUG	LEG
Home Heating	96%	96%	95%	96%	94%	96%	96%	96%	97%	94%	95%*	93%
Water Heater	85%	86%	86%	83%	82%	82%	85%	83%	86%	80%	79%	81%
Fireplace	38%	41%	44%	36%	42%	35%	42%	43%	42%	37%	38%	36%
Cooktop/Stove	29%	26%	31%	29%	31%	30%	31%	30%	32%	32%	32%	32%
Barbecue	27%	23%	26%	20%	24%	24%	27%	28%	25%	23%	25%	23%
Clothes Dryer	21%	20%	19%	17%	19%	16%	15%	17%*	13%	14%	17%*	10%
Pool Heater	(--)	(--)	(--)	(--)	5%	6%		(--)		5%	3%	3%

(--) = was not measured

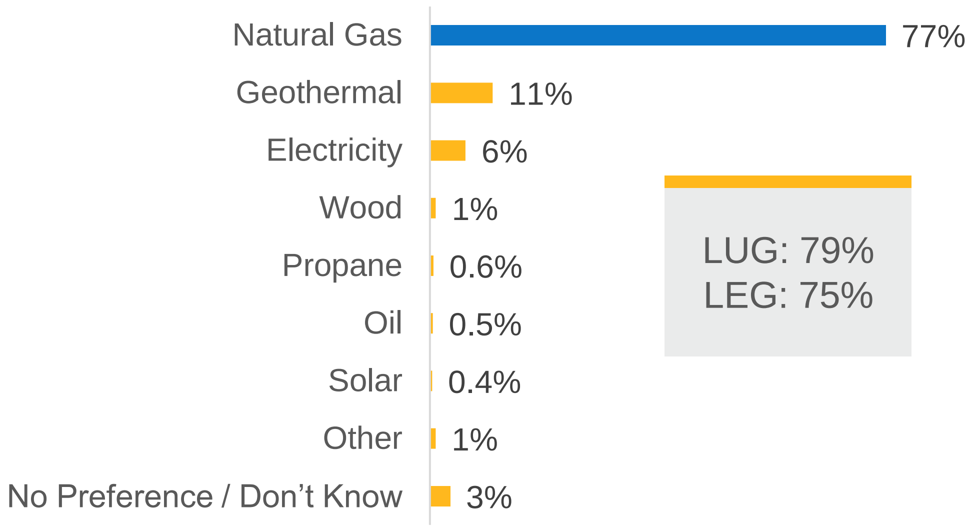
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Home Heating: Preference

- Most customers (77%) would prefer natural gas for home heating in a new home (down from 83% in 2020 and 86% in 2019).
- Preference for geothermal (11%) and electricity (6%) in new homes continues to trend upward.
- Preference for natural gas is strongest in the Northern (82%) region, while lowest in the Toronto (66%) region.
- Key reasons for choosing an alternate fuel source include the perception that it is more environmentally friendly / energy efficient (especially for geothermal) and has lower operation costs. Also, electricity is deemed to be safer by some customers.

Preferred Fuel Source for Home Heating

(Base: all customers, n=2,404)



LUG: 79%
LEG: 75%

Reason for Preferred Fuel Source

(Base: all customers who indicated a preferred fuel source)

	Natural Gas (n=1,841)	Electricity (n=143)	Geothermal (n=254)
Lower operation cost	54%	18%	33%
Environmentally friendly / Energy efficient	21%	37%	70%
It is what I am used to / Used in the past	16%	7%	2%
Easier / More convenient	14%	8%	1%
Reliable / Dependable heat source/ Best option	11%	8%	7%
It is what is available/ Preferred source not available	8%	4%	1%
More heat generated / It's warmer	3%	1%	0.4%
Safer / Safety concerns	2%	13%	1%
Other	3%	8%	8%
DK/NA/Refused	4%	11%	2%

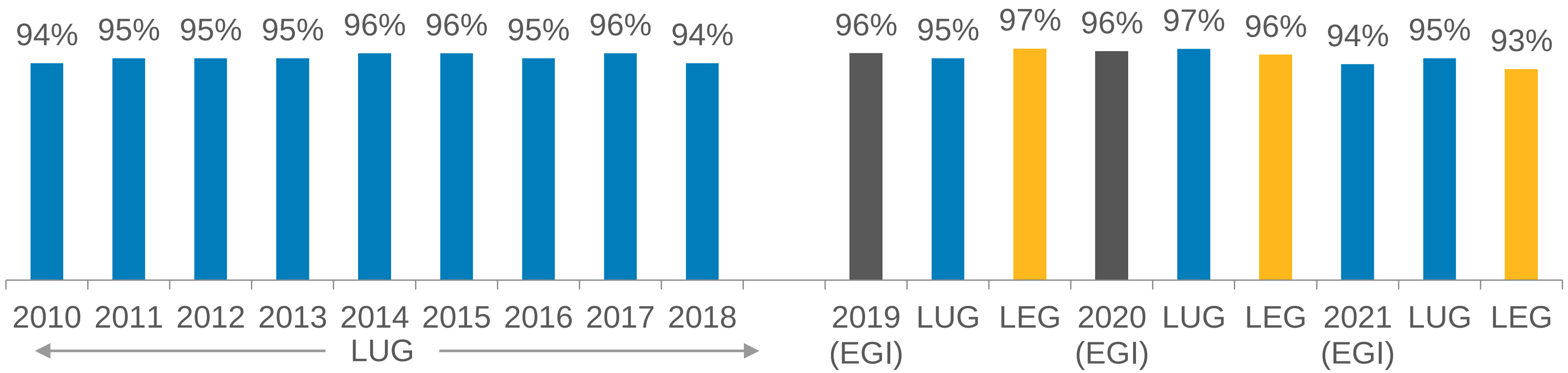
Q: I would now like you to assume that you are moving into a new home. Which energy source would you choose for each of the following? PRIMARY home heating Q: What would you say are your main reasons for choosing (insert choice) as your primary source for your home heating? (Total mentions)

2021 Residential Single Family Natural Gas End Use Study

Home Heating: NG Adoption & Equipment

- Natural gas forced air furnaces continue to be the most used heating equipment across the franchise.
- A sizable portion of customers are not aware of the specific type of heating equipment they have in their home (1-in-10 among those who heat with natural gas)
- Those who don't use natural gas for home heating use electricity (5%) followed by only handfuls in the sample of customers who heat with wood, propane, or oil.

Natural Gas Penetration: Home Heating
(Base: all customers)



Type of Natural Gas Heating Equipment (n=2,236)	
Forced Air	78%
Hydronic	4%
Space Heaters	0%
Combination	2%
Hybrid or dual-fuel system of a forced air furnace and electric air source heat pump	3%
Don't Know	13%

Type of Electric Heating Equipment (n=111)	
Forced Air	62%
Baseboard Heaters	14%
Air Source Heat Pumps	1%
A hybrid or dual-fuel system of a forced air furnace and electric air source heat pump	5%
Electric boiler (radiator)	2%
Other	5%
Don't Know	13%

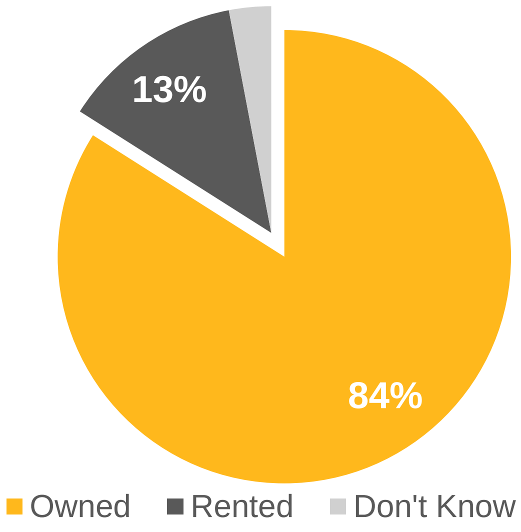
Q: What is the MAIN energy source for heating your home? Q: What type of **(PROPANE/NATURAL GAS/OIL)** furnace or heating system do you have? Q: What type of electric system are you using to heat your home?

Home Heating: Furnace Ownership

- Most customers own their furnace (or heating system), and most customers who anticipate replacing their furnace or heating system in the future would continue to own it (rather than rent it). Furnace ownership is down considerably compared to 2020 (from 89% for 84%) and future ownership intention (from 92% to 79%).
- Rental rates are higher among some customer groups, including households that also rent the water heater (16%), in homes built since 2000 (16%), those with incomes under $40K (19%) and among younger (18-34) customers (18%).

Ownership of Current Furnace / Heating System

(Base: customers who use electricity, natural gas or oil for home heating, n=2,354)

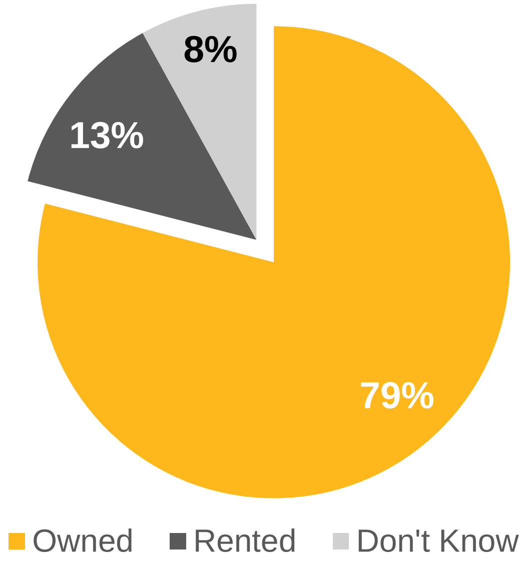


Region	Owns (%)
Northern	88%
LUG Eastern	93%
LEG Eastern	84%
GTA West & Niagara	78%
Toronto	85%
GTA East	79%
Southeast	86%
Southwest	87%

Among younger customers (age 18-34) ownership level is lower at 76% compared to their counterparts, especially those age 65+ (90%)

Ownership of Replacement Furnace / Heating System

(Base: customers who are at least fairly likely to replace their furnace n=301)



Q: Is your furnace or heating system owned or rented? Q: Is your replacement furnace or heating system most likely to be owned or rented?
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Home Heating: Age and Efficiency Levels

- Most forced air furnaces are less than 10 years old (71%) with 2-in-5 of those whose furnace is less than 5 years old indicating that they replaced it in the last 2 years, with about half of those also replacing their air conditioner at the same time.
- The Northern and Southwest region has a larger proportion of older furnaces, specifically those aged 16-20 years (10%) compared to the average (6%).
- When asked about furnace efficiency most indicated that their furnace is high efficiency, and with a change in the question last year (using the age of furnace as a starting point) this proportion is higher than in previous years and should be interpreted with caution.

Age of Forced Air Furnace (all fuels)	
5 years or less	41%
6 to 10 years	30%
11 to 20 years	20%
More than 20 years	5%
Don't Know	5%

38% of those who currently have a furnace that is less than 5 years old have replaced it in the last 2 years (or 13% of the total)

50% of customers who replaced their furnace in the past 2 years and also had an air conditioner also replaced it at the same time

Fuel Source for Original (replaced) Furnace	
Natural Gas	87%
Electricity	4%
Oil	5%
Other	1%
Don't Know	3%

90% of customers whose furnace is less than 10 years old indicate that their furnace is high-efficiency

68% of customers whose furnace is more than 10 years old indicate that their furnace is high-efficiency, among the remainder, 10% indicate having a mid-efficiency furnace and 10% a conventional furnace (9% indicate "don't know")

Forced Air Furnace Efficiency (natural gas)*	
High efficiency (over 90% efficiency)	81%
Medium efficiency	3%
Conventional (less than 75%)	3%
Don't Know	14%

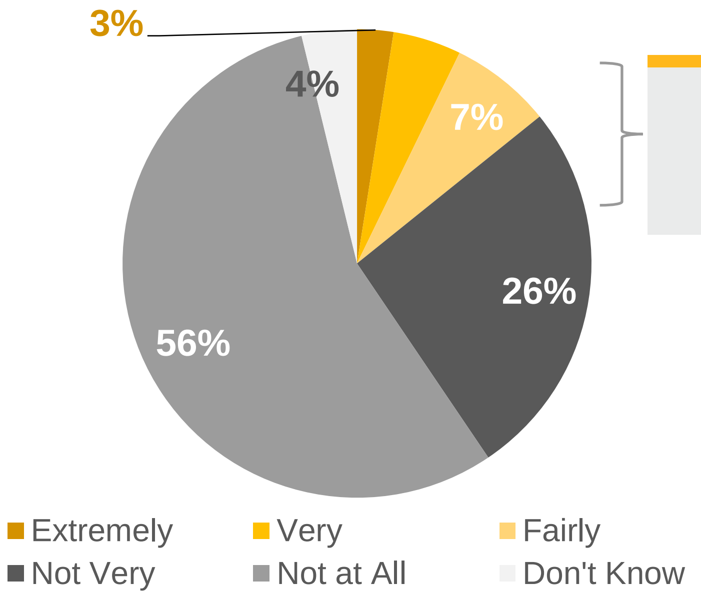
Q:How old is your furnace? Q: Is this a high-efficiency furnace? IF NEEDED: it would likely have one or two plastic vent pipes (often white) that vent out a side wall. Q: What would you say the efficiency level of your furnace is? Would it be a high-efficiency furnace that vents through the side of the house, like dryer, but with a smaller plastic pipe? Q: Is it a furnace with a metal chimney coming up through the roof, such as a conventional furnace (which has a continuously lit pilot light) or a mid-efficiency furnace (which does not have a pilot light)?

Home Heating: Furnace Replacement

- A small proportion of customers (14%) indicate that they are at least likely to replace their furnace in the next 2 year because it is likely to break down – among them most would get a natural gas furnace.
- Making use of current rebates/program increased by 2% over 2020.
- Of those likely to switch home heating source from natural gas cited “environmental impact” as the main factor.

Likely to Replace Furnace in Next 2 Years

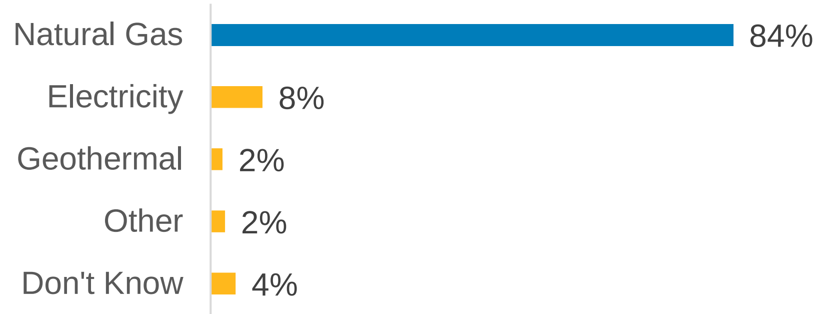
(Base: customers who have not replaced their furnace in the past 2 years, n=2,108)



14% at least fairly likely
LEG: 13%
LUG: 16%

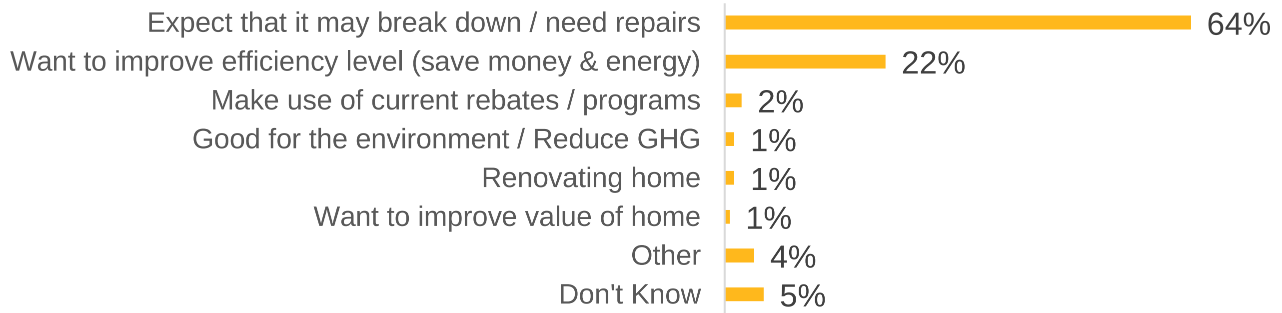
Fuel Source of New Furnace

(Base: customers who are at least fairly likely to replace their furnace n=301)



Reason For Replacing Furnace

(Base: customers who are at least fairly likely to replace their furnace n=301)



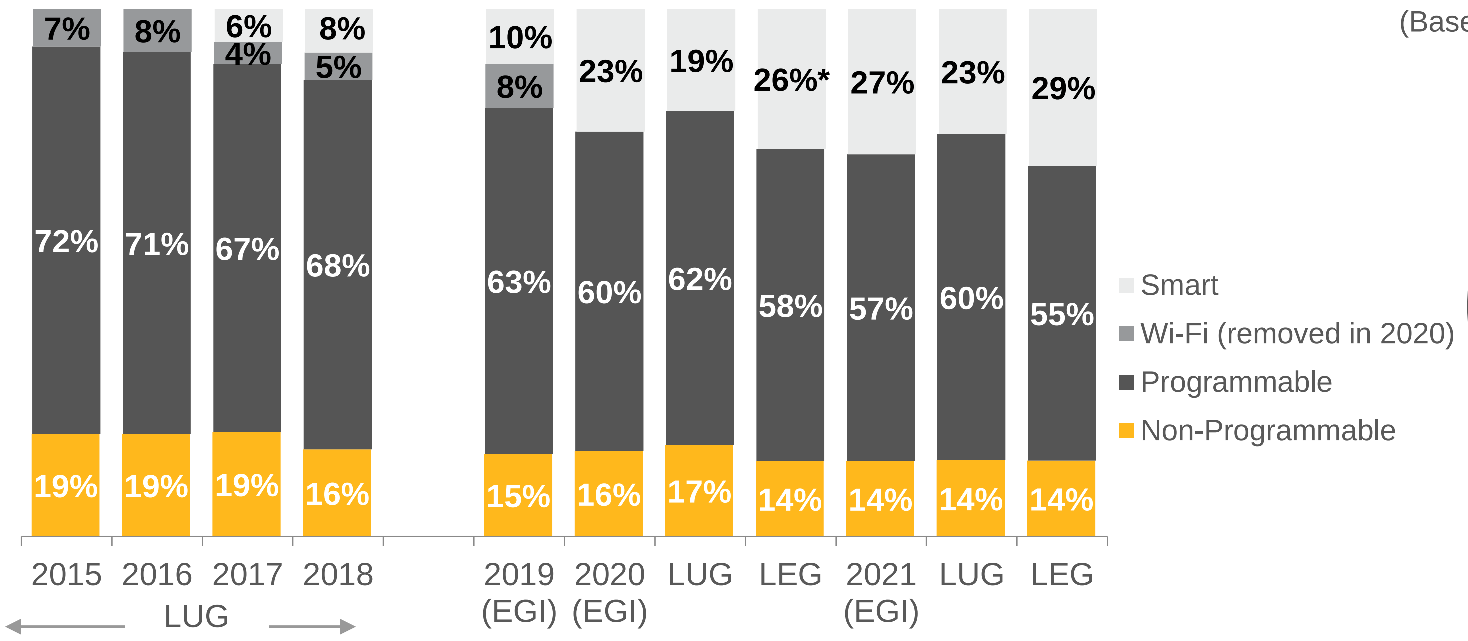
Q:How likely are you to replace the furnace or home heating system in the next 2 years? Q: Which energy source will the new furnace or heating system use? Q: What would you say is the main reason that you are fairly/very/extremely likely to replace your furnace or home heating system?

Home Heating: Thermostats

- Smart thermostats continue to gain in popularity. They are most popular in the GTA East area (36%; up from 30% in 2020), in newer homes (37%), and among higher earning households (42%), and younger customers (40%).
- Non-programmable thermostats appear disproportionately among customers in the Northern (22%) and Toronto (20%) regions, and in older (17%), smaller (18%), lower income (26%), and senior (18%) occupied homes. Opportunities to upgrade thermostats continue to exist, as well as opportunities to encourage customers to actively program their thermostats.

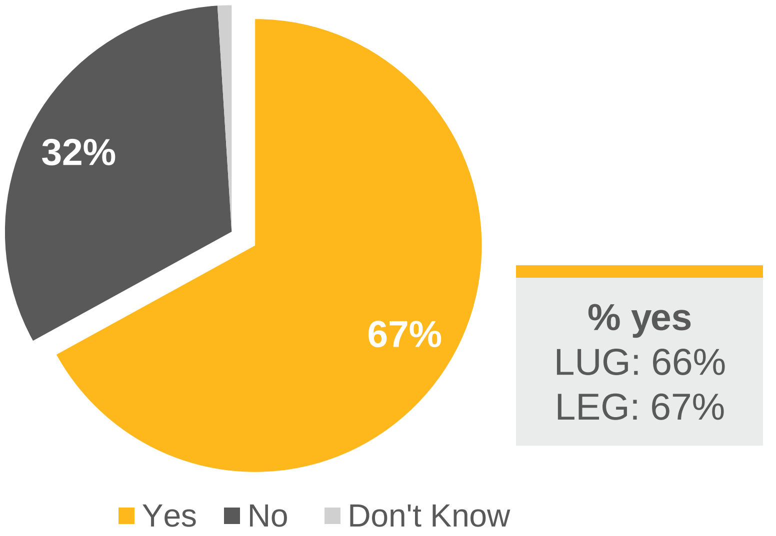
Type of Thermostat

(Base: all customers, n=2,404)



Actively program thermostat to help reduce energy use

(Base: all customers with Smart or Programmable thermostat, n=2,354)



Q: Which of the following thermostats do you have? Q: Do you actively program your thermostat to help reduce your energy use? Response options changed in 2017, and again changed in 2020.

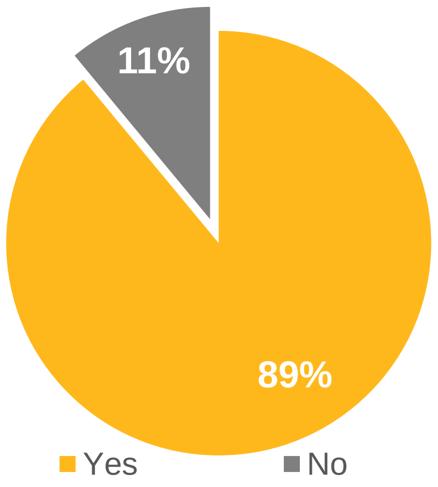
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Air Conditioning

- There is considerable variation across the franchise ranging from 92% among LEG customers to 85% among LUG customers, and from 69% in the Northern region to 93% in the GTA West and LEG Eastern regions in terms of whether a customer has air conditioning or not.
- Air conditioning is also significantly more common in newer houses with 98% of homes built since 2000 having central air conditioning vs. only 75% of homes built before 1950. Proportions are similar by income with air conditioning in 94% of households earning at least $140K vs. 82% of households earning less than $40K.
- Just over half (56%) of customers who replaced their furnace or heating system in the past 2 years also replaced the air conditioner. Homes built between 1990-1999 were significantly more likely to have replaced the air conditioner (73%).

Have Air Conditioning

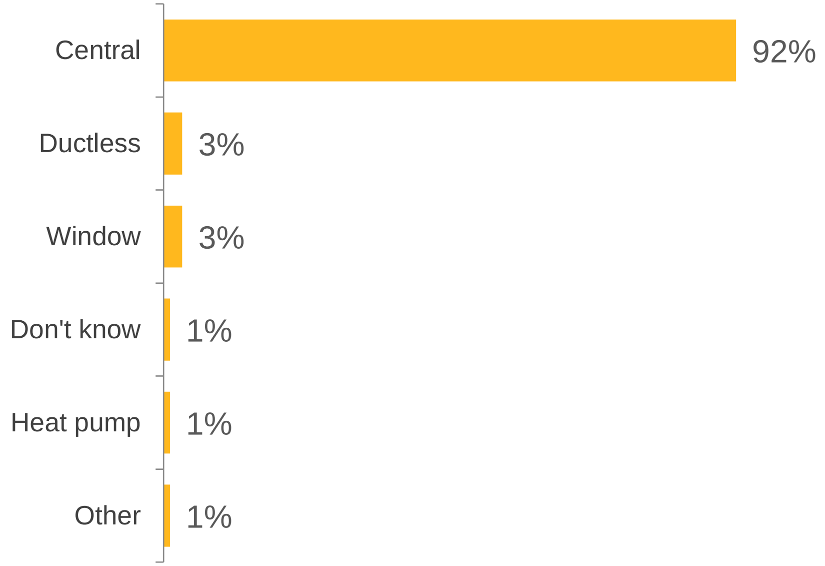
(Base: all customers, n=2,404)



Region	Yes (%)
Northern	69%
LUG Eastern	80%
LEG Eastern	93%*
GTA West & Niagara	93%*
Toronto	90%
GTA East	92%*
Southeast	92%*
Southwest	89%

Type of Air Conditioning

(Base: customers who have air conditioning, n=2,130)



Q: Do you have air conditioning in your home? Q: Which of the following types of air conditioning do you use in your home?

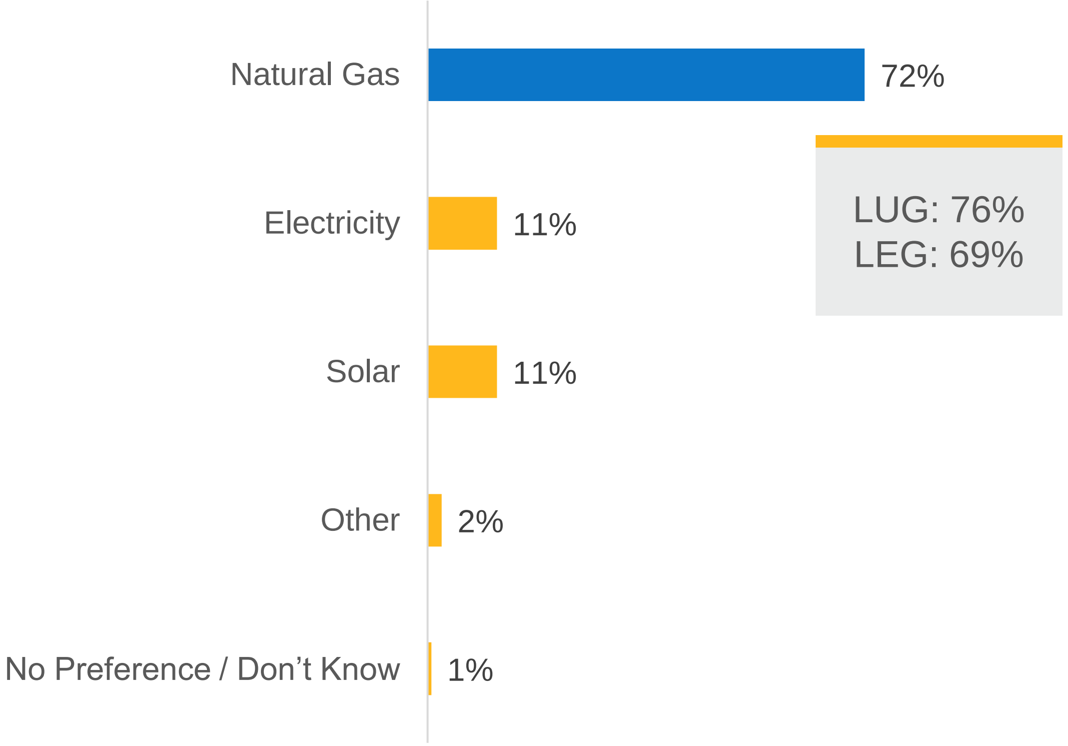
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Water Heating: Preference

- Most customers (72%) would prefer natural gas for water heating in a new home (down from 78% in 2020 and 81% in 2019), followed by electricity (11%) and solar (11%). The preference for natural gas is slightly higher among LUG customers, and regionally is highest in the Southwest (80%) and Eastern (76%) regions.

Preferred Fuel Source for Water Heating

(Base: all customers, n=2,404)



Region	Natural Gas (%)
Northern	74%
LUG Eastern	69%
LEG Eastern	76%
GTA West & Niagara	73%
Toronto	62%
GTA East	71%
Southeast	75%
Southwest	80%*

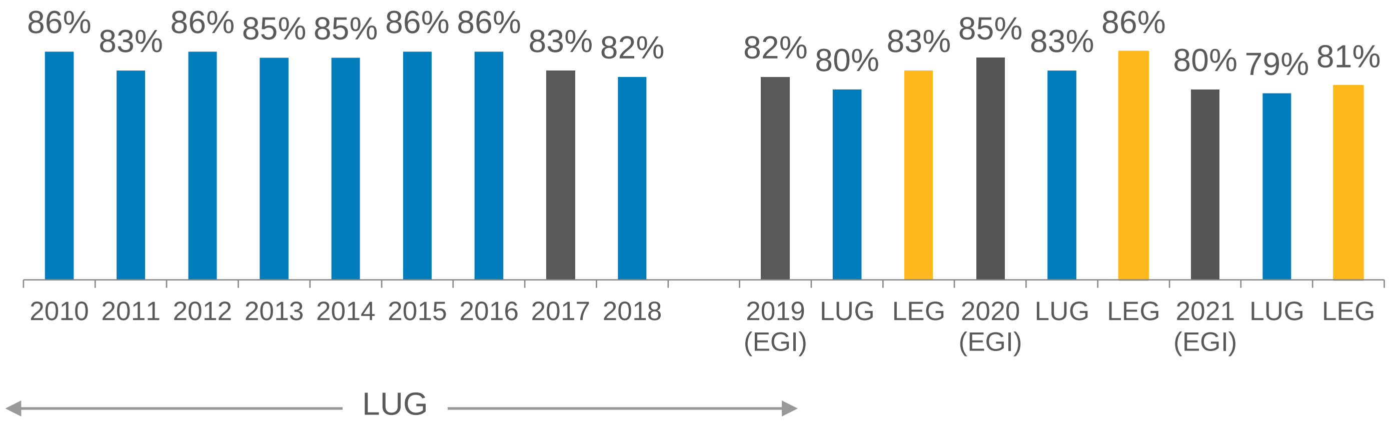
Q: I would now like you to assume that you are moving into a new home. Which energy source would you choose for each of the following? Water heater?
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

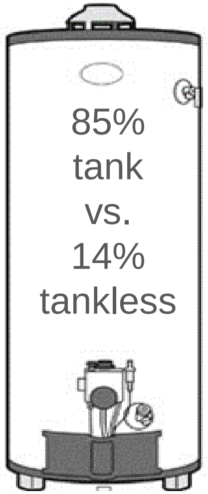
Water Heating: NG Adoption & Equipment

- Penetration of natural gas water heaters has continued to trend downward over the past few years. Natural gas use for water heating ranges from 76% in the Eastern and Northern regions to 83% in the Southeast and Southwest regions.
- The proportion of tankless water heaters continues to grow slowly up from 6% in 2017 to 14% in 2021. Tankless water heaters are more prevalent in homes built after 2000 with 2,500+ square feet.

Age of Water Heater (all)	
5 years or less	48%
6 to 10 years	30%
11 to 15 years	10%
More than 15 years	5%
Don't Know	7%

Natural Gas Penetration: Water Heating
(Base: all customers)



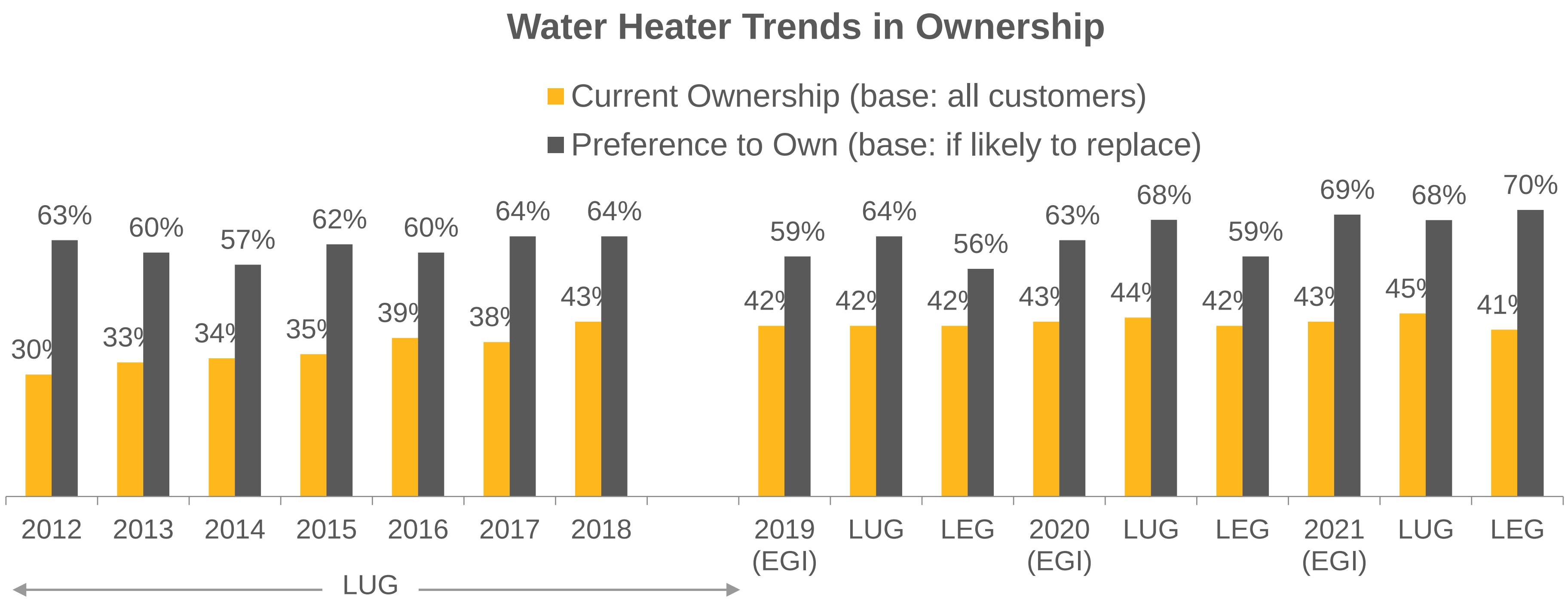


Region	Tankless (%)
Northern	18%
LUG Eastern	12%
LEG Eastern	12%
GTA West & Niagara	16%
Toronto	16%
GTA East	14%
Southeast	10%
Southwest	14%

Q: What type of water heater do you have? Is it...? Q: How old is your water heater? Q: Does your water heater have a tank or is it tankless? IF NEEDED READ *Tankless water heaters are also called continuous or instantaneous water heaters.*

Water Heating: Ownership

- Current ownership is the same among LUG and LEG customers and is quite consistent for LUG over the last couple of years.
- Ownership tends be higher among customers who have an electric water heater compared to one that is fueled by natural gas.
- Future intentions continue to lean toward ownership – 70% plan to own, (69% among LUG customers and 70% among LEG customers).



Owned % by type of water heater
Natural Gas: 40%
Electricity: 56%

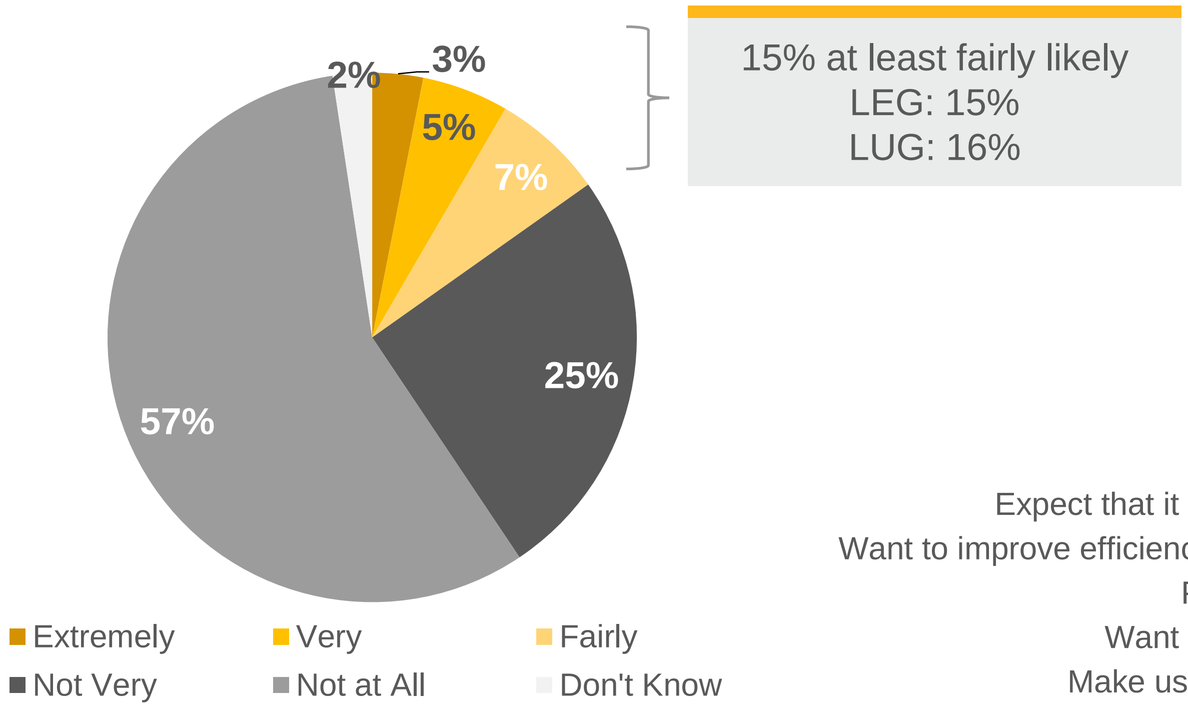
Q: Is your water heater owned or rented? Q: Is your replacement water heater most likely to be owned or rented?

Water Heating: Replacement

- Similar to furnaces, a small proportion of customers (15%) indicate that they are at least likely to replace their water heater in the next 2 years because it is likely to break down or because they're looking to improve the efficiency level – among them, most would get a natural gas water heater.
  - Customers' desire to improve the efficiency level of the water heater increase 10 points compared to 2020 (17% vs. 27%)

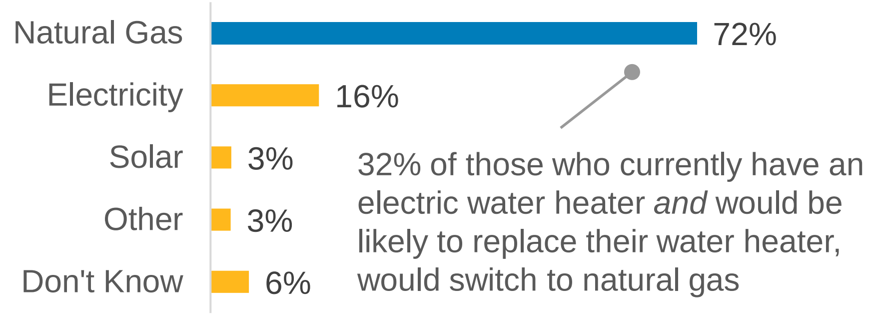
Likely to Replace Water Heater in Next 2 Years

(Base: customers who have a water heater and own their home n=2,079)



Fuel Source of New Water Heater

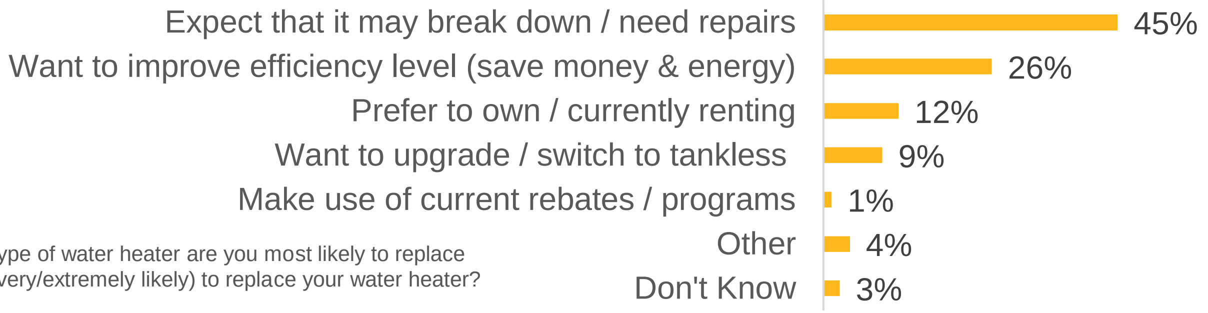
(Base: customers who are at least fairly likely to replace their water heater n=319)



32% of those who currently have an electric water heater *and* would be likely to replace their water heater, would switch to natural gas

Reason For Replacing Water Heater

(Base: customers who are at least fairly likely to replace their water heater n=319)



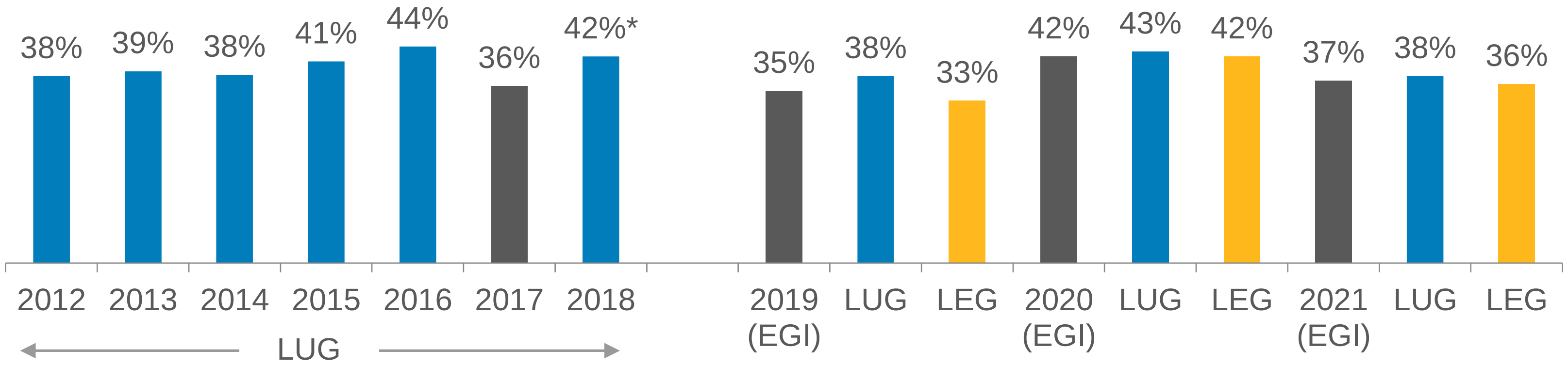
Q: How likely are you to replace your water heater in the next 2 years? Are you...? Q: What type of water heater are you most likely to replace your current water heater with? Q: What would you say is the main reason that you are (fairly/very/extremely likely) to replace your water heater?

Fireplaces: NG Adoption & Equipment

- More LEG customers (55%) have fireplaces compared to LUG customers (52%). Natural gas fireplaces continue to be popular among those who have a fireplace or would like to install one (interest in electric fireplaces is increasing, up from 17% in 2020 and 13% in 2019).
- Just over half of customers with a fireplace indicate that they use it for supplementary heating, while 1-in-3 indicate they use it for ambiance. LEG customers are more likely to use the fireplace as ambiance, while LUG customers are more likely to use the fireplace as a supplementary heating source.

Natural Gas Penetration: Fireplaces

(Base: all customers)



10% are at least fairly **likely to install a fireplace** in the next 2 years, and among them 65% would install one that uses **natural gas**, 20% would use electricity and 13% would use wood as a fuel source

53% of households have a fireplace

- 77% have just one
- 22% have 2 or more

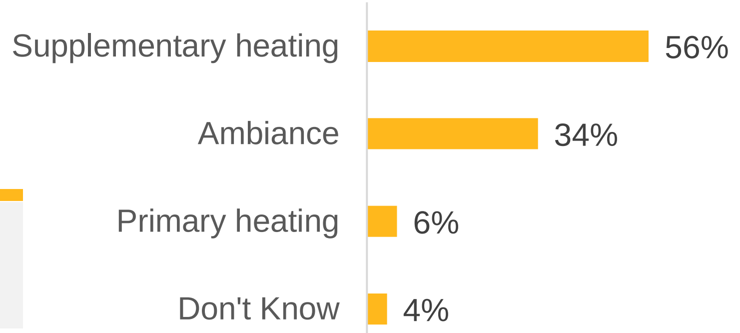
Fuel Type: 69% 24% 14%

Age of Fireplaces (all)

2-in-5 (42%) fireplaces are less than 10 years old

Use of Natural Gas Fireplace

(Base: customers who have natural gas fireplace, n=890)



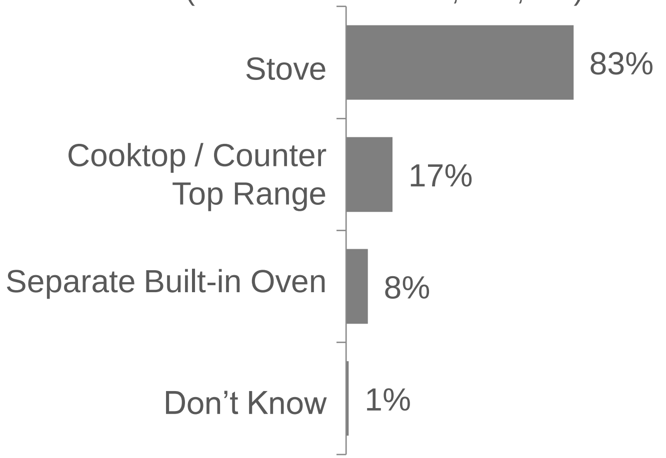
Q: Are there any indoor working fireplaces in your home? Q: How many indoor working fireplaces do you have in your home? Q: How old is (EACH)? Q: And which energy source does (EACH) use? Q: How likely are you to install an indoor fireplace in your home in the next 2 years? Are you... Q: And what type of indoor fireplace are you most likely to install? Q: Which of the following best describes how you use your natural gas fireplace(s)?

Cooking: NG Adoption & Equipment

- At 32%, penetration of natural gas for indoor cooking continues to be relatively stable. While similar across franchise areas, regionally differences exist, with the Northern region (20%) being least likely to use natural gas for cooking while Southwest (38%), Toronto (37%), and Southeast (36%) regions being most likely to.
- Both natural gas fueled stoves and counter top ranges are the most prevalent in the highest earning households (33%, 41%), and the largest homes (in sq ft) (49%, 34%)

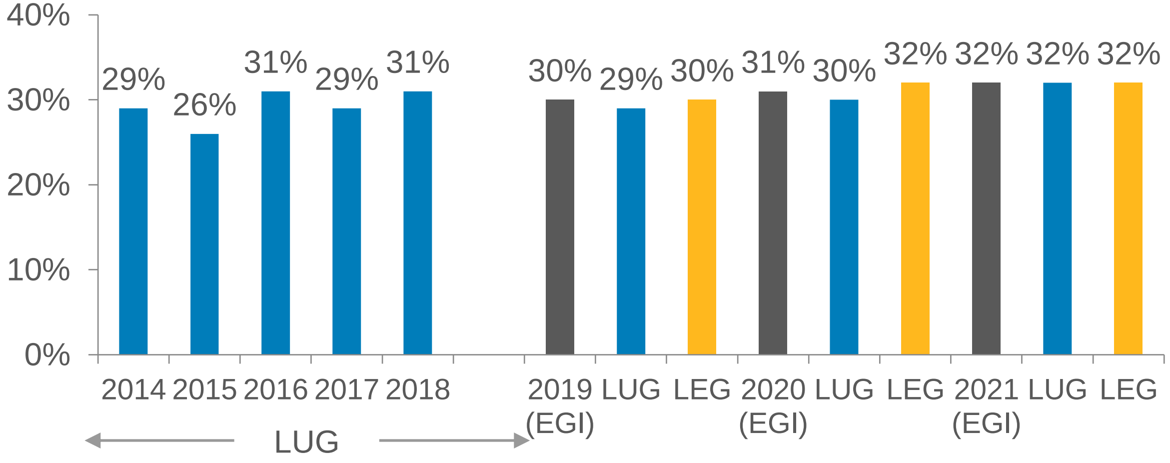
Type of Cooking Equipment (more than one response allowed)

(Base: all customers, n=2,404)



Natural Gas Penetration: Cooktop/Stove

(Base: all customers)



Region	Natural Gas (%)
Northern	20%
LUG Eastern	29%
LEG Eastern	25%
GTA West & Niagara	33%
Toronto	37%
GTA East	30%
Southeast	36%
Southwest	38%

Q: Do you have a stove, or do you have a cook top with a separate oven? *Q:* Is your (ITEM) fueled by natural gas or electricity?

* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Clothes Dryer: NG Adoption & Equipment

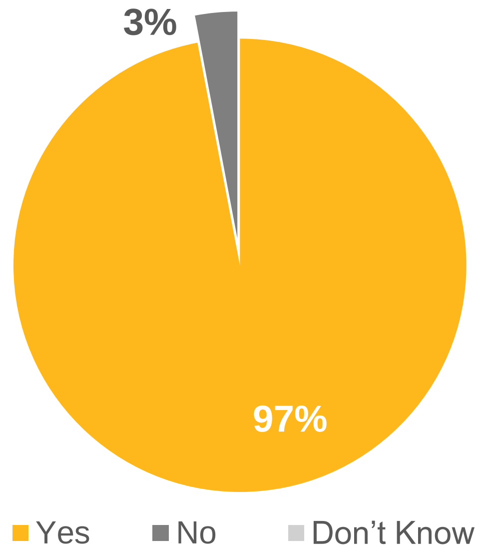
- Almost all single-family homes have a clothes dryer (97%) with electricity being used by most across the franchise (83%) followed by natural gas (14%), with significant differences between LUG and LEG.
- Significantly more dryers in the Southwest region are fueled by natural gas compared to other regions.
- Newer homes are less likely to have a natural gas dryer (12%) compared to older homes.

Region	Natural Gas (%)
Northern	10%
LUG Eastern	11%
LEG Eastern	8%
GTA West & Niagara	9%
Toronto	11%
GTA East	9%
Southeast	18%
Southwest	26%*

Age of Home	Natural Gas (%)
Before 1950	15%
1950-1969	15%
1970-1989	13%
1990-1999	19%*
2000-2020	12%

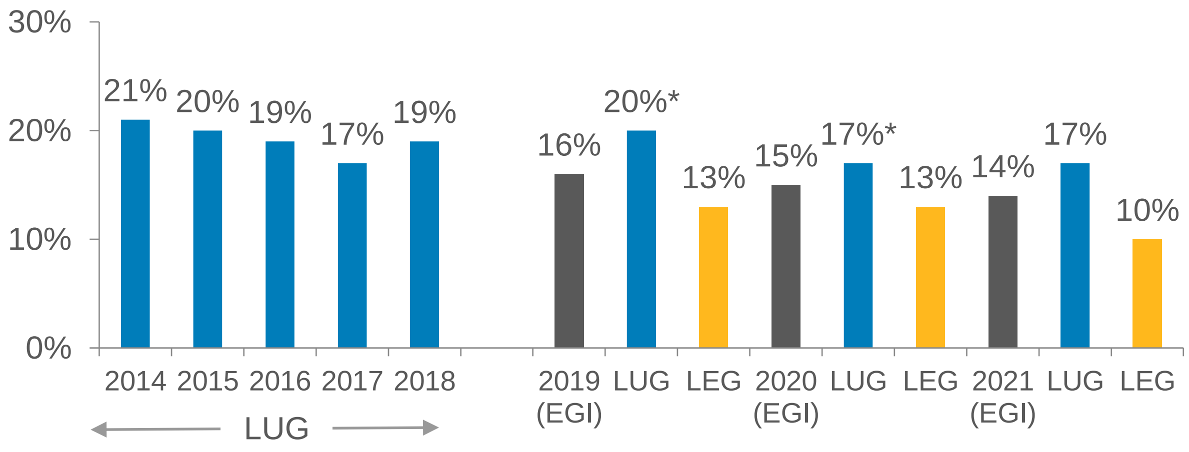
Have a Dryer

(Base: all customers, n=2,404)



Natural Gas Penetration: Clothes Dryers

(Base: all customers)



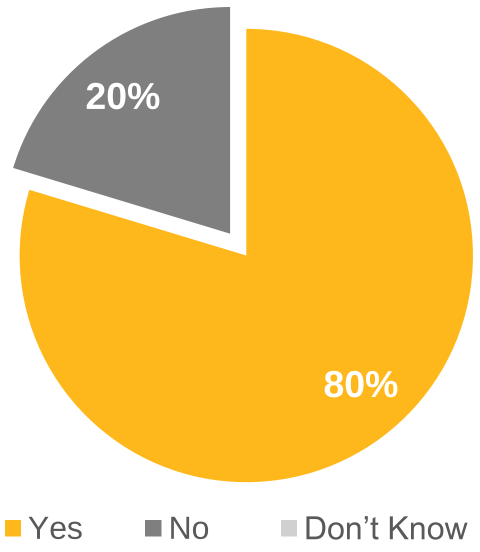
Q:Do you have a clothes dryer? Q: And is it a natural gas or an electric dryer?

* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Barbecues: NG Adoption & Equipment

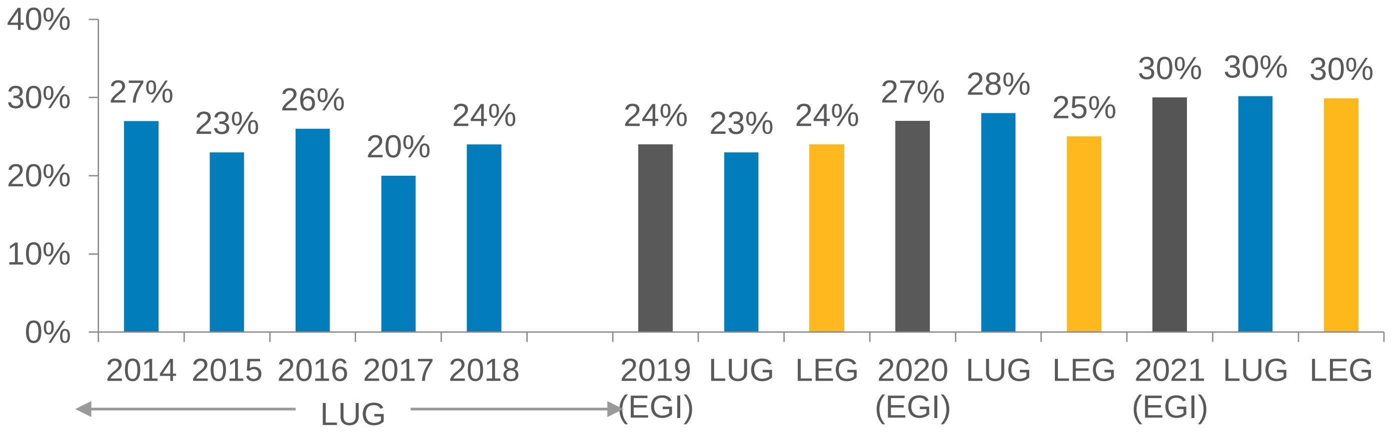
- Most single-family homes have an outdoor barbecue (80%) – among them propane (62%) remains the most common fuel type, followed by natural gas (30%) and charcoal briquettes (6%).
- Households with higher incomes ($140K+) are more likely to have a barbecue and to use natural gas to fuel it (88% ownership, among them 37% using natural gas), compared to lower income households. Just over 2-in-3 of those earning under $40K have a barbecue of which only 21% use natural gas.

Have a Barbecue
(Base: all customers, n=2,404)



% yes
LUG: 81%
LEG: 78%

Natural Gas Penetration: Barbecues
(Base: all customers)

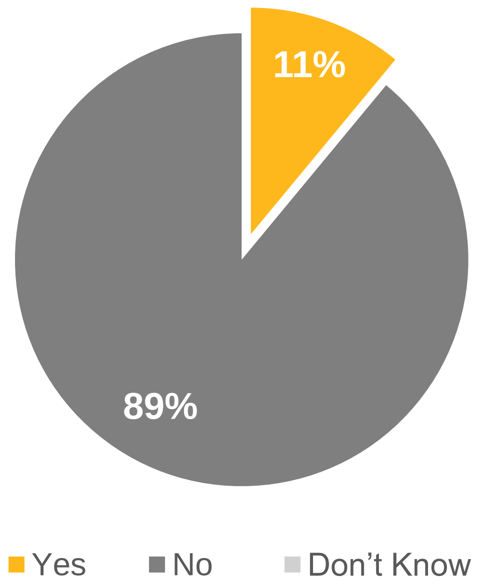


Q: Do you have an outdoor barbecue at your home? Please do not include any barbecues that are at the cottage, or ones that are used only for camping. Q: And is this barbecue fueled by ...?

Pools

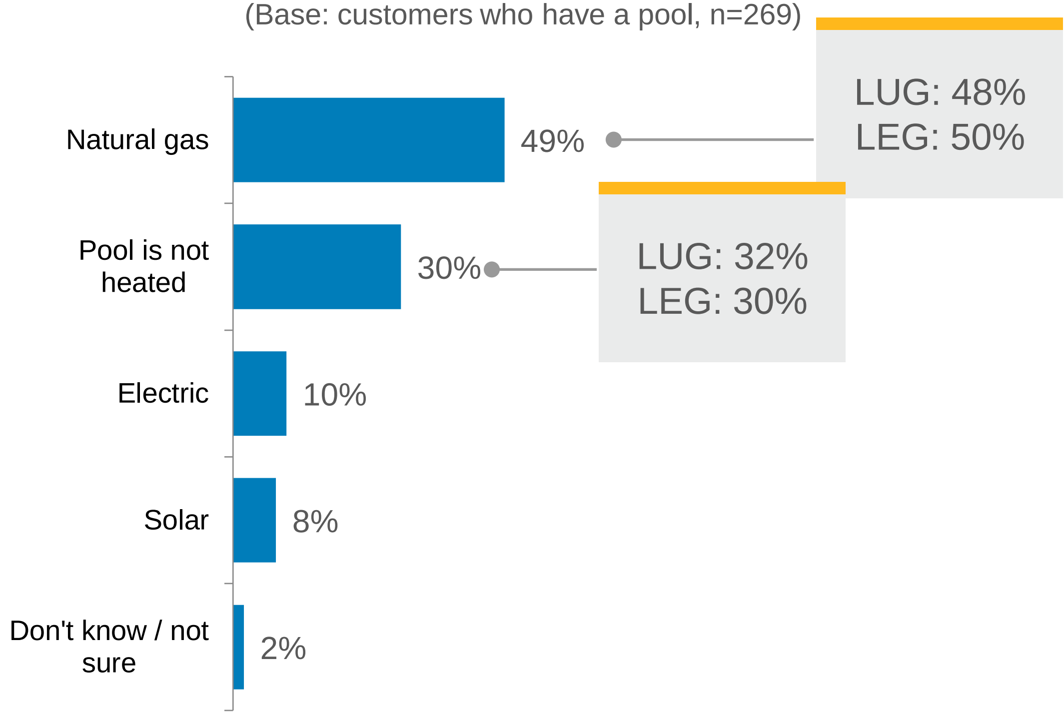
- Pools are not as common in Toronto (6%), in lower income households (6%), or among young customers (6%).
- In terms of heating, pools located in LEG are more likely to be heated with than those in LUG with natural gas being the top fuel choice across the board.

Have a Pool
(Base: all customers, n=2,404)



Region	Natural Gas (%)
Northern	43%
LUG Eastern	29%
LEG Eastern	46%
GTA West & Niagara	37%
Toronto	71%*
GTA East	60%
Southeast	71%*
Southwest	38%

Fuel Used to Heat Pool
(Base: customers who have a pool, n=269)



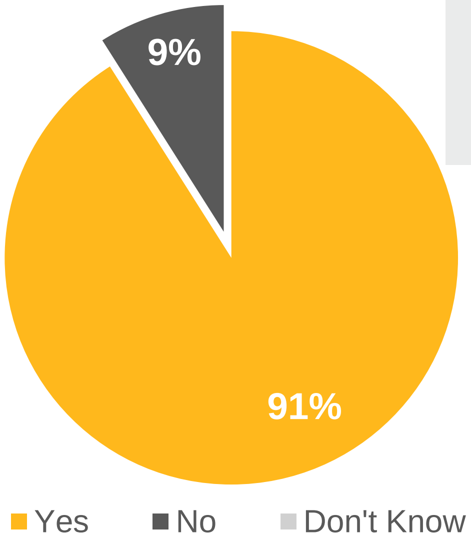
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers).

Insulation: Basement

- 91% of single-family homes have a basement. Homes built before 1950 and since 2000 are less likely to have a basement (90% and 91%).
- Across the franchise, older homes are more likely to have poorly insulated or uninsulated basements.
- Household income also appears to be a factor – among low-income customers 25% have poorly or uninsulated basements. This represents customers who may be eligible for the Home Winterproofing Program.

Have a Basement

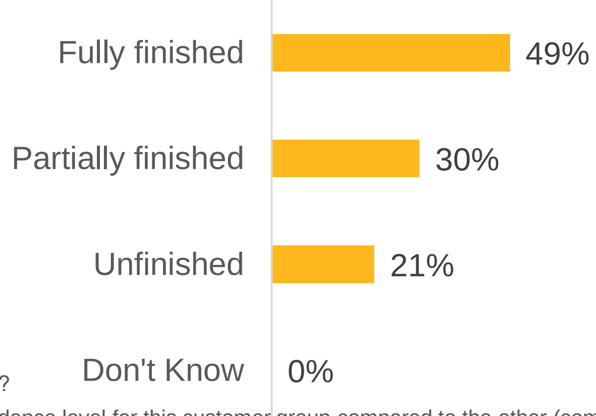
(Base: all customers, n=2,404)



% yes
LUG: 92%
LEG: 91%

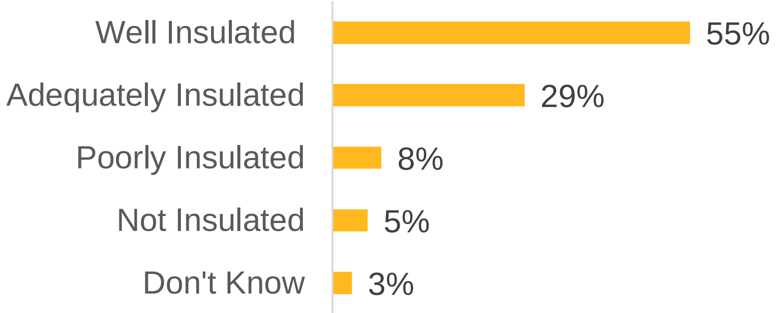
Level of Finish

(Base: customers who have a basement, n=2,191)



Level of Insulation

(Base: customers who have a basement, n=2,191)



Age of Home	Well (%)	Not (%)
Before 1950	37%	17%*
1950-1969	43%	7%
1970-1989	55%*	3%
1990-1999	65%*	2%
2000-2020	69%*	1%

Household Income	Well (%)	Not (%)
Under $40K	43%	11%*
$40K-$80K	48%	8%*
$80K-$100K	49%	7%
$100K-$140K	55%*	4%
$140K+	63%*	3%

Q: Do you have a basement?; Q: Is your basement…?

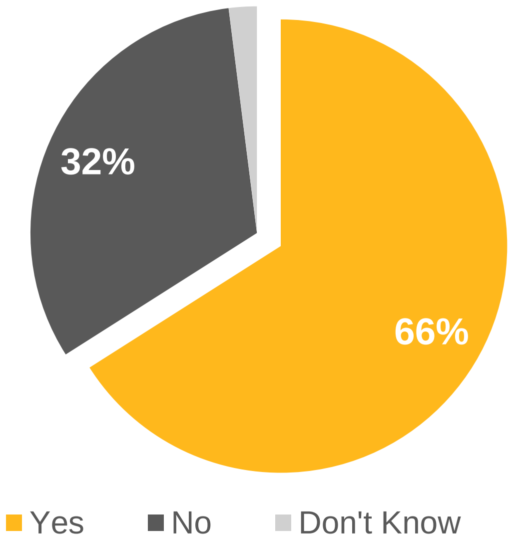
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Insulation: Attic

- About 2-in-3 single family homes have an attic ranging from a low of 52% in the Toronto region to a high of 77% in the Northern region. Across the franchise, older homes are more likely to have poorly insulated or uninsulated attics.
- Household income also appears to be a factor – among low-income customers more attics are poorly (11%) or not at all (3%) insulated, and a significant proportion don't know their insulation levels (as high as 12%, higher for attics than for basements), which represents customers who may be eligible for the Home Winterproofing Program.

Have an Attic

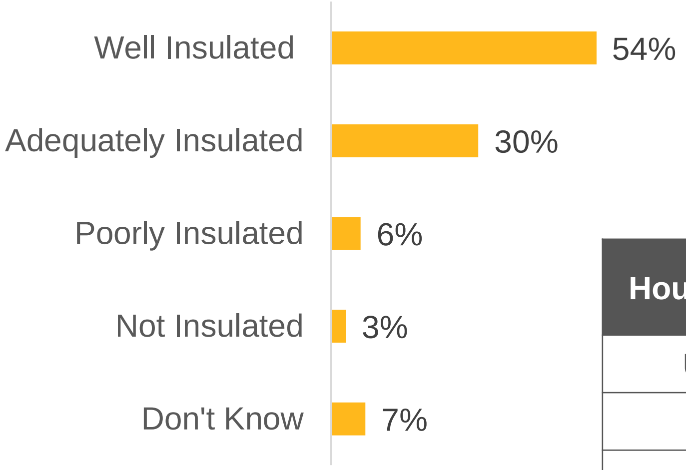
(Base: all customers, n=2,404)



% yes
LUG: 71%*
LEG: 62%

Level of Insulation

(Base: customers who have an attic, n=1,588)



Age of Home	Well (%)	Poorly (%)	Not (%)
Before 1950	47%	10%*	6%*
1950-1969	52%	11%*	2%
1970-1989	55%	4%	1%
1990-1999	60%	3%	3%
2000-2020	60%*	2%	3%

Household Income	Well (%)	Not (%)	Don't Know (%)
Under $40K	53%	3%	12%
$40K-$80K	50%	2%	6%
$80K-$100K	54%	3%	6%
$100K-$140K	52%	2%	7%
$140K+	55%	4%	5%

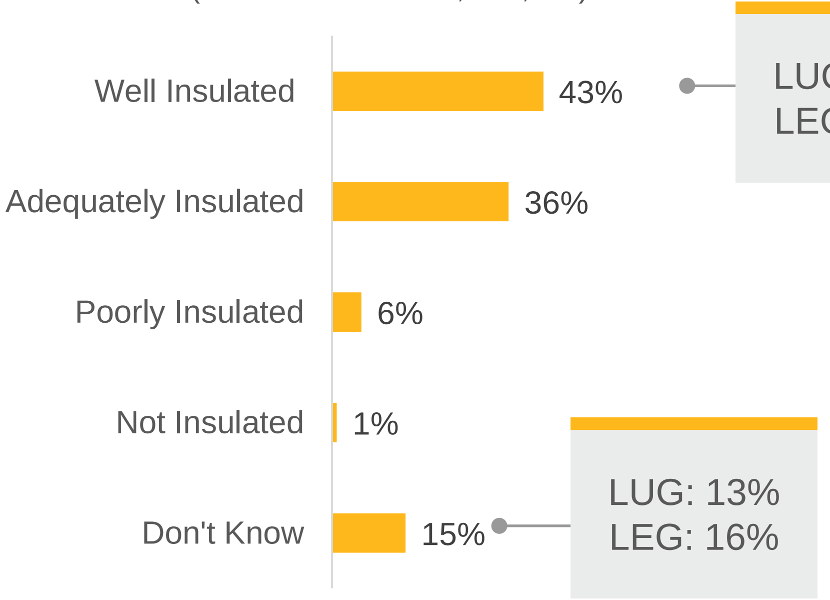
Q: Do you have an attic? Q: Is your attic …?

* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Insulation: Home and Exterior Wall

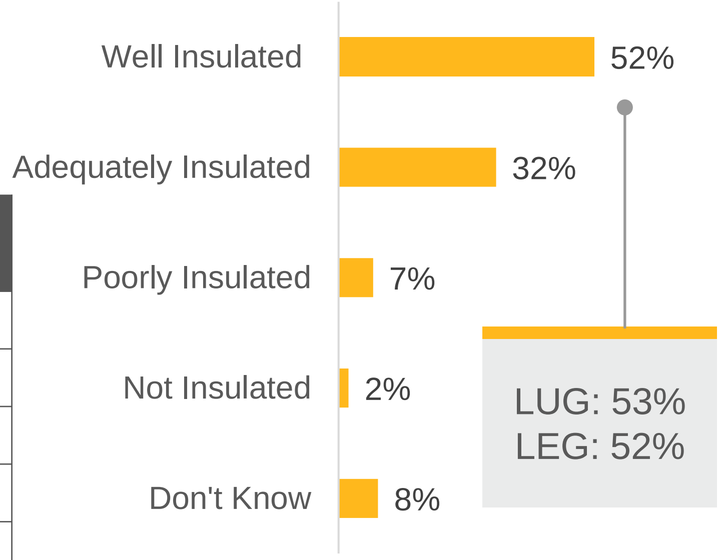
- The number of customers describing their home as being "well insulated" is stable. Toronto customers are more likely to say their home is 'poorly' or 'not' insulated (12% vs. 6% total).
- Perceptions of insulation vary by the age of the home, where newer homes are more likely to be well-insulated compared to homes built before 1950, which sees 14% of customers indicating that their home is poorly insulated.
- Note that 1% of customers were unable to categorize the insulation level of their home.

Level of Home Insulation
(Base: all customers, n=2,404)



Age of Home	Before 1950	1950-1969	1970-1989	1990-1999	2000-2020
Well	29%	29%	38%	55%*	63%*
Adequate	46%*	43%	43%	30%	23%
Poor	14%*	11%	5%	3%	1%
Not	2%*	1%	0%	0%	0%
Don't Know	10%	15%	14%	12%	12%

Level of Exterior Wall Insulation
(Base: all customers, n=2,404)

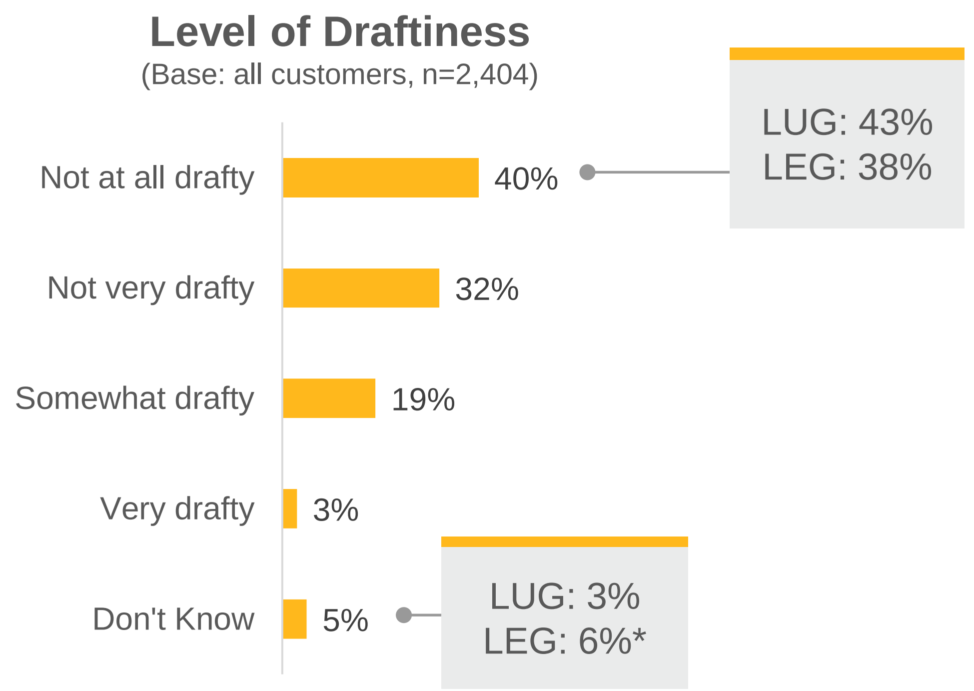


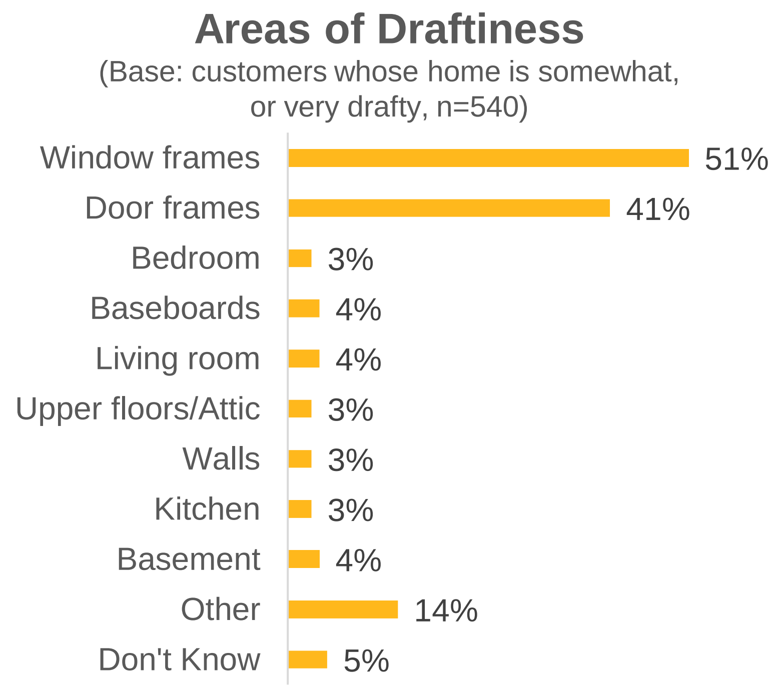
Q: How about your exterior, outside walls, are they…?; Q: Which best describes the insulation level of your home?

* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Insulation: Level of Draftiness

- A new question about levels of draftiness was asked among customers in 2020 and the 2021 results are very similar. Customers are more likely to indicated the level of draftiness (don't know is 5%) compared to the level of insulation (don't know is 15%) in their home.
- Window frames and door frames are most commonly mentioned as areas of draftiness, with door frames especially being mentioned in the Northern region (51%) and bedroom in the GTA East region (7%).





Q: How would you describe the level of draftiness in your home? Q: Where would you say the main areas of draftiness are in your home? (Total mentions)

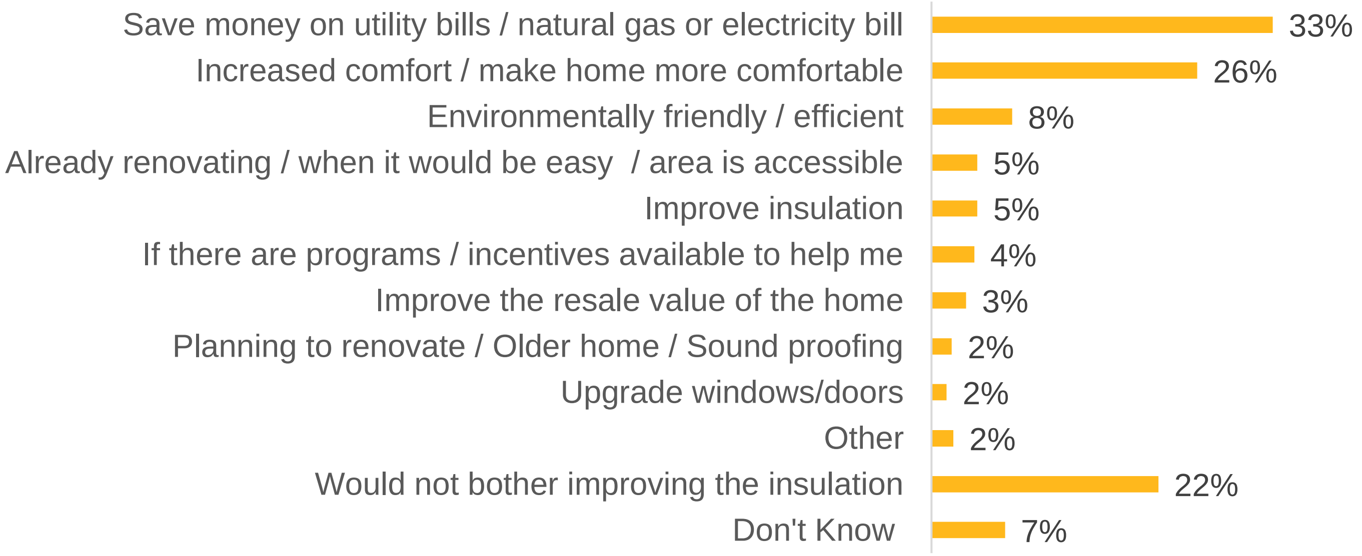
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Insulation: Motivations for Improving Insulation

- "Customers who indicated their home is not already “well” insulated were asked what would motivate them to improve their insulation. While one-in-five indicated that they would not bother (nothing would motivate them), among the remainder, saving money on their utility bills was a key motivator, followed by increasing the comfort of their home.
- Saving money was mentioned more often among men (33%). Additionally, increased comfort and being environmentally friendly were also mentioned more often among household with $100K+ income.

Motivation for Improving Insulation

(Base: customers who indicate that their home is not “well” insulated, n=1,367)



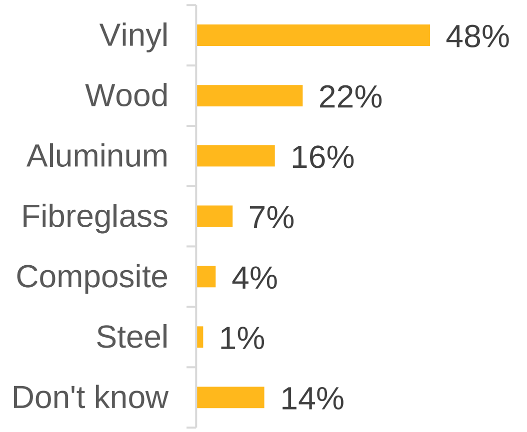
Q: What are the main reasons that you would improve the insulation in your home?

Windows

- Vinyl is the top window material across the franchise with notably higher use among LUG customers (LUG 54% vs. 42% LEG).
- Higher rates of aluminum (24%) and fibreglass (10%) are found in the Toronto Region where use of these materials is much higher than the rest of the franchise.
- Customers in the Northern region are more likely to have replaced windows since moving in than others (51% vs. 43% total).
- Note that a significant number (21%) of customers were unable to answer if the replaced windows were Energy Star certified or not.

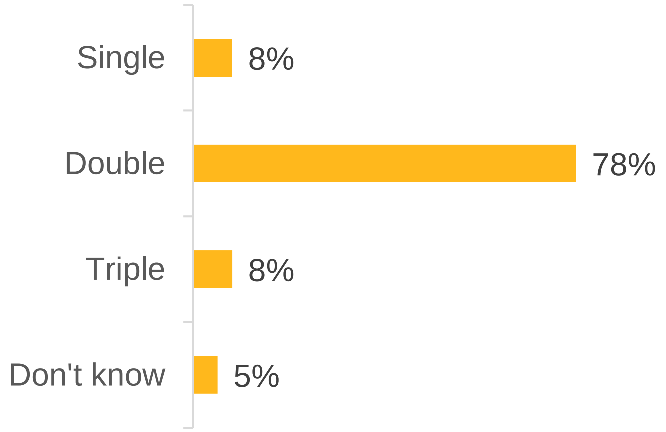
Window Material (multiple mentions)

(Base: all customers, n=2,404)



of panes

(Base: all customers, n=2,404)

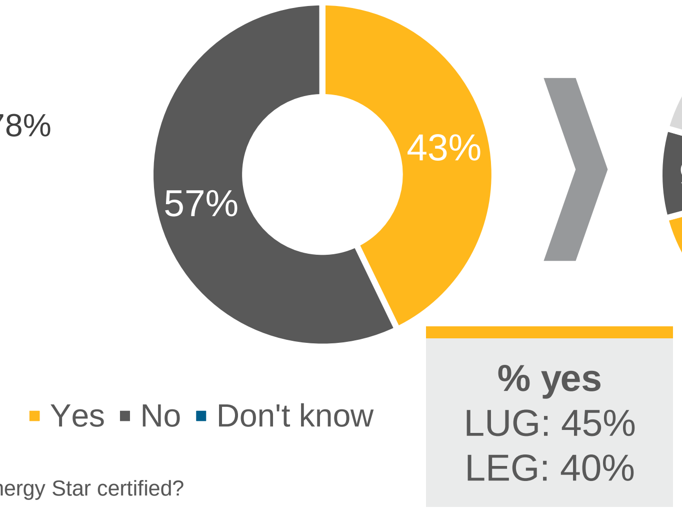


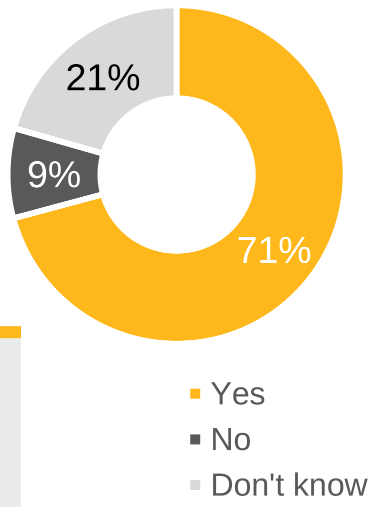
Replaced any Windows Since Moving in

(Base: all customers, n=2,404)

Were any Energy Star certified

(Base: all customers who replaced windows, n=1,026)





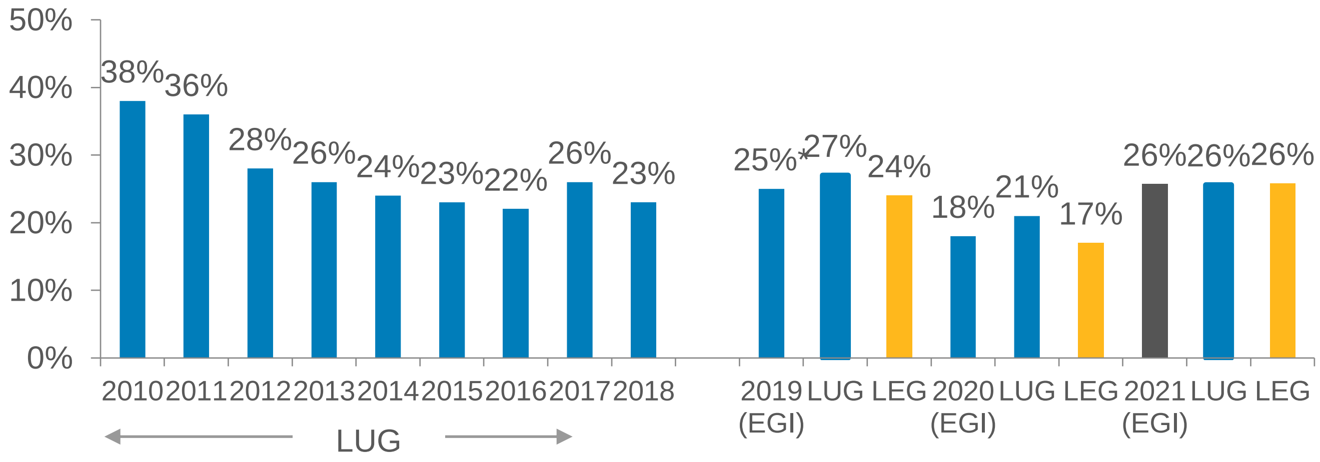
Q: What material are the window frames?; Q. How many panes of glass…?; Q. Since moving in have you replaced any windows?; Q. Are any Energy Star certified?

Energy Efficiency: Future Intentions

- After the lowest result observed in 2020, the number of customers intend to make their home more energy efficient in the next 2 years bounced back to previous years (26%).
- This intention is similar across all regions, ranging from 23% to 28%, and is highest among customers with homes built before 1950 (33%).
- Younger customers, and larger households (3+) with children are more likely to have plans to make their home more energy efficient.

Plans to make home more energy efficient in next 2 years (% yes)

(Base: all customers, n=2,404)



Age Group	Plans (% yes)
18 – 34	36%*
35 – 54	31%*
55 – 64	26%
65+	14%

Region	Yes (%)
Northern	28%
LUG Eastern	23%
LEG Eastern	27%
GTA West & Niagara	26%
Toronto	23%
GTA East	28%
Southeast	24%
Southwest	27%

Age of Home	Yes (%)
Before 1950	33%
1950-1969	24%
1970-1989	28%
1990-1999	25%
2000-2021	22%

Q: Do you have any plans to make your home more energy efficient within the next two years?

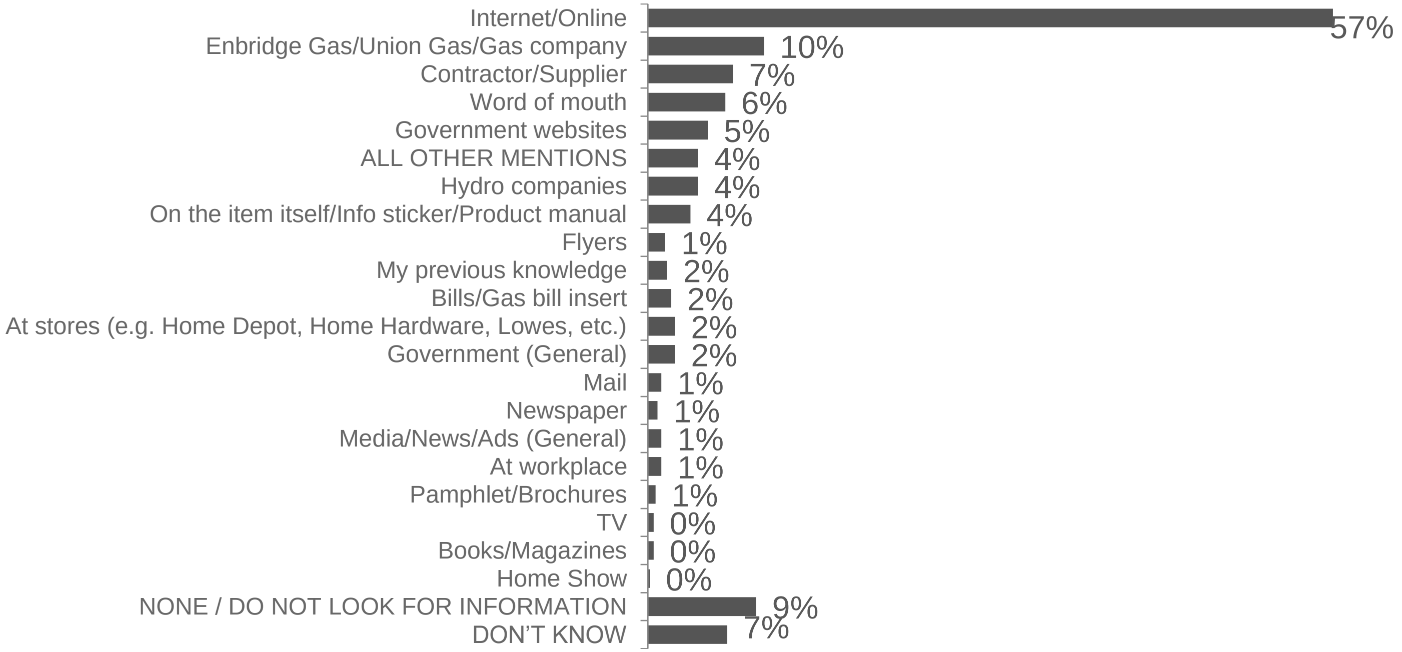
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Energy Efficiency: Sources of Information

- Most customers planning to make their home more energy efficient go online to look for information – senior-led households and lower income households do so at lower rates.
- The internet/online continue to be the source of information for customers. However, at 57%, it is down from 60% in 2020 and 65% in 2019. About 1 in 10 customers mentioned Enbridge Gas as their source of information for energy efficiency followed by Contractor/Supplier.

Top Sources of Information (Unaided)

(Base: all customers who plan to make their home more energy efficient, n=620)



Age Group	Internet / Online	From LEG/LUG
18 – 34	60%	8%
35 – 54	64%	9%
55 – 64	50%	9%
65+	45%	12%

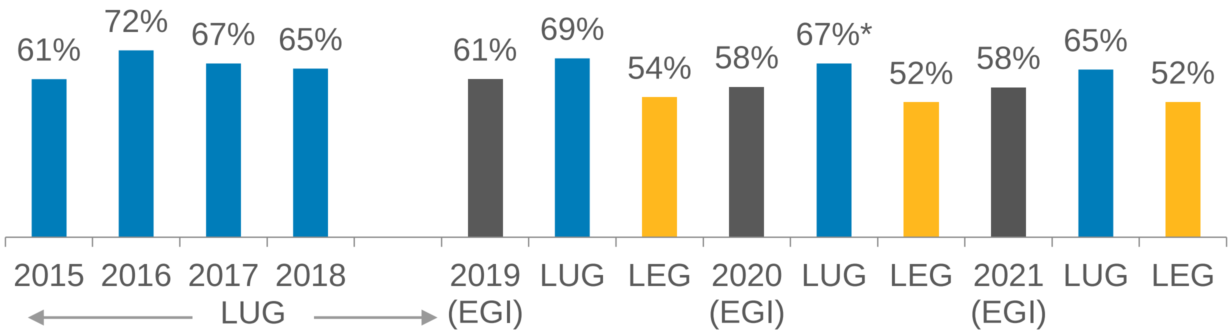
Q: Where do you look for energy efficiency information? IF NECESSARY: What sources do you consider?

* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Energy Efficiency: Awareness of Any Programs

- Awareness that Enbridge Gas offers energy conservation and energy efficiency improvement programs and incentives is significantly higher among LUG customers, and ranges from highest in the Northern and LUG Eastern (68%) to lowest in the GTA East region (49%).
- Awareness is also stronger among customers aged 65+, though they're not as likely to have plans to make their homes more energy efficient compared to their younger counterparts. Awareness is also higher among those whose homes are well insulated compared to those whose homes are adequately or poorly insulated, providing an opportunity for further marketing.

Aware that LUG/LEG offers Energy Conservation & Efficiency Programs
(Base: all customers, n=2,404)



Age Group	Aware (% yes)
18 – 34	50%
35 – 54	52%
55 – 64	63%
65+	66%

Region	Yes (%)
Northern	68%
LUG Eastern	68%
LEG Eastern	58%
GTA West & Niagara	53%
Toronto	51%
GTA East	49%
Southeast	61%
Southwest	66%

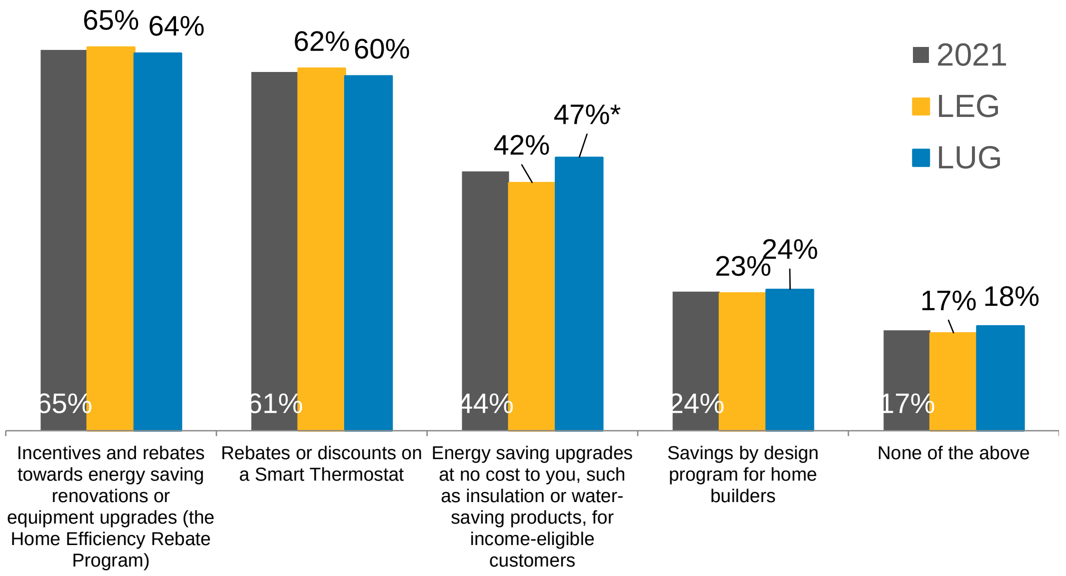
Q: Are you aware that Union Gas / Enbridge Gas offers energy conservation & energy efficiency improvement programs & incentives to help residential customers like you to save money on their energy bills?
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Energy Efficiency: Awareness of Programs

- Among those who are aware that Enbridge Gas offers programs, almost 2-in-3 are aware of the HER program and the rebates or discounts on a Smart Thermostat, while just under 1-in-2 are aware of the HWP. Customers from both legacy regions are equally likely to be aware of Enbridge Gas' offerings.

Offerings Aware of … *(aided awareness)*

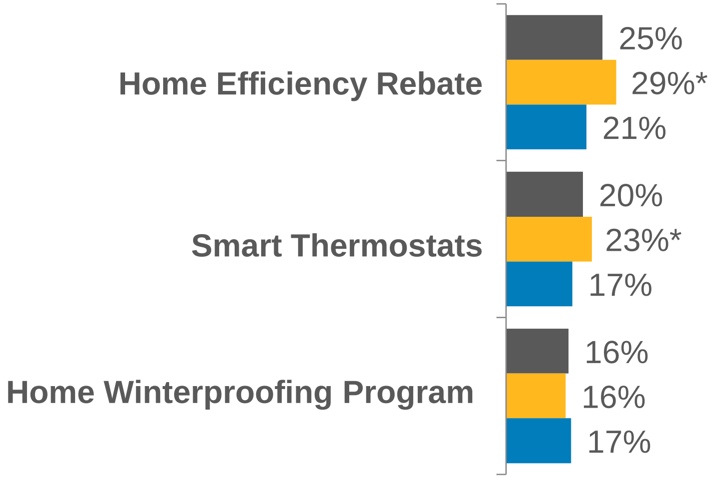
(Base: all customers aware that EGI offers programs)



(Base: all customers)	Incentives and rebates (HER)	Smart Thermostat	Energy saving upgrades at no cost	Savings by design	None of the above
	EGI: 31%	**EGI: 29%**	**EGI: 21%**	**EGI: 11%**	**EGI: 8%**
	LEG: 31%	LEG: 30%	LEG: 20%	LEG: 11%	LEG: 8%
	LUG: 30%	LUG: 28%	LUG: 22%	LUG: 11%	LUG: 8%

Previously Participated (self-reported)

(Base: all customers aware of the specified program)



Program	(Base: all customers)
Home Efficiency Rebate	**EGI: 9%** LEG: 10% LUG: 9%
Smart Thermostats	**EGI: 7%** LEG: 8% LUG: 7%
Home Winterproofing Program	**EGI: 4%** LEG: 4% LUG: 5%
HAP (Home Assistance Program offered by the IESO)	**EGI: 4%** LEG: 4% LUG: 5%

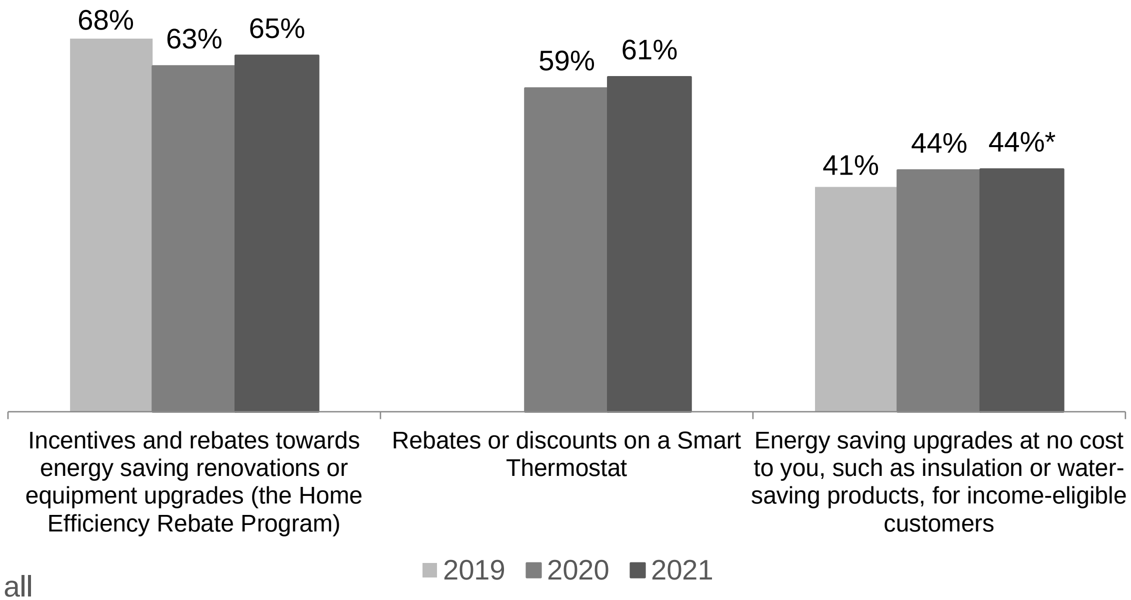
Q: Which of the following company energy conservation offerings are you aware of?; Q: Have you ever participated in the ...

* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Energy Efficiency: Awareness of Programs (Historical)

Offerings Aware of … *(aided awareness)*

(Base: all customers aware that EGI offers programs)

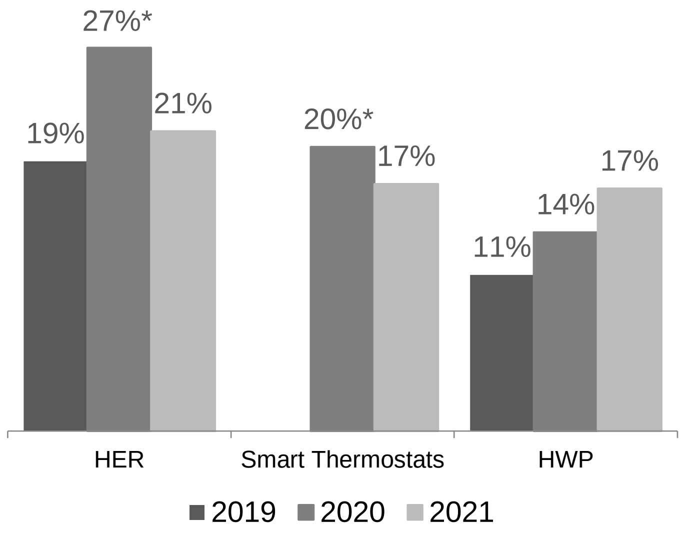


(Base: all customers)

2021	**EGI: 31%**	**EGI: 29%**	**EGI: 21%**
2020	EGI: 36%	EGI: 34%	EGI: 25%
2019	EGI: 41%	EGI: -	EGI: 31%

Previously Participated (self-reported)

(Base: all customers aware of the specified program)



(Base: all customers)

2021	**EGI: 9%**	**EGI: 7%**	**EGI: 4%**
2020	EGI: 10%	EGI: 7%	EGI: 4%
2019	EGI: 19%	EGI: -	EGI: 11%

Q: Which of the following company energy conservation offerings are you aware of?; Q: Have you ever participated in the ...

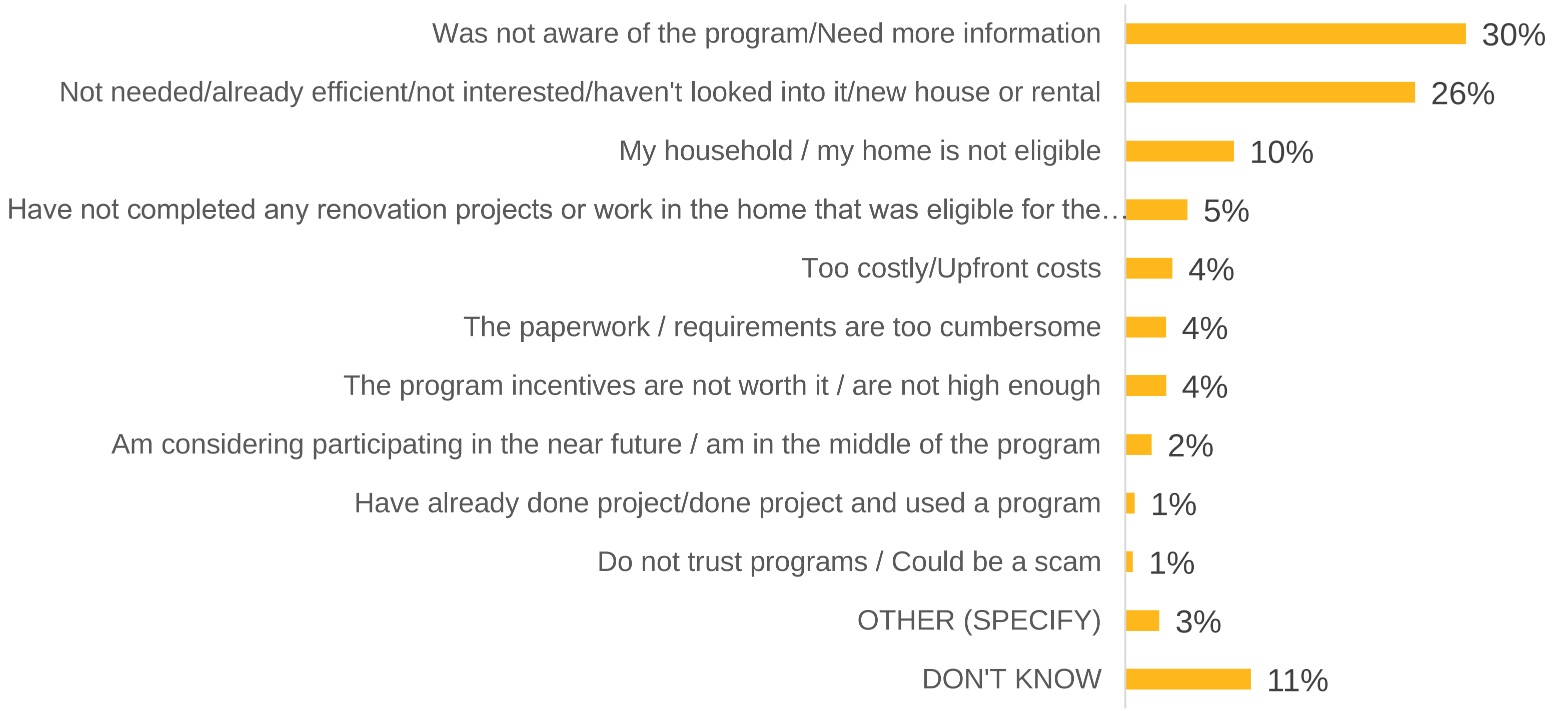
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Energy Efficiency: Reasons for not Participating

- Customers who were aware of Enbridge Gas' offerings but did not participate in any indicated that they did were not aware of the program(s) or needed more information. Others indicated that their home is already efficient or not interested.

Reasons for Not Participating in Any Enbridge Gas Program

(Base: customers who are aware of any program but have not participated, n=1,730)



Q: What would you say are the main reasons that you have not participated in any of Enbridge Gas' energy conservation programs? (Total mentions)

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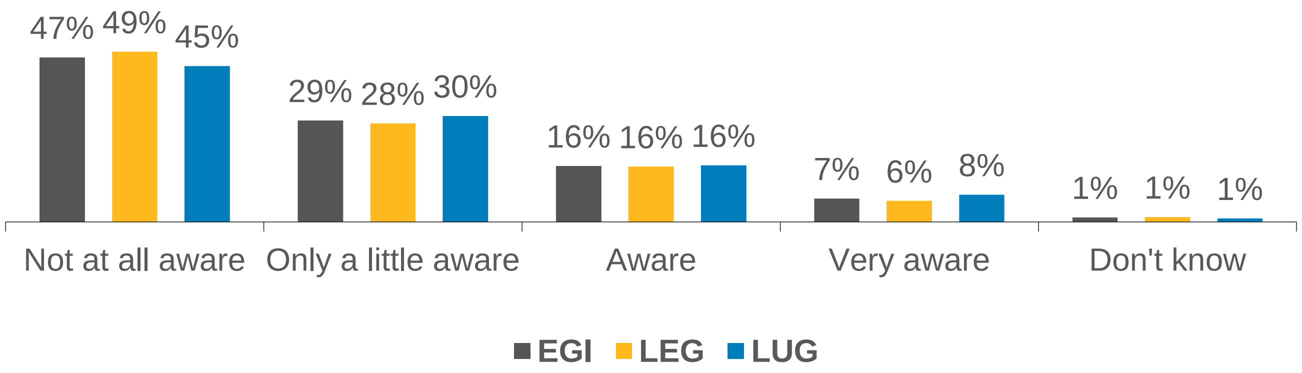
Life Takes Energy

Awareness of Renewable Natural Gas (RNG)

- Nearly half of all customers are not at all aware of renewable natural gas (47%).
- RNG awareness level are similar across Enbridge Gas regions and respondent's age.
- Household income is a factor in the awareness of RNG. Customers with higher household income are more aware of RNG.

Awareness of RNG
(Base: all customers, n=2,404)

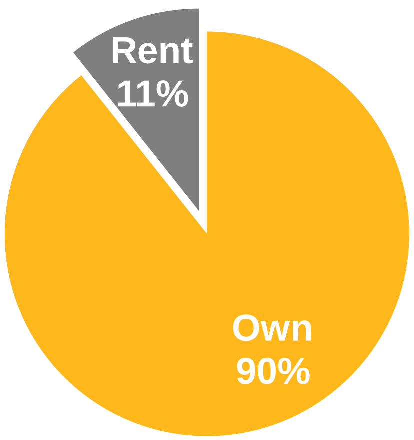


Age Group	Very Aware	Not at all Aware
18 – 34	5%	47%
35 – 54	6%	48%
55 – 64	8%	46%
65+	7%	47%

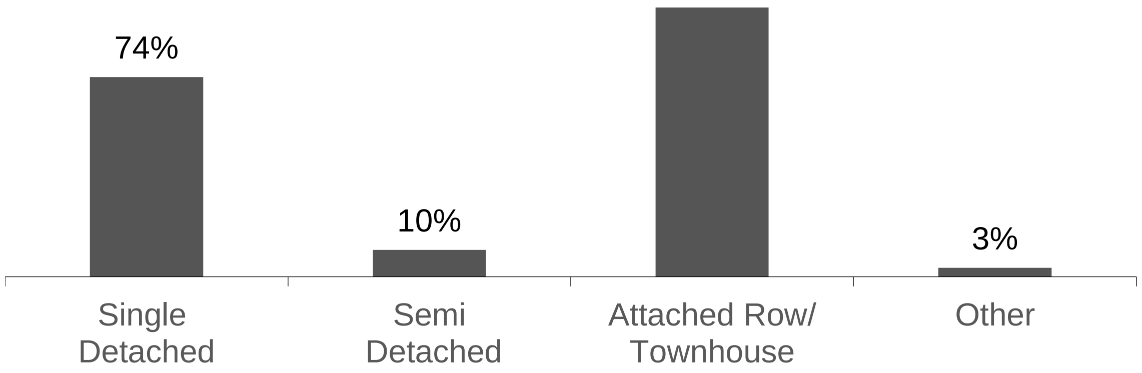
Q: How aware would you say that you are about renewable natural gas, this is sometimes also referred to as bio methane gas, or biogas?
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Demographics: House Characteristics (EGI)

Home Ownership

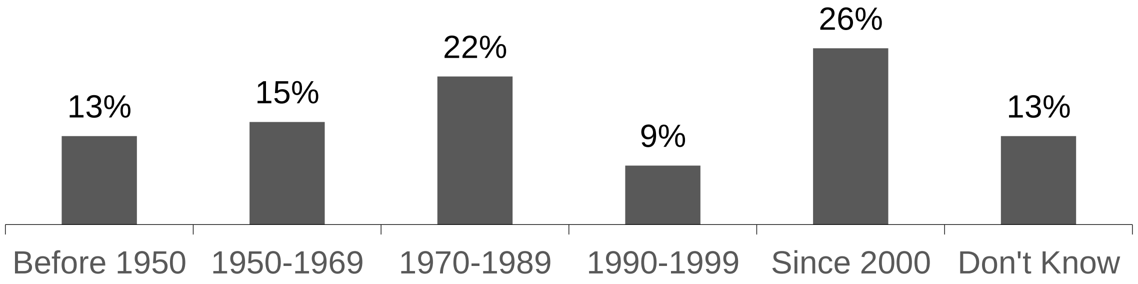


Type of Home

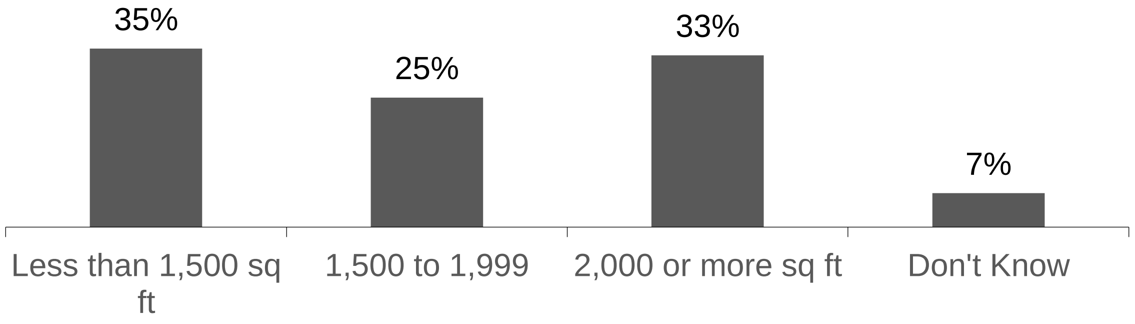


Age of Home

Average: 1977



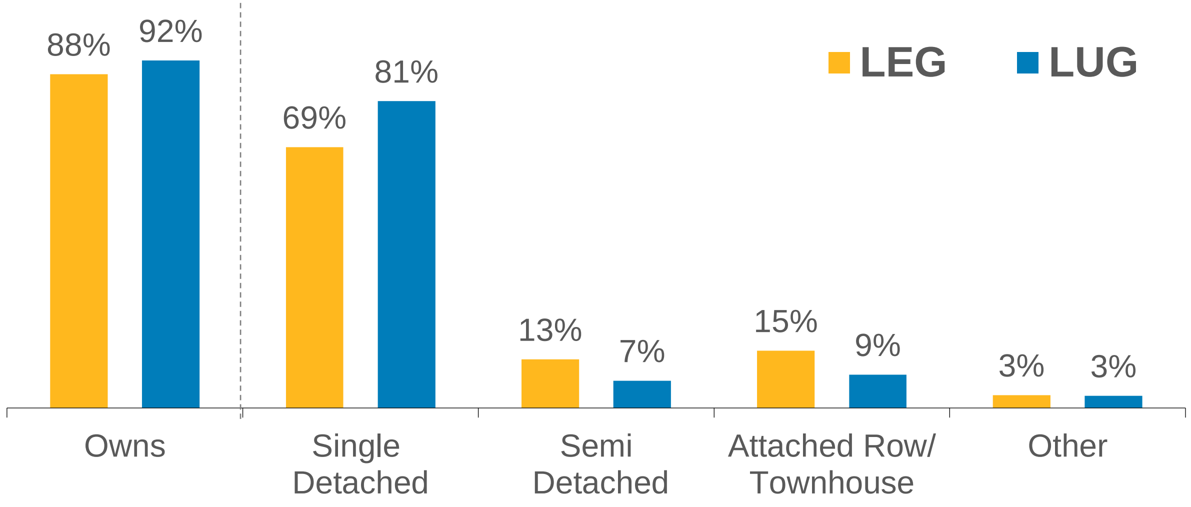
Size of Home



Demographics: House Characteristics (Legacy)

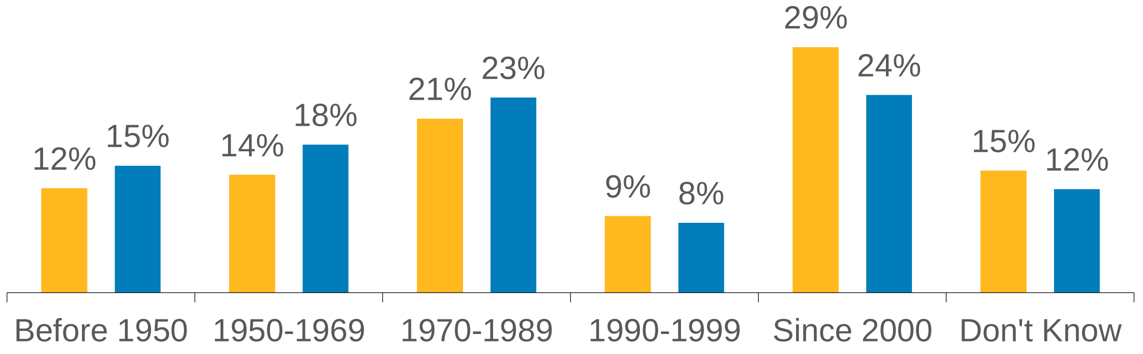
Home Ownership

Type of Home

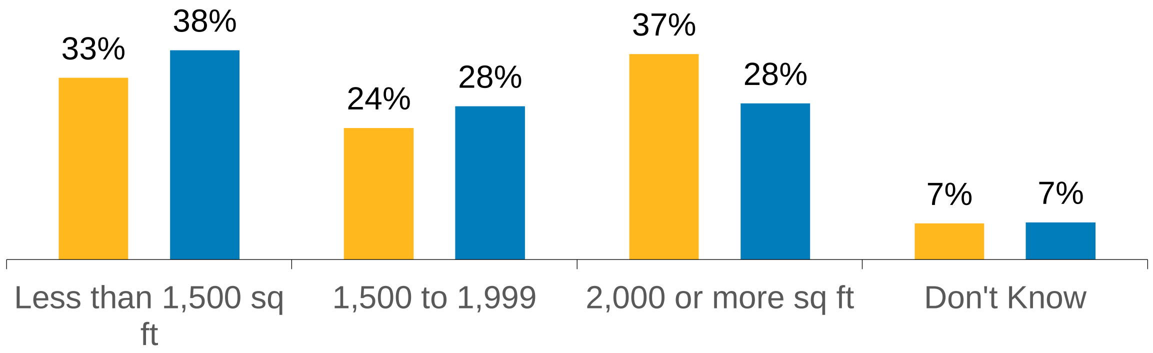


Age of Home

Average
LEG: 1979
LUG: 1973



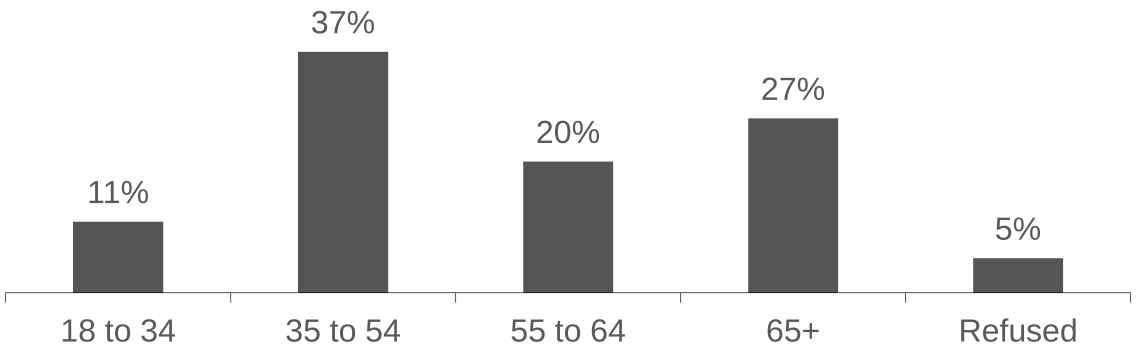
Size of Home



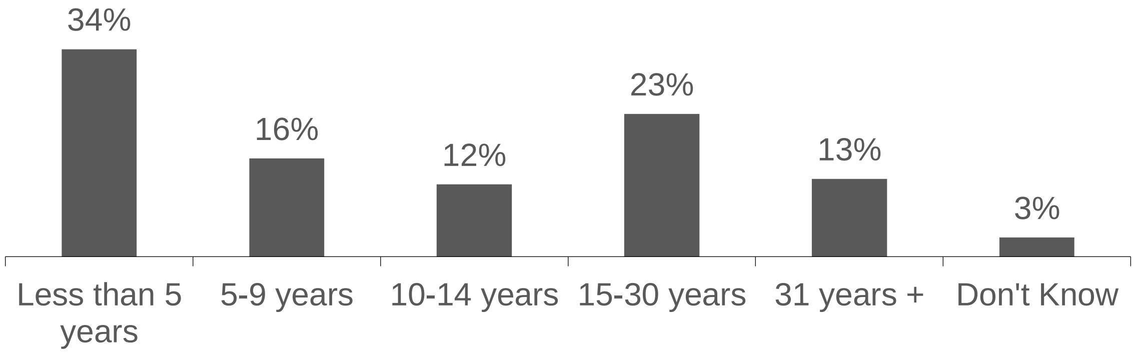
2021 Residential Single Family Natural Gas End Use Study

Demographics: Customer Characteristics (EGI)

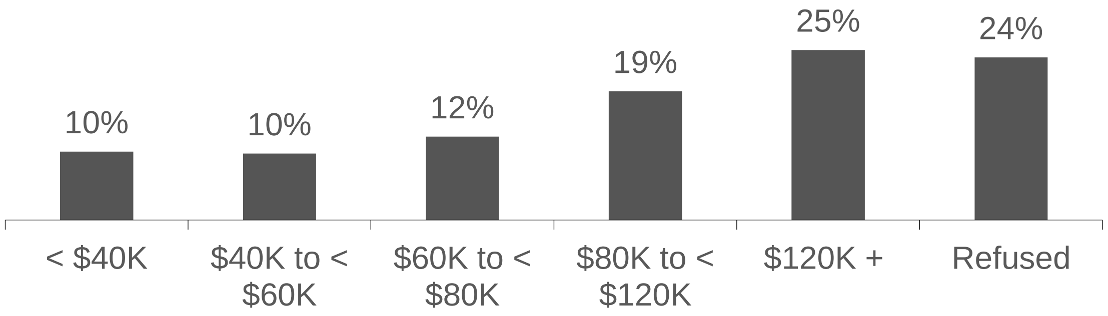
Age



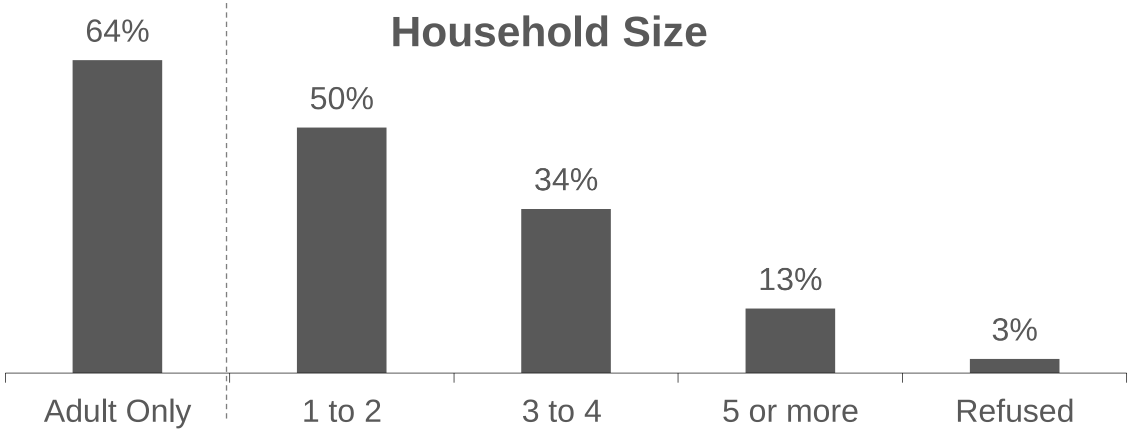
Length of Residence



Household Income



Household Size



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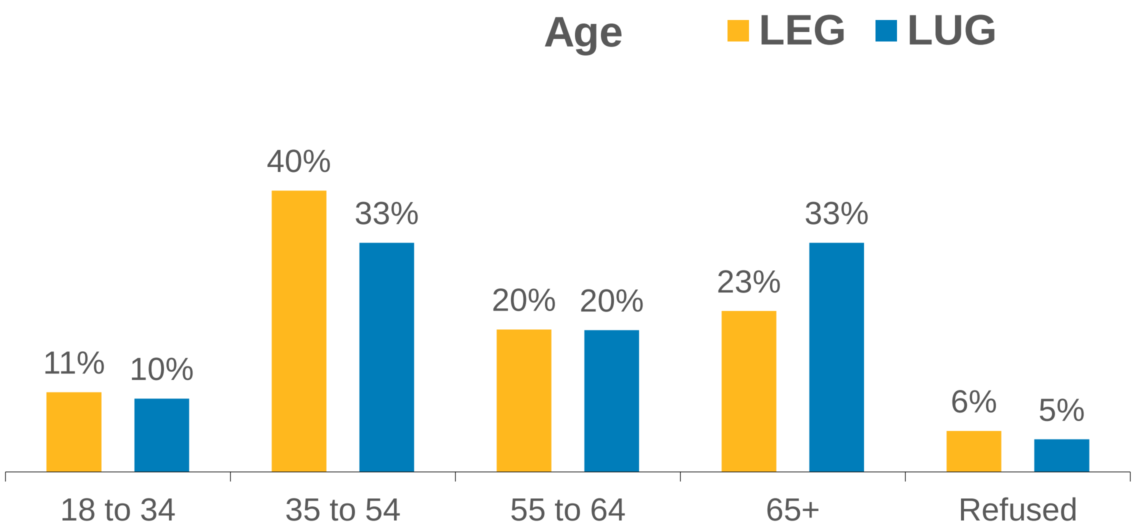
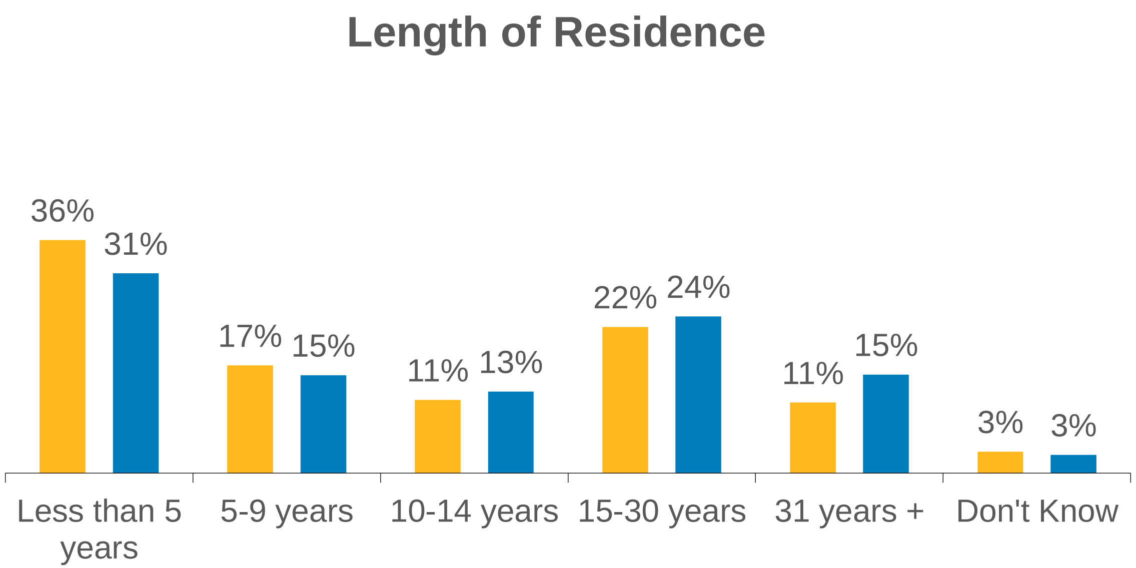
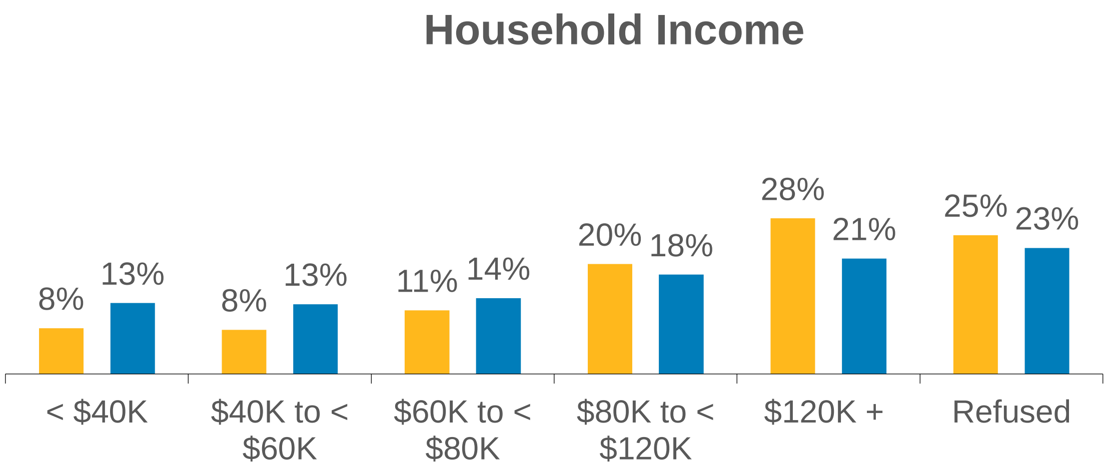
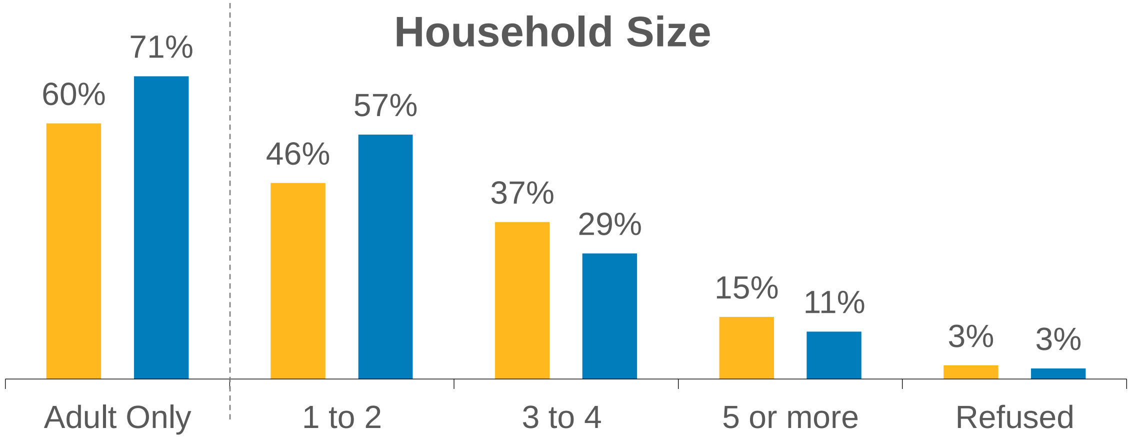
Demographics: Customer Characteristics (Legacy)









Appendix: Number of Natural Gas Applications

- Added to the report in February 2023
- The following applications were included:
  - Home Heating
  - Water Heating
  - Fireplaces (any number)
  - Stove (any number of cooktops / ranges)
  - BBQ
  - Clothes Dryer
  - Pool Heating

	Frequency	Percent
0 natural gas applications	38	2%
1 natural gas application	296	12%
2 natural gas applications	766	32%
3 natural gas applications	642	27%
4 natural gas applications	388	16%
5 natural gas applications	185	8%
6 natural gas applications	76	3%
7 natural gas applications	9	0%
Total	2400	100%

Customers who indicated “don’t know” to any of the individual application questions are included in the base size, but not counted as having natural gas for that application.

Single Family

Residential Natural Gas End Use Study

2022 Annual Results

Customer & Market Insights
February 2023

Objectives

- To measure the penetration of natural gas appliances in the single family residential customer market,
- To understand customer perceptions of the levels of insulation in their home,
- To determine awareness of Enbridge Gas' energy conservation programs, and understand where customers turn to for more information,
- Awareness of renewable natural gas, and
- Awareness of energy generating technology.

Methodology

- Sponsor-identified telephone interviews were completed by Leger between November 30, 2022 and January 22, 2023.
- Interviews were completed with customers who reside in single family dwellings and are (mainly) responsible for making energy-related decisions for the home.
- The total number of completed interviews is 2,400 across the total Enbridge Gas area and final regional results are calculated based on true geographic proportions.
- Overall results yield a margin of error of +/-2% at the 95% confidence interval.
- Unless otherwise noted, results in this report are based on all EGI customers.
- The regions reported in this report are defined as follows:

Region Name	Includes
Northern	Northeast (DMA 46), Northwest (DMA 33)
Eastern	Eastern (DMA 22), DMA 65
GTA West	DMA 17, DMA 21, DMA 53
GTA Toronto	DMA 01
GTA East	DMA 35, DMA 45, DMA 47
Southeast	Waterloo/Brantford (DMA 7), Hamilton/Halton (DMA 16), DMA 76
Southwest	Windsor/Chatham (DMA 2), Sarnia/London (DMA 4)

Executive Summary (1 of 2)

Natural Gas Penetration

- Natural gas remains the top choice for home heating and water heating, with natural gas water heating showing a slight uptick in 2022.
- When asked to think about a hypothetical new home, barring any other considerations, most customers continue to choose natural gas.
- The prevalence of natural gas for secondary appliances is stable. Across secondary appliances some regional variation continues to exist.

Ownership

- Heating system ownership continues to be very high (85%), though rental rates are a bit higher among newer homes and among younger customers. In the future, most customers intend to own their heating system (86%).
- Ownership of water heaters remains stable over the past several years. It continues to remain much lower than heating system ownership. Among those who are at least fairly likely to replace their water heater in the next 2 years, interest in ownership is much stronger (66%) than current ownership (44%).

Furnace Efficiency

- When asked about furnace efficiency, most indicated that their furnace is high efficiency. This proportion remains the same compared to the previous year.
- Still, a sizable group of customers do not know the efficiency level of their furnace (this is consistent over the last decade) – customers who don't know are not likely to be aware of and act on the potential for upgrades.
- There is a continued increase in the proportion of customers who have a Smart Thermostat (30%) as customers upgrade their thermostats. Customers with a Smart Thermostat are more likely to actively program it to reduce energy consumption.

Executive Summary (2 of 2)

Insulation

- About 2-in-5 customers (42%) deem their house to be “well insulated” while 8% describe it as “poorly insulated” or “not insulated,” which varies by the age of the home. 15% of customers indicate that they don’t know the level of insulation in their home.
- While 1-in-5 customers whose home is not “well” insulated would not bother improving their insulation, nearly 2-in-3 would to “save money on utility bills” or to “increase comfort” in the home.

Energy Efficiency (EE) and DSM offerings

- The proportion of customers planning to make energy efficiency updates is stable at 25%.
- Nearly 2-in-3 customers are aware that Enbridge Gas offers energy conservation programs. Awareness varies by customer age, group, and region.
- Enbridge Gas “rebates or discounts on a Smart thermostat” and “incentives and rebates towards energy saving renovations or equipment upgrades” were the most mentioned offerings.
- Overall, customer awareness of the Home Winterproofing Program (HWP) and Home Energy Retrofit (HER) program - now known as HER+ - is stable at 29% and 39%, respectively. Also, 39% are aware of the rebate/discount on a Smart Thermostat.
  - Among those aware of the respective programs, 22% have participated in HWP, 20% in Smart Thermostat, and 15% in HWP.
- The internet continues to be the most used source for general energy efficiency information.
- New for 2022 – customers were asked to rate their level of knowledge with solar panels, heat pumps and geothermal. Knowledge varies across the three technologies and is strongest for solar panels.

Overview of Natural Gas (NG) Appliances

- Natural gas use for all major appliances is stable compared to 2021.
- Across regions, natural gas for home heating is just slightly higher in the Southeast, and the use of natural gas for water heating and cooking is significantly lower in the Eastern and Northern regions compared to last year.

Natural Gas Penetration Rates across Appliances

	2014	2015	2016	2017	2018	2019	2020	2021	2022
			LUG			EGI	EGI	EGI	EGI
Home Heating	96%	96%	95%	96%	94%	96%	96%	94%	94%
Water Heater	85%	86%	86%	83%	82%	82%	85%	80%	82%
Fireplace	38%	41%	44%	36%	42%	35%	42%	37%	35%
Cooktop/Stove	29%	26%	31%	29%	31%	30%	31%	32%	31%
Barbecue	27%	23%	26%	20%	24%	24%	27%	24%	(--)
Clothes Dryer	21%	20%	19%	17%	19%	16%	15%	14%	(--)
Pool Heater	(--)	(--)	(--)	(--)	5%	6%		(--)	(--)

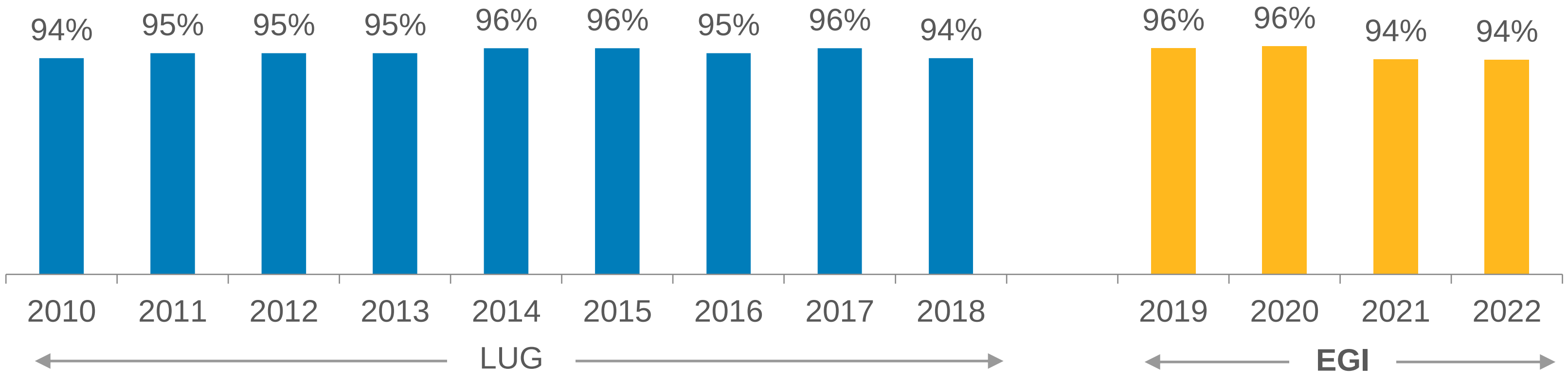
(--) indicates no measurement

Home Heating: NG Adoption & Equipment

- Natural gas forced air furnaces continue to be the most used heating equipment across EGI regions.
- A sizable portion of customers are not aware of the specific type of heating equipment they have in their home (15% among those who heat with natural gas).
- Those who don't use natural gas for home heating are mainly using electricity (5%), while a small portion are using wood or air source heat pump.

Natural Gas Penetration: Home Heating

(Base: all customers, n=2,400)



Type of Natural Gas Heating Equipment (n=2,238)	
Forced Air	76%
Hydronic	4%
Space Heaters	0.3%
Combination	2%
Hybrid or dual-fuel system of a forced air furnace and electric air source heat pump	2%
Don't Know	15%

Type of Electric Heating Equipment (n=112)	
Forced Air	43%
Baseboard Heaters	20%
A hybrid or dual-fuel system of a forced air furnace and electric air source heat pump	4%
Electric boiler (radiator)	4%
Other	5%
Don't Know	17%

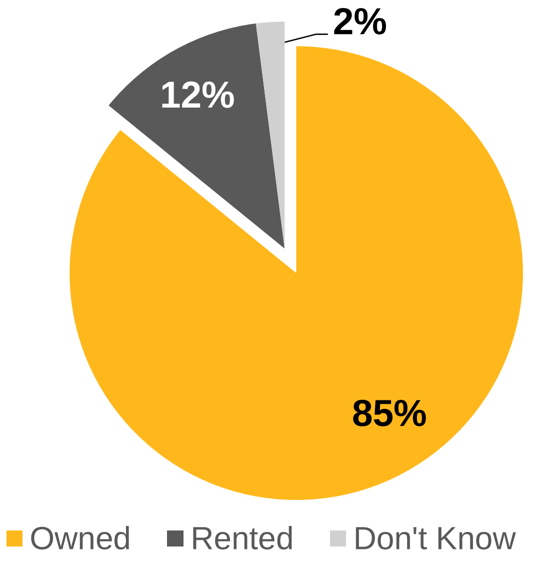
Q: What is the MAIN energy source for heating your home? Q: What type of **(PROPANE/NATURAL GAS/OIL)** furnace or heating system do you have? Q: What type of electric system are you using to heat your home?

Home Heating: Furnace Ownership

- Most customers own their furnace (or heating system), and most customers who anticipate replacing their furnace or heating system in the future plan to own it (rather than rent it).
- Rental rates are higher among some customer groups, including households that also rent the water heater (15%), homes built since 2000 (15%), households with incomes under $40K (16%), and younger (18-34) customers (22%).

Ownership of Current Furnace / Heating System

(Base: customers who use electricity, natural gas or oil for home heating, n=2,360)

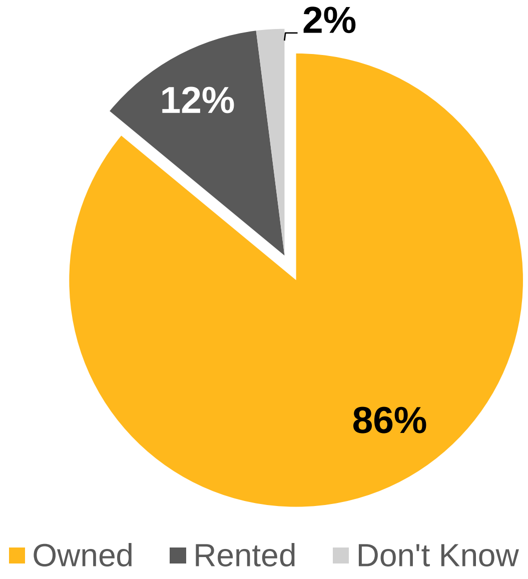


Region	Owns (%)
Northern	88%
Eastern	88%
GTA West	82%
GTA Toronto	82%
GTA East	83%
Southeast	88%
Southwest	91%*

Among younger customers (age 18-34) ownership level is lower at 73% compared to their counterparts, especially those age 65+ (93%)

Ownership of Replacement Furnace / Heating System

(Base: customers who are at least fairly likely to replace their furnace, n=293)



Q: Is your furnace or heating system owned or rented? Q: Is your replacement furnace or heating system most likely to be owned or rented?
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other or against the total.

Home Heating: Age and Efficiency Levels

- Most forced air furnaces are less than 10 years old (68%).
- Among those whose furnace is less than 5 years old, about half replaced their furnace and air conditioner at the same time.
- The Eastern region has a larger proportion of older furnaces, specifically those aged 16-20 years (10%) compared to the average (7%).
- When asked about furnace efficiency, most indicated that their furnace is high efficiency. This proportion remains the same as compared to the previous year.

Age of Forced Air Furnace (all fuels)	
5 years or less	41%
6 to 10 years	27%
11 to 20 years	21%
More than 20 years	5%
Don't Know	5%

38% of those who currently have a furnace that is less than 5 years old replaced it in the last 2 years (or 12% of the total)

51% of customers who replaced their furnace in the past 2 years and also had an air conditioner replaced both at the same time

Fuel Source for Original (replaced) Furnace	
Natural Gas	91%
Electricity	4%
Oil	3%
Other	1%
Don't Know	2%

87% of customers whose furnace is less than 10 years old indicate that their furnace is high-efficiency

69% of customers whose furnace is more than 10 years old indicate that their furnace is high-efficiency, among the remainder, 13% indicate having a mid-efficiency furnace and 12% a conventional furnace (6% indicate "don't know")

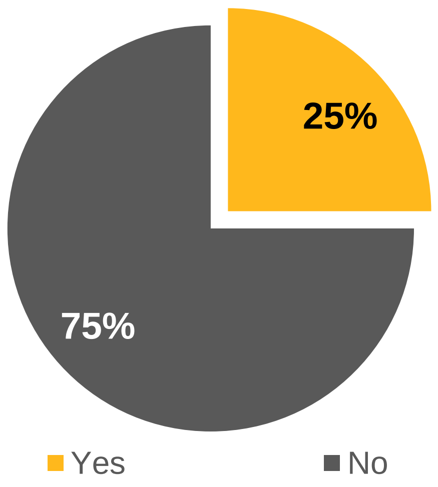
Forced Air Furnace Efficiency (natural gas)*	
High efficiency (over 90% efficiency)	83%
Medium efficiency	4%
Conventional (less than 75%)	3%
Don't Know	11%

Q:How old is your furnace? Q: Is this a high-efficiency furnace? IF NEEDED: it would likely have one or two plastic vent pipes (often white) that vent out a side wall. Q: What would you say the efficiency level of your furnace is? Would it be a high-efficiency furnace that vents through the side of the house, like dryer, but with a smaller plastic pipe? Q: Is it a furnace with a metal chimney coming up through the roof, such as a conventional furnace (which has a continuously lit pilot light) or a mid-efficiency furnace (which does not have a pilot light)?

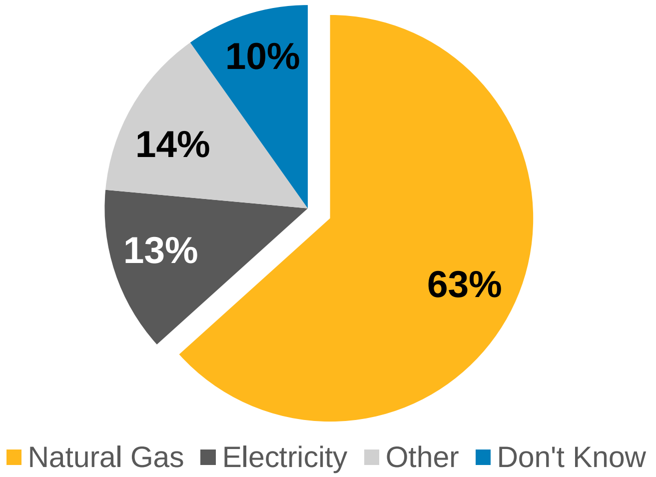
Air Source Heat Pump (ASHP): Secondary Energy Source

- 25% of customers who have an air source heat pump indicated they have a secondary energy source for home heating.
- Of those that have a secondary energy source, 63% have natural gas as the secondary energy source.
- 1-in-3 of the air source heat pumps are less that 5 years old. However, a notable proportion “don’t know” the age of the air source heat pump.

Secondary Energy Source for Furnace/ Home Heating System
(Base: customers who have an ASHP, n=73)



Type of Secondary Energy Source
(Base: customers who have an ASHP and a secondary energy source, n=18)



Age of ASHP (Base: customers who have an ASHP, n=73)	
5 years, or less than 5 years old	35%
6 to 10 years old	20%
11 to 15 years old	10%
More than 15 years old	8%
Don’t Know	27%

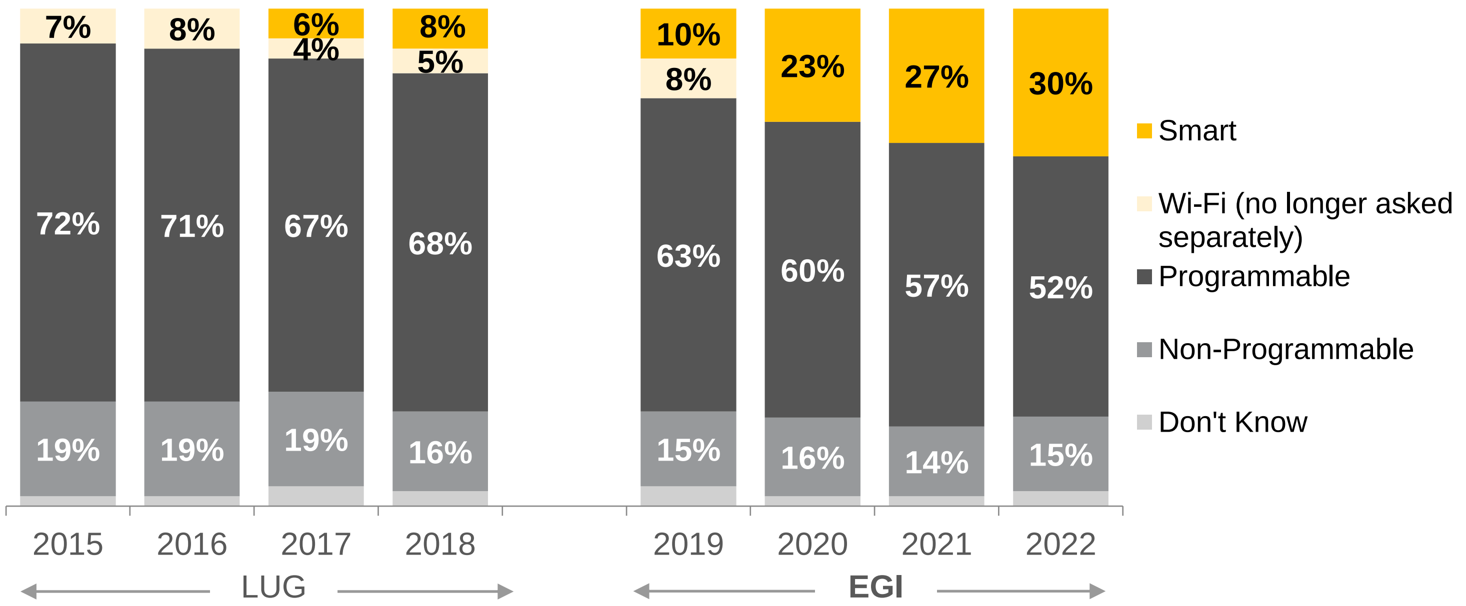
Q: Do you have a secondary energy source for your furnace or home heating system? Q: Which energy source do you use as your secondary energy source for your furnace or home heating system? Q: How old is your air source heat pump?

Home Heating: Thermostats

- Smart Thermostats continue to gain in adoption. They are most prevalent in the GTA West (38%), and GTA East region (35%), and least in the Northern region (18%).
- Smart Thermostats are also more prevalent in newer homes (42%), higher earning households ($140K+) (48%), and customers in the 35-54 age range (39%)
- Opportunities to upgrade thermostats continue to exist, as well as opportunities to encourage customers to actively program their thermostats.

Type of Thermostat

(Base: all participants, n=2,400)



Actively program thermostat to help reduce energy use

Do you actively program your thermostat to help reduce your energy use?	Programmable Thermostat (n=1,250)	Smart Thermostat (n=710)
Yes	69%	79%
No	30%	20%
Don't Know	1%	1%

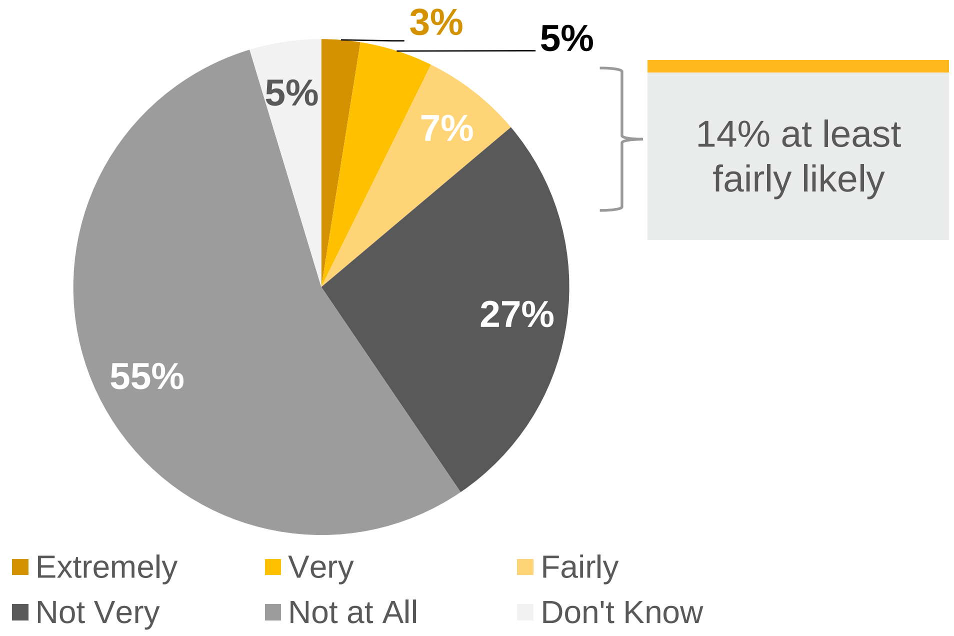
Which of the following thermostats do you have? Q: Do you actively program your thermostat to help reduce your energy use?

Home Heating: Furnace Replacement

- A small proportion of customers (14%) indicate that they are at least likely to replace their furnace in the next 2 year because they expect it to break down – among them most would get natural gas, though this proportion is declining, while a higher proportion of customers are undecided, or indicated “other” compared to previous years.

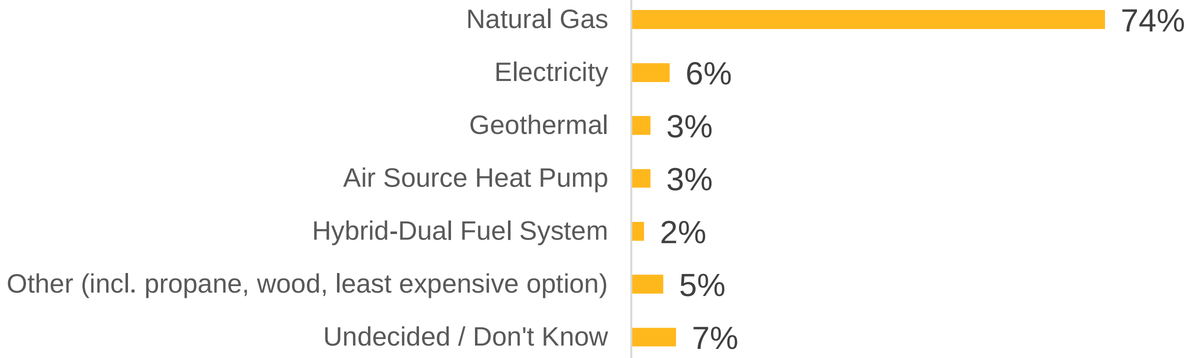
Likely to Replace Furnace in Next 2 Years

(Base: customers who have not replaced their furnace in the past 2 years, n=2,114)



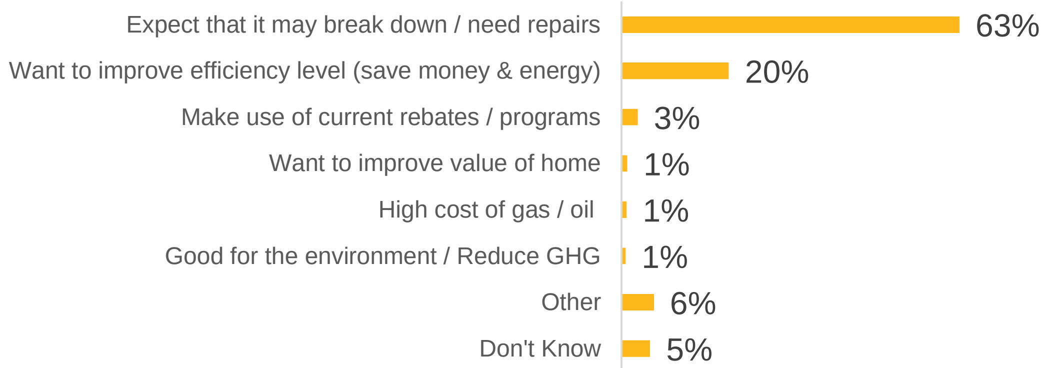
Fuel Source of New Furnace

(Base: customers who are at least fairly likely to replace their furnace, n=293)



Reason For Replacing Furnace

(Base: customers who are at least fairly likely to replace their furnace, n=293)

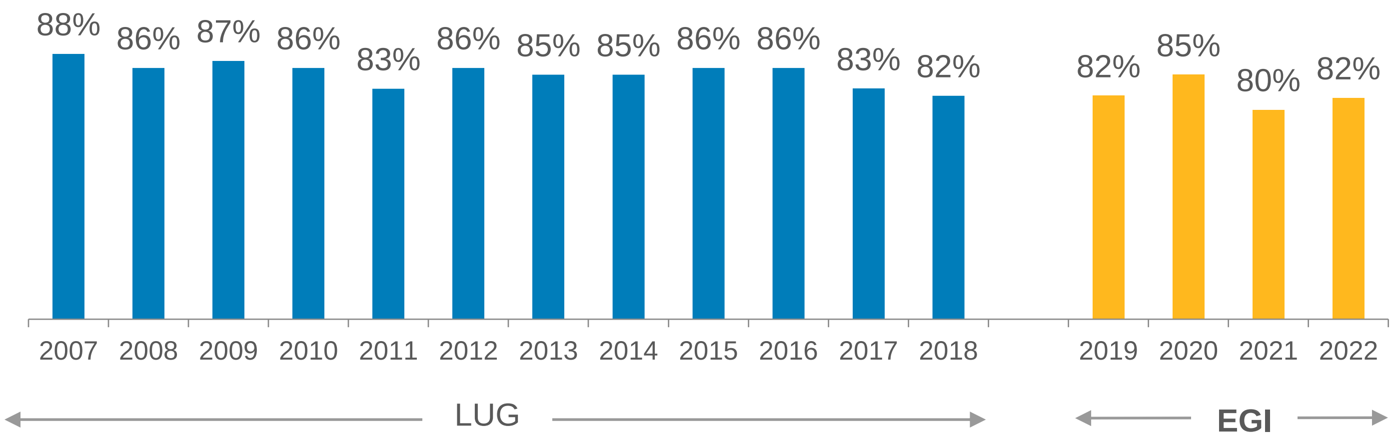


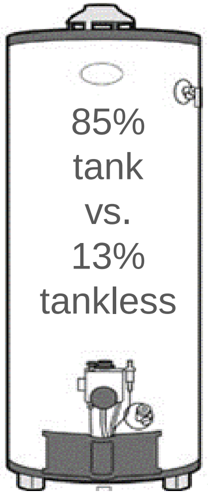
Q:How likely are you to replace the furnace or home heating system in the next 2 years? Q: Which energy source will the new furnace or heating system use? Q: What would you say is the main reason that you are fairly/very/extremely likely to replace your furnace or home heating system?

Water Heating: NG Adoption & Equipment

- Penetration of natural gas water heaters remains stable over the past few years among EGI customers (82%). A higher proportion of Eastern and Northern customers have an electric water heater.
- The proportion of tankless water heaters continues to grow slowly, up from 6% in 2017 to 14% in 2021 – but appears to have stabilized in 2022 (13%).

Natural Gas Penetration: Water Heating
(Base: all customers, n=2,400)





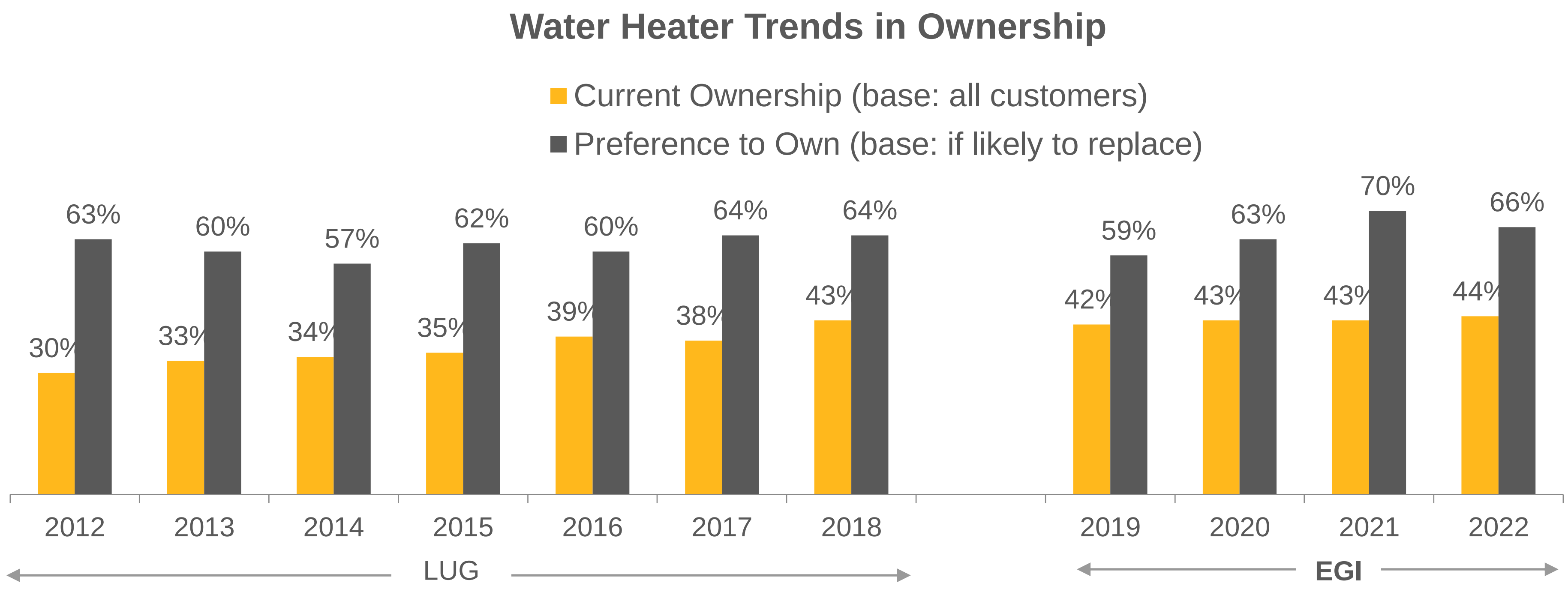
Age of Water Heater (all)	
5 years or less	47%
6 to 10 years	29%
11 to 15 years	11%
More than 15 years	6%
Don’t Know	7%

Region	Tankless (%)
Northern	13%
Eastern	15%
GTA West	12%
GTA Toronto	20%*
GTA East	12%
Southeast	8%
Southwest	15%

Q: What type of water heater do you have? Is it...? Q: How old is your water heater? Q: Does your water heater have a tank or is it tankless? IF NEEDED READ *Tankless water heaters are also called continuous or instantaneous water heaters.* * Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other or against the total.

Water Heating: Ownership

- Ownership is stable over the past couple of years. Ownership tends be higher among customers who have an electric water heater compared to one that is fueled by natural gas.
- Future intentions continue to lean toward ownership – 66% plan to own. Customers with higher household incomes are more likely to want to own the replacement water heater.



Owned % by type of water heater
Natural Gas: 41%
Electricity: 55%

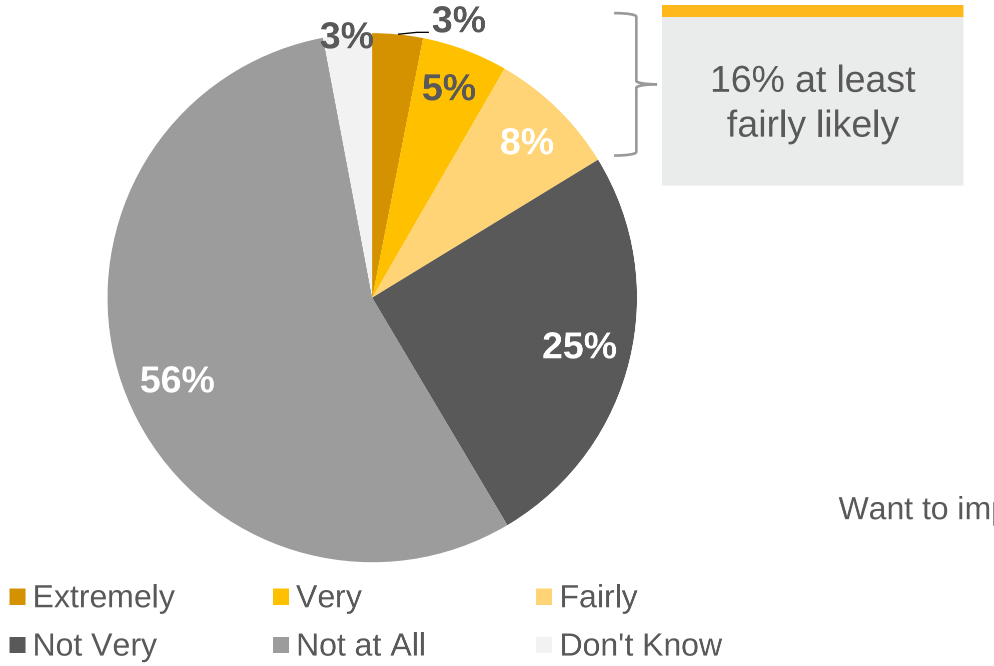
Q: Is your water heater owned or rented? Q: Is your replacement water heater most likely to be owned or rented?

Water Heating: Replacement

- Similar to furnaces, a small proportion of customers (16%) indicate that they are at least likely to replace their water heater in the next 2 years because it is expected to break down or because they're looking to improve the efficiency level – among them, most would get a natural gas water heater.
- Older customers (65+) are considerably less likely to replace the water heater in the next 2 years.

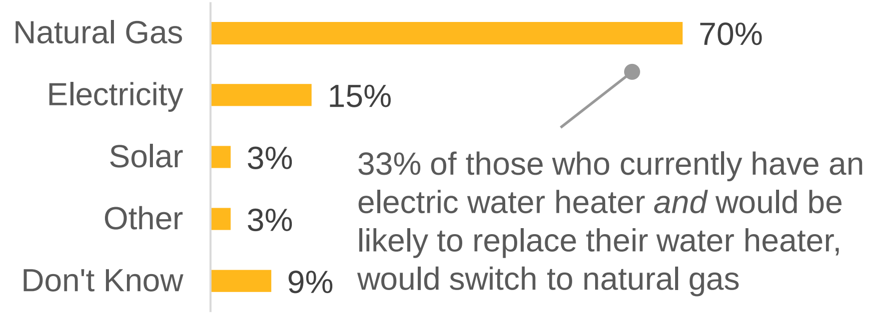
Likely to Replace Water Heater in Next 2 Years

(Base: customers who have a water heater and own their home, n=2,044)



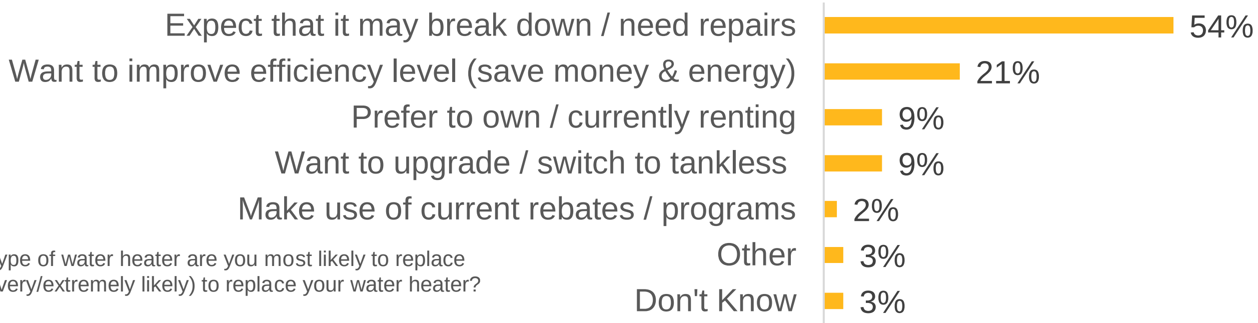
Fuel Source of New Water Heater

(Base: customers who are at least fairly likely to replace their water heater, n=320)



Reason For Replacing Water Heater

(Base: customers who are at least fairly likely to replace their water heater, n=320)



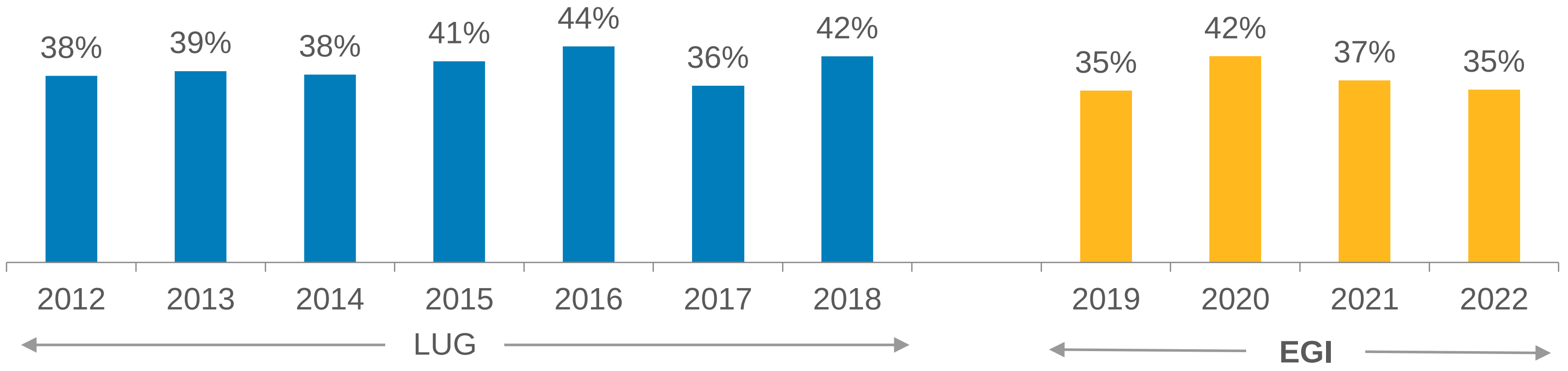
Q: How likely are you to replace your water heater in the next 2 years? Are you...? Q: What type of water heater are you most likely to replace your current water heater with? Q: What would you say is the main reason that you are (fairly/very/extremely likely) to replace your water heater?

Fireplaces: NG Adoption & Equipment

ENBRIDGE Life Takes Energy

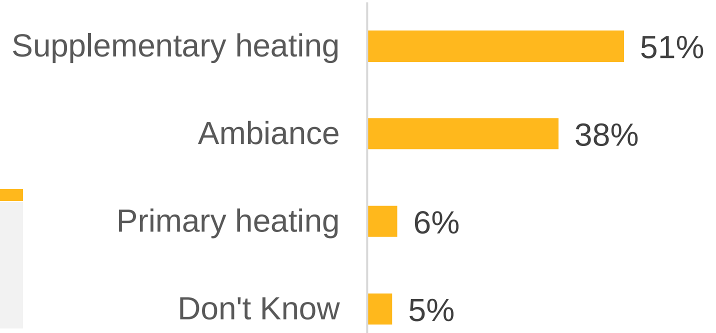
- Natural gas fireplaces continue to be popular among those who have a fireplace or would like to install one (interest in electric fireplaces is increasing, up from 20% in 2021, 17% in 2020, and 13% in 2019).
- Just over half of customers with a fireplace indicate that they use it for supplementary heating, while usage of a fireplace for ambiance has been steadily increasing.

Natural Gas Penetration: Fireplaces
(Base: all customers, n=2,400)



9% are at least fairly **likely to install a fireplace** in the next 2 years, and among them 53% would install one that uses **natural gas**, 28% would use electricity and 16% would use wood as a fuel source

Use of Natural Gas Fireplace
(Base: customers who have natural gas fireplace, n=844)



52% of households have a fireplace

- 75% have just one
- 23% have 2 or more

Fuel Type: 67% 21% 14%

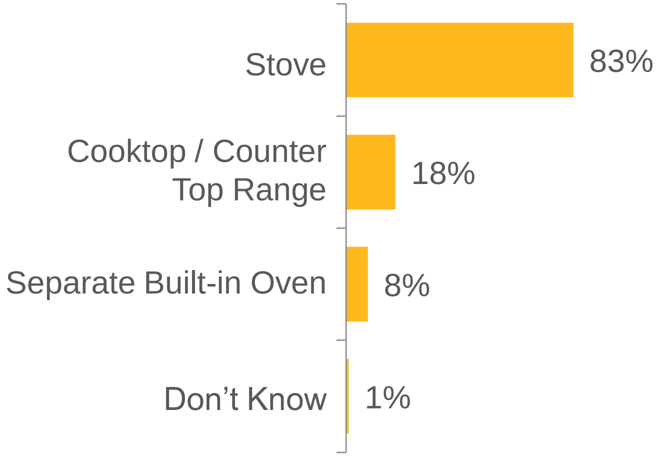
Age of Fireplaces (all)
About 37% of fireplaces are less than 10 years old

Q: Are there any indoor working fireplaces in your home? Q: How many indoor working fireplaces do you have in your home? Q: How old is (EACH)? Q: And which energy source does (EACH) use? Q: How likely are you to install an indoor fireplace in your home in the next 2 years? Are you... Q: And what type of indoor fireplace are you most likely to install? Q: Which of the following best describes how you use your natural gas fireplace(s)?

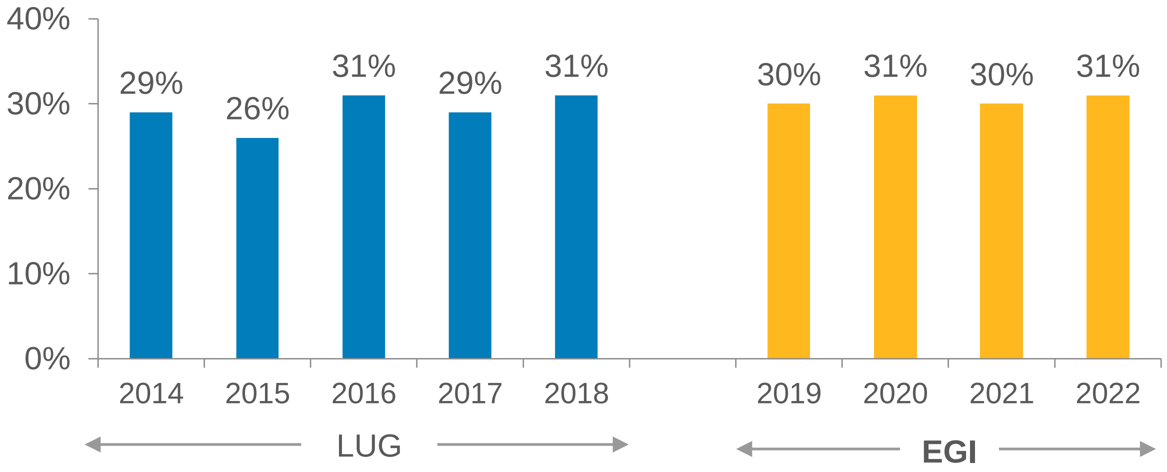
Cooking: NG Adoption & Equipment

- Penetration of natural gas for indoor cooking continues to be relatively stable (31%). Regionally, the Northern region (18%) is the least likely to use natural gas for cooking while Southwest (33%) is the most likely to.
- Both natural gas fueled stoves and counter top ranges are the most prevalent in the highest earning households (39%, 47%), and the largest homes (in sq ft) (45%, 47%).

Type of Cooking Equipment (more than one response allowed)
(Base: all customers, n=2,400)



Natural Gas Penetration: Cooktop/Stove
(Base: all customers, n=2,400)



Region	Natural Gas (%)
Northern	18%
Eastern	19%
GTA West	34%
GTA Toronto	34%
GTA East	33%
Southeast	33%
Southwest	36%*

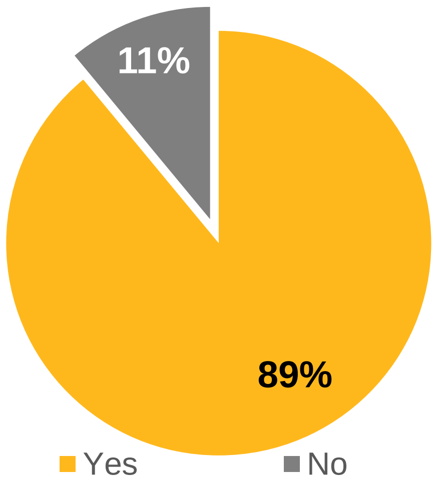
Q: Do you have a stove, or do you have a cook top with a separate oven? *Q:* Is your (ITEM) fueled by natural gas or electricity? * Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other or against the total.

Air Conditioning

- There is considerable variation across EGI regions. Customers who have air conditioning ranges from 66% in the Northern region to 92% in the GTA East and West.
- Air conditioning is also significantly more common in newer houses with 96% of homes built since 2000 having air conditioning vs. only 75% of homes built before 1950. Differences were also observed with the size of home and household income. Customers with a larger home or higher household income are more likely to have air conditioning in the house.
- The majority have central air conditioning (90%), while "ductless/portable air conditioners" are more prevalent in the Northern region.
- Just over half (51%) of customers who replaced their furnace or heating system in the past 2 years also replaced the air conditioner.

Have Air Conditioning

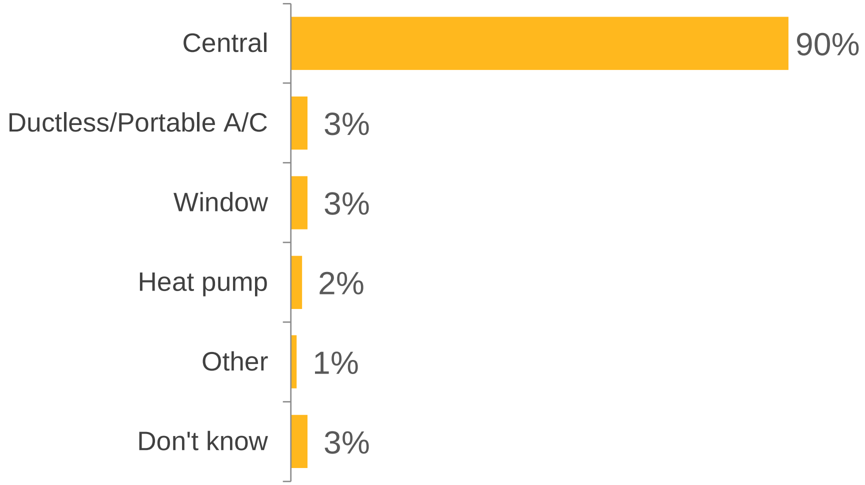
(Base: all customers, n=2,400)



Region	Yes (%)
Northern	66%*
Eastern	90%
GTA West	92%*
GTA Toronto	90%
GTA East	92%*
Southeast	88%
Southwest	89%

Type of Air Conditioning

(Base: customers who have air conditioning, n=2,130)



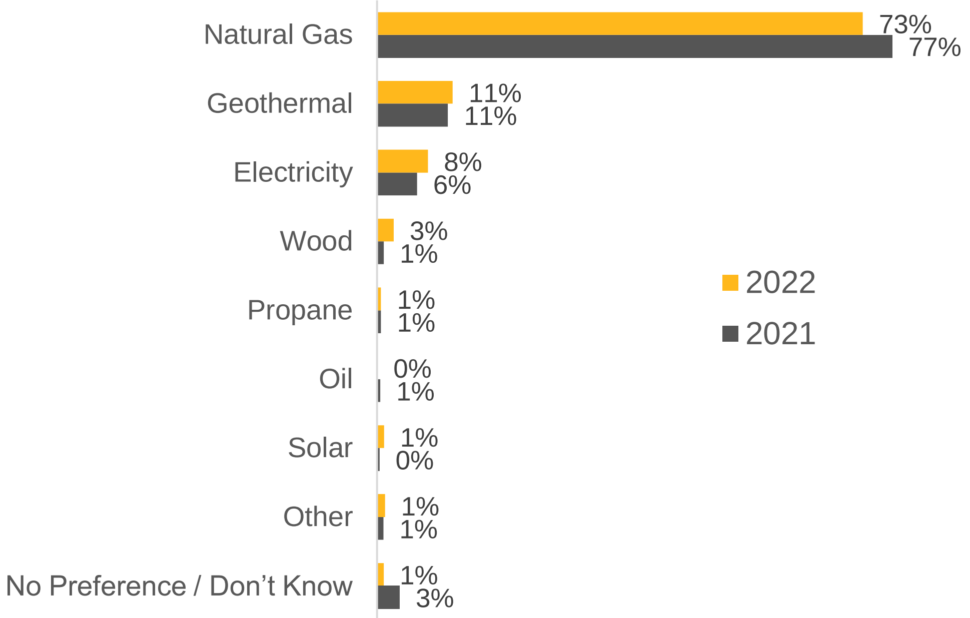
Q: Do you have air conditioning in your home? Q: Which of the following types of air conditioning do you use in your home?
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other or against the total.

Home Heating: Preference for New Home

- Most customers (73%) would prefer natural gas for home heating in a new home. Preference for natural gas home heating continues to decline (down from 77% in 2021, 83% in 2020 and 86% in 2019). Preference for geothermal (11%) and electricity (8%) trend upward, as did wood in 2022.
- Preference for natural gas is strongest in the Northern (76%) and GTA East (76%) region and lowest in the Toronto (68%) region.
- Key reasons for choosing an alternate fuel source include the perception that it is more environmentally friendly / energy efficient (especially for geothermal) and has lower operation costs.

Preferred Fuel Source for Home Heating

(Base: all customers, n=2,400)



Reason for Preferred Fuel Source

(Base: all customers who indicated a preferred fuel source)

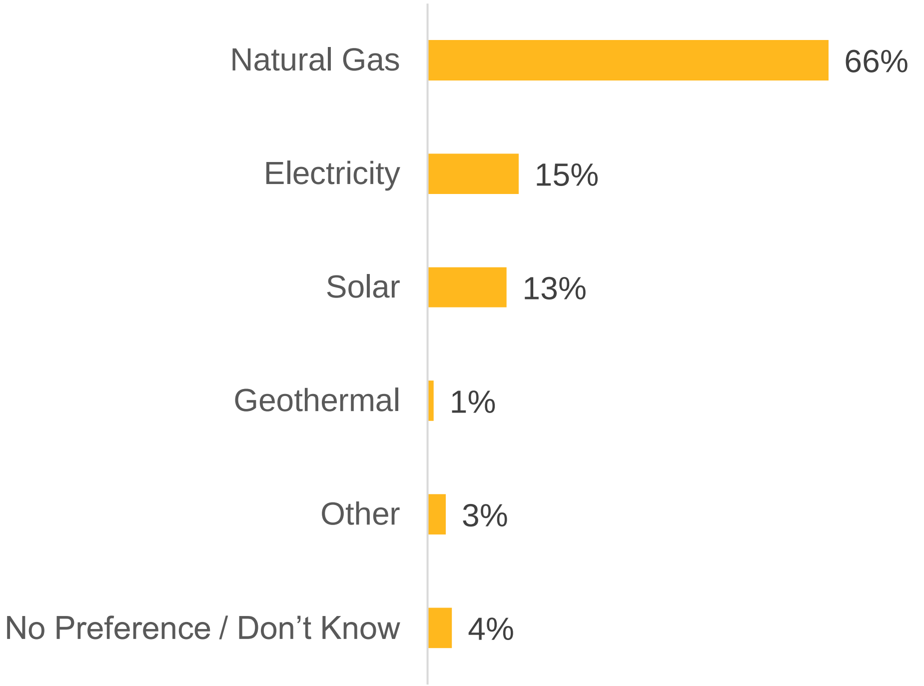
	Natural Gas (n=1,742)	Electricity (n=182)	Geothermal (n=272)
Lower operation cost	47%	33%	36%
Environmentally friendly / Energy efficient	19%	28%	67%
It is what I am used to / Used in the past	18%	8%	1%
Easier / More convenient	12%	7%	2%
Reliable / Dependable heat source/ Best option	13%	4%	5%
It is what is available/ Preferred source not available	7%	3%	2%
Safer / Safety concerns	3%	8%	0.3%
Effective / Performs well / Others don't perform as well	2%	2%	1%
Other	9%	15%	9%
Don't Know / Refused	4%	5%	3%

Q: I would now like you to assume that you are moving into a new home. Which energy source would you choose for each of the following? PRIMARY home heating Q: What would you say are your main reasons for choosing (insert choice) as your primary source for your home heating? (Total mentions)

Water Heating: Preference for New Home

- Most customers (66%) would prefer natural gas for water heating in a new home (down from 72% in 2021, 78% in 2020 and 81% in 2019)
- Preference for electric (15%) and solar (13%) water heating continue to trend upward.

Preferred Fuel Source for Water Heating
(Base: all customers, n=2,400)



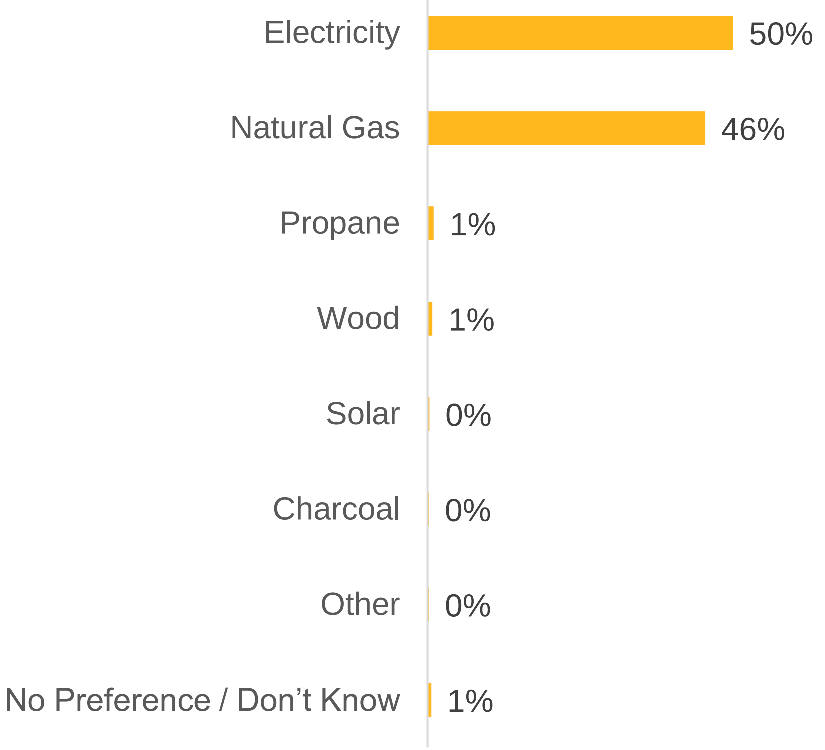
Region	Natural Gas (%)	Electricity (%)
Northern	65%	16%
Eastern	60%	20%*
GTA West	67%	12%
GTA Toronto	63%	18%*
GTA East	64%	15%
Southeast	70%*	13%
Southwest	69%	14%

Q: I would now like you to assume that you are moving into a new home. Which energy source would you choose for each of the following? Water heater?
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other or against the total.

Stove/Cooktop: Preference for New Home

- About 1-in-2 customer prefer natural gas for cooking in a new home (down from 52% in 2021), while preference for electric (50%) continues to trend upward.
- Preference for natural gas cooking varies by region, household income, and size of home. Customers with higher household incomes and larger homes prefer natural gas for cooking.

Preferred Fuel Source for Stove/Cooktop
(Base: all customers, n=2,400)



Region	Natural Gas (%)	Electricity (%)
Northern	37%	58%
Eastern	35%	62%*
GTA West	48%	48%
GTA Toronto	40%	57%*
GTA East	46%	50%
Southeast	53%*	42%
Southwest	52%*	44%

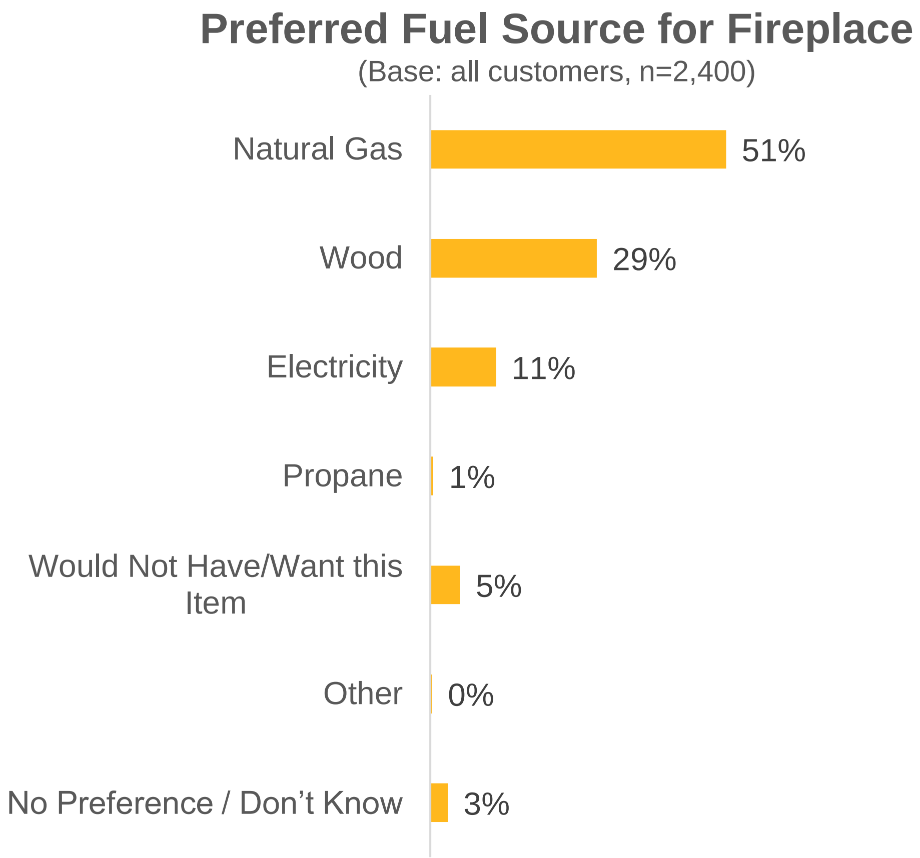
Household Income	Natural Gas (%)
Under $40K	37%
$40K-$80K	45%
$80K-$100K	44%
$100K-$140K	48%
$140K+	55%*

Size of Home	Natural Gas (%)
<1,500 sq ft	42%
1,500-1,999	46%
2,000-2,499	45%
2,500+	56%

Q: I would now like you to assume that you are moving into a new home. Which energy source would you choose for each of the following? Stove/cooktop?
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other or against the total.

Fireplace: Preference for New Home

- 51% of customers prefer natural gas for fireplaces in a new home (down from 54% in 2021) followed by wood (27%) and electricity (11%).
- Preference for natural gas fireplaces vary by region, household income and size of home. Customers with higher incomes and larger homes prefer natural gas fireplaces.



Region	Natural Gas (%)	Electricity (%)
Northern	48%	7%
Eastern	49%	6%*
GTA West	52%	13%
GTA Toronto	43%	12%
GTA East	51%	13%
Southeast	52%	14%
Southwest	58%*	9%

Household Income	Natural Gas (%)
Under $40K	49%
$40K-$80K	51%
$80K-$100K	47%
$100K-$140K	48%
$140K+	56%*

Size of Home	Natural Gas (%)
<1,500 sq ft	46%
1,500-1,999	47%
2,000-2,499	56%
2,500+	64%*

Q: I would now like you to assume that you are moving into a new home. Which energy source would you choose for each of the following? Fireplace?
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other or against the total.

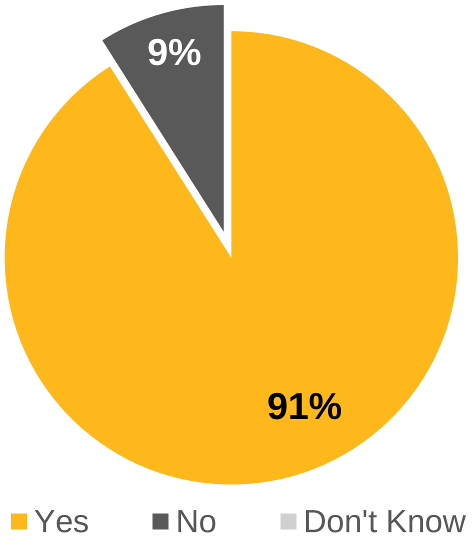
2022 Residential Single Family Natural Gas End Use Study

Insulation: Basement

- Over 9-in-10 single-family homes (91%) have a basement. The proportion of homes with a basement ranges regionally from a low of 83% in the Southwest to a high of 94% in GTA West.
- Older homes are more likely to have poorly insulated or uninsulated basements.
- Household income also appears to be a factor. About 2-in-5 (21%) low-income customers have poorly insulated or uninsulated basements. This represents customers who may be eligible for the Home Winterproofing Program.

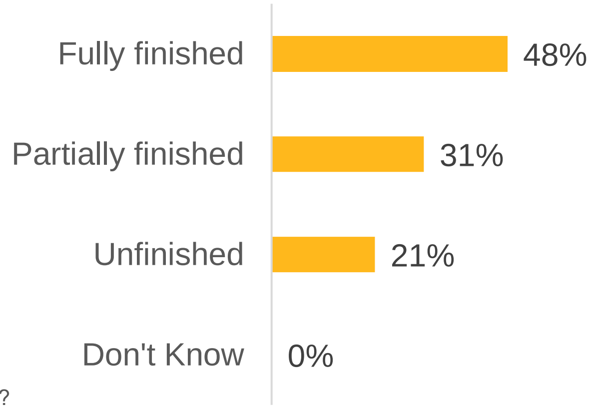
Have a Basement

(Base: all customers, n=2,400)



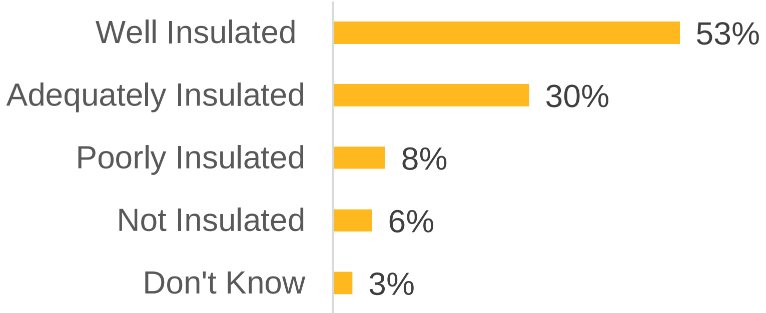
Level of Finish

(Base: customers who have a basement, n=2,181)



Level of Insulation

(Base: customers who have a basement, n=2,181)



Age of Home	Well (%)	Not (%)
Before 1950	28%	18%*
1950-1969	50%	7%
1970-1989	53%	3%
1990-1999	69%*	1%
2000-2022	71%*	3%

Household Income	Well (%)	Not (%)
Under $40K	43%	10%*
$40K-$80K	49%	8%
$80K-$100K	51%	7%
$100K-$140K	54%	4%
$140K+	60%*	4%

Q: Do you have a basement?; Q: Is your basement…?

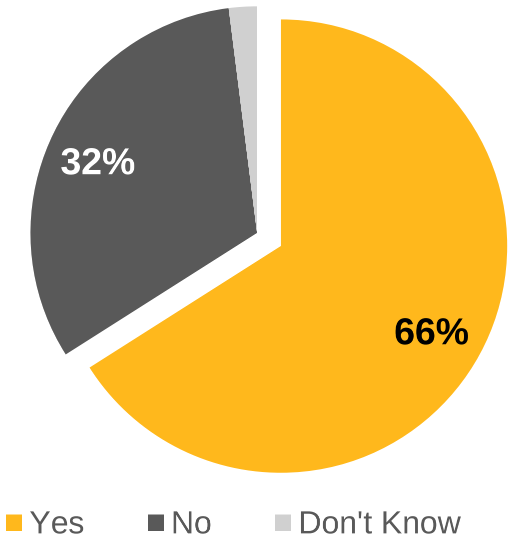
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other or against the total.

Insulation: Attic

- Just 2-in-3 single family homes have an attic ranging from a low of 54% in the GTA Toronto region to a high of 75% in the Northern region.
- Most customers perceive their attic to be adequately insulated or well insulated.
- Older homes are more likely to have poorly insulated or uninsulated attics.
- Low-income customers with an attic are more likely to have an attic that is poorly insulated (12%) and a significant proportion don't know their insulation levels (14%).

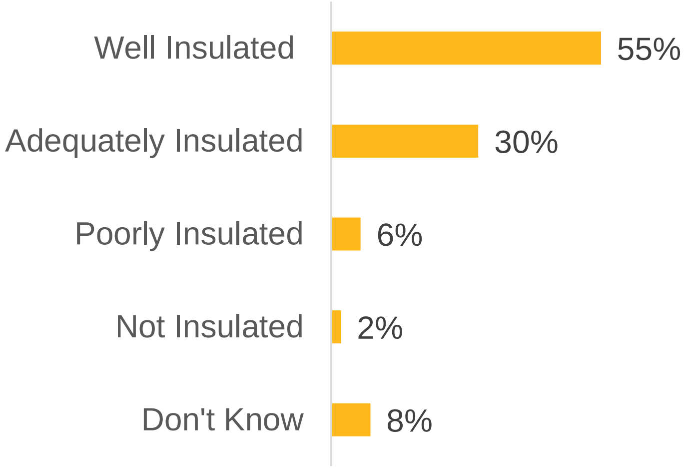
Have an Attic

(Base: all customers, n=2,400)



Level of Insulation

(Base: customers who have an attic, n=1,586)



Age of Home	Well (%)	Poorly (%)	Not (%)
Before 1950	49%	10%*	2%
1950-1969	55%	3%	0%
1970-1989	56%	7%	2%
1990-1999	52%	4%	1%
2000-2022	61%	3%	3%

Household Income	Well (%)	Poorly (%)	Don't Know (%)
Under $40K	49%	12%*	14%*
$40K-$80K	56%	7%	8%
$80K-$100K	48%	7%	9%
$100K-$140K	61%	5%	8%
$140K+	55%	3%	5%

Q: Do you have an attic? Q: Is your attic …?

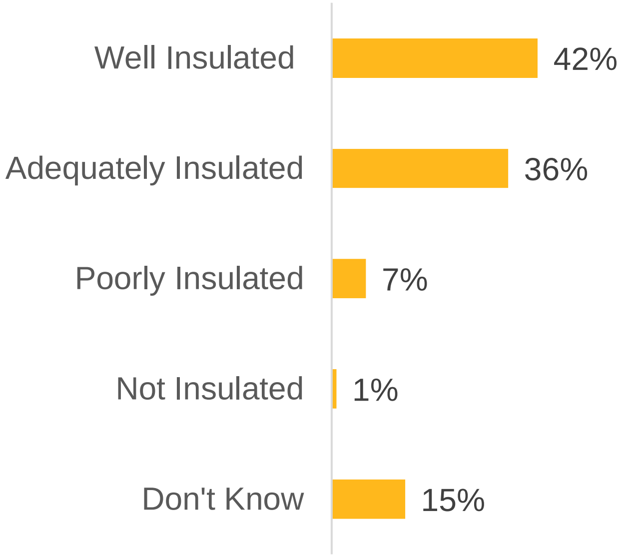
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Insulation: Home and Exterior Wall

- Over 2-in-5 customers perceive that their home is “well” insulated (42%). Customers in the Southwest region are the most likely to say their home is ‘well’ insulated (46%), while GTA Toronto customers are the most likely to indicate their home is ‘poorly’ insulated (13%).
- Perceptions of insulation vary by the age of the home, where newer homes are almost three times as likely to be well-insulated compared to homes built before 1950, which sees 20% of customers indicating that their home is poorly insulated.
- Note that 15% of customers were unable to categorize the insulation level in their home.

Level of Home Insulation

(Base: all customers, n=2,400)



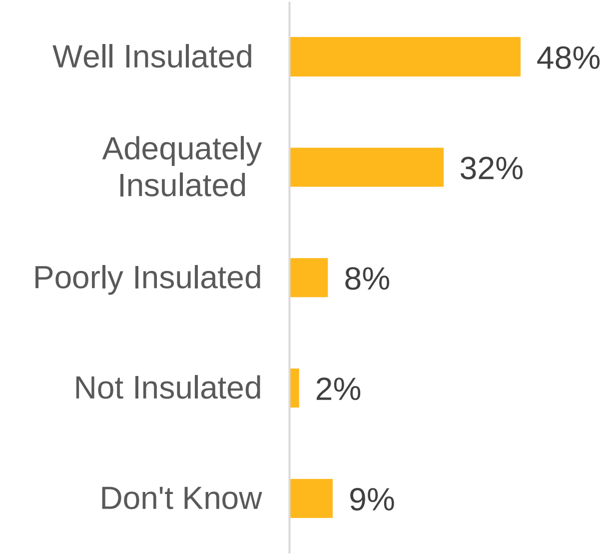
Level of Home Insulation by Age of Home

(Base: all customers, n=2,400)

Age of Home	Before 1950	1950-1969	1970-1989	1990-1999	2000-2022
Well	24%	29%	40%	46%	65%
Adequate	39%*	50%	40%	39%	22%
Poor	20%*	11%	5%	2%	1%
Not	1%	1%	1%	0%	1%
Don’t Know	16%	10%	14%	14%	11%

Level of Exterior Wall Insulation

(Base: all customers, n=2,400)



Q: How about your exterior, outside walls, are they…?; Q: Which best describes the insulation level of your home?

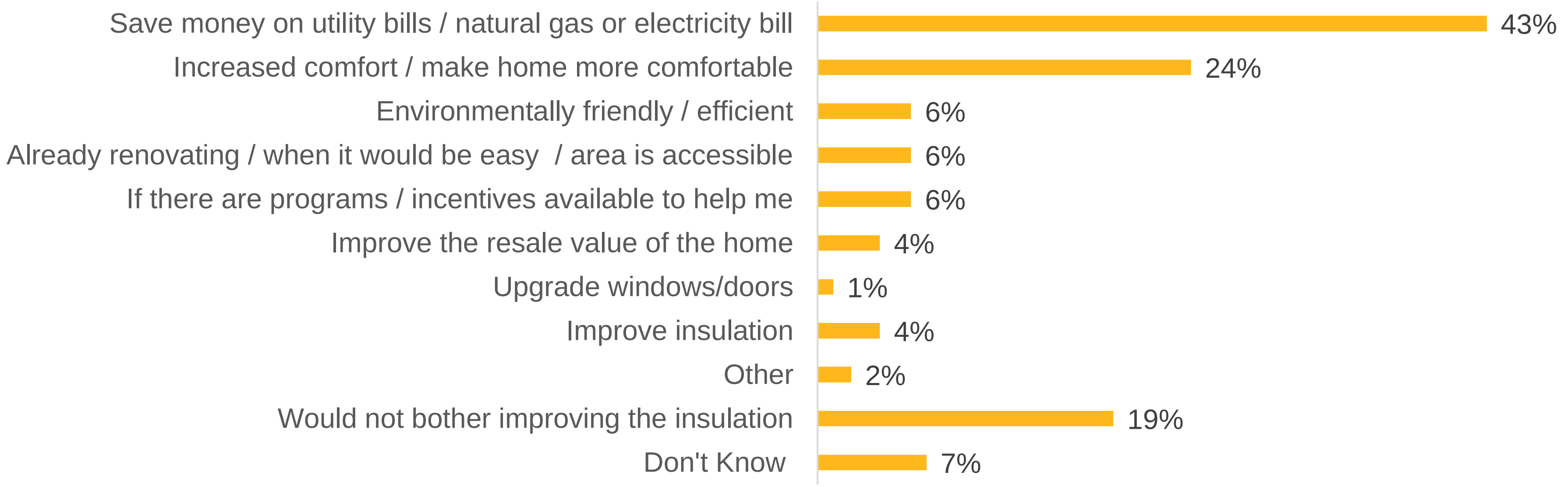
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other or against the total.

Insulation: Motivations for Improving Insulation

- Customers who indicated their home is not already "well" insulated were asked what would motivate them to improve their insulation. While almost 1-in-5 indicated that they would not bother (nothing would motivate them), among the remainder, saving money on their utility bills was a key motivator, followed by increasing the comfort of their home.
- The proportion of customers who indicated that they "would not bother improving the insulation" dropped significantly since 2020 (48%).
- Increased comfort was mentioned significantly more often among women (27%), while saving money was mentioned more often among men (46%). Additionally, increased comfort was also mentioned more often among younger customers (age 18-34).

Motivation for Improving Insulation

(Base: customers who indicate that their home is not "well" insulated, n=1,398)

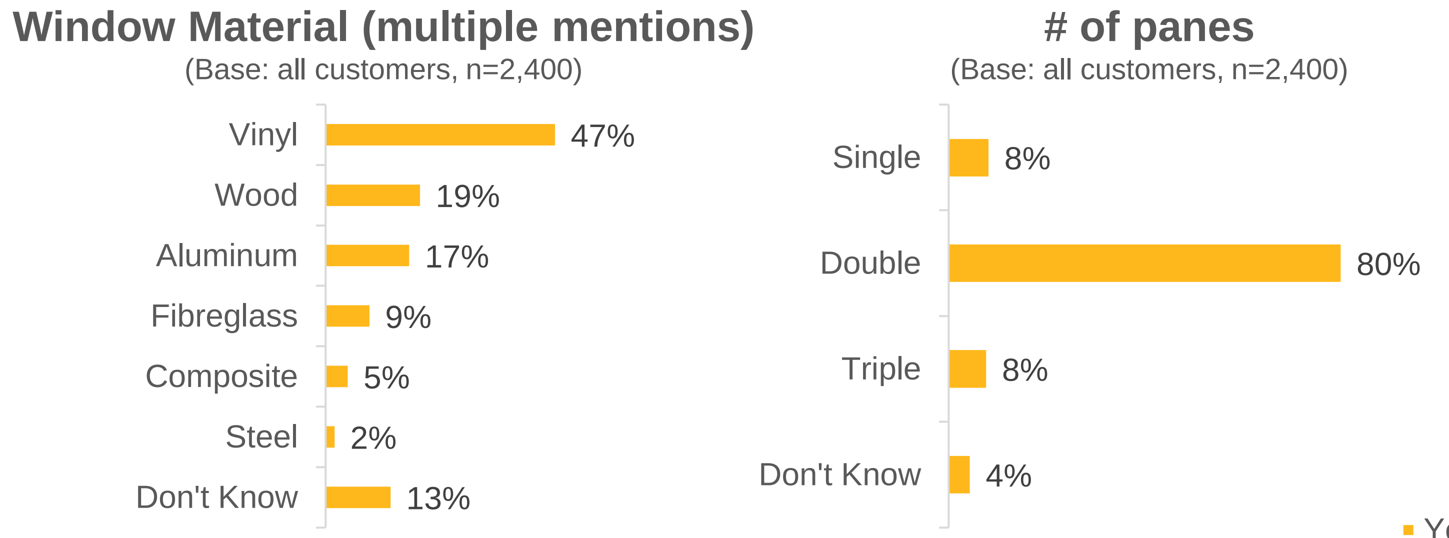


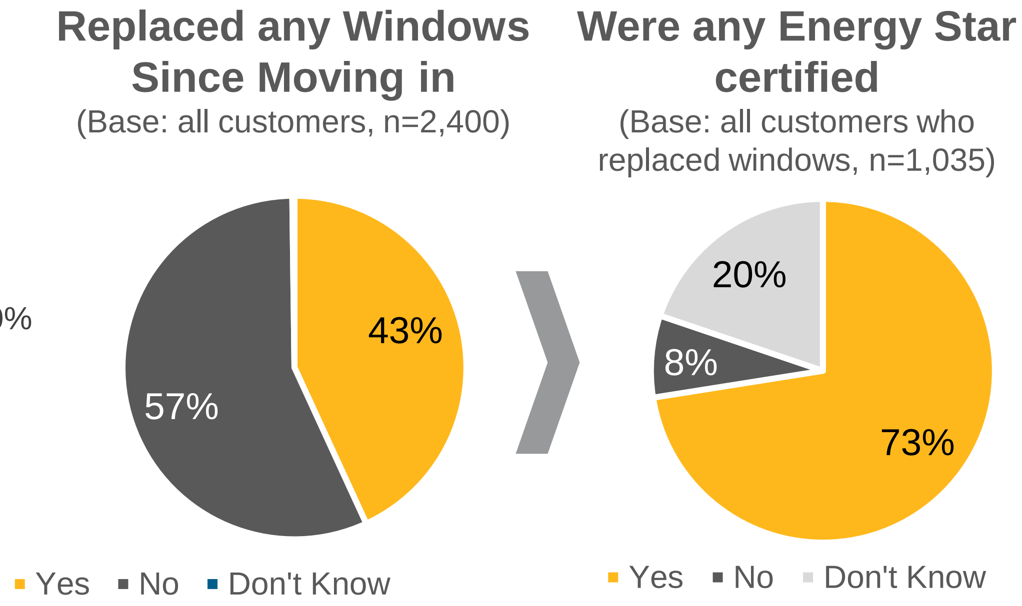
Q: What are the main reasons that you would improve the insulation in your home?

ENBRIDGE Life Takes Energy

Windows

- Vinyl continues to be the top window material for EGI customers.
- Aluminum (24%) and fibreglass (11%) windows are more prevalent in the GTA Toronto region.
- The majority of customers indicated their windows have double panes of glass. Customers in GTA Toronto region are more likely to have single pane windows (11%) whereas Northern region customers are likely to have windows with triple panes (13%).
- Household income is also a key factor in the type of windows installed in the home. Low-income households are more likely to have single pane windows (13%) whereas higher income households ($140K+) are more likely to have triple panes (9%).
- Note a significant number (20%) of customers were unable to answer if the replaced windows were Energy Star certified or not.



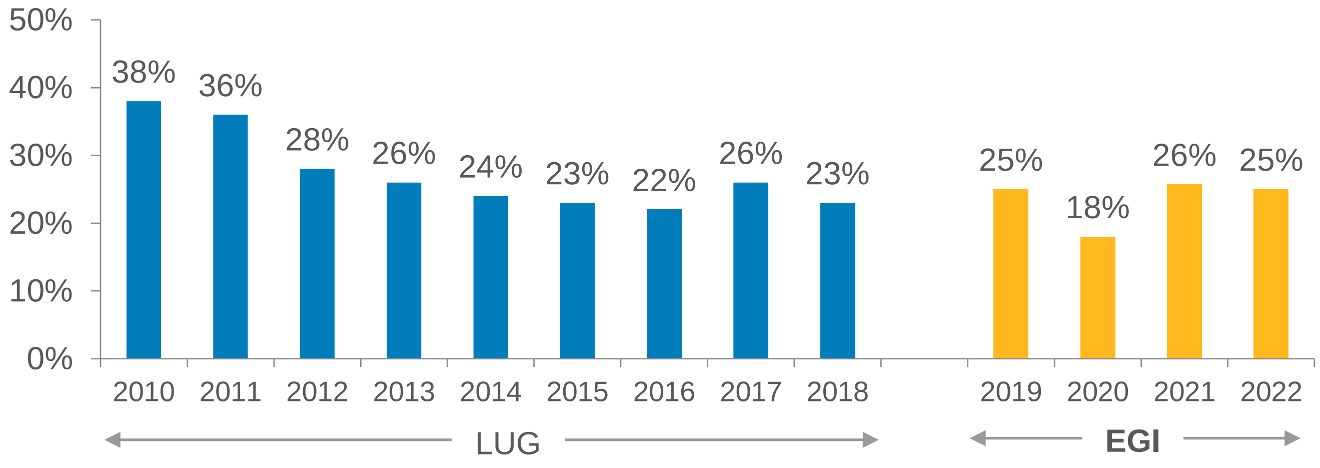


Q: What material are the window frames?; Q. How many panes of glass…?; Q. Since you have moved into the home, have you replaced any of the windows?; Q. Are any Energy Star certified?

Energy Efficiency: Future Intentions

- About the same number of customers intend to make their home more energy efficient in the next 2 years compared to last year (25%).
- This intention varies across all regions, ranging from 22% to 33%, while customers who perceived their home to be 'poorly' insulated are the most likely to have plans to make their home more energy efficient in the next 2 years.
- Younger customers, and larger households (3+) with children are more likely to have plans to make their home more energy efficient.

Plans to make home more energy efficient in next 2 years (% yes)
(Base: all customers, n=2,400)



Age Group	Plans (% yes)
18 – 34	36%
35 – 54	30%
55 – 64	25%
65+	17%

Region	Yes (%)
Northern	33%
Eastern	22%
GTA West	25%
GTA Toronto	24%
GTA East	27%
Southeast	25%
Southwest	26%

Age of Home	Yes (%)
Before 1950	34%
1950-1969	23%
1970-1989	27%
1990-1999	30%
2000-2022	21%

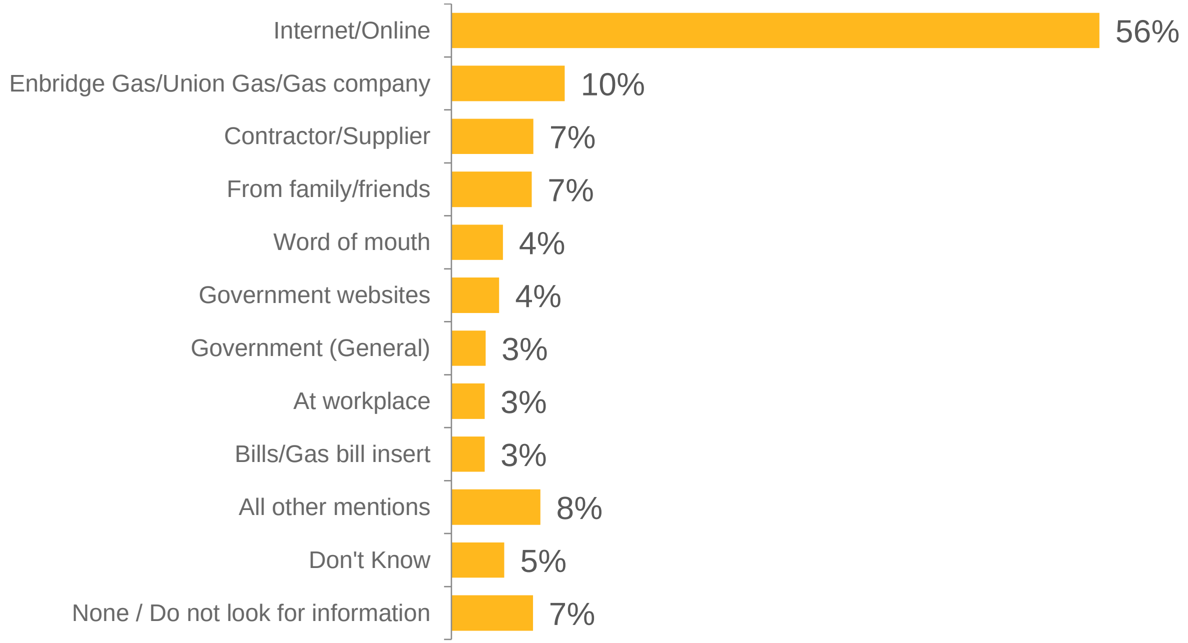
Q: Do you have any plans to make your home more energy efficient within the next two years?

Energy Efficiency: Sources of Information

- Most customers planning to make their home more energy efficient go online to look for information – senior-led households and lower income households do so at lower rates.
- While internet/online continues to be the most cited source of information, mentions are down from 57% in 2021, 60% in 2020 and 65% in 2019. About 1-in-10 customers mentioned Enbridge Gas as their source of information for energy efficiency followed by Contractor/Supplier. Customers in the GTA East are likely to mention Enbridge Gas as a source of information (19%).

Top Sources of Information (Unaided)

(Base: all customers who plan to make their home more energy efficient, n=608)



Age Group	Internet / Online	Enbridge Gas/ Union Gas/ Gas company
18 – 34	56%	11%
35 – 54	62%	10%
55 – 64	51%	5%
65+	52%	12%

Q: Where do you look for energy efficiency information? IF NECESSARY: What sources do you consider?

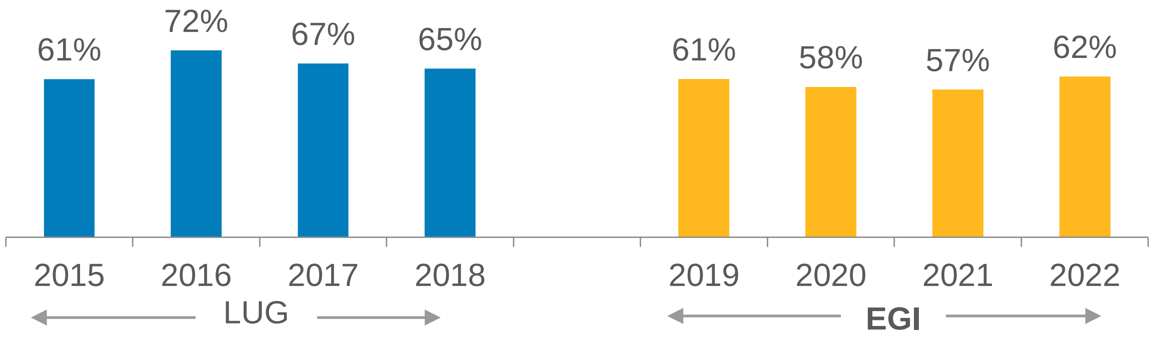
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other or against the total.

Energy Efficiency: Awareness of Any Programs

- Awareness that Enbridge Gas offers energy conservation and energy efficiency improvement programs and incentives is fairly stable (with a slight uptick in 2022), and ranges from highest in the Southwest (69%) to lowest in the GTA West region (57%).
- Awareness is also stronger among customers aged 65+, though they're not as likely to have plans to make their homes more energy efficient compared to their younger counterparts.

Aware that Enbridge Gas offers Energy Conservation & Efficiency Programs

(Base: all customers, n=2,400)



Age Group	Aware (% yes)
18 – 34	50%
35 – 54	58%
55 – 64	66%
65+	70%

Region	Aware (% yes)
Northern	64%
Eastern	60%
GTA West	57%
GTA Toronto	61%
GTA East	62%
Southeast	62%
Southwest	69%

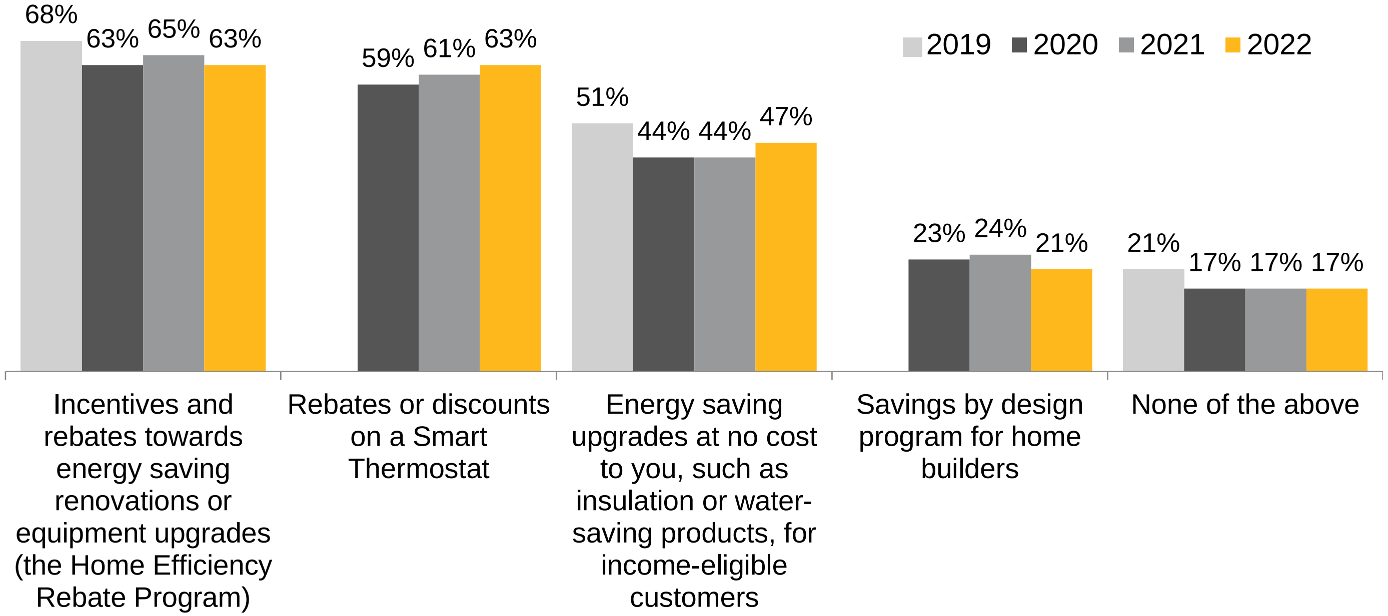
Q: Are you aware that Enbridge Gas offers energy conservation & energy efficiency improvement programs & incentives to help residential customers like you to save money on their energy bills?
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers) or against the total.

Energy Efficiency: Awareness of Programs

- Among those who are aware that Enbridge Gas offers programs, almost 2-in-3 are aware of the HER program (now known as HER+) and the rebate/discount for Smart Thermostats, while just under 1-in-2 are aware of the HWP.
- Participation in Enbridge Gas programs varies by age and household income. For example, low-income households and older customers (65+) are least likely to have participated in the “rebates or discounts on a Smart Thermostat” program (15% and 15% respectively).

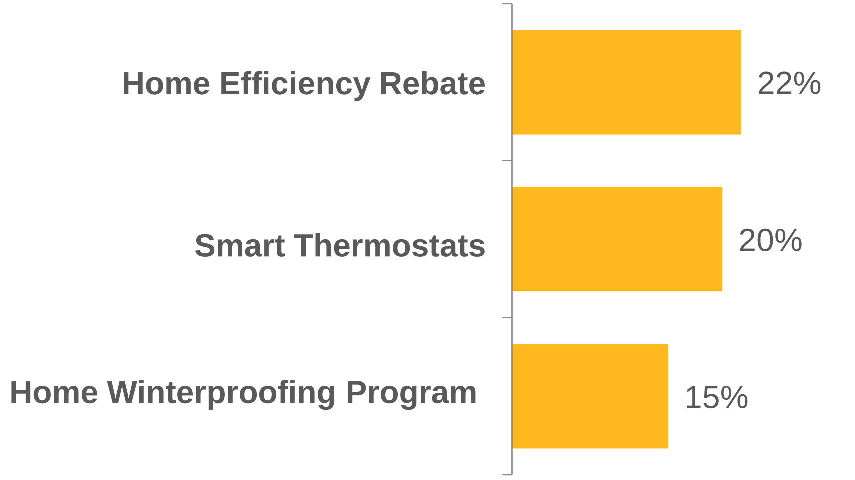
Offerings Aware of … *(aided awareness)*

(Base: all customers aware that EGI offers programs, n=1,481)



Previously Participated (self-reported)

(Base: all customers aware of the specified program)



HAP (Home Assistance Program offered by the IESO)
(Base: all customers, n=2,400)

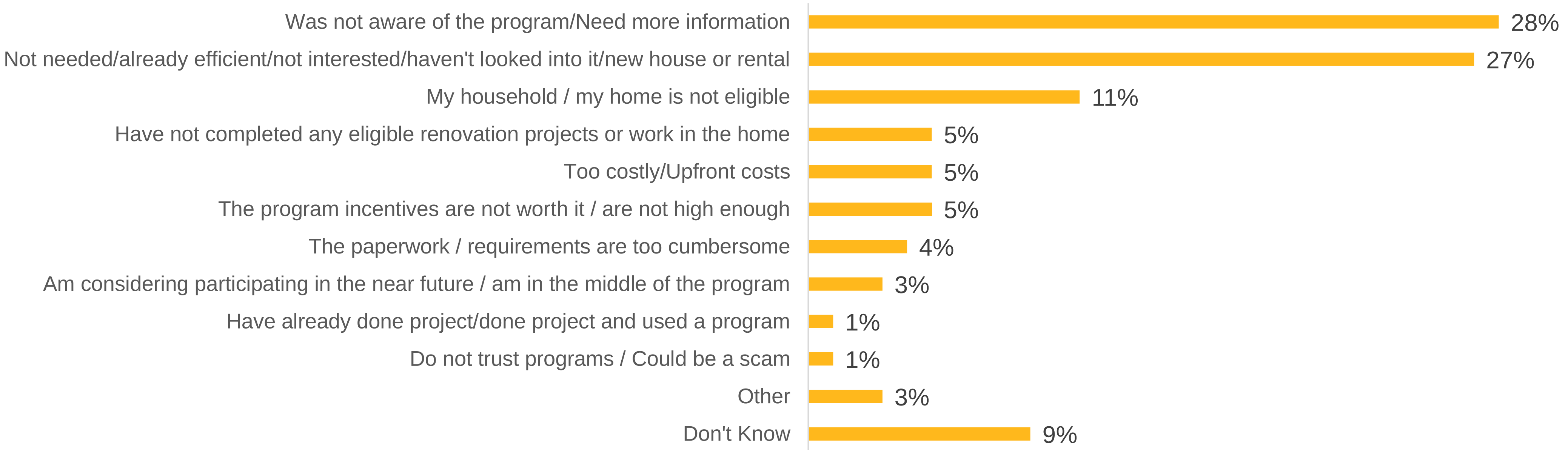
EGI: 4%

Q: Which of the following company energy conservation offerings are you aware of?; Q: Have you ever participated in the ...

Energy Efficiency: Reasons for not Participating

- Customers who were aware of Enbridge Gas offerings but did not participate in any program indicated that they were not aware of the program(s) or needed more information. Others indicated that their home is already efficient or they are simply not interested.
- Homes built after 1999 were more likely to mention that their home is already efficient or not interested (33%), while younger customers (18-34) were more likely to be unaware of the program or need more information.

Reasons for Not Participating in Any Enbridge Gas Program
(Base: customers who are aware of any program but have not participated, n=1,711)

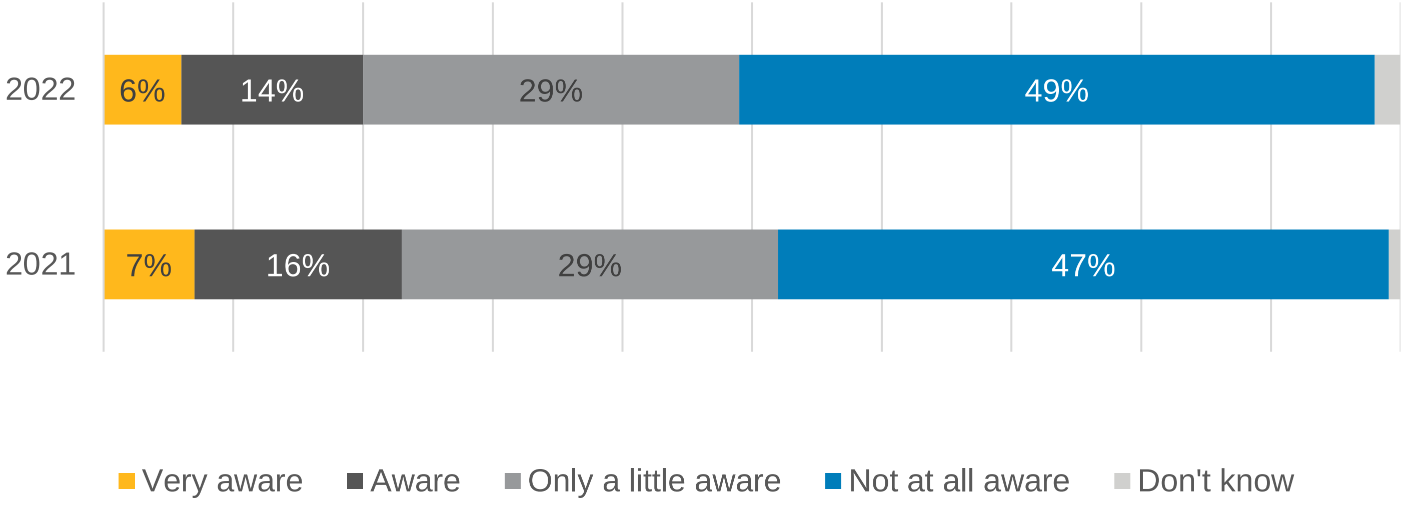


Q: What would you say are the main reasons that you have not participated in any of Enbridge Gas' energy conservation programs? (Total mentions)

Energy Efficiency: Awareness of Renewable Natural Gas (RNG)

- Nearly half of all customers are not at all aware of renewable natural gas (49%).
- Customers in the GTA (East, Toronto and West) are less likely to be aware of renewable natural gas.
- Household income is a factor of awareness of RNG as well. Customers with household income over $100K are more aware of RNG.

Awareness of RNG
(Base: all customers, n=2,400)



Age Group	Very Aware	Not at all Aware
18 – 34	6%	47%
35 – 54	6%	50%
55 – 64	5%	47%
65+	6%	52%

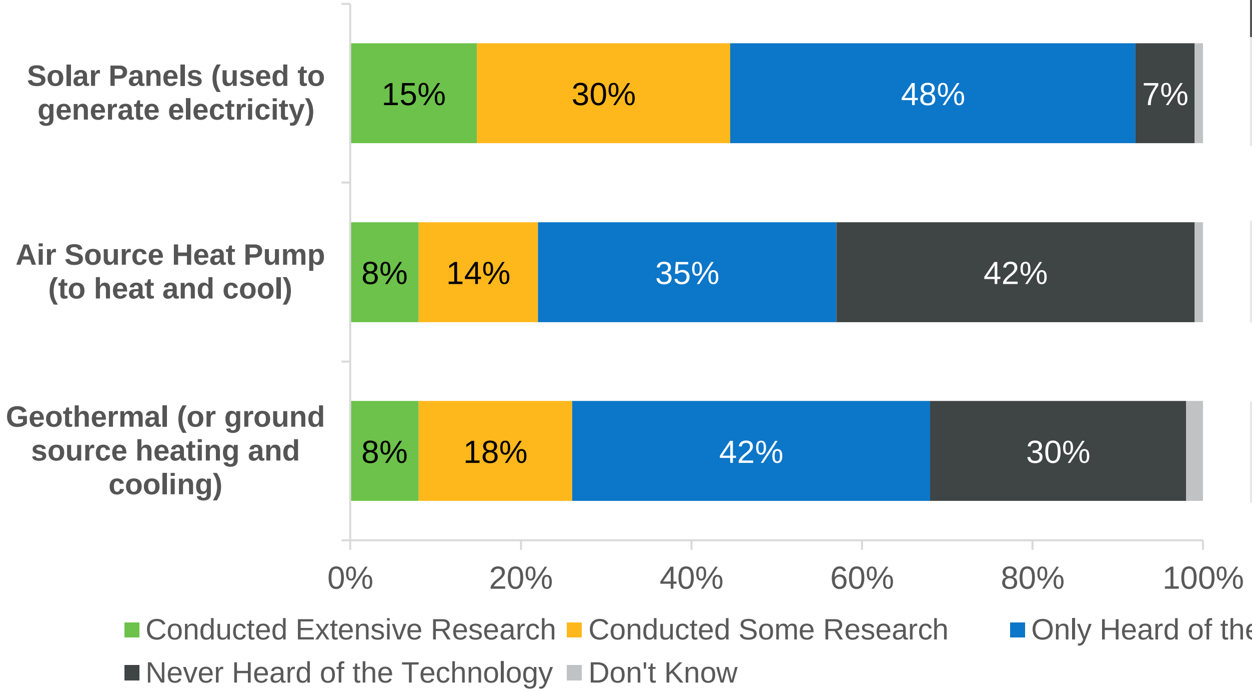
Q: How aware would you say that you are about renewable natural gas, this is sometime also referred to as bio methane gas, or biogas?

Knowledge of Technology

- New for 2022 – respondents were asked to rate their level of knowledge with three technologies.
- Age is a key factor of knowledge of technology. For example, younger customers (18-34) were more likely to have “never heard of” air source heat pumps (59%).

Knowledge of Technology for the Home

(base: all new housing customers)



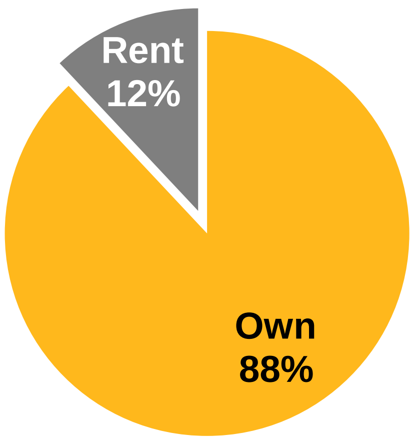
Top 2 Box (Conducted Extensive/Some Research)
45%
22%
26%

Region	Never Heard of the Technology (%)		
	Solar Panel	Air Source Heat Pump	Geo-Thermal
Northern	7%	40%	29%
Eastern	6%	30%	26%
GTA West	7%	50%	32%
GTA Toronto	7%	49%	33%
GTA East	6%	49%	34%
Southeast	6%	37%	28%
Southwest	7%	37%	25%

Q: Please tell me which of the following statements best describe your knowledge with the following technologies?

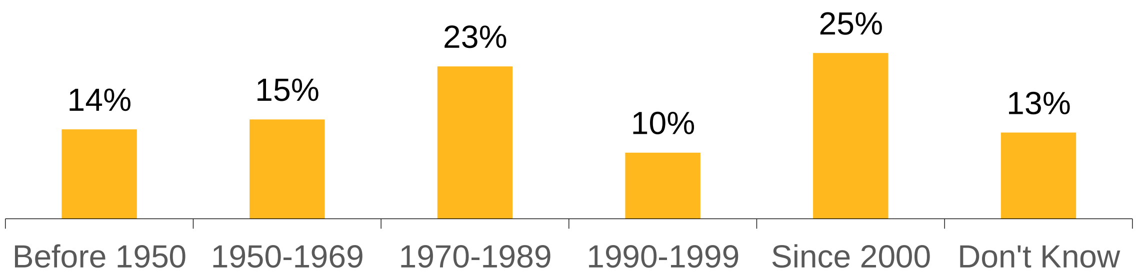
Demographics: House Characteristics

Home Ownership

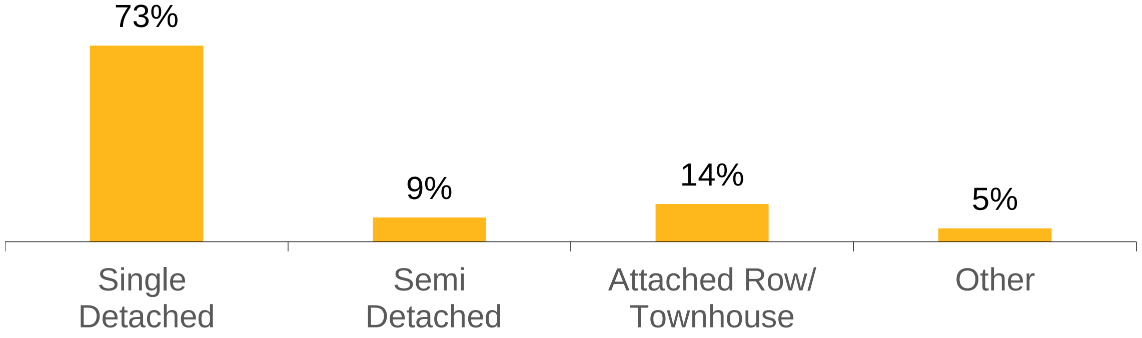


Age of Home

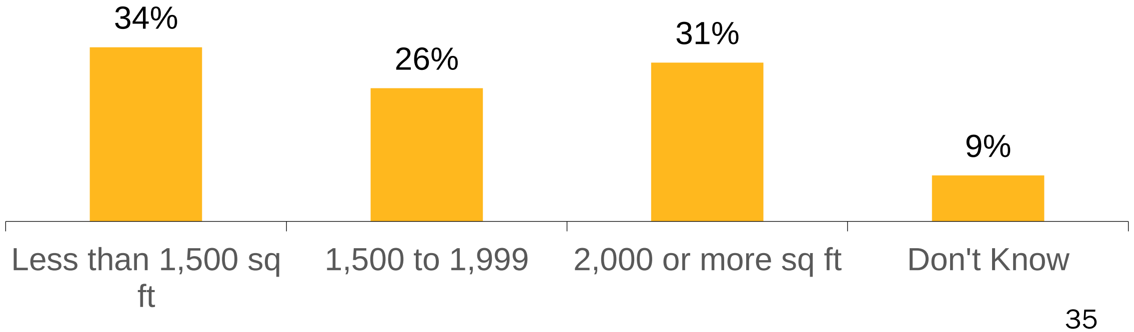
Average: 1976



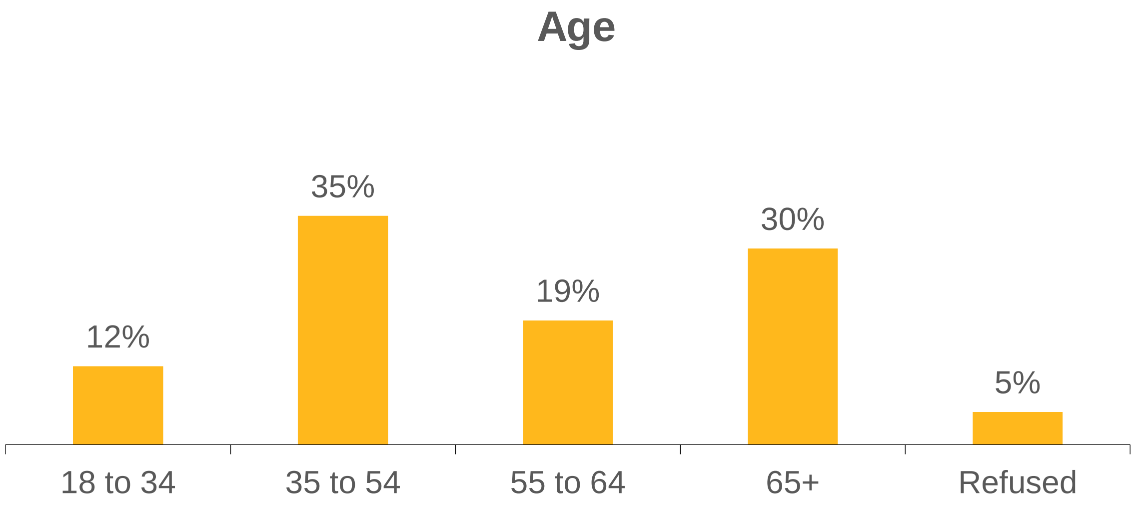
Type of Home

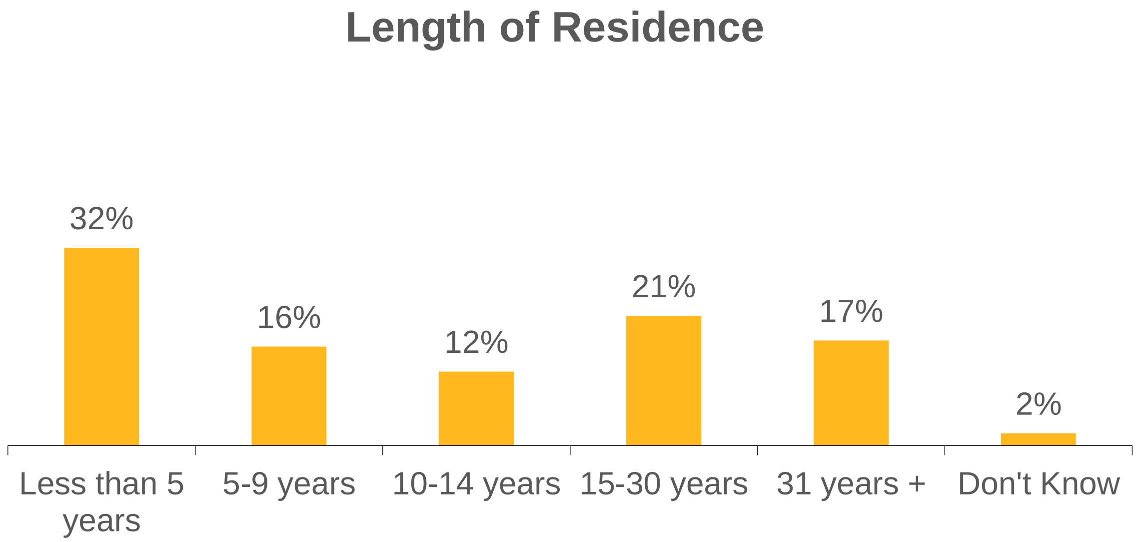


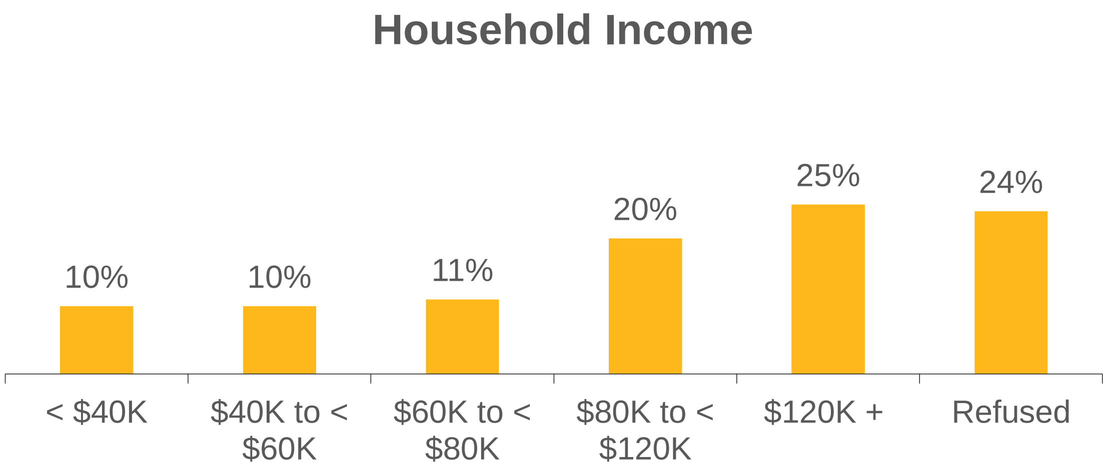
Size of Home

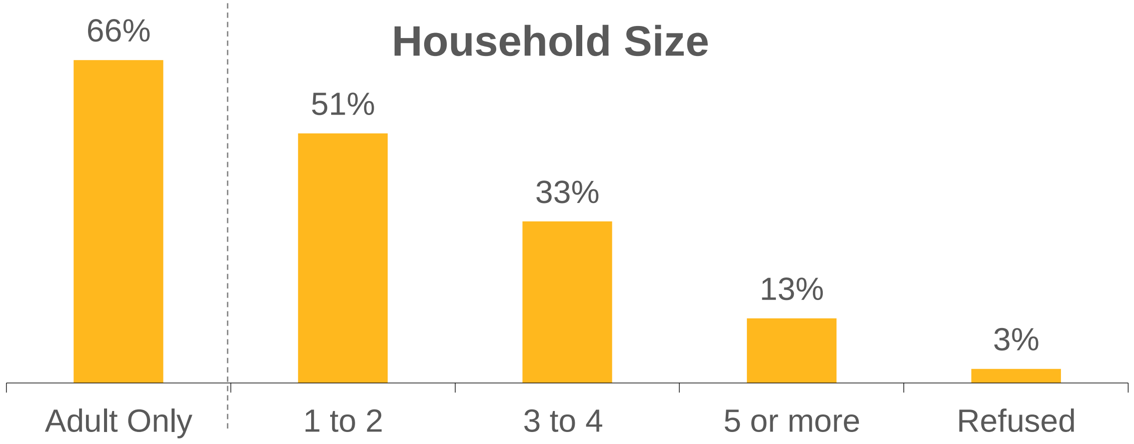


Demographics: Customer Characteristics









Appendix: Number of Natural Gas Applications

- The following applications were included:
  - Home Heating
  - Water Heating
  - Fireplaces (any number)
  - Stove (any number of cooktops / ranges)

	Frequency	Percent
0 natural gas applications	39	2%
1 natural gas application	325	14%
2 natural gas applications	1,003	42%
3 natural gas applications	765	32%
4 natural gas applications	268	11%
Total	2,400	100%

Customers who indicated “don’t know” to any of the individual application questions are included in the base size, but not counted as having natural gas for that application.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S4 p. 7, Figure 1

Question(s):

a) Please provide the numeric values in the graph.

b) Please provide actual customer additions for each of the five years prior to 2023.

c) The note below the graph states that the depiction “excludes community expansion”. Please provide the 2023-2032 values including community expansion.

Response:

a) The numeric values for the Figure 1 graph are provided in response at Exhibit I.1.10-STAFF-31, Attachment 1, Table 16 (Customer Additions Forecast before Energy Transition Assumptions) and Table 17 (Customer Additions Forecast after Energy Transition- Assumptions).

b) The actual customer additions for five years prior to 2023 are included in Table 2.

Table 2

Customer Additions Actual 2018 to 2022

Line No.	Year	Actual
1	2018	50859
2	2019	44194
3	2020	43369
4	2021	42482
5	2022	45817

c) The forecast for 2023 to 2032 is provided in Table 3.

Table 3

Customer Additions Forecast

After ET Assumptions and Including Community Expansion

Line No.	Year	Customer Additions after ET Assumptions Including Community Expansion
1	2023	41,879
2	2024	41,648
3	2025	41,103
4	2026	39,636
5	2027	37,331
6	2028	34,969
7	2029	32,950
8	2030	30,959
9	2031	29,537
10	2032	28,117

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S4 pp.7-8

Question(s):

Enbridge states its forecast includes an adjustment to account for its DSM program. It further states that the assumed "annual volume reductions are detailed in Enbridge Gas's Multi-Year Demand Side Management Plan (2022 to 2027) Application and provided at Exhibit 3, Tab 2, Schedule 7, Table 1.

a) E3/T2/S7 Table 1 only covers 2023 and 2024. What assumptions were made beyond 2024?

b) In EB-2021-0002, Enbridge was ordered to make a number of changes to its proposed DSM Plan, as well as to plan to begin significantly ramping up its savings levels in 2026 to 2028. In a letter to the Board on January 27, 2023, Enbridge included an update to its estimate of 2024 Test Year Revenue Requirement to reflect the Board's DSM decision. Please explain what changes Enbridge made to its DSM savings assumptions, by year, for 2023 through 2032. Please include in the explanation what level of annual DSM savings the Company is now assuming it will achieve for every year from 2023 through 2032.

Response:

a) Enbridge Gas's forecasted volumes beyond 2024 are based on DSM assumptions consistent with the pre-filed evidence in EB-2021-0002.

b) Please see response at Exhibit I.1.10-STAFF-29 part b) and c).

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S4 p. 9

Question(s):

Enbridge states that its design hour demand adjustment factors are "based on peak hour trends observed in the ETSA Reference Case scenario, which includes impacts from future DSM programming, carbon pricing and natural gas commodity pricing, building performance and appliance efficiency improvements for existing customers…"

a) Please explain how the effects of carbon pricing and natural gas commodity pricing are assumed to affect annual gas demand as well as peak hour demand?

b) What did Enbridge assume about average annual, winter and winter peak hour commodity prices for each year from 2023 through 2032? What were those assumptions based on?

c) Did Enbridge perform any sensitivity analyses for the ETSA reference case, including sensitivities in which the Energy Transition involves significantly more electrification of new and/or existing customers? If so, please provide:

i. All assumptions for such sensitivities.

ii. The impacts of those assumptions in forecast annual gas consumption and forecast design hour demand (e.g., relative to values in Figure 3)

iii. The impacts of those assumptions on the forecast capital spending on the AMP (on p. 14, Enbridge states that the combined effect of its ETSA reference case assumptions regarding the energy transition results in a reduction of $66 million relative to the Distribution Reinforcement Capital forecast previously filed; how much larger of a reduction would be realized under greater electrification assumptions assumed in any sensitivity analyses performed by Enbridge?).

<u>Response:</u>

a) Enbridge Gas's annual gas demand forecast for general service customers is derived by multiplying the forecasted number of customers by their respective average use forecast. The effects of carbon pricing and natural gas commodity pricing are assumed to affect general service demand through the average use forecast. Higher burner tip natural gas prices (combination of commodity, carbon pricing, etc.) may contribute to the decreases in natural gas consumption. Sharp increases typically cause two primary effects. First, it influences the customer's fuel use behaviours, such as lowering thermostat settings. Second, the price increase influences the customer's decision-making around purchasing more efficient appliances. Furthermore, some homeowners may also respond by retrofitting older residences to reduce energy consumption.

Enbridge Gas's annual demand for the distribution contract market is developed through customer specific bottom-up forecast for existing and forecast new customers, and factors such as carbon pricing and natural gas commodity pricing are inherent within the customer volume forecast. Other adjustments not related to specific customers are provided at Exhibit 3, Tab 2, Schedule 8 but are not underpinned by a specific pricing assumption as part of their development.

Enbridge Gas's determination of design hour demand is provided at Exhibit 4, Tab 2, Schedule 3, page 28. The design hour adjustment factors that were applied in Enbridge Gas's hydraulic models for future years were derived from the ETSA Reference Case scenario provided by the Posterity Group's navigator model. Each scenario takes into account the effect of all critical drivers, which include increasing energy efficiency (from Demand Side Management programming, newly constructed buildings and more efficient end-use equipment), energy content of gases, in addition to effects from carbon and natural gas commodity pricing.

b) Enbridge Gas annual demand (average use) forecast uses the Consensus Henry Hub price forecast for the commodity component to determine its burner tip gas price forecast included in some average use models. Please see Exhibit 3, Tab 2, Schedule 4, Table 1 for the Henry Hub price forecast used for 2023 to 2024. Beyond 2024, the consensus forecast continues to be used.

Enbridge Gas's design hour demand does not directly consider the price of natural gas (either carbon or commodity price). The assumed natural gas commodity price used in the ETSA Reference Case scenario is provided at Exhibit 1, Tab 10, Schedule 4, Attachment 1, page 42.

c)

i - iii. While the ETSA Project included a scenario that included significantly more electrification of new and existing customers (the Electricity Centric scenario), it was not practical to undertake a sensitivity analysis using these assumptions to determine the impacts to the annual general service volume, design hour demand forecasts or the AMP, particularly where no laws or regulations have been proposed that would mandate such electrification. Please see response at I.1.10-STAFF-27 part h) for additional discussion on why a sensitivity analysis is not feasible.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S4 p. 11, Figure 3

Question(s):

a) Please provide the numeric values for each year for each of the three lines in an Excel file.

b) Please provide the comparable forecast assumptions (for each of the three scenarios represented by the three lines in Figure 3) for annual gas demand (e.g., the amount of annual consumption that would be associated with the nearly 12.3 million m3/h in 2023 and other values in subsequent years). Please also provide these values in an Excel file.

c) Please provide Enbridge's design hour demand for each year from 2013 through 2022.

d) Please provide Enbridge's actual historic peak hour demand for each of the ten years from 2013 through 2022. Please also provide the day and hour of day on which the peak hour was experienced in each of those years.

e) Please provide Enbridge's actual annual gas sales for each year from 2013 through 2022.

Response:

a) Please see response at Exhibit I.1.10-SEC-23.

b) Exhibit 1, Tab 10, Schedule 4, Figure 3 expresses design hour demand from general service and distribution contract market customers. Please see Table 1 for the general service annual gas volume forecast before energy transition assumptions and after energy transition assumptions (from adjustments to the general service customer forecast). As noted in response at Exhibit I.1.10-SEC-20, no energy transition adjustments have been applied to the distribution contract customer demand forecast and are, therefore, not being provided. The adjustment to design hour demand (i.e., the black line in Figure 3) applies only to design hour demand and does not have an equivalent adjustment that can be applied to the annual volume forecast and, therefore, cannot be provided.

Table 1
General Service – Annual Volume Forecast

Line No.	Year	Annual Volume Forecast Before Energy Transition Assumptions (10^6m^3)	Annual Volume Forecast After Energy Transition Assumptions (10^6m^3)
		(a)	(b)
1	2024	15,689.3	15,688.2
2	2025	15,686.7	15,684.7
3	2026	15,683.5	15,673.6
4	2027	15,679.3	15,667.0
5	2028	15,671.2	15,657.4
6	2029	15,660.1	15,645.3
7	2030	15,645.7	15,629.4
8	2031	15,667.4	15,650.7
9	2032	15,687.3	15,669.2

c) The historical project design hour demand forecast is not available for 2013 through 2022. The long-range design hour demand forecast is stored within the distribution models which are updated nominally on a three-year cycle. However, the demand is available from the previous long-range plans in 2017 for LEG, 2018 for LUG, and the current 2022 System Reinforcement plan. The first combined year of data is available for 2018 and is shown in Table 2.

Table 2
Design Hour Demand

Year	Design Hour Demand (Mm^3/hr)
2018	10.67
2019	10.77
2020	10.85
2021	10.93
2022	11.03

d) The hourly flow data is not available prior to 2020 due to the different SCADA systems used by the legacy companies. The table below outlines the actual historical peak hour demand for 2020 to 2022. It must be noted that this data represents the volume of gas flowing through the system at a given time and may include variability in contract customer usage, bundled and un-bundled flows, and interruptible contract volumes.

Year	Day	Hour	Flow 10^3m^3/hr
2020	February 13	8am	7,882
2021	February 11	9am	7,557
2022	January 20	9am	8,507

e) Please see response at Exhibit I.8.2-SEC-217, Attachment 2.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S4, p. 12

Question(s):

Enbridge lists three reasons why additional energy transition adjustments were not made. The first reason is that “specific locations for wider-scale injection of hydrogen have yet to be identified, creating uncertainty regarding the impact on the design day demand forecast.”

a) Is Enbridge referring to hydrogen blending with methane or to direct generation or direct supply of 100% hydrogen to individual customers?

b) If locations for either hydrogen injection or complete conversion to 100% hydrogen for individual customers were known, how would that affect design day demand? How is the location of such injections related to design day demand?

c) Would Enbridge agree that injection of hydrogen, because it is much less dense than methane (i.e., 70% less energy content per m3), reduces the peak demand capacity of its pipes? If not, why not?

Response:

a) The uncertainty related to the specific locations for wider-scale injection of hydrogen includes hydrogen blending with methane and direct supply of 100% hydrogen. Enbridge Gas has proposed to undertake a Hydrogen Blending Grid Study (please see Exhibit 4, Tab 2, Schedule 6, pages 16 to 18) that will evaluate hydrogen blending across the system.

b) All other things being equal, hydrogen injection to the system would cause an increase in the customer demand volume. Customer demand volume will increase with the addition of hydrogen which has a lesser energy content to natural gas. The addition of lower energy content hydrogen to natural gas results in a lowered total overall energy content mixture of natural gas and hydrogen due to the properties of hydrogen. This will increase the design day and design hour (in terms of m^3/d or

m^3/h) of the customers receiving blended gas. More specifically, the impacts on the system design or operation would be dependent upon the details of the injection (including amount and location), and the end use requirements/capabilities of the customers on that system. For example, hydrogen injection at Dawn would result in a hydrogen blend throughout all systems fed downstream. The volume required of this blended gas to serve the design day and design hour demand would be greater than the natural gas received at Dawn today. This is due to lower heating value of hydrogen, creating a requirement for incremental capacity of the blended fuel to transport the same quantity of energy. If hydrogen injection was located within a downstream distribution subsystem, it may or may not trigger piping reinforcement due to available volumetric space on that local system and could create capacity on the upstream transportation systems.

c) Please see response at Exhibit I.4.2-ED-127 b).

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S4 p. 17

Question(s):

Enbridge states that “there is also the possibility that service lives could be lengthened or maintained if low-carbon fuels, such as hydrogen and RNG, are determined to be viable sustainable alternatives to gas.”

a) When Enbridge refers to “lengthened”, does it mean lengthened relative to how long investments would last with just fossil methane being consumed? If not, what does it mean? Lengthened relative to what?

b) Does Enbridge believe that use of hydrogen or RNG could increase the physical longevity of any capital assets? If so, please explain how and why?

Response:

a) When Enbridge Gas refers to “lengthened,” it is referring to the impact that hydrogen, RNG or other low-carbon fuels may have on the economic life of its system relative to natural gas. Please see Exhibit 4, Tab 5, Schedule 1, Attachment 1 page 19 and response at Exhibit I.1.10-GEC-65 part a) for additional details.

b) Enbridge Gas is not aware of research indicating that hydrogen or RNG will produce a change in the pipeline’s material properties to result in an increase to physical longevity.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S4, pp. 17-18

Question(s):

Enbridge has suggested that an Economic Planning Horizon (EPH) for depreciating assets “is not appropriate at this time” because of uncertainty about how the energy transition would affect its system, but that “if a diversified pathway to net-zero is not adopted in Ontario, Enbridge Gas would seek to introduce an EPH on its system to mitigate the risk of stranded assets.” Enbridge further states that “if a system-wide 2050 EPH were to be implemented starting 2024, the 2024 Test Year depreciation expense would increase by $282 million, from $921 million to $1.2 billion.”

a) Why is uncertainty about how the energy transition will affect Enbridge’s system a reason not to adopt an EPH? Doesn’t the uncertainty about the impacts of the energy transition create risk for future ratepayers which an EPH can mitigate? In other words, isn’t an EPH, at least in part, a ratepayer risk mitigating strategy? If not, why not?

b) Would Enbridge agree that there will always be uncertainty about the impacts of the energy transition twenty or more years into the future? If so, does that mean Enbridge would never find it appropriate to put an EPH in place? If not, please explain in detail how much “certainty” there must be for Enbridge to support adoption of an EPH?

c) How does Enbridge define a “diversified pathway to net-zero”? Please be specific about exactly what features a pathway would need to have to be considered by Enbridge to be “diversified”. Is there a minimum or maximum amount of gaseous energy throughput through Enbridge’s system? Is there a minimum or maximum amount of peak hour demand to be served by Enbridge?

d) What information would Enbridge need to have that it does not currently have in order to propose an EPH? Put another way, please provide the specific conditions under which Enbridge would pr

e) Would Enbridge agree that there is at least a significant possibility that Ontario's pathway to decarbonization will involve significantly lower annual volumes of gas distributed by the Company? If not, why is that not at least a significant possibility?

f) Is the estimated increase in 2024 Test Year depreciation expense of $282 million associated with the application of an EPH to all assets, both (1) those for which capital investments have already been made but not yet fully depreciated and (2) new assets? If so, what would the 2024 Test Year depreciation expense increase be if a 2050 EPH was just applied to new capital investments?

g) Please provide an Excel file, with formulae intact, showing the actual calculation of the $282 million increase in 2024 Test Year depreciation expensive associated with adoption of a 2050 EPH.

<u>Response:</u>

a) Enbridge Gas agrees that an EPH is appropriate as a risk mitigation strategy to address energy transition. However, the Company is not proposing to incorporate this assumption into the depreciation rates at this time as there is not enough known regarding the impacts of energy transition on the system and the impact of implementing an EPH is significant to rate payers. This view is also supported by Concentric and is provided at Exhibit 4, Tab 5, Schedule 1, Attachment 1, page 19. It may not be appropriate to apply the EPH scenario to all of the utility assets; however, which assets will actually be impacted is not yet determinable. In addition, climate and energy transition legislation is still evolving and there are no specific programs in place that would provide guidance as to future utilization levels of Enbridge Gas's assets. Concentric recommends, and Enbridge Gas supports, that an additional study of changes is required prior to implementation of an EPH and will re-evaluate applying an EPH in future studies.

b) Enbridge Gas agrees that there will continue to be uncertainty about the impacts of energy transition in the future, but that does not necessarily mean that it would never be appropriate to implement an EPH. The Company will reassess the need to implement an EPH at the next depreciation study and will look for 'sign posts' such as government policy changes or commitments from municipalities to convert to alternative fuels to determine what an appropriate EPH might be. If implemented in the next study, the EPH assumptions would be revisited in subsequent studies and as more certainty regarding future usage of assets is known, depreciation rates would be adjusted to either reflect an acceleration due to faster transition or decreased to reflect the lengthening of asset lives.

c) As provided at Exhibit 1, Tab 10, Schedule 5, page 23, paragraph 73 "It is also important to note that Enbridge Gas believes that the diversified pathway outlined in the P2NZ Study is just one version of what a diversified pathway could look like; there are many different permutations of how it could unfold in Ontario. Enbridge Gas believes that to develop the most optimal diversified pathway, that it must work closely with the electricity sector to undertake an integrated approach to energy transition modeling and planning." It is for this reason that Enbridge Gas has not yet defined exactly what a diversified scenario would mean for each sector and for each part of its system. At a high-level, however, Enbridge Gas would define a diversified pathway as one where energy choices are not mandated by government policy, rather customers have the ability to meet emissions reductions targets by making energy choices that meet their affordability, reliability and resiliency requirements. Energy system utilization and build out would respond to customer preferences. The gas system would serve all sectors of the economy including buildings, industrial, transportation, and power generation. Customers would have the choice of natural gas paired with carbon capture utilization and storage (CCUS), low and zero carbon fuels and low carbon electricity. Depending on customer preferences, gaseous fuels could be used to meet year-round requirements, peak season demands, back up for resiliency or not at all. Enbridge Gas believes that the degree to which each sector utilizes the gas system would vary by region, as each region would leverage and optimize the gas and electric infrastructure in place as well as optimize any required buildouts. Optimization will consider safety, energy system cost, reliability, resiliency, customer choice and maintaining a competitive industry.

d) Enbridge Gas notes that this question is incomplete and is replying in terms of the first sentence in the question. As described in part a), Enbridge Gas would need to have more data to support the expected changes in utilization to a more specific subset of system assets. For example, a change in utilization for distribution as compared to transmission or storage assets.

e) Enbridge Gas would agree that Ontario's pathway to decarbonization could involve lower annual gas volumes as a result of continued focus on energy efficiency, the uptake of technologies like hybrid heating and some from fuel-switching away from gaseous fuels. It does not, at this point, however, agree that this is a significant possibility, due to two key reasons. First, natural gas consumption could be replaced with the consumption of RNG and hydrogen, and second some larger customers could maintain their current natural gas consumption and pair it with CCUS, and others could increase their consumption of natural gas as they move away from higher emitting fuels to natural gas as part of their long-term plan to transition to hydrogen.

f) Please note that the impact of applying the 2050 EPH scenario to the 2024 Test Year depreciation expense has been updated to $290 million, please see Exhibit 1, Tab 10, Schedule 4, page 18, updated March 8, 2023.

The rates are applied to total balances which would include assets that are not yet fully depreciated. Enbridge Gas is unable to calculate the 2024 Test Year depreciation expense if the 2050 EPH was only applied to new capital investments due to the nature of the depreciation forecasting models used.

g) Please see response at Exhibit I.4.5-LPMA-34 Attachment 1.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S5/Attachment 2, Figure ES-2 on p. 5 of 86

Question(s):

a) Did Guidehouse also develop a reference case with no decarbonization requirements? If so, what were the Total Energy System Costs, peak demands by fuel, and CO2e emissions for that scenario?

b) Please confirm that the Total Energy System Costs shown in the upper left are expressed in net present value (NPV) terms using a 4% real discount rate? If not, please explain what they represent.

c) Are Total Energy System Costs expressed in “societal” terms (in the sense that they represent total incremental costs to society) or in customer terms (i.e., based on retail energy prices customers would pay)?

d) When computing electric peak demand impacts and related costs, did Guidehouse consider and assume deployment of demand response – either for electric vehicles or for building heating or other end uses – in its analysis? If so, what did it assume about how much winter peak load could be shifted in each year of its analysis? Please provide the assumption separately for electric vehicles and buildings. Please also provide the basis for any assumptions.

e) Regarding the Energy Demand by Decade graphs:

i. Please explain what is meant by “energy demand”. Is this the total amount of energy delivered to all energy end uses? Or is it the amount of energy need or energy load across all end uses? For example, if a home had an annual energy need of 1 GJ and that need/load was met with equipment with a coefficient of performance (COP) of 1.5, would that appear in this graph as 1 GJ of demand/load or 0.667 GJ of demand/energy supplied? Please explain.

ii. Please provide the numeric values underpinning each of the two graphs. Please provide them separately for each fuel type as well as totals across all fuels.

f) What are the comparable figures for Total Energy Costs, Peak Demands, Carbon Emissions and Energy Demand by Decade for just the buildings sector (residential and commercial).

g) Did Guidehouse assume that all RNG and all hydrogen was zero emitting, or did it base its estimate of emission reductions from RNG on a lifecycle emissions accounting basis such that different sources of RNG or hydrogen had higher or lower levels of emission reductions depending on the source (e.g., as shown in Table B-1 in a September 2022 Michigan RNG Potential Study which can be found here: https://www.michigan.gov/mpsc/commission/workgroups/renewable-natural-gas-study-workgroup)? If lifecycle emissions accounting was used, please explain what assumptions were made about the percent emission reduction, relative to fossil gas, that each type/source of RNG and hydrogen would produce and the basis for those assumptions.

h) In assessing costs, what did Guidehouse assume about when and how gas consuming heating equipment and other gas-consuming appliances would be replaced? For example, did it assume that all equipment would be replaced at the end of its useful life (e.g., assuming an average life 20 years, so 5% equipment stock turnover every year), so that the cost of decarbonization is just the incremental cost from a standard new piece of gas-consuming equipment to a lower-emitting piece of equipment? Or did it assume there would be early retirement or early replacement of some portion of equipment in buildings to either more efficient gas equipment (e.g., gas heat pumps) or electric equipment (e.g., electric heat pumps), such that the cost of converting to lower-emitting equipment was the total cost of new equipment (perhaps with credit for a future deferred replacement)? Please explain the basis for the approach taken.

i) The Energy Demand by Decade graph suggests that the vast majority of gaseous fuel delivered to meet energy demand in the Diversified Scenario in 2050 is hydrogen.

   i. What is Guidehouse's vision for how massive amounts of fossil gas consumption would be replaced by hydrogen consumption? Would this happen gradually, as customer's methane furnaces reach the end of their life and are replaced with hydrogen burning alternatives? Or would it happen at roughly the same time for all housing units in a neighborhood

ii. If Guidehouse's vision of switching to hydrogen is that it would happen at roughly the same time in a neighborhood, would Guidehouse agree that would require retrofit programs to both (1) convert existing methane-burning equipment to hydrogen-burning and/or to replace some methane-burning equipment well before the end of its useful life; and (2) convert existing methane carrying pipes in homes and businesses – from the customers' meters to locations of gas-burning appliances – to hydrogen-carrying pipes? Would Guidehouse further agree that there would be a significant cost to such a program? If not, why not? If Guidehouse agrees, were such added customer equipment conversion/replacement program costs captured in its analysis? Please provide details and any cost estimates of such changeovers that Guidehouse or Enbridge are aware of.

j) The Energy Demand by Decade graph suggests that there is still a substantial amount (though less than the amount of hydrogen) of methane (in the forms of RNG and fossil gas + CCS) being consumed in the Diversified Scenario in 2050.

i. What is Guidehouse's vision of how both very large amounts of hydrogen and smaller but still quite substantial amounts of methane would be simultaneously delivered to residential and commercial customer classes? Would there be some neighborhoods or communities with one just one of those fuels and other neighborhoods or communities with just the other fuel being supplied? Or would some or many neighborhoods or communities have two parallel sets of pipes – one for hydrogen and one for methane? Please explain.

ii. To the extent that some neighborhoods or communities would have two parallel sets of pipes, did Guidehouse include the cost of maintaining and operating both sets of pipes in its estimates of Total Energy System Cost? If not, why not?

<u>Response:</u>

The following response was provided by Guidehouse Canada Ltd.:

a) Guidehouse did not develop a reference case with no decarbonization requirements.

b) Guidehouse confirms that the Total Energy System Costs shown in the upper left of Figure ES-2 are expressed in real 2020 dollars. /u

c) The Total Energy System Costs presented in the P2NZ represent total costs to society and do not reflect retail energy prices that customers would pay.

d) At the time of the analysis, the Low Carbon Pathways model did not include explicit modeling of demand response measures as a feature. Guidehouse implicitly accounted for the impact of demand response in the transportation sector when developing the demand forecasts. Guidehouse estimated that the managed charging of electric vehicles will be an impactful demand response measure that will shape the hourly electric load profile of the transportation sector. To implicitly account for the impact of demand response, the analysis used separate electric load shapes for the buildings and transportation sectors that do not have coincident peaks. Guidehouse did not account for deployment of demand response in the buildings sector.

e)
   i. "Energy demand" describes the amount of energy delivered to energy consumers. Following the example in the prompt, if a home had an annual energy load of 1 GJ and that load was met with equipment with a coefficient of performance (COP) of 1.5, the energy demand would be counted as 0.667 GJ of energy supplied.

   ii. The numeric values underpinning the Energy Demand by Decade graphs are provided in the response at Exhibit I.1.10-SEC-26, Attachment 1, page 2.

f) Please see Exhibit I.1.10-ED-29 for a summary of emissions from the buildings, /u
transportation, and industry sectors.

Guidehouse declines to provide total energy costs for the buildings sector because /u
the P2NZ analysis assessed costs on an economy-wide basis. As a result, the total /u
cost of energy supply is developed at an aggregate level and is not attributed back /u
to specific sectors.

The table below provides estimates of energy demand by decade for the Electrification and Diversified scenarios. Estimates of buildings sector peak electricity demand by decade are provided in Exhibit I.1.10-ED-47 part d).

Table 1
Energy Demand by Energy Source for the Buildings Sector (PJ)

Electrification Scenario					
Energy Source	**2020**	**2030**	**2040**	**2050**	
Electricity	391	489	656	709	/u
Natural Gas	543	425	156	0	/u
RNG	0	0	21	25	/u
Hydrogen	0	0	15	38	/u
Diversified Scenario					
Energy Source	**2020**	**2030**	**2040**	**2050**	

Electricity	391	460	519	544	/u
Natural Gas	543	434	207	0	/u
RNG	0	23	27	51	/u
Hydrogen	0	6	122	223	/u

Table 2
Peak Gas (Methane + Hydrogen) Demand for the Buildings Sector (TJ/hour)

Scenario	2020	2030	2040	2050	
Electrification	289	226	102	33	/u
Diversified	289	246	190	146	/u

Table 3
Peak Gas (Methane + Hydrogen) Demand for the Buildings Sector (GW)

Scenario	2020	2030	2040	2050	
Electrification	80	63	28	9	/u
Diversified	80	68	53	40	/u

g) Please see the response at Exhibit I.1.10-ED-26, part d) for Guidehouse's assumptions for emissions factors from RNG and hydrogen.

h) Guidehouse assumed that residential space heating equipment would be replaced at end of life with either electric heat pump, gas heat pump, or hybrid heating systems. Attachment 1 to the response at Exhibit I.1.10-SEC-52 provides details of the end user costs associated with conversion of residential space heating systems. To provide a basis for comparing the scenarios, the cost calculation for residential heating equipment conversions uses the full installation cost of replacement equipment in all cases. Guidehouse did not assess costs associated with conversions of other non-space-heating equipment types.

i)

i.-ii. Guidehouse assumed that hydrogen-ready models of space heating equipment would be gradually adopted by customers and that branches of the gas network would convert to pure hydrogen service when all gas customers on the branch are equipped with hydrogen-ready equipment.

To provide a basis for comparing the scenarios, the cost calculation for residential heating equipment conversions uses the full installation cost of replacement equipment in all cases. The cost of behind-the-meter upgrades to gas pipe, electrical panels, and HVAC ductwork are outside the scope of the P2NZ analysis. Also please refer to the response in part h).

j)

i.-ii. Guidehouse assumed that conventional natural gas + CCS would be primarily used for industrial end uses that are difficult to electrify or serve with hydrogen fuel. Guidehouse assumed that some gas network branches would be served by a blend of RNG and hydrogen, and that other gas network branches would convert to pure hydrogen service. The P2NZ analysis did not model the development of parallel distribution networks for pure hydrogen and methane.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S5/Attachment 2, p. 6 of 86:

Question(s):

In the discussion of sensitivity 1, Guidehouse states that lower renewable energy and battery costs would lead to more distributed renewables with cost savings of $12 billion for the Electrification Scenario and $13 billion for the Diversified Scenario. Why would the cost savings be greater (or even similar) in the Diversified Scenario since the Electrification scenario requires much more new generation and, presumably, much more T&D infrastructure (some of which could potentially be eliminated through distributed renewables deployment)?

Response:

The following response was provided by Guidehouse Canada Ltd.:

The observation in this question illustrates the complex interactions that take place in an energy system that is transitioning to net-zero, and specifically the electric and gas system dynamics that can be explored in the Low Carbon Pathways model. Sensitivity #1 models a case with lower cost renewable electricity generation and lower cost batteries. These assumptions have implications for both the electric system and the gas system, as described on page 48 of the *Pathways to Net Zero Emissions for Ontario* report. For the Electrification scenario, the lower cost of renewables means that it is less expensive to expand Ontario's electric generation capacity to meet high levels of peak electric demand. In Sensitivity #1, electric system costs are projected to be about $12 billion less than the core Electrification scenario in real 2020$.

The Diversified scenario has higher levels of hydrogen demand in 2030 and beyond, and to meet this hydrogen demand, the optimization model must choose between blue hydrogen (incurring capital costs for SMR + CCS and ongoing emissions costs from fugitive CO_2 and methane emissions) or green hydrogen (which is less expensive in Sensitivity #1, due to the reduced cost of renewable electric generation). In the Sensitivity #1 case, the lower cost of renewables makes green hydrogen more /u
competitive with blue hydrogen in 2040, with 51% of hydrogen production coming from /u

green hydrogen in 2040 compared to 44% in the core Diversified scenario. By 2050, green hydrogen is the lowest cost choice for hydrogen production and the optimization model opts to supply green hydrogen instead of blue hydrogen. The Sensitivity #1 costs are $11 billion lower than the core Diversified scenario due to reduced emissions costs and reduced investment in SMR+CCS. Reduced solar costs also result in a slight decrease in electricity system costs, allowing more solar capacity to be built at a lower cost per capacity unit than in the core Diversified scenario.

/u

/u

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S5/Attachment 2, p. 26 of 86:

Question(s):

Guidehouse states that in the Diversified scenario it is assumed that gas supply shifts from fossil gas to low- and zero-carbon gases.

a) How does Guidehouse define “low-carbon”?

b) What did Guidehouse consider to be “low-carbon” gases in its analysis? For that gas, did it count the remaining emissions as requiring offsets? If not, please explain?

c) Is RNG considered “low-carbon” or “zero-carbon”? Is that true for all sources of RNG, or did Guidehouse consider some to be low-carbon and others to be zero-carbon?

d) What are the various forms of hydrogen that are considered to be “low-carbon” and what sources are considered to be “zero-carbon”? Please explain the rationale.

Response:

The following response was provided by Guidehouse Canada Ltd.:

a) The analysis for the *Pathways to Net Zero Emissions for Ontario* study considered a gas to be low carbon if it exhibits a significant reduction in GHG emissions relative to a comparable alternative. For instance, RNG is a low-carbon alternative to geologic natural gas and blue hydrogen is a low-carbon alternative to grey hydrogen (produced via steam methane reformation without carbon capture).

b) Guidehouse’s analysis considered RNG and hydrogen produced via steam methane reformation with carbon capture and storage (i.e., blue hydrogen) to be low-carbon

gases. The carbon emissions associated with blue hydrogen include upstream methane emissions from natural gas transmission and 5% of the CO2 byproduct /u
from steam methane reformation (assuming that 95% of CO2 byproduct is captured by CCS). For RNG, Guidehouse accounted for the methane (CH4) and nitrous oxide (N2O) emissions from RNG combustion using the emission factor 0.0113 kgCO2e/m3 from the National Inventory Report.[1] Guidehouse did not account for CO2 emissions from RNG combustion, since these are biogenic emissions. The Guidehouse analysis accounted for these and counted the cost of counteracting these emissions through the production of negative emissions via biomass-fired electricity generation with CCS.

c) Guidehouse understands that, depending on the feedstock and baseline defined for individual projects, RNG can have zero carbon emissions or negative carbon emissions on a lifecycle basis. For the *Pathways to Net Zero Emissions for Ontario* Study, Guidehouse considered all RNG produced and consumed in Ontario to be a low-carbon fuel.

d) The different forms of hydrogen and the emissions associated with them are detailed in section 2.3 of the *Pathways to Net Zero Emissions for Ontario* Study. The study only considered the deployment of green and blue hydrogen in the two scenarios examined. The study assumed that green hydrogen is zero-carbon, since it is produced from renewable electricity and its consumption produces no carbon emissions. The study assumed that blue hydrogen is low carbon, since the production of blue hydrogen results in some carbon emissions, as described in part b) above.

[1] Environment and Climate Change Canada. (2022, April 14). 2022 National Inventory Report 1990-2020: Greenhouse Gas Sources and Sinks in Canada. Part 2. Table A6.1-3.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S5/Attachment 2, p. 38 of 86

Question(s):

Regarding the estimates of electricity peak demand by decade:

a) Please provide a breakdown of the components of peak demand by scenario, by decade. Specifically, what fraction is associated with:
   i. residential space heating,
   ii. residential water heating,
   iii. other residential end uses,
   iv. commercial space heating,
   v. other commercial end uses,
   vi. industrial uses,
   vii. transportation (e.g., electric vehicle charging),
   viii. hydrogen generation, and
   ix. other end uses (please specify what these would be).

b) For residential space heating, please explain how Guidehouse estimated the impact on the electric grid at the time of system winter peak. Please address the following in the response:
   i. Was a heat pump load shape used to convert total annual heating energy into peak hour demand? If so, please provide that load shape, describe how it was generated or where it comes from, and provide all underlying assumptions about heat pump efficiency under different weather conditions.
   ii. What was assumed about the time of day and temperature at which peak demands would occur?
   iii. What was assumed about electric heat pump efficiencies (including any back-up systems) at temperatures experienced in peak hours? Please explain the basis for the assumption.
   iv. Please provide all assumptions and calculations used to estimate peak demands from residential and commercial space heating

Response:

The following response was provided by Guidehouse Canada Ltd.:

a)

i.-v., ix. Guidehouse declines to provide peak demand components by end use (e.g., space heating, water heating) because the P2NZ analysis estimated peak demand at a sector-wide level of granularity.
vi.-vii. Table 1 below provides the sector-level contribution to coincident electric peak demand.
viii. Guidehouse assumed that hydrogen generation would take place in off-peak periods, so hydrogen generation would not contribute to coincident peak demand.

The Table 1 values represent the buildings sector's contribution to the coincident peak load. Guidehouse notes that these values do not represent the same view shown in P2NZ report Figure 26. For the Diversified scenario in 2050, the coincident peak load occurs at a separate time from the buildings sector peak load that is shown in Figure 26. /u

For the Electrification scenario in 2050, the buildings sector peak occurs at the same time as total system peak, so the buildings coincident peak here matches the buildings peak in Figure 26.

Table 1
Contribution to Coincident Electric Peak Demand,
by Scenario and Decade (GW)

Diversified Scenario					
Sector	2020	2030	2040	2050	
Buildings	15.7	22.0	32.3	29.7	/u
Transportation	0.0	4.1	4.0	12.9	/u
Industry	5.8	6.4	6.2	8.5	/u
Total	21.5	32.5	42.5	51.1	/u

Electrification Scenario					
Sector	2020	2030	2040	2050	
Buildings	15.7	28.7	52.2	59.7	/u
Transportation	0.0	3.2	6.8	10.8	/u
Industry	5.8	6.1	9.2	11.6	
Total	21.5	38.0	68.2	82.1	/u

b)

i. Guidehouse declines to answer this question because Guidehouse did not calculate the peak load impact of specific end uses such as residential space heating.

ii. The winter peak hour is projected to occur at different times of day for the two scenarios modeled in the P2NZ study. Outdoor air temperature estimates are based on Toronto historical weather, considering average hourly temperature (degrees Celsius) over the 5-year period from 2017-2021 (inclusive). Source: Environment Canada.

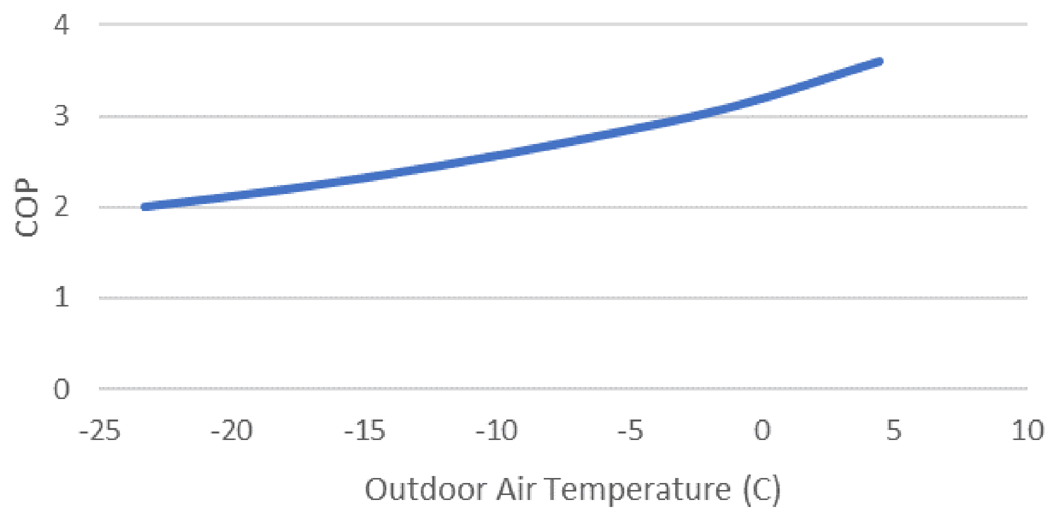
In the Diversified scenario the 2050 winter peak is in the hour 6:00-7:00pm. The
peak hour is late in the day because it is driven by the electric vehicle (EV) charging /u
load shape since, in this scenario, the limited electrification of building heating
reduces the influence that building heating demand has on the coincident system
peak. The average winter temperature in the hour 6:00-7:00pm is -4.4 degrees /u
Celsius. On the winter peak demand day, the temperature in the hour 6:00-7:00pm
is —7.8 degrees C. /u

In the Electrification scenario, the 2050 winter peak is in the hour 7:00-8:00am. This /u
is driven primarily by the electrification of building heat, with some contribution from
EV charging. The average winter temperature in the hour 7:00-8:00am is -5.2 /u
degrees C. On the winter peak demand day, the temperature in the hour 7:00-
8:00am is -15.5 degrees C.

iii. For cold climate air-source heat pumps, Guidehouse estimated heat pump efficiencies at different outdoor temperatures using a heat pump performance curve for mid-range cold climate air-source heat pumps provided by E3 (2020)[1] and reproduced in Figure 1.

[1] E3 (2020).” Net-Zero New England: Ensuring Electric Reliability in a Low-Carbon Future.” Figure 7-4. Available at: https://www.ethree.com/wp-content/uploads/2020/11/E3-EFI_Report-New-England-Reliability-Under-Deep-Decarbonization_Full-Report_Nov-2020.pdf.

Figure 1: COP as a Function of Outdoor Air Temperature for Mid-range Cold Climate Air-Source Heat Pumps. Source: E3 (2020)



iv. Please see response at Exhibit I.1.10-ED-52.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S5/Attachment 2, p. 42 of 86

Question(s):

Guidehouse states that the “share of natural gas with CCS installed at the end user and natural gas used to create blue hydrogen increases significantly over time in both scenarios.”

a) For what types of customers did Guidehouse assume end user CCS? Is this only for large industrial customers or smaller residential and commercial customers as well? What is the CCS technology (or technologies) assumed to be deployed for end user CCS and what was assumed about its (or their) cost(s).

b) How much of the CCS is end user CCS vs. blue hydrogen CCS. Please provide the breakdown by scenario and by year.

Response:

The following response was provided by Guidehouse Canada Ltd.:

a) Guidehouse assumed that end-user CCS would be applied at industrial facilities where alternatives to natural gas combustion are infeasible or prohibitively expensive. Guidehouse assumed that CCS would not be deployed in the residential or commercial sectors. The analysis conducted for the P2NZ study did not specify a particular type of CCS technology (e.g., pre-combustion, post-combustion, oxyfuel, or others). The CCS technology deployed at individual sites will be selected based on the particulars of the process that is generating the CO2 emissions. Guidehouse assumed that end user emitters of CO2 would opt to install CCS as an economical alternative to paying carbon tax. Guidehouse’s analysis did not include the capital costs of CCS upgrades for industrial end users and, similarly, did not include the costs of electrifying industrial end uses. For blue hydrogen production (SMR+CCS) and electric generation from biomass combustion with CCS, the cost of CCS is included in the total capital and O&M costs reported in Table A-11 of the P2NZ study.

b) Please see response at Exhibit I.1.10-ED-37 which includes a table that provides the amount of CO_2 captured and stored from blue hydrogen production and from methane combustion, by scenario and by decade of analysis.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S5/Attachment 2, p. 46 of 86

Question(s):

Figure 18 presents Energy System Costs by decade for each scenario analyzed. Costs are broken down into four categories: gas system, electricity system, emissions and end users.

a) Please explain whether the values presented per decade are expressed in net present value (NPV) terms, discounted back to 2020 using a 4% real discount rate. If not expressed in NPV terms, please explain what these costs represent (e.g., are they simply the sum of inflation adjusted, but undiscounted annual costs?).

b) Please further break down gas system costs, by decade and by scenario, into the following:

   i. Capital costs for connecting hydrogen generating facilities to transmission or distribution pipelines
   ii. Capital costs for hydrogen transmission pipelines – either new or refurbished methane pipelines
   iii. Capital costs for carbon capture and storage systems (if included in gas system costs, if included in electric system costs, please explain)
   iv. Capital costs for connecting RNG facilities to transmission or distribution pipelines
   v. Capital costs for methane transmission pipelines (if any)
   vi. Capital costs for hydrogen distribution pipelines and related distribution infrastructure – whether new or refurbished methane distribution components
   vii. Capital costs for methane distribution system upgrades
   viii. Hydrogen energy costs (if these are captured in electric system costs, please explain)
   ix. Hydrogen transmission system operating costs
   x. Hydrogen distribution system operating costs
   xi. RNG energy costs
   xii. Fossil methane energy costs
   xiii. Fossil methane + CCS energy costs

xiv. Methane transmission system operating costs
xv. Methane distribution system operating costs
xvi. Any other relevant costs (please separate capital from variable operating costs and explain what these are)

c) Please further break down electricity system costs, by decade and by scenario, into the following:

i. Capital investment in new electric generation and storage – if possible, break these down between new generation needed for end use electricity and new generation needed for hydrogen production
ii. Capital investment in electric transmission lines (new or upgrades) – if possible, break these down between transmission investments needed for end use electricity consumption and investments need for hydrogen production
iii. Capital investment in electric distribution system additions or upgrades
iv. Electric fuel costs
v. Other electric system costs (please explain)

d) Please further break down end user costs, by decade and scenario, into the following

i. Capital investment in end use energy consuming equipment (e.g., heat pumps, water heaters, furnaces, etc.) in buildings
ii. Capital investment in building envelop efficiency (e.g., weatherization) upgrades
iii. Capital investment in end use equipment in industry
iv. Capital investment in retrofitting existing end use energy consuming equipment so that it can burn hydrogen instead of methane
v. Capital investment in converting pipes that currently carrying methane inside buildings (i.e., on the customer side of the meter, from the meter to different gas burning appliances in homes and businesses) to pipes that can safely carry hydrogen
vi. Customer operation and maintenance costs (if any)
vii. Any other end use costs (please break down between capital and operating costs and explain)

e) Please explain what “emission costs” represent. Are these assumed emissions taxes or are these societal costs of remaining emissions? If the latter, why would costs be highest in the 2030s when emissions are lower that decade than in the 2020s?

Response:

The following response was provided by Guidehouse Canada Ltd.:

a) The cost figures provided in Figure 18 of the P2NZ report are provided in real 2020$ CAD and are not discounted. For each demand scenario, the Low Carbon Pathways model selects the least-cost pathway to develop energy supply using an optimization function that seeks to minimize the NPV of energy system costs. However, the summary costs presented in Figure 18 of the P2NZ report are not in NPV terms. /u

b) Please see Attachment 1 for a detailed breakdown of gas system cost categories by decade for both scenarios.

i. The capital costs for connecting hydrogen generation facilities are included in the total cost of hydrogen generation facilities, reported in categories “Electrolyser” and “SMR CCS” in Attachment 1.

ii.,ix. The capital and operating costs for hydrogen transmission pipelines are included in category “H2 Pipeline” in Attachment 1.

iii. The P2NZ analysis used a levelized cost of CCS to account for capital costs of CCS. The cost of CCS related to natural gas combustion is included in the “CH4 + CCS” category, and the cost of CCS related to blue hydrogen production is included in the “SMR CCS” category in Attachment 1

iv. The capital and operating costs for connecting RNG facilities to transmission or distribution pipelines are included in category “Anaerobic Digestion” in Attachment 1.

v. The P2NZ analysis projects that there will not be Capital costs for methane transmission pipelines prior to 2050.

vi-vii., x. The costs for upgrading methane distribution pipelines to accept hydrogen blending and for the hydrogen distribution system within Ontario are outside the scope of the P2NZ analysis and are not included. This is because a more detailed regional analysis is needed to understand how new hydrogen networks would develop depending on where demand centers develop geographically and potential opportunities for collocated supply

viii., xi. The P2NZ study did not estimate a cost per unit production of RNG or hydrogen, as the intent of the study was to model economy-wide energy system costs.

xii. The cost of methane imported to Ontario is included in the “CH4 Imports” category in Attachment 1.

xiii. The cost of CCS for natural gas combustion is included in the “CH4 + CCS” category in Attachment 1.

xiv.-xv. Methane transmission and distribution system operating costs are reported in the “Gas Pipeline O&M” category in Attachment 1. /u

xvi. The cost of carbon dioxide equivalent emissions resulting from natural gas combustion, RNG combustion, and blue hydrogen production are reported in the “Emissions” category in Attachment 1.

c) Please see Attachment 1 for a detailed breakdown of electricity system cost categories by decade for both scenarios.

i. The P2NZ analysis accounts separately for planned new electric supply capacity and for incremental new supply capacity beyond plans that have been announced. As described in Appendix A section “Planned New Electricity Supply Capacity,” the analysis referenced planned capacity expansions for Ontario from the IESO 2020 APO.[1] The 2020 APO plans include investments in battery storage, hydro power, natural gas turbines, solar PV, and wind power. The costs associated with these planned capacity expansions are reported in the “Planned Capacity Costs” category in Attachment 1.

The costs associated with incremental capacity expansions beyond the 2020 APO plans are broken out by supply technology type in the “Electricity System Costs” category in Attachment 1.

ii.-iii. The costs of new and upgraded electric transmission lines are included in the “Electric Transmission in Ontario” and “Interregion Electric Transmission” categories of Attachment 1. However, Guidehouse is not able to disaggregate the electric infrastructure costs into electric infrastructure costs specific to hydrogen production and costs specific to end users. The cost modeling took a high-level approach and did not consider the capital cost of new electric distribution within Ontario. The cost modeling also did not include electrical upgrade costs on a premise-by-premise basis, so the cost analysis omits behind-the-meter costs of upgrading electric circuits and breakers.

[1] IESO (2020). Annual Planning Outlook. https://www.ieso.ca/en/Sector-Participants/Planning-and-Forecasting/Annual-Planning-Outlook

Electrification Scenario

Totals (Billion CAD)	2020-2030	2030-2040	2040-2050	TOTAL	
End User Costs	15	51	3	70	/u
Electricity System	122	110	109	341	/u
Emissions Costs	27	108	44	179	/u
Gas System	40	47	45	132	/u
Total	205	316	201	722	/u

Totals (Billion CAD)						
Type	**Cost**	**2020-2030**	**2030-2040**	**2040-2050**	**TOTAL**	
	Equipment	13.86	22.2	1.73	37.8	/u
End User	Retrofits	1.59	28.88	1.75	32.2	/u
	Anaerobic Digestion	0	0	0.04	0.1	/u
	CH4 + CCS	0	0.08	0.9	1.0	/u
	SMR CCS	0.08	0.89	2.02	3.0	/u
Emissions	CH4 Imports	27.27	106.97	40.74	175.0	/u
	Anaerobic Digestion	0	1.66	13.2	14.9	/u
	CH4 + CCS	0	0.3	3.15	3.5	/u
	CH4 Salt Cavern Storage	0.01	0.01	0	0.0	/u
	Electrolyser	0	0	0.07	0.1	/u
	H2 Salt Cavern Storage	0.01	0.14	0.54	0.7	/u
	SMR CCS	5.28	7.28	6.97	19.5	/u
	CH4 Imports	26.05	29.25	12.76	68.1	/u
	Gas Pipeline O&M	8.53	7.63	6.72	22.9	/u
	H2 Imports	0	0.04	0.46	0.5	/u
Gas System	H2 Pipeline	0.02	0.59	1.62	2.2	/u
	Planned Capacity Costs	2.7	7.49	6.95	17.1	/u
	Battery Storage	0	0.18	0.06	0.2	/u
	Biomass	0	0.03	0.02	0.1	/u
	Biomass + CCS	0	0.6	-0.3	0.3	/u
	Hydro	0	1.18	0.45	1.6	/u
	Nuclear	95.09	72.6	78.2	245.9	/u
	Nuclear SMR	0	4.7	6.3	11.0	/u
	O/CCGT - CH4 Existing	0	0	0	0.0	/u
	O/CCGT - CH4 New	0	0	0	0.0	/u
	O/CCGT - H2 New	3.3	6.5	5.4	15.2	/u
	Solar PV	2.7	0.7	0.6	4.0	/u
	Wind Offshore	0	0	0	0.0	/u
	Wind Onshore	18.1	14.9	10.5	43.5	/u
	Electric Transmission in Ontario	0.9	0.9	0	1.8	/u
Electricity System Costs	Interregion Electric Transmission	-0.3	0.4	0.4	0.5	/u
Total		205	316	201	723	/u

Diversified Scenario

Totals (Billion CAD)	2020-2030	2030-2040	2040-2050	TOTAL	
End User Costs	19	32	2	53	/u
Electricity System	116	93	100	309	/u
Emissions Costs	23	65	35	122	/u
Gas System	50	69	77	197	/u
Total	207	259	214	681	/u

Totals (Billion CAD)						
Type	**Cost**	**2020-2030**	**2030-2040**	**2040-2050**	**TOTAL**	
	Equipment	14.3	23.14	1.81	39.3	/u
End User	Retrofits	4.4	8.71	0.44	13.6	/u
	Anaerobic Digestion	0	0.02	0.04	0.1	/u
	CH4 + CCS	0.03	0.41	0.9	1.3	/u
	SMR CCS	0.11	1.29	2.26	3.7	/u
Emissons	CH4 Imports	22.48	62.88	31.88	117.2	/u
	Anaerobic Digestion	1.5	11.19	21.7	34.4	/u
	CH4 + CCS	0.19	2.25	5.38	7.8	/u
	CH4 Salt Cavern Storage	0.01	0	0	0.0	/u
	Electrolyser	0	1.36	1.25	2.6	/u
	H2 Salt Cavern Storage	0.01	0.19	0.6	0.8	/u
	SMR CCS	13.78	13.77	13.31	40.9	/u
	CH4 Imports	25.9	29.19	16.96	72.1	/u
	Gas Pipeline O&M	8.7	10.63	15.12	34.5	/u
	H2 Imports	0	0.32	2.92	3.2	/u
Gas System	H2 Pipeline	0.1	0.25	0.25	0.6	/u
	Planned Capacity Costs	2.7	7.49	6.95	17.1	/u
	Battery Storage	0	0	0	0.0	/u
	Biomass	0	0	0.03	0.0	/u
	Biomass + CCS	0	0	0.27	0.3	/u
	Hydro	0	0	0	0.0	/u
	Nuclear	94.6	68.3	78.2	241.1	/u
	Nuclear SMR	0.02	0.17	1.12	1.3	/u
	O/CCGT - CH4 Existing	0	0.04	0.03	0.1	/u
	O/CCGT - CH4 New	0	0	0.01	0.0	/u
	O/CCGT - H2 New	0.24	1.09	1.33	2.7	/u
	Solar PV	0	1.2	0.6	1.8	/u
	Wind Offshore	0	0	0	0.0	/u
	Wind Onshore	18.1	14.9	10.83	43.8	/u
	Electric Transmission in Ontario	0.62	0.3	0.02	0.9	/u
Electricity System Costs	Interregion Electric Transmission	-0.3	0	0.12	-0.2	/u
Total		207	259	214	681	/u

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S5/Attachment 2, p. 47 of 86

Question(s):

Guidehouse discusses the various costs included in its analysis as well as “out of scope costs”.

a) Under “Gas System Costs”, Guidehouse lists “T&D network costs”. T&D means “transmission and distribution”. This would imply that gas distribution system costs – or at least a portion of them – are included in the analysis. However, under out-of-scope costs, it states that “cost for upgrading gas and electricity distribution systems (last-mile delivery) are out of scope.” Please clarify this apparent discrepancy. Are any gas distribution system costs – capital or operating – included in the analysis? If so, which are included and which are excluded.

b) Under “Electricity System Costs”, Guidehouse states that “CAPEX and OPEX…of new or reinforced T&D infrastructure” are included. T&D means “transmission and distribution”. Also, in Appendix A (p. A-9), Guidehouse presents Electricity Distribution Infrastructure Investment Cost Inputs. This would imply that electric distribution system costs – or at least a portion of them – are included in the analysis. However, under out-of-scope costs, it states that “cost for upgrading gas and electricity distribution systems (last mile delivery) are out of scope.” Please clarify this apparent discrepancy. Are any electric distribution system costs – capital or operating – included in the analysis? If so, which are included and which are excluded.

c) Under out-of-scope costs, Guidehouse notes that the potential costs of decommissioning portions of the gas network are excluded from its analysis. Would Guidehouse agree that there are also potential cost savings from decommissioning portions of the gas system, both from avoiding gas infrastructure replacements or upgrades and from avoiding maintenance costs? If not, why not?

Response:

The following response was provided by Guidehouse Canada Ltd.:

a-b) The analysis for the P2NZ report includes the following costs:

- Electricity system interjurisdictional transmission (CAPEX, OPEX) (e.g., between ON and others)
- Gas system interjurisdictional transmission (CAPEX, OPEX) (e.g., between ON and others)
- The capital cost assumptions for new electric generation resources (e.g., new wind and solar), which include the costs associated with connecting those resources to the grid.
- The cost of operation existing electric generation facilities, electric infrastructure, and existing pipeline networks
- The cost of new in-province electric transmission and gas transmission
- The ongoing costs of natural gas imports and operating existing pipeline infrastructure are included and are roughly equal in both scenarios.

The cost modeling for the P2NZ study took a high-level approach and did not consider:

- The cost of new electric distribution (CAPEX, OPEX) within Ontario.
- The cost of new gas distribution (CAPEX, OPEX) within Ontario.
- The cost modeling did also not include electrical upgrade costs on a premise-by-premise basis, so the cost analysis omits behind-the-meter costs of upgrading electric circuits and breaker panels.

Distribution level costs are outside the scope of the P2NZ analysis and are not included. This is because a more detailed regional analysis is needed to understand how new hydrogen networks would develop depending on where demand centers develop geographically and potential opportunities for collocated supply.

c) A targeted decommissioning approach could enable a reduction in network O&M costs. However, the feasibility of this approach and the potential for gas system cost avoidance is uncertain. Among other things, feasibility is influenced by the upfront customer equipment cost of whole-building electrification, customer willingness to opt-in to electrification programs and technologies, and uncertainty about the timelines necessary to fully electrify all customers on individual pipeline segments so that segments can be decommissioned.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S5/Attachment 2, p. 48 of 86

Question(s):

Figure 19 shows somewhat lower emissions for the Electrification Scenario from the early 2030s through the mid- to late-2040s. For example, in 2040 emissions under the Electrification Scenario are 49 MTCO2e whereas they are 55 MTCO2e under the Diversified Scenario.

a) Why wasn't the modeling done to achieve exactly the same level of emission reduction?

b) Would Guidehouse agree that if the pace of electrification was slowed somewhat under the electrification scenario, so that total emission reductions were the same in both scenarios, there would be some cost savings relative to the costs for the Electrification Scenario shown in its study results? If not, why not?

Response:

The following response was provided by Guidehouse Canada Ltd.:

a) The objective function of the Low Carbon Pathways model was set to achieve a net-zero emissions target by the year 2050. The purpose of the scenario-based analysis is to examine different potential pathways to achieving that objective. Some pathways will result in greater emissions reductions early in the study period and some will not. Constraining the model to match the emissions between scenarios in interim years would not improve the cost-effectiveness of either scenario, since the LCP model already uses an optimization function to find the least-cost pathway to the net-zero objective, given the various constraints defined by the scenarios

b) There are many interactive effects that influence the emissions and cost outcomes of the modeling. It is possible that the cost savings from postponing electrification measures would be outweighed by the added costs of carbon emissions. Guidehouse cannot answer this question without designing and analyzing a separate scenario (which is outside the scope of this analysis).

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S5/Attachment 2, p. 59 of 86

Question(s):

Guidehouse states that Ontario's existing gas pipeline network "is ideally suited to be repurposed to a hydrogen network, as the province's newer pipelines, typically made of polyethylene, are already largely hydrogen-ready. Metal pipes will require integrity assessments and internal coatings before they can be used to transport hydrogen."

a) What fraction of transmission pipelines in Ontario are the "newer" type, made from polyethylene? Please provide the response in both percentage terms and in kilometer terms.

b) What fraction of distribution pipe in Ontario is made from polyethylene? Please provide the response in both percentage terms and in kilometer terms.

c) Guidehouse's scenarios, particularly the Diversified scenario, appear to rely on both hydrogen and methane (e.g. from RNG). How can the existing gas pipes be repurposed for hydrogen if there is still a need to transport and distribute RNG and other forms of methane? Doesn't this require two sets of pipes? If not, why not?

d) How could existing gas pipes designed to carry methane be repurposed to carry hydrogen fuel that has only ~30% as much energy content per cubic meter. Wouldn't the pipes have to be replaced with versions that are three times the size – or supplemented with significant additional pipe? If not, why not?

Response:

a) There are no transmission pipelines in Enbridge Gas made from polyethylene.

b) Please see Exhibit 2, Tab 6, Schedule 2, Page 81, Table 5.2.3-1: Distribution Pipe Inventory that has been duplicated below. Modern PE accounts for approximately 40% of all pipe (not including service pipe).

Table 5.2.3-1: Distribution Pipe Inventory8				
Asset EGD Rate Zone	**EGD Rate Zone**	**Union Rate Zones**	**Total**	**% Total**
Mains (km)	**42,973**	**44,690**	**87,663**	
TIMP Pipe - Distribution Pipe	341	1,744	2,085	2.4%
TIMP Pipe - Transmission Pipe*	142	1,312	1,454	1.7%
Steel Mains (Pre- and including 1970)	7,292	10,131	17,423	19.9%
Distribution Steel Pipe Post-1970	6,593	8,788	15,381	17.5%
Plastic Pipe - Modern PE	22,763	12,372	35,135	40.1%
Plastic Pipe - Intermediate Plastic Mains	4,721	1,342	6,063	6.9%
Plastic Pipe - Not yet categorized	0	7,893	7,893	9.0%
Plastic Pipe - Vintage Plastic Aldyl A	1,042	1,053	2,095	2.4%
Bare unprotected pipe (km) **	0	136	136	0.2%

c-d) Please see response at Exhibit I.4.2-ED-127.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S5/Attachment 2, Appendix A

Question(s):

a) Are all of the cost assumptions presented in the Appendix expressed in nominal dollars? Or are they expressed in constant dollars for a given year? Or are they a mix of the two? If a mix of the two, please indicate which cost assumptions in the different Appendix A tables are expressed in constant dollars, as well as what year's dollars they are expressed in, and which are expressed in nominal dollars.

b) Regarding Table A-2: why would the carbon price be different for two different pathways? Isn't the social cost of carbon the same regardless of the emission source? If this is intended to reflect carbon taxes, why would the tax be different for different emission sources?

c) On p. A-2 Guidehouse states that "all electricity capacities are forecast to remain the same in the IESO 2020 APO, except for nuclear power; reactors at the Bruce and Darlington Nuclear Generating Stations are expected to be refurbished in the next 10-12 years." How were such refurbishments assumed to change the Bruce and Darlington generating capacities?

d) On p. A-2 Guidehouse states that it assumes all existing gas turbines will be phased out from 2030 to 2050 and that new planned gas turbines in 2030 will be decommissioned by 2050, so that the only gas-fired turbines operating in 2050 will be hydrogen-powered turbines.

   i. Why was this assumption made?
   ii. Did Guidehouse consider the potential to run existing and new gas turbines with RNG instead of using RNG in the gas distribution system? If not, why not?
   iii. Did Guidehouse consider the potential to run existing and new gas turbines with fossil gas only to meet electric system peak demands, with limited carbon capture to offset such limited emissions? If not, why not?

e) On p. A-3 Guidehouse states that it assumes wind and solar capacity factors will improve by 0.5% per year.

   i. Is that 0.5 percent per year or 0.5 percentages points per year?
   ii. Does Guidehouse's assumption about annual improvements to wind and solar capacity factors continue throughout the entire analysis period – i.e. up through 2050? If not, for how many years is the assumption in place?
   iii. Guidehouse says "resulting capacity factors are presented in Table A-4." For what year do the capacity factors in Table 4 apply?
   iv. What are the assumed capacity factors for wind and solar for 2030, 2040 and 2050?

f) Regarding Table A-5

   i. Do costs of green hydrogen decline over time for any reason other than improved capacity factor of wind and solar? If so, what are the reasons and related assumptions used by Guidehouse to develop the cost estimates presented?
   ii. Please provide the assumptions and calculations performed to estimate Green hydrogen costs for Ontario for 2030, 2040 and 2050.

g) Regarding Table A-10: Guidehouse estimates the cost of RNG crop feedstock cost to be $42/MW in 2020, declining to $36/MW in 2050. This is based on "the techno-economic parameters presented."

   i. What is meant by "techno-economic parameters presented"? How were these values derived? What is the basis for the assumption that they will decline over time?
   ii. If this is the just cost of crop feedstock, what is the resulting cost per m3 of RNG delivered to the Enbridge distribution system in each year? What other assumptions and calculations were used to derive that cost per m3? Please specify in detail.
   iii. Does Guidehouse believe that crop feedstocks would be the most expensive source of RNG? If so, what is the basis for that assumption? Please provide appropriate references.
   iv. Did Guidehouse assume that the most expensive source of RNG would set the market clearing price for all RNG – and did its model assume that all RNG consumed in a scenario had a cost equal to the market clearing price set by the most expensive unit of RNG? If so, what did it assume would be the market clearing price in 2030, 2040 and 2050? If not, why not?
   v. Did Guidehouse assume that the average cost per m3 of RNG would be lower under the electrification scenario than under the diversified scenario, since there would be much lower demand under the electrification scenario (and therefore the market would not have to move as high up the RNG cost curve)? If not, why not?

vi. Please provide the following:

1. Guidehouse's estimates of the total bcm of RNG consumed each year from 2020 through 2050. Please provide the estimate separately for the diversified and electrification scenarios (i.e., expanding Table A-8).
2. Guidehouse's estimates of the total cost of all RNG delivered to the Enbridge distribution system in each year from 2020 through 2050. Please provide this value separately for the diversified and electrification scenarios.

h) Regarding Tables A-14, A-15 and A-16:

i. How many km of each type of new gas transmission pipeline and refurbished transmission pipeline (provide separately) were assumed to be required in each year for each scenario (diversified and electrification)?
ii. What was the total available km of methane pipeline and hydrogen pipeline in each year from 2020 through 2050?
iii. What was the basis for Guidehouse's estimates of how many km of new gas transmission line and how many km of refurbishing of existing gas transmission line would be required in each year for each scenario?
iv. How did Guidehouse determine how much existing methane pipeline could be reburbished (vs. having to be replaced) to take hydrogen instead of methane?
v. There are no tables presented for CAPEX costs for new or refurbished gas distribution pipe? If not, why not? If new/refurbished distribution pipe costs were estimated, please provide all assumptions about costs, as well as total assumed capital costs per year per scenario.
vi. Were costs estimated for reburbishing or replacing gas pipe on the customers' side of the meter (in homes and businesses) to carry hydrogen instead of methane? If not, why not? If they were estimated, please provide all assumptions about costs, as well as total assumed capital costs per year per scenario.

i) Regarding cost of Electricity Infrastructure discussed on p. A-9:

i. How many MW-km of transmission lines were assumed to be added, by year, in each scenario?
ii. How did Guidehouse estimate how many MW-km of new transmission capacity would be required each year?
iii. For electric distribution system costs, did Guidehouse simply multiply the year-over-year increase winter peak demand by the $99,700 cost per kW of distribution capacity in table A-19? If not, how were new electric distribution costs estimated?
iv. Why did Guidehouse model electric distribution system upgrade costs but not gas distribution system costs – particularly the costs associated with converting from a system delivering methane to a system delivering primarily hydrogen?

j) Regarding end user costs on pp. A-10 and A-11:

i. Guidehouse states that its analysis does not include “the cost of existing heating system and end-of-life replacements.” What does that mean? Did Guidehouse assume a one-time cost (consistent with Table A-20) for equipment replacement and no subsequent replacements at the end of the equipment life, even if before 2050? If so, why? If not, please explain.
ii. How many residential households were assumed to install each of the pieces of heating equipment listed in Table A-20 in each year from 2020 through 2050. Please provide the response separately for the diversified and electrification scenarios.
iii. Are the gas heat pump and hybrid heat pumps included in Table A-20 systems that would consume methane or hydrogen? Or did Guidehouse assume that the cost would be the same, regardless of the type of gaseous fuel? If the latter, what is the basis for that assumption?
iv. What did Guidehouse assume about the cost of other gas-consuming appliances (water heaters, stoves, dryers) and their electric alternatives?
v. What did Guidehouse assume – implicitly or explicitly – about the heating capacities (BTUh) of the different heating equipment listed in Table A-20.
vi. What did Guidehouse assume about the average annual heating Coefficient of performance (COP) and the average SEER cooling efficiency rating for piece of equipment listed in Table A-20? What was the basis for each assumption?
vii. What did Guidehouse assume about the peak heating hour heating COP for each piece of equipment listed in Table A-20? What was the basis for each assumption?
viii. Did Guidehouse make any assumptions about whether (1) the costs of any building heating, water heating or other equipment would change over time (other than for inflation); (2) the average seasonal COP/efficiency of new equipment would improve over time; and/or (3) the peak hour COP/efficiency of new equipment would improve over time? If so, please provide all such assumptions about cost and/or efficiency changes over time, including the type of equipment, magnitude of change and specific years in which the changes were assumed to occur. If not, why not?
ix. What did Guidehouse assume about the percent annual energy savings and percent peak hour savings associated with the two levels of building efficiency retrofits in Table A-21.
x. How much more efficient did Guidehouse assume new homes would be relative to existing homes? How much less energy consumption would be needed per home for heating? How much less energy consumption would be needed during the peak heating hour in winter? What was the basis for these assumptions?
xi. What did Guidehouse assume about the measure life for each type of gas consuming equipment (heat pumps, water heaters, etc.), as well as for building efficiency improvements?

k) Does Guidehouse have all of the inputs to its model in an Excel file, database file or other electronic file? If so, please provide a live copy of the file (or files) with formulae intact.

Response:

The following response was provided by Guidehouse Canada Ltd.:

a) The natural gas price forecast in Table A-1, carbon prices in Table A-2, and blue hydrogen costs in Table A-6 are provided in nominal dollars. The remaining tables (Tables A-5, A-10, A-11, and Tables A-14 to A-22) are provided in real 2020$.

b) The carbon price is intended to reflect carbon taxes that will be levied and adjusted to drive the adoption of electric technologies. Guidehouse assumed that a higher cost of carbon would be introduced in the Electrification scenario as a policy measure to motivate the higher levels of electrification that are needed to achieve the Electrification scenario assumptions defined in Table 2 of the P2NZ report.

c) Guidehouse assumed that refurbishments of the Bruce and Darlington generating stations would result in Ontario's total nuclear generating capacity increasing 5.0 GW by 2030 and a further 2.5 GW by 2040.

d)
i-iii. Guidehouse's least-cost optimization modeling determined that the phase out of natural gas-fired turbines and replacement with hydrogen-fired turbines would be a lower cost approach than continuing to operate natural gas-fired turbines with RNG or with CCS. Fueling turbine operation with fossil gas produces emissions from combustion, but also upstream emissions from natural gas transmission. CCS would not be sufficient to mitigate fugitive emissions upstream to achieve net-zero goals.

e)
i. Guidehouse assumes that wind and solar capacity factors will improve by 0.5 percent per year beginning in 2025 (for a cumulative improvement of 1.13).

ii. Guidehouse assumed annual improvements to wind and solar capacity factors will begin in 2025 and continue throughout the analysis period (through 2050).

iii. The capacity factors in Table A-4 of the P2NZ Report apply in 2050.

iv. The Tables 1 and 2 present the assumed capacity factors for wind and solar for 2030, 2040 and 2050. Guidehouse assumed that the capacity factors for new installations of solar and wind generators will increase at a rate of about 1.20% per year through 2050. These performance improvements are reflected in Table 1 and Table 2 below, showing the capacity factors projected for new solar and wind installations in 2030, 2040, and 2050 values. The Guidehouse model accepts just one capacity factor input for each technology and region, so Guidehouse calculated an average capacity factor to represent fleet-wide improvements over the 2020-2050 period. The average capacity factors used as inputs to the model are shown in the final columns of Table 1 and Table 2, and the input factors represent a fleet-wide (old plus new installations) improvement rate of 0.75% per year. /u

Table 1 :
Assumed Capacity Factors for New Wind Installations by Decade,,
and Average Fleet Factors Used for Modeling /u

Region	Capacity Factors of New Installations			Average CF Values Used to Model	
	2030	2040	2050		/u
ON	41%	46%	52%	47%	/u
QC	29%	33%	37%	33%	/u
WC	41%	46%	52%	46%	/u
NY	39%	44%	49%	44%	/u
PJM	42%	47%	53%	47%	/u
MISO	34%	39%	43%	39%	/u

Table 2 :
Assumed Capacity Factors for New Solar Installations by Decade,
and Average Fleet Factors Used for Modeling /u

Region	Capacity Factors of New Installations			Average CF Values Used to Model	
	2030	2040	2050		/u
ON	14%	16%	18%	16%	/u
QC	14%	16%	18%	16%	/u
WC	15%	17%	19%	17%	/u
NY	19%	22%	25%	22%	/u
PJM	20%	23%	26%	23%	/u
MISO	20%	23%	26%	23%	/u

f)

i. The cost of green hydrogen is also influenced by the cost to install and operate electrolysers and the operating efficiency of electrolyzers. Guidehouse assumed that electrolyzer technology matures, costs will decrease and efficiencies will increase. These assumptions are provided in Table A-11 of the P2NZ Report.

ii. The green hydrogen costs for Ontario provided in Table A-5 of the P2NZ Report are an approximation of hydrogen production costs using on-shore wind power as an electricity source and electrolyzers as the hydrogen production technology. Guidehouse estimated the cost to build and operate wind turbines and electrolyzers (see capital and O&M costs in P2NZ Table A-11) along with the capacity factor of wind energy (see table in (e)(iv) above) and the efficiency of electrolyzers (P2NZ Table 11) to calculate this estimate. In the P2NZ Report, the text above Table A-5 provides important context. It says, "In comparison the cost of hydrogen production in ON is not static, but rather changes hour-to-hour based on several factors, including hour-to-hour changes in hydrogen demand, the electricity supply mix, periods of surplus electricity generation, among other factors. The impacts of all these factors are modelled endogenously via our energy systems model.

g)

i. The estimates of RNG feedstock costs are based on projections from a 2019 report[1] that developed long-term estimates of feedstock costs across several feedstock types. The report explored different scenarios with different RNG feedstock supply mixes. Given the uncertainty associated with forecasting feedstock costs out to 2050, as well as the uncertainty associated with forecasting the evolution of the supply mix, Guidehouse adopted the report's base case supply mix representing a mix of sequential crops, biodegradable waste, and agricultural residues. Note that the figures in Table A-10 should be reported in $/MWh and not $/MW.

ii.-v The purpose of the P2NZ report was to estimate the total costs for each scenario to achieve net-zero emissions by 2050. To estimate total costs, Guidehouse accounted for the capital cost of new RNG projects (CONE), the fixed O&M costs (FOM) of operating RNG production capacity regardless of output, and the variable O&M costs (VOM) which scale based on production volume. The CONE and FOM costs for anaerobic digestion are provided in Table A-11 of the P2NZ study. Guidehouse derived these costs from a 2021 U.S. EPA

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[1] Gas for Climate (2019). "The optimal role for gas in a net zero emissions energy system." p. 106. Available at: https://gasforclimate2050.eu/wp-content/uploads/2020/03/Navigant-Gas-for-Climate-The-optimal-role-for-gas-in-a-net-zero-emissions-energy-system-March-2019.pdf

report[2] that describes the capital and O&M costs of a gas collection and flare system (page 4-3) and the capital and O&M costs of a typical RNG pipeline-injection project with a 2-mile pipeline and a 15-year lifetime (page 4-10). For the infrastructure needed to upgrade and inject RNG into natural gas networks, Enbridge Gas Inc. provided Guidehouse with capital and O&M cost estimates based on a sample of projects scoped by Enbridge Gas.

Guidehouse did not estimate a cost per unit production of RNG, as the intent of the study was not to model commodity costs or market prices for RNG.

Guidehouse cannot determine the cost per unit production of RNG from the output of our Low Carbon Pathways model because the cost per unit production would include other project parameters (e.g., taxes, cost of financing, etc.) that we have not estimated.

vi.

1. The P2NZ analysis was conducted on decade intervals and did not estimate energy demand in interim years. The table below provides Guidehouse estimates of total bcm of RNG consumed per year, on a decade basis from 2020-2050.

Table: Ontario RNG Consumption (bcm/year)

	2020	2030	2040	2050	
Diversified	0.0	1.2	2.5	4.7	/u
Electrification	0.0	0.0	1.6	2.0	/u

2. Guidehouse's approach to cost modeling did not determine commodity costs of RNG on a $/m3 basis. Instead, Guidehouse accounted for the cost of RNG supplies by (1) determining the required production capacity by decade, (2) estimating the capital costs of developing RNG production capacity, and (3) estimating the fixed and variable O&M costs of using this capacity to produce RNG. The table below summarizes the total cost of RNG production by decade for two scenarios.

[2] U.S. EPA (2021). "LFG Energy Project Development Handbook." pp. 4-3 to 4-10. Available at: https://www.epa.gov/system/files/documents/2021-07/pdh_full.pdf

Table: RNG Production Cost by Decade (million real 2020$CAD)

	2020-2030	**2031-2040**	**2041-2050**
Diversified	1,517	11,210	21,774
Electrification	-	1,665	13,241

/u
/u

h)

i. Please see the table below for pipeline lengths and capacities for interregional hydrogen transmission pipelines. Guidehouse did not explicitly model the length requirements of in-province transmission and distribution pipelines.

Note that no new methane transmission pipelines are built in either scenario. Also, no new dedicated hydrogen transmission pipelines are built between regions, only repurposed. Also, the Electrification scenario requires more capacity between western Canada and Ontario than the Diversified scenario because the Electrification scenario requires large scale deployment of hydrogen generators for electricity generation during peak hours that coincide with limited wind generation. In contrast, the Diversified scenario requires more hydrogen imports over the year, but not as large volumes all at once.

Table 1. Interregional Hydrogen Pipeline Length and Capacity

	2020	2030	2040	2050
Diversified Scenario: Repurposed Dedicated Hydrogen Pipeline				
Ontario to Quebec	-	-	-	100 km 10 GW
Ontario to Western Canada	-	-	1400 km 2 GW	1400 km 19 GW
Electrification Scenario: Repurposed Dedicated Hydrogen Pipeline				
Ontario to Quebec	-	-	-	100 km 10 GW
Ontario to Western Canada	-	-	1400 km 27 GW	1400 km 45 GW

/u
/u

ii. Please see table below for interregional pipeline lengths. Guidehouse did not explicitly model the length requirements of in-province transmission and distribution pipelines. Pipeline lengths did not vary by year, they are defined by the distance between the geographies they connect. Pipeline capacities varied by scenario and by study year.

Table 2. Assumed Lengths of Interregional Gas Pipelines (kilometers)

	Ontario to Western Canada	Ontario to Quebec	Ontario to New York	Ontario to Michigan	Ontario to PJM
Methane Pipeline	2000	700	500	500	200
Hydrogen Pipeline	1400	100	-	-	-

iii.-iv. Guidehouse determined the amount of transmission pipeline conversion to hydrogen-ready pipe based on the peak demand for methane and hydrogen in each decade. Guidehouse did not evaluate specific geographies or sections of gas network pipeline that could be refurbished or replaced to transport hydrogen.

v. The costs for upgrading methane distribution pipelines to accept hydrogen blending and for the hydrogen distribution system within Ontario are outside the scope of the P2NZ analysis and not included. This is because a more detailed regional analysis is needed to understand how new hydrogen networks would develop depending on projections of regional demand centers and potential opportunities for collocating supply with demand.

vi. Guidehouse expects that nearly all customers will incur adaptation costs in the transition to net-zero, whether those costs include piping upgrades to receive hydrogen service, or electric panel upgrades to accommodate electrification of space heating and other end uses typically served by gas. However, the cost modeling took a high-level approach and did not consider piping or electrical upgrade costs on a premise-by-premise basis. As described in the call-out box on page 44 of the P2NZ report, the P2NZ cost analysis did not include costs for expanding and upgrading gas and electricity distribution systems (last-mile delivery). This means that the cost analysis omits behind-the-meter costs of replacing gas pipes for hydrogen service and the cost analysis omits behind-the-meter costs of upgrading electric circuits and breaker panels or upgrading HVAC ductwork.

i)

i. Guidehouse used the $/MW-km figures from Table A-18 of the P2NZ report as assumptions to develop costs of expanded electricity interties with neighboring regions, for which distances (in km) were assumed. These figures were not used directly to determine electricity transmission costs in Ontario. Given this, Guidehouse did not make assumptions related to annual additions of MW-km of transmission line in Ontario.

Guidehouse's cost modeling assumptions for the cost of new electric generation facilities (e.g., wind and solar plants) include the cost of infrastructure required to connect the new resources to the electric grid.

To estimate costs of additional electric transmission in Ontario, Guidehouse used avoided transmission capacity costs reported by the IESO[3], converted from annualized units ($/kW-year) to upfront CAPEX ($/kW) and OPEX ($/kW-year). This approach is consistent with the approach described for the distribution capacity cost figures reported in Table A-19.

ii. Guidehouse did not estimate annual additions of MW-km of new transmission capacity for Ontario. Transmission capacity costs were estimated by multiplying the year-over-year increases in peak electricity demand by the cost of transmission capacity in $/kW terms, as described in our response to question (i)(i).

iii. The P2NZ analysis did not include the costs of electricity distribution system upgrades. Guidehouse determined that an assessment of distribution costs would involve a more detailed regional analysis that was outside the scope of the P2NZ study. The distribution cost assumptions in Table A-19 were not used in the P2NZ cost analysis.

iv. Guidehouse regrets that the P2NZ report is not clearer on this point: The P2NZ study includes the cost of operating existing electric generation facilities, electric infrastructure, and existing pipeline networks. The P2NZ study includes the costs of electric transmission and gas transmission. The P2NZ study does not include the cost of new electric distribution infrastructure or gas distribution infrastructure. Costs for upgrading methane distribution pipelines to accept hydrogen blending and for the hydrogen distribution system within Ontario are outside the scope of the P2NZ analysis and not included. This is because a more detailed regional analysis is needed to understand how new hydrogen networks would develop depending on projections of regional demand centers and potential opportunities for collocating supply with demand.

j.

i. Guidehouse states that its analysis does not include “the cost of existing heating system and end-of-life replacements.” Guidehouse did not estimate that costs of heating systems that are already part of Ontario’s installed base. When estimating heating system costs, Guidehouse accounted for systems that undergo a transition (e.g., furnace to heat pump) and did not count the costs of like-for-like end-of-life replacements (e.g., furnace to furnace, or heat pump to heat pump). Guidehouse took this approach because the intent of this study is to estimate the cost of the transition to net-zero under different scenario assumptions.

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[3] IESO (2017). Local Avoided Costs – Overview. https://www.ieso.ca/-/media/Files/IESO/Document-Library/regional-planning/Toronto/engagement/Toronto-LAC-20170926-Local-Avoidable-Costs.ashx

ii. The number of household heating system conversions by decade in each scenario are detailed in Exhibit I.1.10-SEC-52 Attachment 1.

iii. Guidehouse assumed that the designs of gas heat pump and hybrid heating systems described in Table A-20 will evolve to be hydrogen ready in advance of the deployment of pure hydrogen gas service. Guidehouse assumed that the future hydrogen-ready appliances would be of comparable cost to natural gas-fired appliances available on the market today. Guidehouse observed that boiler companies (e.g., Viessman[4]) have announced testing of hydrogen-ready boilers with the goal of introducing models that are cost-competitive to gas-fired boilers, and Thermolift advertises a gas heat pump model that is capable of running on hydrogen.

iv. Guidehouse did not model the costs of other gas-consuming appliances.

v.-vi. The table below provides heating capacity and efficiency assumptions for the different heating equipment listed in Table A-20 of the P2NZ Report. Heating capacities for electric heat pumps were selected based on heating load estimates for an archetype home in Toronto. The system efficiency for gas heat pumps was selected based on the NRCan market transformation roadmap.[5] The system efficiency for electric heat pumps is based on a market scan of currently available equipment and on a review of Dunsky (2020).[6]

Table: Heating Capacity and Efficiency of Residential Heat Pump Systems.

Heating Equipment	Assumed Heating Capacity	System Efficiency, 2020
Gas Heat Pump with A/C Unit	80,000 Btu/h	1.2 COP heating 13 SEER cooling
Cold Climate Electric Air-Source Heat Pump with Electric Resistance Backup	36,000 Btu/h	2.8 COP heating 16 SEER cooling
Electric Geothermal Heat Pump	40,000 Btu/h	3.7 COP heating 16 EER cooling
Hybrid Heat Pump	36,000 Btu/h	2.4 COP heating (heat pump) 14 SEER cooling

[4] Hydrogen Central (2021). "Viessmann Develops wall-Mounted Gas Boilers for Pure Hydrogen, Retrofit Kit for easy Conversion from Natural Gas to New Fuel Source." Available at: https://hydrogen-central.com/viessmann-wall-mounted-gas-boilers-hydrogen-conversion-natural-gas-new-fuel/

[5] Paving the Road to 2030 and Beyond: Market transformation road map for energy efficient equipment in the building sector, p. 32, Figure 4-2. https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/emmc/pdf/2018/en/18-00072-nrcan-road-mapeng.pdf

[6] Dunsky (2020). "The Economic Value of Ground Source Heat Pumps for Building Sector Decarbonization." Available at: https://ontariogeothermal.ca/downloads/dunsky--hrai-benefitsofgshps--2020-10-30-.pdf

vii. Guidehouse declines to answer this question. Guidehouse used electric load shapes to account for the temperature-dependent performance of air-source heat pumps, but Guidehouse did not explicitly estimate the peak heating hour COP values for the heating equipment listed in Table A-20 of the P2NZ report.

viii.

1. The cost decline over time for building energy efficiency retrofits are provided in Table A-21 of the P2NZ report. Guidehouse assumed that the real costs of all heat pump equipment (i.e., gas heat pumps, electric air-source and ground-source equipment, and hybrid heating systems) will decline 5% by decade, for a total cumulative cost decline of 15% in 2050 relative to 2020 costs. Guidehouse did not make cost assumptions regarding water heater equipment.

2. Guidehouse assumed that the average seasonal efficiency of new air-source heat pumps, new gas heat pumps, and new electric heat pump water heaters would improve by 15% from 2020 to 2050. Guidehouse assumed that these efficiency improvements would progress on a linear path over the 2020 to 2050 time period.

3. Guidehouse did not make explicit assumptions about improvement in peak load performance for space heating equipment because these improvements are implicitly modeled based on the average seasonal efficiency improvements described above.

ix. Guidehouse assumed that space heating and space cooling loads would decrease by 15% following a “moderate” retrofit and by 36% following a “deep” retrofit.

x. To estimate the space heating energy consumption of new and existing homes, Guidehouse referenced housing statistics from Natural Resources Canada (NRCan). Data from NRCan describe the number of existing buildings by building vintage and the total space heating energy use by building vintage, on an annual basis, for the 2000-2019 period.[7] Homes of a pre-1946 vintage consume about 0.12 TJ of energy per year for space heating, compared to 0.06 TJ/year for homes in the 1984-1995 vintage and 0.04 TJ/year for homes in the 2016-2019 vintage. Guidehouse did not estimate peak electric load contribution on a building-by-building basis.

[7] Natural Resources Canada (2022). “Residential Sector, Ontario, Table 15: Housing Stock by Building Type and Vintage” and “Table 7: Space Heating Secondary Energy Use and GHG Emissions by Vintage.” Available at: https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive/trends_res_on.cfm

xi. Guidehouse assumed an 18-year measure life for gas consuming equipment and a 30-year measure life for building efficiency improvements. Guidehouse did not model the lifetime of other gas consuming equipment (e.g., water heaters).

k) Guidehouse has not consolidated the inputs from all modeling activities in this study into a single workbook. Appendix A of the P2NZ Study serves as a summary of modeling assumptions. Please see the response to undertaking JT1.28 for a set of spreadsheet workbooks detailing the upstream and downstream model calculations. /u

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S5/Attachment 2, p. 85 of 86

Question(s):

Guidehouse states that "capital costs are converted to a levelized amount using an annuity factor based on the economic lifetime of each type of investment and a real discount rate of 4%.

a) Were all capital costs – whether on the gas system, electric system or for end users (heating equipment, weatherization, etc.) – levelized in this way? If not, which capital costs were levelized and which were not?

b) Does this mean that if a heat pump costing $10,000 was assumed to have a 15-year life that Guidehouse would have included a levelized cost for each year of the heat pump's life (or each year of its life within the study analysis period through 2050) of $899? If not, please explain.

Response:

The following response was provided by Guidehouse Canada Ltd.:

a) The capital costs of generation and transmission resources modeled in the P2NZ study are counted as an overnight installation cost in the first year that the resources are required to meet the demand forecast. The overnight installation cost is reduced to reflect the portion of the asset lifetime that coincides with the 2020-2050 study period. These costs are not annualized. Please see Exhibit JT1.29 and Exhibit JT2.5 for further details and examples of capital cost calculations. A revised version of the P2NZ report corrects the statement referenced in the intervenor's question. /u

b) In a revision to the P2NZ analysis, Guidehouse updated the approach to end user costs to align with the approach to energy system costs described above in (a). The capital costs of end user heating equipment and residential building retrofits modeled in the P2NZ study are counted as an overnight installation cost in model year when the equipment / retrofit is installed. The overnight installation cost is /u reduced to reflect the portion of the asset lifetime that coincides with the 2020-2050 study period. These costs are not annualized. Exhibit I.1.10-SEC-52 provides further details on the approach to end user capital costs. For the customer heat pump installation example provided in the question, the installation cost of the heat pump would be fully incurred in the installation year and would be discounted by the proportion of the heat pump lifetime that extends beyond 2050.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S5 p. 5

Question(s):

Enbridge states that each of the four scenarios assessed in its ETSA project considered key drivers that have the potential to affect gas demand. The critical drivers listed by Enbridge does not appear to include either (1) government incentives for electrification; or (2) the potential for municipal incentives for electrification, banning of new gas connections or other municipal policies. Were these factors not considered in the scenario analyses? If not, why not?

Response:

Incentives for electrification and potential restrictions on use of gas equipment were included in the “non-price driven fuel-switching critical driver”. Please see Exhibit 1, Tab 10, Schedule 5, Attachment 1 page 43 for non-price driven fuel-switching related critical driver assumptions for each scenario.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S5, p. 9

Question(s):

Figure 2 shows that the volume of gas demand would increase under a "diversified portfolio". Enbridge explains that this is because of assumptions regarding growing use of hydrogen which delivers only about 30% as much energy per m3 as methane.

a) Please provide volumetric gas demand for the diversified portfolio, by year, separately for hydrogen and methane.

b) Please clarify how much of the hydrogen demand in each year is associated with hydrogen blending with methane and how much is delivery of 100% hydrogen through hydrogen only pipes.

c) Please clarify how much of any 100% hydrogen delivery, by year, is assumed to be for (1) industrial customers, (2) commercial customers and (3) for residential customers.

d) To the extent that, if any of the 100% hydrogen gas is assumed to be delivered to residential customers or commercial customers on the Enbridge distribution system, what is Enbridge's vision for how that would occur? Specifically:
   i. Does Enbridge envision that a 100% hydrogen distribution pipe to a neighborhood or community would be constructed to run parallel to an existing methane pipe and customers then, gradually over time, converting from methane to hydrogen (e.g., as their methane burning furnaces and other equipment are replaced at their natural end-of-life cycle)? Or does Enbridge envision that the hydrogen pipe would be built alongside the existing methane pipe, and once constructed every customer in the neighborhood or community would be converted from methane to hydrogen at roughly the same time so that the methane pipe could be decommissioned?
   ii. In either case, would Enbridge agree that it could not repurpose methane distribution pipes to deliver hydrogen because the methane pipes would need to carry methane until 100% of all customers' equipment, as well as gas-

carrying pipes inside buildings on the customers' side of the meter, are converted to hydrogen for a distribution area. If not, why not?

iii. If Enbridge's vision is that that all customers in a neighborhood or community would be expected to switch from methane to hydrogen at roughly the same time, how would that happen? How could Enbridge ensure that all customers would choose to convert to hydrogen? What if some customers wanted to continue to burn methane?

Response:

a) The following response was provided by Posterity Group:

Diversified Portfolio Scenario: Annual volume by fuel (m3)

Year	Hydrogen	Natural Gas	Natural Gas with Carbon Capture	Renewable Natural Gas
2019		25,162,554,774		
2020		25,257,136,202		
2021		25,348,391,502		589,887
2022	174,831	25,470,590,144		837,657
2023	183,452	25,455,979,060		902,049
2024	191,999	25,380,183,822		966,289
2025	15,973,479	25,074,920,347		129,740,516
2026	15,769,780	24,487,014,325		360,593,978
2027	31,226,057	24,018,949,027		589,998,065
2028	46,235,061	22,631,738,008	874,563,736	813,160,882
2029	90,538,933	21,799,837,554	966,708,733	1,026,997,932
2030	766,464,218	20,800,871,733	1,351,849,281	1,248,453,172
2031	1,397,416,305	19,600,475,973	1,736,188,258	1,475,924,919
2032	1,999,781,522	18,167,560,904	2,411,969,409	1,691,152,513
2033	3,400,506,962	17,019,669,616	2,501,951,330	1,895,040,527
2034	4,335,666,850	15,507,033,190	3,222,466,789	2,088,065,495
2035	5,194,941,118	14,595,266,775	3,201,924,364	2,263,253,542
2036	7,084,051,931	13,453,652,081	3,180,024,981	2,428,775,230
2037	8,866,571,425	12,260,484,126	3,263,693,482	2,583,968,204
2038	10,762,946,944	11,128,730,758	3,228,903,793	2,722,126,298

b-c) The following response was provided by Posterity Group:

Please see response at Exhibit I.1.10-SEC-41 part a).

d) Please see response at Exhibit I.4.2-ED-127 parts b-e).

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

E1/T10/S5 p. 14

Question(s):

Enbridge states that "energy efficiency is a key aspect of both scenarios" for pathways to achieve net zero GHG emissions by 2050. How does the amount of energy efficiency assumed in the Guidehouse study between 2020 and 2030 compare to the levels Enbridge will have achieved between 2020 and the end of its currently approved three-year DSM plan (i.e. through 2025)?

Response:

The following response was provided by Enbridge Gas:

The Company notes that the request seeks to compare items that were done for different purposes, have different timeframes, cover differing geographical areas and are on a different basis. Performing any reconciliation between the two items would be extremely time intensive and the Company does not believe it would be useful.

The following response was provided by Guidehouse Canada Ltd.:

For the P2NZ study, Guidehouse incorporated energy efficiency measures into the forecast of energy demand from residential and commercial buildings. Guidehouse's forecast of energy demand from these sectors includes energy consumption for all of Ontario and is not limited to customers of Enbridge Gas. The Guidehouse forecast of building energy demand accounted for energy reduction due to (1) improvements in the average efficiency of space heating and water heating equipment and (2) building envelope improvements.

In Guidehouse's building energy demand model, a portion of improvements in building envelope efficiency may be attributed to natural building turnover, through which older buildings with less efficient envelopes are torn down and replaced by newer more efficient buildings. Energy efficiency improvements due to building turnover may not correspond to activities in Enbridge Gas's DSM plan.

The table below presents the annual gas consumption savings in 2030 due to cumulative energy efficiency improvements from 2020 to 2030. For example, the first row of the table presents the annual gas savings from increased adoption of high-efficiency gas-fired space heating and water heating appliances in the decade following 2020.

Table 1
Annual Gas Consumption Savings in 2030 due to Cumulative Energy Efficiency Improvements from 2021 to 2030 (PJ/year)

Energy Efficiency Intervention	Electrification Scenario	Diversified Scenario	
Improvements to residential space heating and water heating appliance efficiency	7.7	8.2	/u
Improvements to commercial space heating and water heating appliance efficiency	4.1	4.5	/u
Improvements to residential building envelopes	7.7	8.3	/u
Improvements to commercial building envelopes	6.0	7.0	/u

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.1, Tab 10, S.2

Question(s):

"Enbridge Gas has over $14 billion in regulated assets". What proportion of those assets (in dollar value) will need to be modified to enable the predominantly hydrogen-based pathway the evidence suggests?

Response:

Currently it is not known what proportion will require or may not require modifications to enable hydrogen on Enbridge Gas regulated assets. Enbridge Gas plans to undertake a Hydrogen Blending Grid Study during the IR term to address this and other questions related to hydrogen in the gas distribution system. Please see Exhibit 4, Tab 2, Schedule 6 pages 16-18 for more details.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 4, Page 18 of 20

Question(s):

EGI notes that a 2050 EPH would increase 2024 depreciation expense by $242 million. If no such adjustment is made between now and 2050 but these assets are retired in 2050, what would be the resulting amount of stranded assets? If the adjustment is made starting in 2030, what would be the resulting impact on depreciation expense in that year?

Response:

Note the variance between the proposed depreciation expense and the 2050 EPH depreciation expense is not $242 million as stated in the question. The initial increase in the pre-filed evidence was $282 million. The amount has been updated to $290 million, please see Exhibit 1, Tab 10, Schedule 4, page 18, updated March 8, 2023. Assuming the assets are fully intact without any damages and replacements, the remaining net book value is estimated to be $1.1 billion in 2050. It should be noted that this is an unrealistic depiction of the projected net book value as there is an on-going level of capital investment required in order to safely maintain the system between now and 2050. Subsequent depreciation studies would also be required in order to review and adjust the rates based on additions, retirements and refined useful lives for assets between now and 2050. Enbridge Gas is unable to estimate the resulting impact on depreciation expense if the adjustment is made starting in 2030 as this is beyond the Company's forecasting horizon for depreciation expense.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 5, Page 5

Question(s):

Exhibit 1, Tab 10, Schedule 5, Page 5 refers to external stakeholders consulted as having “encouraged Enbridge Gas to continue with energy transition planning, and to work towards a goal of absolute zero GHG emissions by 2050.” Please elaborate on the choice of the phrase “absolute zero” rather than ‘net zero’. Is that wording indicative of stakeholder concerns about reliance on CCUS?

Response:

Enbridge Gas understood the stakeholder comments to mean that the Company should take actions to reduce Scope 3 emissions from customer use of natural gas to approach absolute zero, instead of placing a large reliance on procurement of offset credits.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 5, p. 6

Question(s):

"While the steady progress scenario assumes the adoption of higher carbon pricing ($170/tCO2e by 2030) and the introduction of more stringent building codes and standards, modeled results indicate the emission reductions from these measures alone are not sufficient to meet net-zero emission goals by 2050."

In light of that observation, what more stringent building codes and standards has the company included in its load forecasts?

Response:

Enbridge Gas has interpreted the reference to load forecast in the question as the general service volume forecast, which is derived by multiplying the total number of general service customers forecast by average use per customer forecast. Please see response at Exhibit I.1.10-SEC-21 for details on how future building codes and standards are considered in the average use forecast.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 5, p. 16

Question(s):

a) Given that hydrogen has roughly one third the energy content of methane, would Enbridge agree that there are three possibilities in a predominantly hydrogen carrying grid – (if not please explain):

   i. distribution system capacity is increased three-fold to serve existing peak loads, or
   ii. if the system is not dramatically increased to accommodate hydrogen, distribution costs roughly triple for the third of customer demand that can be accommodated by the gas grid and be served by hydrogen at peak, or
   iii. a combination of the above alternatives with a combination of increased system and customer asset-related costs to accommodate hydrogen and increased rates as fixed distribution costs are borne by fewer customers (as would appear to be the case in the Diversified Scenario)?

b) Does Enbridge agree that while there may be significant investment required on the electricity system in an electrification scenario, there will be significantly more electrical load and accordingly, the electricity rate impacts will be moderated?

c) Please provide gas rate impact estimates for the two scenarios in the P2NZ study.

d) Please provide electricity rate impact estimates for the two scenarios in the P2NZ study.

Response:

a) Please see response at Exhibit I.4.2-ED-127.

b) Enbridge Gas agrees that there will be significant electricity load growth as the province moves toward net-zero, requiring significant investments in the electricity system to support this load growth. Enbridge Gas does not agree that electricity prices will be moderated as a result. The IESO estimates in their Pathways to Decarbonization (P2D) scenario that unit costs of electricity will rise by 20-30% from today,[1] which is a significant increase. Additionally, Toronto Hydro in their Climate Action Plan states that actions in their plan will result in "significant increases to distribution rates paid for by customers".[2]

c-d) Enbridge Gas is unable to provide gas and electric rate impact estimates for the two scenarios in the Pathways to Net Zero Emissions for Ontario (P2NZ) Study. The P2NZ Study conducted a scenario and cost analysis at the provincial level and did not determine the portion of the required investments related to the gas and electric system costs that would be made by Enbridge Gas or the electric LDCs versus other parties, such as low-carbon fuel suppliers or low-emissions power producers. Additionally, costs for expanding and upgrading the distribution system were out of scope.

The current unit capital cost for delivering annual and peak hour energy in the form of natural gas is approximately one quarter of the unit cost of delivering annual and peak hour electricity in Ontario, as provided at Exhibit I.1.10-SEC-28, Table 1. This does not reflect the added resilience benefit stemming from the buried nature of the gas system, nor the additional costs to the electricity system to provide a similar level of resilience.

Enbridge Gas suggests that Ontario's Electrification and Energy Transition Panel should explore what the implications of incremental investments in the gas and electricity systems to decarbonize the province would mean from a rate impact standpoint. Enbridge Gas also suggests this is best done in partnership with the IESO, LDCs, and Enbridge Gas to ensure customers have access to reliable, resilient, affordable, and lower emissions energy.

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[1] IESO Pathways to Decarbonization, 2022, page 34 Available: https://www.ieso.ca/-/media/Files/IESO/Document-Library/gas-phase-out/Pathways-to-Decarbonization.ashx

[2] Toronto Hydro Climate Action Plan: Powering Forward Building a Greener City Through Climate Action, 2021, pg. 4, https://www.torontohydro.com/documents/20143/74105431/climate-action-plan.pdf/8fe4406c-7675-76a7-00c9-c0c4e58ae6df?t=1638298942821.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 6, Page 27

Question(s):

The company cites Ontario based CCUS as a ‘safe bet’. To what extent are the storage basins being considered for CCUS in Ontario currently utilized for methane?

Response:

Enbridge Gas is not considering utilizing existing natural gas storage pools in Ontario as suitable candidates for CCUS.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 5, Attachment 2, Page 3 of 86

Question(s):

Guidehouse indicates that its study mandate included examining each pathway in terms of feasibility. Please describe in detail the assumptions used by Guidehouse for the physical change-over of the distribution system from methane to hydrogen. For example, would a neighborhood being switched require simultaneous appliance upgrades and universal changeover or would there be a need for the duplication of portions of the system to accommodate gradual transitions? Please indicate what costs and timing were assumed for each aspect of this changeover. How has Guidehouse spread the transition from methane to hydrogen out over time to make the transition manageable?

Response:

The following response was provided by Guidehouse Canada Ltd.:

The Guidehouse assumptions regarding gas network transitions from methane to hydrogen service are described in response at Exhibit I.1.10-GEC-15 i-j). The P2NZ study modeled pathways to net-zero emissions on a province-wide basis and did not model the transition at a neighborhood level of granularity. Costs for upgrading methane distribution pipelines to accept hydrogen blending and for the development of hydrogen distribution systems within Ontario are outside the scope of the P2NZ analysis and not included. This is because a more detailed regional analysis is needed to understand how new hydrogen networks would develop depending on projections of regional demand centers and potential opportunities for collocating supply with demand.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 5, Attachment 2, Page 6 of 86

Question(s):

Guidehouse finds that adoption of hybrid heating technologies leads to the least cost pathway. Please provide a comparison of hydrogen, RNG, and CCUS requirements for that scenario vs the two primary scenarios. Please indicate how the relative energy intensity of hydrogen vs methane was captured in the cost estimates for storage employed in costing the scenarios.

Response:

The following response was provided by Guidehouse Canada Ltd.:

The following tables compare the annual hydrogen supply and annual RNG supply for the core Electrification and Diversified scenarios and for the hybrid heating sensitivity (i.e., sensitivity case #4). Carbon sequestration volumes for the Diversified and Electrification scenarios are included in Exhibit I.1.10-ED-37. Guidehouse notes that CO_2 storage volumes for sensitivity case #4 would be less than in the Diversified scenario, but Guidehouse declines to provide CO_2 storage requirements for sensitivity case #4. While CCS costs were implicitly accounted for in the Low Carbon Pathways mode, Guidehouse did not extract CO_2 storage volumes from the model for sensitivity cases.

Table 1
Annual Hydrogen Supply, Ontario (PJ per year)

	2020	2030	2040	2050	
Diversified Scenario	0	156	493	854	/u
Electrification Scenario	0	60	156	266	/u
Sensitivity 4 (Hybrid Heating)	0	157	477	834	/u

Table 2
Annual RNG Supply, Ontario (PJ per year)

	2020	2030	2040	2050	
Diversified Scenario	0	44	91	171	/u
Electrification Scenario	0	0	59	72	/u
Sensitivity 4 (Hybrid Heating)	0	44	91	171	/u

As described in the P2NZ report, Appendix A, section "Costs of Electricity and Gas Supply Technologies," Guidehouse estimated storage costs on a levelized basis in terms of $/MWh and did not calculate physical volumes of stored gas. Guidehouse's calculations of gas storage costs do not include a factor for energy density of hydrogen vs. methane, because Guidehouse's source of cost data already accounted for the impact of changing energy intensities and compression requirements for these gases. The 2021 study[1] referenced by Guidehouse, the European Hydrogen Backbone report, references four other studies, all of which report levelized cost of hydrogen storage in caverns, in €/MWh terms.

For example, the Agora/AFRY 2021 study[2] references modelled case studies of hydrogen storage in Northern Europe and Southern Europe, based on different operational characteristics. Similarly, the Energy Transitions Commission (2021) study[3] reports hydrogen storage cost estimates for salt and rock caverns. Both studies implicitly account for the difference in energy intensities and compression requirements of hydrogen compared to natural gas.

[1] EHB (2021). "Analysing future demand, supply, and transport of hydrogen", p.83. Available at: https://gasforclimate2050.eu/wp-content/uploads/2021/06/EHB_Analysing-the-future-demand-supply-and-transport-of-hydrogen_June-2021_v3.pdf.
[2] Agora/AFRY (2021). "No-regret hydrogen" p.65. Available at: https://static.agora-energiewende.de/fileadmin/Projekte/2021/2021_02_EU_H2Grid/A-EW_203_No-regret-hydrogen_WEB.pdf.
[3] Energy Transitions Commission (2021). "Making the Hydrogen Economy Possible", p. 43. Available at: https://energy-transitions.org/wp-content/uploads/2021/04/ETC-Global-Hydrogen-Report.pdf.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 5, Attachment 2, Pages 45 and 46 of 86

Question(s):

Guidehouse attributes some of the higher costs of the electrification scenario to the timing of carbon emissions (where emissions occur later when carbon pricing has escalated). It finds emissions costs of $120 billion for the diversified scenario vs $191B for electrification ($71 billion of the $181 billion difference).

a) Please reconcile the above with the graphics at Guidehouse figure 19 and at Posterity Ex. 1, T 10, S 6, Att 1 p. 25 of 34 (ETI Exhibit 17) both of which appear to depict equal or lower emissions for the electrification scenario at all times.

b) Does Guidehouse agree that carbon taxes affect rates but are not a net societal cost (as opposed to emissions)?

Response:

The following response was provided by Guidehouse Canada Ltd.:

a) The question compares the emissions level and emissions costs for the Diversified and Electrification scenarios. The question observes that in 2040, the Electrification scenario has a lower level of emissions but a higher cost of emissions. This is owing to the different emissions cost trajectories that the analysis assumed for the two scenarios. Table A-2 of the *Pathways to Net Zero Emissions for Ontario* Study presents the carbon price forecast for the Diversified and Electrification scenarios. These carbon price projections are aligned with the assumptions of the ETSA study, which assumed that higher carbon prices would be implemented in an Electrification scenario to incentivize energy consumers to electrify their consumption.

b) This *Pathways to Net Zero Emissions for Ontario* study did not examine how various cost components would be socialized among ratepayers, so Guidehouse cannot comment on how carbon prices would impact energy rates in the scenarios considered here. This analysis treated carbon taxes as a material cost that represents the impact of GHG emissions.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 5, Attachment 2, Pages 45 of 86

Question(s):

Guidehouse notes:

"Electricity system costs are $111 billion higher than in the Diversified scenario. This is driven by a much larger electricity peak demand in the Electrification scenario (94 GW) compared to the Diversified scenario (51 GW). This increase in peak is driven by higher penetration of electric heat pumps and the electrification of transport, triggering significant investment in hydrogen gas turbine capacity and T&D infrastructure."

Did Guidehouse consider alternate scenarios to find gas/electric mixes that reduce total costs? Please provide details. Would an electrification scenario that utilized more hydrogen and RNG for the transportation load reduce electricity generation and T&D costs without requiring full gas grid switchover costs?

Response:

The following response was provided by Guidehouse Canada Ltd.:

Guidehouse did not consider additional alternative scenarios beyond the two core scenarios (Electrification and Diversified) and the four sensitivity cases that are presented in the *Pathways to Net Zero Emissions for Ontario* Report. There are many interactive effects that influence the emissions and cost outcomes of the modeling. Guidehouse cannot speculate on the outcomes of new scenarios without designing and modeling them.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 5, Attachment 2, Pages 45 of 86

Question(s):

Guidehouse cites the costs of building retrofits indicating:

"To provide adequate heating in winter conditions, electrically heated homes need to be well-insulated and weatherized to minimize heat leakage…. A regular-sized gas furnace usually provides 20 to 35 kW of heat output, while a whole-home heat pump may only provide 5 to 15 kW of heat output at colder outdoor temperatures."

a) When Guidehouse states that a regular-sized furnace usually provides 20 to 35 kW of heat output, does it mean that a regular-sized furnace is capable of providing that output (i.e., those are the rated capacities of regular-sized furnaces) or does it mean that is the actual level of heat output typically provided, on average over the course of peak heating hours, by furnaces? If the latter, please provide data and analysis supporting the conclusion. If Guidehouse is referring to furnace nameplate capacities, would Guidehouse agree that gas furnaces are commonly significantly oversized relative to design heating loads? If not, why not?

b) What assumptions has Guidehouse used for heat pump capacities at cold temperatures and the hours per year when heat pumps cannot meet heating needs?

c) How and to what extent has Guidehouse incorporated the improving trend for air source heat pump cold climate performance?

d) How has Guidehouse optimized the tradeoff between customer retrofit costs and system capacity and energy costs to address the few extreme cold days when heat pumps need to be paired with retrofits or auxiliary heating to meet heating needs?

Response:

The following response was provided by Guidehouse Canada Ltd.:

a) Guidehouse's reference to a capacity of 20 to 35 kW for a regular-sized furnace refers to the nameplate capacities of regularly sized furnaces. Guidehouse has not assessed whether furnace nameplates are oversized relative to design heating loads.

b) Guidehouse reviewed performance data for five representative cold-climate air-source heat pumps published by heat pump manufacturers in engineering manuals. The manufacturer-published performance data indicates that the heating capacity of air-source heat pumps declines at low outdoor air temperatures. Compared to heating capacity at a reference temperature of 7 degrees Celsius, heat pump capacities are 20% lower at -10 degrees Celsius and 37% lower at -20 degrees Celsius. Guidehouse included the assumption that installations of air source heat pumps in older building stock would be accompanied by investments to improve building envelope efficiency so that a typical cold climate air source heat pump could meet heating needs throughout the year.

c) Guidehouse assumed that the average annual energy efficiency of air-source heat pumps will improve 15% between 2020 and 2050. Guidehouse assumed that the efficiency of new air-source heat pumps available on the market would gradually improve over time (i.e., Guidehouse modeled improvements on a linear slope, not a step change). Guidehouse assumed these efficiency improvements would apply across the full range of heat pump operating temperatures. Guidehouse did not separately model improvements in low-temperature and high-temperature performance.

d) For the scenarios modeled in the P2NZ study, Guidehouse did not consider an optimization of the tradeoff between customer retrofit costs, heating system capacity, and energy costs. Such an optimization would depend heavily on projections of retail energy rates. The P2NZ study examined scenarios in terms of total energy system costs and a forecast of retail energy rates was outside the scope of the P2NZ study.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 5, Attachment 2, Pages 49 of 86

Question(s):

Please reconcile these two statements:

“CCS does not capture 100% of emissions, some residual emissions remain in both scenarios.”

“residual emissions are offset via the use of bioenergy with CCS in power generation”

Response:

The following response was provided by Guidehouse Canada Ltd.:

The first statement referenced in the question pertains to the assumption that carbon capture and sequestration (CCS) processes can capture and store only 95% of CO2 emissions that result from a combustion process. Put differently, the analysis assumes that 5% of CO2 emissions from fossil fuel combustion with CCS will be vented to the atmosphere as residual emissions, since carbon capture processes do not perfectly capture all CO2 emissions.

Biomass combustion is assumed to have net-zero emissions since biomass feedstock is a non-fossil biogenic source. The analysis assumes that the combination of biomass combustion and CCS results in net-negative emissions since these processes capture and sequester carbon from a net-zero emissions process. The analysis assumes that the net-negative emissions from biomass combustion with CCS may be used to offset residual emissions from fugitive methane or CO2 emissions resulting from 95% effective CCS applied to fossil fuel combustion.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 5, Attachment 1, Page 25 of 116

Question(s):

Posterity indicates that the maximum level of DSM considered was that mandated in the recent OEB DSM Decision: "Starting in 2022, a 3% year-over-year real increase in DSM spending. Starting in 2028, a 10% annual increase." At page 27 it is noted: "DSM savings potential: This was not a CD, but a DSM budget was specified in the scenarios and the associated energy savings potential was included in the scenario results." Did Enbridge direct that higher levels of DSM spending not be considered? If not, why was this limitation in place?

Response:

The following response was provided by Posterity Group:

The approved DSM budget for 2023 onwards had not been established at the time the study scenarios were developed. DSM budgets included in the reference case represent a continuation of current activity (as of 2019). DSM budget assumptions for the Steady Progress, Diversified Portfolio and Electricity Centric scenarios were provided by Enbridge Gas. For clarity, the Diversified Portfolio and Electricity Centric scenarios considered a 10% annual increase in the DSM budget starting in 2028, and both represent a higher level of spending compared to the other scenarios.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 5, Attachment 1, Page 26 of 116

Question(s):

Posterity includes hydrogen blending at 14% in 2038. Please indicate how this level is achieved having regard to distribution and end-use limitations on the mixing of methane and hydrogen.

Response:

The following response was provided by Posterity Group:

Please see response at Exhibit I.1.10-SEC-41 parts a-b).

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 5, Attachment 1, Page 7 of 116

Question(s):

Posterity notes that "Peak load is also impacted by Enbridge Gas' expected growth in some Industrial customers that have a higher portion of their load used for HVAC, as HVAC accounts for approximately 60% of industrial peak but only 16% of annual volume."

Given this high contribution to peak load, did Posterity or Guidehouse consider scenarios where dedicated Hydrogen or RNG facilities (including local storage) meet a greater proportion of these particular industrial loads and thereby alleviate capacity costs on the electricity system? Please provide details.

Response:

The following response was provided by Posterity Group:

The Diversified Scenario assumed the distribution of natural gas, hydrogen, RNG and natural gas with CCS using Enbridge Gas's infrastructure. Please see Exhibit 1, Tab 10, Schedule 5, Attachment 1, pages 113-114 for details on input assumptions for hydrogen demand across different segments and end-uses in the industrial sector (assumptions are also provided for the residential and commercial sectors).
The scenarios did not consider dedicated RNG or hydrogen facilities as a means of reducing peak demand. Impacts to the electricity system and their costs were outside of the scope of the study.

The following response was provided by Guidehouse Canada Ltd.:

No, Guidehouse did not consider any such scenarios. The Guidehouse analysis did not model at a site-specific level of granularity and did not model local storage facilities.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 6, Attachment 1, Page 11 of 34

Question(s):

Please update the ETI report to reflect the impact of DSM spending resulting from the EB-2021-0002 Decision and an extrapolation thereof.

Response:

The following response was provided by Posterity Group:

There is insufficient time for this analysis before IR responses are due.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.1, Tab 10, S.6 p. 10

Question(s):

Enbridge references Canada's federal hydrogen strategy suggesting that the strategy envisions a role for hydrogen in buildings. The quote that Enbridge references to support this conclusion discusses "low carbon fuel for high-grade heating applications where electric heating is not the best option…" and also states that "In regions with heat pumps, hydrogen can also be used to provide heat during winter season with hybrid heating systems."

a) What is Enbridge's interpretation of "high-grade heating applications"? Is that not a reference to certain industrial uses? Please explain the basis for the response.

b) Does Enbridge believe that the federal hydrogen strategy contemplates use of hydrogen as the sole heating fuel in some residential or commercial buildings, or just as a fuel to address peak loads when part of a hybrid system that relies on heat pumps for heat for most of the winter? Please explain the basis for the response.

Response:

a) Enbridge Gas understands the term "[h]igh-grade or high-quality heat to be a blanket term that refers to heat that is both high in temperature and in flux (the flow rate of heat energy[1]… and capable of meeting the needs of heavy industry (high flux heat from 300^{0}C up to 1,800^{0}C)"[2]. Other definitions may refer to high grade heating at and above 400^{0}C.

[1] Sustainably Heating Heavy Industry, January 15, 2020, p.1, https://www.sciencedirect.com/science/article/pii/S254243511930635X
[2] Ibid, p.2.

b) Canada's Hydrogen Strategy[3] recognizes many opportunities for the use of hydrogen, both as a primary heating and a peaking fuel source in buildings. For example, on page 44, the strategy positions hydrogen as a primary heating fuel – burned directly or blended – for industry and buildings[4]. On page 62, the strategy also notes the applicability of hydrogen as a peaking fuel: "In regions with heat pumps, hydrogen can also be used to provide heat during winter season with hybrid heating systems."[5] In general, the Hydrogen Strategy concludes that "[b]lending low carbon intensity hydrogen into Canada's natural gas networks, for use in both industry and the built environment, provides the largest potential demand opportunity for hydrogen"[6]

Enbridge Gas intends to further the identification and evaluation of opportunities for hydrogen-blended gas as a fuel source for heating applications in its planned Hydrogen Blending Grid Study, provided at Exhibit 4, Tab 2, Schedule 6, pages 16 to 18. The importance of this Grid Study is underscored by the Hydrogen Strategy for Canada which identifies the importance of leveraging Canada's "valuable energy and infrastructure assets" to deliver the energy needs of our communities[7].

[3] Hydrogen Strategy for Canada, Seizing the Opportunities for Hydrogen, A Call to Action., December 2020, https://publications.gc.ca/collections/collection_2021/rncan-nrcan/M134-65-2020-eng.pdf
[4] Ibid, p. 44.
[5] Ibid, p.62.
[6] Ibid, p.62.
[7] Ibid, p.86.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.1, Tab 10, S.6 p. 16

Question(s):

Enbridge states that it plans is to both offer a “Low-Carbon Voluntary Program” for large customers and to procure up to 1% of planned gas supply as “low-carbon energy” beginning in 2025, ramping up to 4% by 2028.

a) What types of energy alternatives to fossil methane will Enbridge consider “low-carbon”.

b) Does Enbridge agree that different sources of RNG have very different lifecycle GHG emissions profiles? If not, why not?

c) Will Enbridge distinguish between different sources of “low-carbon” energy – between those that have lower lifecycle GHG emissions and those that have higher lifecycle GHG emissions – in determining which low-carbon energy sources to procure? If so, please explain how that will be done. What sources will be prioritized? If not, why not?

Response:

a-c) This issue will be addressed in Phase 2 of the proceeding in accordance with the OEB’s Decision on Issues List dated January 27, 2023.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.1, Tab 10, S.6 p. 16

Question(s):

Enbridge has no proposal to address industrial fuel-switching. Given that switching to hydrogen and/or other low-carbon fuels may be the only way to decarbonize many industrial operations, why is Enbridge not proposing anything for such customers?

Response:

Please see Exhibit 1, Tab 10, Schedule 6, pages 24-25 for a description of how Enbridge Gas supports its industrial customers in decarbonizing their operations.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.1, Tab 10, S.6 p. 17

Question(s):

Enbridge is proposing to expand its NGV program.

a) Would Enbridge agree that NGV vehicles emit far more greenhouse gases (GHGs) than electric vehicles? If not, please explain the basis for the disagreement?

b) Has Enbridge conducted an assessment of the relative economics of NGV vehicles, electric vehicles and/or internal combustion vehicles? If so, please provide the assumptions, calculations and analysis conducted.

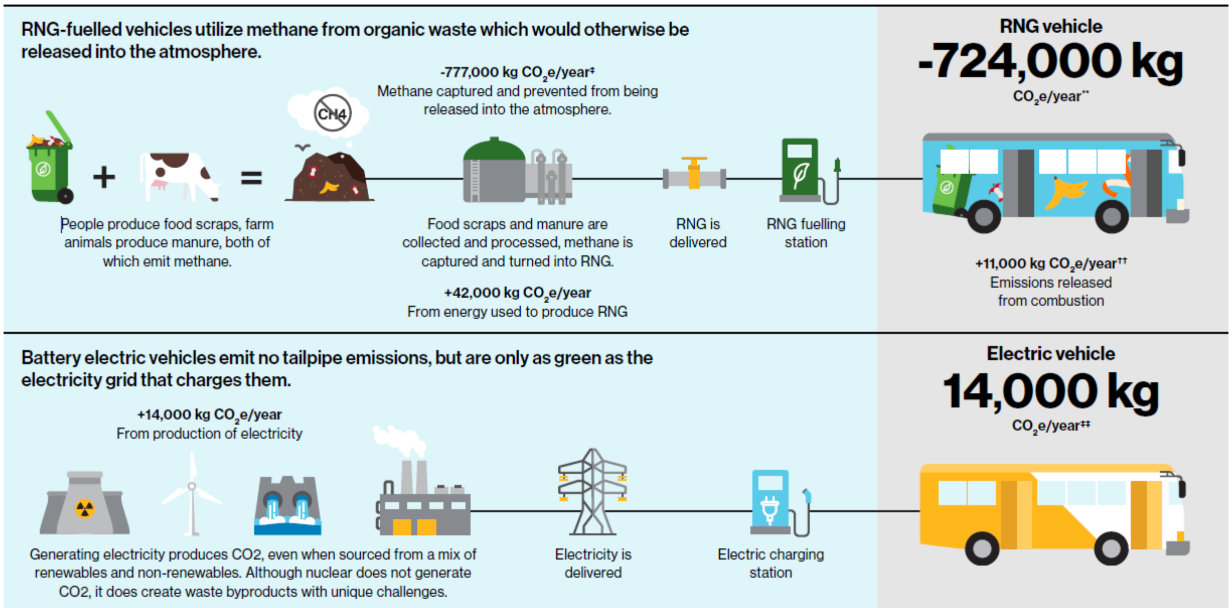
c) If NGV vehicles emit more GHGs than electric vehicles, and where the amount of RNG available to displace fossil gas is far less than the amount of fossil gas being consumed today, why would it make sense to promote NGV vehicles?

Response:

a) There are two ways to look at GHG emissions and GHG emission reductions in vehicles. The first is emissions generated from tank to wheel, and the second is emissions from well to wheel. Electric vehicles (EVs) have zero emissions from a tank-to-wheel perspective. This assumes the EV does not have diesel auxiliary heating systems on board. Diesel auxiliary systems are becoming standard practice in the EV transit sector. The reasoning is to mitigate the negative cold weather impacts on batteries, such as diminished range.

When looking at GHG emissions on a well to wheel basis, the comparison looks very different, as outlined in Figure 1. The important factor is that there are GHG emissions associated with producing, transporting and distributing, and using each type of fuel, including electricity. For EV charging in Ontario, there is CO_2 emitted due to Ontario's electric generation energy mix of renewables and non-renewables. Even if Ontario's electricity generation were to become fully renewable, the lowest carbon intensity it could reach is 0 g CO2e/kW. NGVs with an RNG fuel supply have the opportunity to fully decarbonize the vehicle fuel supply.

Figure 1: Well to wheel transit emissions calculations



‡ CO_2e stands for carbon dioxide equivalent. It is used to describe different greenhouse gases in a common unit.
** Net emissions from vehicle using 40,000 m³ RNG/year. 40,000 m³ of RNG is the equivalent of 1,623 GJ or 451,195 kWh of energy per year.
†† 85,000 kg CO_2e/year of CO2 is released from the combustion of RNG. Since RNG is derived from organic waste produced by plants that take up CO2, these CO2 emissions are considered biogenic and not additional to the atmosphere. Trace amounts of CH4 and N20 are also produced from the combustion of RNG that result in 11,000 kg CO_2e/yr of emissions being released.
‡‡ Net emissions from powering electric bus using 451,000 kWh/year based on Ontario grid.
All calculations are based on Ontario's electric grid for illustration purposes only. Actual calculations will be provided when working with Enbridge Gas. ENB 540 09/2021.

Currently, there are certain segments, e.g. medium and long haul trucking, 60-foot transit buses, long route transit, etc., where EVs are not practical or suitable due to technical or performance constraints; the Enbridge Gas NGV Program is targeting these segments and not light duty passenger vehicles.

b) Enbridge Gas has not conducted a specific study comparing RNG, electric vehicles and internal combustion vehicles. Enbridge Gas has used the Canadian Urban Transit Research and Innovation Consortium (CUTRIC) RNG transit Study[1] (Study) in its assumptions. The study focuses on comparing NGV buses operating with RNG versus diesel. In the study, CUTRIC noted that "compressed natural gas (CNG)

[1] Renewable natural gas as a complementary solution to decarbonizing transit, June 30,2022, https://cutric-crituc.org/wp-content/uploads/2022/06/CUTRIC_Renewable-Natural-Gas-as-a-Complementary-Solution-to-Decarbonizing-Transit_June-30-2022.pdf

buses operating using renewable natural gas (RNG) can be cleaner and cheaper to operate than battery electric buses (BEB) and fuel cell electric buses (FCEB)."[2]

On page 23, Table 7 of the study, CUTRIC provides a chart of the fuel price points and the corresponding CIs in kgCO2/dLe for diesel, CNG and various blends of RNG. This shows that RNG is a viable option in decarbonizing transportation because "the fuel can dramatically reduce GHG emissions, while maintaining the operational costs comparable with diesel and CNG. Depending on specific operating conditions and source of organic matter for RNG production, it is possible to realize operational savings in comparison to diesel."[3]

Figure 2: Observed and extrapolated volumetric price point of fuels[4]

Fuel	Fuel price (C$/DLE)	CI ($kgCO_2$/DLE)
Diesel	1.00	3.7
CNG	0.64	2.2
100% RNG – landfill	0.78	1.4
100% RNG – animal manure	1.26	-12.1
100% RNG – food waste	1.19	-2.3
22% RNG/CNG – animal manure	0.65	0
61% RNG/CNG – food waste	0.92	0
89%/11% landfill/animal manure RNG/RNG	0.84	0

CUTRIC further states, "These savings are possible without the massive infrastructure investments that would be required if BEBs or FCEBs are chosen to clean transit."[5]

c) There is no one solution to the pressing environmental issues facing the transportation sector. Programs such as Enbridge Gas's NGV Program – particularly in conjunction with RNG – are needed to quickly deploy readily available solutions, maximize cost-effective emission reductions, and provide a real pathway to carbon neutral or carbon-negative emissions. Fleets select technologies that are suitable to their specific set of conditions and needs. They must consider technology readiness, range, weight, refueling time and related infrastructure. As discussed in Exhibit I.1.14.STAFF-42, EVs are not the best option for many applications from a cost or operational perspective.

[2] Renewable natural gas as a complementary solution to decarbonizing transit, June 30,2022, p.6, https://cutric-crituc.org/wp-content/uploads/2022/06/CUTRIC_Renewable-Natural-Gas-as-a-Complementary-Solution-to-Decarbonizing-Transit_June-30-2022.pdf
[3] Ibid, p.25
[4] Ibid, p.23.
[5] Ibid, p.25.

The NGV Program targets medium and heavy duty fleets where these vehicles currently have limited opportunities outside RNG to move away from diesel. NGVs make practical sense because they are already in the market and, even without using RNG, can provide immediate reductions compared to diesel, both tailpipe and lifecycle, in addition to other co-benefits such as cost.

RNG demand in NGVs has grown in markets such as the United States. RNG used as a transportation fuel has increased by over 234%[6] in the last five years. In 2021, 64% of all on-road fuel used in NGVs was RNG. As provided at Exhibit 4, Tab 2, Schedule 7, Enbridge Gas proposes implementing a Low-Carbon Voluntary Program (LCVP). With diesel fuel reaching over $50/GJ in 2022 and the Federal Carbon Charge escalation, Enbridge Gas customers have a strong business case to sign up for the LCVP paired with the Enbridge Gas NGV Program. These two programs provide Enbridge Gas customers with a readily available, proven and cost-effective solution to accelerate the transition to a low-carbon transportation future.

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[6] Decarbonize Transportation with Renewable Natural Gas, May 2, 2022, https://ngvamerica.org/wp-content/uploads/2022/05/NGV-RNG-Decarbonize-2022-5.2.22.pdf

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.1, Tab 10, S.6 p. 19

Question(s):

Section 2.1 has the heading "maximizing energy efficiency". What does "maximizing" mean to Enbridge? Is it something less than achieving all cost-effective energy efficiency? If not, why not? Please explain.

Response:

The safe bet action of "maximizing energy efficiency" referenced in Section 1.10.6, page 19, means maximizing the results of our DSM programs as described in the 2022-2027 Multi-year Demand Side Management Plan Application[1]. This includes leveraging opportunities to collaborate with government in the furtherment of energy efficiency across the province, which will ensure all are focused on the most effective actions to avoid duplication and confusion in the marketplace. This safe bet action also includes "maximizing energy efficiency", or maximizing take-up of, enhanced targeted energy efficiency programming completed as part of IRP projects where appropriate under the IRP Framework.

[1] EB-2021-0002

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.1, Tab 10, S.6 p. 25

Question(s):

Enbridge makes reference to supporting industrial customers in switching from higher emitting fuels to natural gas.

a) When investments for such conversions involve new equipment that will last 15 or 20 years or more, wouldn't a conversion to fossil gas make it more difficult to achieve medium-term to longer-term GHG emissions reductions? If not, why not?

b) Shouldn't Enbridge instead only provide technical and/or financial support to such customers if they are making a conversion to low-carbon fuels such as green hydrogen (i.e., not precluding a switch to fossil gas, but not promoting it technically or financially supporting it)? If not, why not?

Response:

a-b) Enbridge Gas works closely with its industrial customers to understand and support their current and future energy requirements. Customer energy needs are unique and are driven by their industry sector, their processes, and the market conditions in which they operate. These considerations are brought to bear on decisions involving new investments and alternatives. For a number of sectors, fossil fuels are both a feedstock and fuel, limiting the ability to completely switch away from fossil fuels. As well, certain industrial processes require high-temperature heat that only certain equipment and fuels can provide. Additionally, there is the consideration of market competitiveness where the costs of new equipment, of rebuilds or retrofits, are evaluated alongside the cost, and timing of availability of low-carbon energy alternatives. If a decision is made by a customer to switch from higher emitting fuels to natural gas, the conversion itself results in reduced emissions. Additional emissions reductions can be progressively achieved and enabled by utilizing energy efficiency measures, renewable natural gas (RNG) and/or low or zero carbon hydrogen, and carbon capture, utilization and storage (CCUS) technologies along this pathway. Ultimately, how a facility decarbonizes is up to the customer. Enbridge

Gas is able to fulfill its obligation to serve by providing customers with the information needed to meet their current and future energy needs while achieving their ESG targets.

Where utility programs exist that support customer targets and/or defray customer costs, Enbridge Gas similarly includes this information for customer consideration. Enbridge Gas provides technical and/or financial support to customers if they are making an investment to reduce emissions through the Company's DSM programs. The OEB recently approved the DSM Framework, which includes plans that minimize lost opportunities for energy efficiency. It supports the notion that replacement of equipment occurs within an existing planning period and if foregone, could be more expensive to implement in a subsequent period or could result in the use of higher emitting fuels. In this regard, GHG emissions reductions can be achieved through long term energy savings and lower emitting fuels.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.1, Tab 10, S.7 pp. 4-5

Question(s):

Enbridge states that it has completed field trials of hybrid heating technology in over 40 single family homes and subsequently seen it installed it in more than 100 homes in London.

a) Please describe the initial 40 home field test, including the type of homes into which the technology was installed, where they were located, the hybrid heating technology tested (the specifics of the heat pump and furnace or other technologies tested), the rated efficiencies of the technology, how smart controllers were used to optimize cost, etc.

b) Please describe and provide data regarding the results of the field tests including:
   i. the typical or average temperature at which heat pump operation switched to gas heating,
   ii. the average reduction in gas use relative to a gas-only heating system,
   iii. the average change in heating energy bills relative to gas only or electric only (heat pump with electric resistance back-up) alternatives,
   iv. the cost of the technology relative to both an electric-only (heat pump with electric resistance back-up) and gas furnace only alternative, and
   v. other impacts measured by the Company.

c) When were the systems installed in the 100+ homes in London?

d) Are there any performance or cost data yet available from the London homes? If so, please provide those data in summary form (e.g., averages across the population).

Response:

a-d) This evidence will be addressed in Phase 2 of the proceeding as noted in Enbridge Gas's February 1, 2023 letter.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.1, Tab 10, S6, Attachment 1, p. 9 of 34

Question(s):

ETI RNG supply is estimated at 1% of 47.1% of “system supply customers” in 2024, increasing to 5% for 45.5% of “system supply customers” in 2028 and beyond.

a) What is the definition of a “system supply customers”? Please identify all rate classes to which that definition applies.

b) Why is the percent of system supply customers’ load falling?

Response:

a) System supply customers are those customers that Enbridge Gas provides gas supply commodity to, also referred to as sales service customers. All in-franchise rate classes have the option to take system supply service, except for Rate T1, T2, T3 in the Union South Rate Zone and Rate 125, and Rate 300 in the EGD Rate Zone.

b) The percentage of system supply customers’ load is falling due to forecasted load growth associated with direct purchase supply from contract market customers. While the overall system supply volume is relatively consistent, the percentage of system supply relative to total in franchise throughput is falling due to the increase in direct purchase supply volumes.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.1, Tab 10, S6, Attachment 1, p. 9 of 34

Question(s):

ETI annual hydrogen volumes are 175,148 m3/year for 2022 to 2024, increasing to 778,437 m3/year in 2025 and subsequent years. What fraction of Enbridge gas sales do those values represent, both as percent of gas volumes and as percent of gas energy content? Please explain key variables in the calculation.

Response:

The following response was provided by Posterity Group:

175,148 m3/year would be approximately 0.0007% of total post-DSM volume in 2022 in the ETI scenario, which would be approximately 0.0002% of the total post-DSM energy. 778,437 m3/year would be approximately 0.003% of total post-DSM volume in 2025 in the ETI scenario, which would be approximately 0.001% of the total post-DSM energy. The key variables in this calculation are the hydrogen volumes, the total modeled post-DSM volumes, and the ratio of hydrogen m3/GJ to natural gas m3/GJ. That ratio was assumed to be 3.03 in this study.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.1, Tab 10, S6, Attachment 1 p. 16 of 34

Question(s):

Ex.1, Tab 10, S6, Attachment 1 p. 16 of 34 has a graph that shows Enbridge's annual hourly peak demand for 2019 through 2050.
A. Please provide the numeric values for depicted in the graph for Residential, Commercial and Industrial peak demands (provide separately for each sector) by year.
B. The graph shows total peak demand as a little more 11 million m3/hour for 2022. By comparison, in E1/T10/S4 p. 11 Enbridge provides a graph (Figure 3) which shows peak demand in 2022 of about 12.3 million m3/hour. What explains this difference? Please provide a detailed, numeric breakdown of all factors contributing to the difference.
C. The Posterity graph shows peak demand per hour declining from what appears to be a little more than 11 million m3/hour in 2022 to what appears to be a little less than 9 million m3/hour in 2032 – a roughly 20% reduction. By comparison, in E1/T10/S4 p. 11 Enbridge's graph of peak demand shows it increasing from about 12.3 million m3/hour in 2022 to about 12.5 million m3/hour in 2032 (with energy transition assumptions in the customer forecast and demand per customer) – or a roughly 2% increase. What explains this dramatic difference in forecast trends, particular given Enbridge's description of Posterity's direction (E1/T10/S6 p. 37) being to "model a scenario that examines the gas demand and GHG emissions between 2019 and 2050 based on the energy transition initiatives proposed within this rebasing application, as well as energy transition initiatives under review or already approved by the OEB in separate applications (e.g. DSM Plan, LCEP Phase 1)."? Please provide a detailed, numeric breakdown of all factors contributing to the difference.

Response:

a) The following response was provided by Posterity Group:

The graph provided at Exhibit 1, Tab 10, Schedule 6, Attachment 1 page 16 of 34 shows annual volume by sector (m3), rather than hourly peak demand. We have provided the numeric annual volume values depicted in the referenced graph:

Exhibit 6 - ETI Scenario: Annual Volume by Sector (m3)

Year	Residential	Commercial	Industrial
2019	9,984,086,861	4,749,649,184	10,428,845,487
2020	9,990,592,362	4,783,148,077	10,483,394,538
2021	9,982,404,052	4,807,571,567	10,559,019,400
2022	9,911,137,189	4,815,824,363	10,707,387,047
2023	9,862,904,347	4,749,138,521	10,679,126,555
2024	9,844,346,986	4,693,028,177	10,585,940,830
2025	9,772,141,456	4,619,180,774	10,522,521,760
2026	9,697,238,983	4,498,438,083	10,393,327,816
2027	9,627,132,759	4,411,531,690	10,217,352,398
2028	9,532,844,016	4,310,146,947	9,989,836,229
2029	9,354,122,838	4,179,361,178	9,790,778,880
2030	9,215,799,004	4,109,718,777	9,780,818,574
2031	9,036,706,105	3,975,317,825	9,649,753,217
2032	8,901,799,389	3,825,654,108	9,564,542,654
2033	8,756,734,718	3,671,494,872	9,476,416,843
2034	8,601,563,115	3,514,598,795	9,391,785,528
2035	8,405,780,873	3,342,493,985	9,306,820,916
2036	8,215,285,257	3,174,875,980	9,276,267,526
2037	8,031,350,487	3,012,936,515	9,238,028,084
2038	7,829,191,240	2,850,450,239	9,219,435,046
2039	7,730,856,683	2,722,007,130	9,185,168,486
2040	7,632,967,750	2,597,231,440	9,162,494,336
2041	7,535,594,266	2,477,254,917	9,199,034,549
2042	7,438,805,090	2,364,310,761	9,235,442,254
2043	7,342,670,076	2,259,352,885	9,271,890,588
2044	7,259,372,448	2,161,770,918	9,307,649,081
2045	7,175,877,401	2,071,391,615	9,342,685,997
2046	7,092,287,666	1,987,178,729	9,376,969,249
2047	7,008,705,250	1,908,436,739	9,410,486,253
2048	6,925,228,856	1,834,548,317	9,443,217,827
2049	6,838,242,540	1,765,492,341	9,475,131,073
2050	6,751,988,034	1,705,599,878	9,509,337,921

We are also providing the numeric peak hour by sector values depicted in the graph provided at Exhibit 1, Tab 10, Schedule 6, Attachment 1, page 18 of 34:

Exhibit 8 - ETI Scenario: Peak Hour by Sector (m3/hour)

Year	Residential	Commercial	Industrial
2019	4,591,569	3,267,260	3,175,844
2020	4,587,255	3,287,431	3,191,887
2021	4,576,246	3,300,087	3,193,442
2022	4,536,006	3,297,494	3,248,704
2023	4,511,201	3,257,825	3,181,205
2024	4,497,741	3,225,266	3,094,352
2025	4,458,648	3,176,384	3,005,050
2026	4,423,843	3,097,616	2,911,666
2027	4,388,966	3,038,367	2,810,015
2028	4,341,035	2,968,030	2,678,128
2029	4,250,759	2,876,272	2,536,447
2030	4,184,199	2,827,377	2,451,948
2031	4,096,335	2,733,095	2,327,439
2032	4,029,297	2,625,930	2,211,615
2033	3,957,521	2,515,085	2,097,807
2034	3,880,802	2,401,637	1,986,099
2035	3,783,083	2,275,572	1,872,042
2036	3,689,371	2,152,259	1,769,466
2037	3,599,450	2,032,826	1,668,343
2038	3,500,153	1,910,948	1,569,315
2039	3,450,959	1,815,790	1,481,014
2040	3,402,028	1,722,592	1,408,843
2041	3,353,401	1,632,646	1,412,122
2042	3,305,116	1,547,869	1,415,439
2043	3,257,212	1,469,588	1,418,735
2044	3,215,599	1,397,752	1,421,940
2045	3,173,936	1,331,972	1,425,050
2046	3,132,276	1,271,465	1,428,062
2047	3,090,672	1,215,575	1,430,973
2048	3,049,173	1,163,718	1,433,782
2049	3,006,708	1,115,773	1,436,483
2050	2,964,606	1,073,936	1,439,460

b) The following response was provided by Posterity Group:

There are at least two reasons that explain the difference:

- At the time the ETI scenario was modelled, Posterity Group's peak hour assumptions were not perfectly calibrated to Enbridge's hydraulic model assumptions.

- 2022 is Year 3 of the ETI scenario model (its base year is 2019). Per the response to Exhibit I.1.10-GEC-57C, there are key differences between assumptions in the ETI scenario and Enbridge's filed forecast.

b) The following response was provided by Enbridge Gas:

Please also see response at Exhibit I.1.10-SEC-23 for an additional explanation of the difference.

c) The following response was provided by Enbridge Gas:

While the ETI scenario included critical drivers at settings that reflected proposals within the rebasing application and applications underway, namely estimated supplies of hydrogen and RNG, and DSM programming, it also included the same assumptions regarding progressively more stringent building codes for new construction and the introduction of a retrofit building code for existing buildings as the Diversified scenario. Please see Exhibit 1, Tab 10, Schedule 6, Attachment 1, pages 6 to 11 for the assumed critical driver settings for the ETI scenario.
The building code changes assumed in the ETI and Diversified scenarios represent very aggressive deployment timelines and levels of energy efficiency that were considered plausible for the purpose of scenario modeling to observe impacts on the gas system and related emissions by 2050 (e.g. by 2050 it was plausible building code changes would have occurred). At the time of forecasting, however, proposals related to future building code changes (new construction or retrofit) were not available and were therefore not appropriate to be incorporated into Enbridge Gas forecasts. This treatment of building codes represents the most material difference between the Posterity ETI scenario peak hour results and the Enbridge Gas design hour demand forecast. There is not sufficient time within the interrogatory response period to undertake an analysis of the individual differences between the ETI scenario and Enbridge Gas's design hour demand forecast to provide the numeric values for each of these differences.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.1, Tab 10, S5, Attachment 1 p. 21 of 116

Question(s):

Posterity states that it bases estimates of GHG emissions solely on emissions from end-use combustion of a fuel, not lifecycle emissions.

a) Would Posterity agree that actual emissions from end-use combustion of RNG are identical to those from fossil methane since the molecules being burned are identical?

b) Would Posterity agree that the only reason for considering emissions from RNG to be lower than emissions from fossil methane is that GHG emission reductions would have been higher had the so-called renewable methane not been captured and burned? If not, why not?

c) Would Posterity agree that if the amount of GHG emissions that (1) would be released into the atmosphere without the capture and combustion of a particular source of renewable methane are identical to (2) the GHG emissions that would be released to the atmosphere with the capture and combustion of that same source of renewable methane, then there is no climate benefit from combustion of that source of RNG? If not, why not? Would Posterity agree that the answer to this question is not different depending on whether the source of the RNG is biogenic or not?

d) Would Posterity agree that RNG that is collected from a landfill that was otherwise venting methane to the atmosphere would produce greater net GHG emission reduction after combustion – and greater climate benefits – than RNG that is collected from a landfill that was flaring methane? If not, why not?

e) Would Posterity agree that some portion of RNG will leak (between its source and a residential or commercial gas appliance) and/or not be 100% completely combusted by a furnace, water heater or cookstove? If not, why not?

f) Would Posterity agree that if GHG emissions impacts from leaks and/or incomplete combustion of methane are not accounted for in emissions modeling, that the result will be a bias against electrification measures fueled by zero-carbon sources (because they have no comparable leaks or incomplete combustion)? If not, why not?

Response:

The following response was provided by Posterity Group:

a-d) While this is not Posterity Group's area of expertise, please see response at Exhibit I.1.10-ED-16 part b) for an explanation of how we developed assumptions for end-use RNG combustion emissions

e) Please see to response at Exhibit I.1.10-ED-16 part b). While this is not Posterity Group's area of expertise, the emission factor for RNG used in the study includes an assumption for CH4 emissions, which we understand is an assumption to account for incomplete combustion. Because our analysis reported end-use combustion emissions (not lifecycle emissions), the RNG factor does not include fugitive emissions.

f) Please see our response above for part e) and please also see Exhibit 1, Tab 10, Schedule 5, Attachment 1, page 21. While this is not Posterity Group's area of expertise, the emission factors used in the study include an assumption for CH4 emissions, which we understand is an assumption to account for incomplete combustion.

   The scope of our study focused solely on Enbridge Gas's gas system and was based on end-use combustion (not lifecycle emissions). An emission scenario that modelled both major energy systems (gas and electric) and included lifecycle emissions is a more comprehensive approach, however the model complexity and the estimation of individual fuel types and their carbon intensities exceeded the project scope.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.1, Tab 10, S5, Attachment 1 p. 42 of 116

Question(s):

Posterity notes that the Reference Case assumption for gas commodity prices is 11.75 cents/m3 in 2019 rising to 15.9 cents/m3 by 2038.

a) Are these values expressed in real dollars or nominal dollars? If real dollars, for which year?

b) Current gas commodity prices are more than double those assumed by Posterity at the time its report was developed. Please provide your best estimate of how that would affect:

   i. Annual gas demand through 2030
   ii. Peak hour gas demand through 2030
   iii. The number of current customers (or percent of current load) that would electrify.

Response:

The following response was provided by Posterity Group:

a) The values are in real dollars, for 2019.

b) The additional analysis and modelling required to answer this question cannot be completed within the IR timeframe.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.1, Tab 10, S5, Attachment 1 p. 46 of 116

Question(s):

Posterity describes the seven steps in its scenario modeling process.

a) The first step involves establishing initial estimates of unit energy consumption (UEC). The third and fourth steps involve modifications to those UECs. The seventh step which accounts for energy savings from DSM presumably results in further UEC adjustments. Please provide all of Posterity's UEC assumptions by sector (residential, commercial, industrial), building type (e.g., Residential single family detached, residential single family attached/row house, etc.), end use (e.g., heating, water heating, cooking, etc.), equipment type (e.g., furnace, boiler, etc.), and year (2019 through 2050). Please provide them in an Excel file.

b) On p. 13 of 116 Posterity makes reference to "researched load shapes for different end uses". Please provide the load shapes for each sector/building type/end use/equipment type that it analyzed. Please provide the load shapes in an Excel file. If the load shape assumptions changed for different years of the analysis, please include the changes and the years in which they were assumed to occur. Please indicate which hour in the load shape was assumed to represent the hour coincident with Enbridge system peak hour demand.

Response:

a) The following response was provided by Posterity Group:

The Posterity Group model is extremely granular. For each scenario, the three sector models include UEC values for 10 IESO zones, 5 gas regions, 23 rate classes, 36 building types (7 dwelling types, 14 commercial building types, and 15 industrial plant types), 16 end uses (5 residential, 4 commercial, and 7 industrial), 20 years (or 32 for the ETI scenario), and for the different fuels (RNG and NG UECs are the same but hydrogen UECs are different because of the lower energy density of the fuel). Altogether the complete set of UEC values for all five scenarios would be over 2.4 million numbers. We believe this is an impractical level of detail to provide in response to this interrogatory response..

b) The following response was provided by Posterity Group:

Please see response at Exhibit I.1.10-GEC-57, part b). As mentioned in this response, Posterity Group obtained the load shapes from a subcontractor. We would have to request their permission to distribute their IP to parties outside this contract. The load shapes are also very large files. The load shape consists of 8760 numbers for each non-leap year and 8784 numbers for each leap year. The model uses 98 distinct load shapes, so the file is over 500,000 rows of 24 columns.

None of the load shapes are assumed to change for the different years in the analysis. The fourteen different shapes for each load shape differ from each other in that each of the non-leap years starts on a different day of the week and each of the leap years starts on a different day of the week. The “random” distribution of peaky and average days in each month also varies.

The hour in which the Enbridge Gas system peak occurs does not correspond to an hour in the hour-by-hour load shape file. As described in the response at Exhibit 1.10-GEC-57, part b), the load shape calibration process involved developing hour-use factors that were intended to represent system design conditions, which differ from a typical meteorological year (TMY) 8760 load shape profile.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.1, Tab 10, S5, Attachment 1 p. 84 of 116

Question(s):

Exhibit 75 shows Posterity's assumptions about Residential End-Use Shares by Segment.

a) Please provide the table in Excel format with percentages extended to one decimal point.

b) Please add to the table the number of housing units associated with each row for 2023 for Enbridge's entire customer base. If not available for 2023, provide for the most recent year available.

c) Please add the system-wide average gas appliance penetration for each end use.

d) Please add to the table the average total annual gas consumption per housing unit for Enbridge's entire customer base for each row for 2023. If not available for 2023, provide for the most recent year available.

Response:

The following response was provided by Posterity Group:

a-d) Please see Attachment 1 for the Excel.

Exhibit 75 - Residential End-Use Shares by Segment

Segments	Cooking	Misc Residential	Space Heating	Washing/Drying Appliances	Water Heating	Housing Units - 2023	Average Gas Consumption per Housing Unit (m3) - 2023
Attached / Row House	0.9%	6.8%	76.9%	1.3%	14.1%	533,603	2,094
Detached House	1.0%	9.1%	75.3%	1.5%	13.1%	2,039,089	2,784
Low Income, MF	1.9%	2.2%	55.2%	3.6%	37.1%	769,999	786
Low Income, SF	1.0%	5.2%	78.2%	1.8%	13.8%	654,461	1,796
Multi-Res, High Rise	1.5%	1.5%	70.8%	2.2%	24.1%	575,877	1,369
Multi-Res, Low Rise	1.4%	1.5%	71.1%	2.2%	23.8%	241,630	1,314
System-Wide Average Gas Appliance Penetration	29.6%	50.0%	96.3%	15.5%	81.9%		

*Data in columns B-F comes from the Residential Base Year for the ETSA study, and data in columns G and H comes from the Residential Reference Case scenario for the ETSA study.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.1, Tab 10, S5, Attachment 1 p. 85 of 116

Question(s):

Posterity states that "electric UECs for space heating, water heating, cooking and washing/drying appliances were determined by multiplying the gas UECs by assumed efficiencies of 85%, 65%, 55% and 85% respectively."

a) How were the electric UECs used in the analysis. What affect do they have on Posterity's scenario analyses?

b) What are the bases for the assumed average gas efficiencies for each of the four end uses.

c) Why would electric UECs be solely the product of gas UECs multiplied by average gas efficiencies? Wouldn't such multiplications simply produce electric end use loads? To obtain electric energy UECs, electric end use loads then be divided by average electric efficiencies for heat pumps, heat pump water heaters, induction cooktops and electric dryers? If not, why not.

Response:

The following response was provided by Posterity Group:

a) The electricity UECs were used internally to obtain a ballpark estimate of the amount of additional electricity that would be required to meet the additional load in scenarios with fuel switching from gas to electricity. No attempt was made to calibrate or refine these numbers and they were not reported in the results. They had no effect on the scenario analyses.

b) The average gas efficiencies were rough approximations based on Posterity Group's experience. Their only purpose in the Navigator model is to back out a "tertiary load" from the gas consumption number. Tertiary load is an estimate of the useful work or heat delivered by the end use. The tertiary load numbers were not used in the analysis or reported in the results, so we made no attempt to refine these numbers.

c) Estimating electric UECs by multiplying gas UECs by average gas efficiencies makes the grossly oversimplifying assumption that all electric end uses are operating at 100% efficiency. It does indeed neglect the efficiency of heat pumps and other technologies superior to simple resistance. If we had expected to report electricity results from the model, we would have worked to refine the efficiency estimates for the electric end use. The electric UECs would then be related to the gas UECs by the ratio of their efficiencies.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.4, Tab 5, S1, p. 19

Question(s):

Enbridge concludes that it is not in the best interest of customers to set up a segregated fund for SRC amounts. The Company explains that it "believes its system will be a key contributor to Ontario's ability to achieve net-zero" and that it "does not anticipate that large sections of its system will be retired in the foreseeable future." In E1/T10/S5 Attachment 2, Figure 11 on p. 31 of 86, Guidehouse shows peak volumetric demand for methane to drop to only about 2 million m3/hour (a roughly 80% reduction relative to 2020) under the Diversified Scenario that it prefers and to only about 1 million m3/hour (a roughly 90% reduction) under the Electrification Scenario.

a) If peak demand for methane drops that dramatically, would that not mean that significant portions of Enbridge's current methane distribution system could be retired? If not, why not?

b) If Enbridge's response to part A of this question is that some of its methane pipe will be converted to hydrogen and therefore remain useful, please provide the estimated portion of the 16 million m3 of peak demand assumed to be delivered under the Diversified Scenario that it assumes would flow through refurbished methane distribution pipes. Please provide the basis for this assumption.

c) Would Enbridge agree that if the Electrification Scenario came to pass, with a roughly 40% reduction in gas peak demand by 2050, even including hydrogen, that significant portions of the Company's distribution system could and likely would be retired by 2050? If not, why not?

Response:

a) No, Enbridge Gas does not believe that when methane drops dramatically that significant portions of its current distribution system could be retired. This is because, as the energy transition progresses, as the Diversified scenario notes, the majority of customers could replace their natural gas with blended fuels, like hydrogen, which could increase throughput, and peak demand, on the gas system.

b) Enbridge Gas believes that the use of low and zero carbon fuels delivered by the gas system in combination with electrification can achieve net-zero emissions in Ontario. As provided at Exhibit 4, Tab 2, Schedule 6, pages 16 to 18, Enbridge Gas is planning to undertake a Hydrogen Blending Grid Study to better understand the impacts of blending hydrogen into the pipeline system. The scope of the study will consider all of Enbridge Gas's existing gas transmission and distribution assets in Ontario. The study will inform which parts of the gas system can accommodate hydrogen at various blend levels up to and including 100% hydrogen delivery.

c) The gas system in Ontario currently delivers 30% of the energy consumed in the province safely and reliably on an annual basis. The gas system is also resilient to extreme weather. A reduction in peak demand doesn’t preclude that any portion of the gas system would be retired by 2050; however, there is uncertainty with how the energy systems in Ontario will evolve, and with the choices people would make to maintain energy system resilience along Ontario’s path to a net-zero future. It is the view of Enbridge Gas that the 150,000 kms of buried gas transmission, storage and distribution infrastructure is an extremely valuable asset for Ontario that must be factored into energy transition policies. It is too soon to speculate about what changes to the gas system would be required along any pathway to net-zero in Ontario.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.4, Tab 5, S1, Attachment 2

Question(s):

Please provide the assumed useful lives of each type of asset shown in the table.

Response:

Please see Exhibit 4, Tab 5, Schedule 1, Attachment 1, pages 40 and 41, column 4 for the proposed useful lives of each type of asset shown in Attachment 2. The first two digits for the data in column 4 indicate the proposed useful life of each asset. For example Account 442.00 structures and improvements uses an estimated survivor curve 40-S5, indicating that the proposed useful life for this asset is 40 years.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.4, Tab 5, S1, Attachment 2, p. 19 of 451

Question(s):

Concentric states that there is uncertainty regarding how climate policy will affect Enbridge's system: "The introduction of hydrogen may have a life lengthening impact on the system if it is determined that hydrogen is a sustainable replacement fuel. The same may be true of renewable natural gas or other low carbon fuels. However, it may also be true that the move from carbon based fuels necessitates a greater electrification, in which case there may be a life shortening impact on some or all of the EGI system."

a) What does Concentric mean by "a life lengthening" impact? Lengthening relative to what? How would the introduction of hydrogen provide such a lengthening impact?

b) In E1/T10/S5, Attachment 2, p. 21 of 86, Guidehouse states that RNG potential in Ontario "represents roughly 4-26% of Ontario's (current) annual natural gas demand." Does Concentric have any reason to dispute the conclusion that RNG, by itself, could not enable Enbridge to continue to serve the vast majority of its current customers' load? If not, why not?

c) Would Concentric agree that even under the most optimistic assumptions, due to technical challenges with both distribution pipe and consumers' gas-burning equipment, no more than 3-6% of energy (10-20% of volume) could be provided to gas customers through hydrogen if blended with methane? If not, why not?

d) Given the limitations on the amount of energy that hydrogen can provide when blended with methane, would Concentric agree that for hydrogen to be the fuel that enables Enbridge's current distribution system assets to remain fully used and useful while meeting future greenhouse gas emission reduction goals, existing distribution pipe would have to be refurbished so that it could carry hydrogen instead of methane? If not, why not?

e) What is Concentric's view for how a transition from methane-burning to hydrogen-burning could occur while using existing methane-carrying distribution pipe? If the pipe has to carry either methane or hydrogen, wouldn't that mean that there would have to be an essentially immediate switch from one fuel to the other by the neighborhood or community served by the distribution pipe? How would it be possible for the entire neighborhood or community to instantaneously convert? Does Concentric view that as realistically possible? If not, wouldn't there have to be a new hydrogen pipe running parallel to the methane pipe locally and upstream to enable customers to switch over time? If not, why not?

f) Given Concentric's responses to parts "B, C and D" of this question, how could the emergence of hydrogen as a low carbon alternative to fossil methane – even if it turned out to be economically or otherwise preferable to electrification – significantly affect the usefulness of existing methane distribution pipe and other methane related distribution assets? Please explain.

<u>Response:</u>

The following response was provided by Concentric:

a) The use of the term "Life Lengthening Impact" in the context of the quoted section of the depreciation study refers to the influence of an ability of injecting hydrogen into the gas stream, providing an additional source of supply. As such, the scenario where there may be an alternative source of supply available to Enbridge Gas, it is Concentric's view that the system may have a longer life expectation as compared to the scenario where there is no alternative and the use of natural gas (or other carbon based fuels) are not permitted,

b) At this point in time, Concentric does not have any reason to dispute the conclusion that RNG, by itself, could not enable Enbridge Gas to continue to serve the vast majority of its current customers' load.

c) At this point in time, Concentric cannot express an opinion on the technical aspects of the impact and feasibility of hydrogen injection into the Enbridge Gas system, including what volumes of alternative fuels are feasible.

d) At this point in time, Concentric cannot express an opinion of the physical reconfigurations that would be required.

e) Concentric cannot express an opinion on the technical considerations being requested in this question.

f) At this point in time, given the amount of uncertainty of the many of technical aspects of the use of alternative fuels, the life of the Enbridge Gas assets could be lengthened, shortened or remain unchanged. As such, Concentric views that at the time of the next depreciation study, when more information is known, a better estimate of the impact of alternative fuels could be determined.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.4, Tab 5, S1, Attachment 2, p. 19 of 451

Question(s):

Regarding the basis for adoption of an Economic Planning Horizon (EPH):

a) Is it Concentric's view that there must be an expectation of retirement of assets in order to justify an EPH? If so, why?

b) If assets are not expected to be retire, but are expected to serve significantly fewer customers, isn't there an inter-generational argument for placing more of the cost recovery burden on current customers (when there are many more of them using an asset) and less on future customers (when there are considerably fewer of them)? If not, why not?

c) If the number of customers expected to use an asset is expected to decline significantly over time, wouldn't an EPH improve inter-generational equity by placing more of the cost recovery burden on early years when there is greater use of the asset? If not, why not?

d) Are there other forms of adjustment to cost recovery, other than an EPH, that Concentric believes would more effectively address the inter-generational equity issues raised in parts "B" and "C" of this question? If so, what are they? Please describe them in detail, with references to how and where they are used today (if any).

Response:

The following response was provided by Concentric:

a) All depreciable investment will retire at some point in time. The use of an EPH is implemented into depreciation rates when it is expected that large groups of assets will retire simultaneously due to causes of retirement other than physical wear and tear or deterioration. Additionally, a reasonable determination of the timing of the simultaneous retirement is also required.

b) Concentric agrees that any customer or customer group should only be responsible for the consumption of the service value of the assets that they have access to. As such, in the circumstance where the demand on a gas distribution system decline, generational fairness would indicate that the remaining net book value of the system to be recovered from the later customers would be consistent with the system that had largely been consumed by earlier users when the system was operating at higher capacity levels.

c) While intergenerational equity would require that the original cost of investment of an asset is recovered by the customers who gain the benefit of the assets, in the current circumstances of Enbridge Gas, an EPH is not the appropriate mechanism to recover this investment in the case of a substantial reduction in customer load. This is because an EPH depreciates the entire asset value over a reduced time frame. As such, there is no ability to retain investment in a particular account for customers who maintain service beyond the end of the economic date. However, in the circumstances when it can be estimated that significant assets would be retired at various capacity levels, an EPH could be established for that specific group.

d) The use of the Equal Life Group (ELG) procedure in the depreciation rate calculation will deal with the issue identified in this question. The ELG procedure recognizes that all retirement of investment will not occur in a linear fashion and specially adjusts for the retirement of some investment at younger ages. In part, it is for this reason that Concentric has recommended the use of the ELG procedure in this application.

   Concentric is aware of a recurrence in the consideration of the use of the Units of Production method of depreciation to deal with this issue. While Concentric has not recently recommended the use of Unit of Production, it is a depreciation tool that could be considered in future applications.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.4, Tab 5, S1, Attachment 2, Appendix 1 *(Note: Reference is to 4.5.1 - Attachment 1)*

Question(s):

Please provide the tables in the Appendix in an Excel file, with formulae intact.

Response:

a) The following response was prepared by Concentric:

Please see Attachment 1 for the tables in the listed Appendix in an Excel file.

ENBRIDGE GAS INC.

TABLE 1. ESTIMATED SURVIVOR CURVE, ORIGINAL COST, BOOK DEPRECIATION RESERVE AND

CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO PLANT IN SERVICE AT DECEMBER 31, 2021

Related to Total Expense

Account	Description	Truncation Date	Estimated Survivor Curve	Net Salvage Percent	Surviving Original Cost as of 12/31/2021	Book Reserve	Future Accruals	Annual Accrual Amount	Composite Remaining Life	Annual Accrual Rate
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
LOCAL STORAGE PLANT										
442.00	STRUCTURES AND IMPROVEMENTS	2050	40-S5	0%	6,282,181	2,805,060	3,477,121	125,758	20.7	2.00%
443.01	HOLDER - STORAGE TANK	2050	45-R4	0%	5,804,412	4,023,544	1,780,869	70,878	15.8	1.22%
443.02	HOLDER EQUIPMENT	2050	55-R4	0%	21,554,522	11,363,396	10,191,126	366,664	24.5	1.70%
TOTAL LOCAL STORAGE PLANT					**33,641,115**	**18,192,000**	**15,449,115**	**563,300**		1.67%
UNDERGROUND STORAGE PLANT										
451.00	LAND RIGHTS INTANGIBLE	2050	55-R4	0%	74,762,354	45,841,825	28,920,529	1,306,142	20.2	1.75%
452.00	STRUCTURES AND IMPROVEMENTS	2050	40-R3	-11%	104,433,820	47,148,032	68,773,509	4,739,050	17.4	4.54%
453.00	WELLS	2050	45-R2.5	-34%	143,144,395	50,040,540	141,772,949	7,057,598	20.8	4.93%
454.00	WELL EQUIPMENT	2050	40-R2	0%	13,364,517	8,575,936	4,788,581	215,267	18.4	1.61%
455.00	FIELD LINES	2050	55-R3	-11%	201,920,080	53,298,115	170,833,174	7,264,186	23.8	3.60%
456.00	COMPRESSOR EQUIPMENT	2050	40-R4	-6%	682,328,757	228,311,196	494,957,286	23,065,924	21.6	3.38%
457.00	REGULATING AND MEASURING EQUIPMENT	2050	35-R3	-15%	77,194,133	51,829,828	36,943,425	2,303,495	14.7	2.98%
TOTAL UNDERGROUND STORAGE PLANT					**1,297,148,055**	**485,045,470**	**946,989,454**	**45,951,662**		3.54%
TRANSMISSION PLANT										
461.00	LAND RIGHTS INTANGIBLE	2050	60-R4	0%	88,171,402	20,599,533	67,571,869	2,473,684	27.1	2.81%
462.00	COMPRESSOR STRUCTURES AND IMPROVEMENTS	2050	50-S4	-6%	163,351,958	40,353,631	132,799,445	5,017,376	26.2	3.07%
463.00	MEASURING AND REGULATING STRUCTURES AND IMPROVEMENTS	2050	55-S4	-7%	11,252,284	7,167,268	4,872,675	206,037	21.1	1.83%
464.00	EQUIPMENT	2050	50-S4	-6%	2,920,218	523,642	2,571,789	100,528	26.3	3.44%
465.00	MAINS	2050	60-R4	-16%	2,783,251,797	919,330,147	2,309,241,938	86,187,728	26.0	3.10%
466.00	COMPRESSOR EQUIPMENT	2050	30-R4	-7%	1,005,060,039	331,530,582	743,883,660	38,321,598	19.2	3.81%
467.00	MEASURING AND REGULATING EQUIPMENT	2050	40-R4	-17%	395,646,542	119,798,512	343,107,942	14,756,768	23.1	3.73%
TOTAL TRANSMISSION PLANT					**4,449,654,239**	**1,439,303,314**	**3,604,049,317**	**147,063,719**		3.31%
DISTRIBUTION PLANT										
471.00	LAND RIGHTS INTANGIBLE	2050	60-R4	0%	63,907,560	12,099,619	51,807,941	1,904,842	27.1	2.98%
472.00	* STRUCTURES AND IMPROVEMENTS - OTHER	2050	40-S0.5	0%	220,832,605	64,014,227	156,818,378	8,303,384	18.3	3.76%
472.31	STRUCTURES AND IMPROVEMENTS - STONEY CREEK	2046	40-S0.5	0%	29,662,115	5,056,171	24,605,944	1,325,428	18.6	4.47%
472.32	STRUCTURES AND IMPROVEMENTS - WIN-RHODES	2046	40-S0.5	0%	23,216,546	5,549,955	17,666,591	991,735	17.9	4.27%
472.33	STRUCTURES AND IMPROVEMENTS - LONDON ADMIN	2026	40-S0.5	0%	19,789,902	9,778,917	10,010,985	2,365,393	4.2	11.95%
472.34	STRUCTURES AND IMPROVEMENTS - KINGSTON OFFICE	2046	40-S0.5	0%	16,737,576	4,069,504	12,668,072	704,663	18.0	4.21%
472.35	STRUCTURES AND IMPROVEMENTS - MAINWAY	2023	40-S0.5	0%	15,937,297	3,958,252	11,979,045	8,045,939	1.5	50.48%
473.01	SERVICES - METAL	2050	45-S1	-36%	549,648,294	268,325,815	479,195,865	25,654,986	18.6	4.67%
473.02	SERVICES - PLASTIC	2050	55-S3	-32%	4,458,883,265	1,384,833,504	4,500,892,406	179,929,092	25.0	4.04%
474.00	REGULATORS	2050	25-SQ	0%	488,870,931	59,858,893	429,012,038	43,329,780	15.5	8.86%
475.00	MAINS - ENVISION	2050	25-SQ	0%	181,264,676	59,887,548	121,377,128	10,469,399	12.2	5.78%
475.21	MAINS - COATED & WRAPPED	2050	55-R3	-53%	3,320,418,328	1,051,359,036	4,028,881,007	176,679,582	23.6	5.32%
475.30	MAINS - PLASTIC	2050	60-R4	-51%	3,480,106,028	928,431,883	4,326,528,219	163,157,768	26.5	4.69%
476.00	COMPANY NGV COMPRESSOR STATIONS	2050	17-S2.5	0%	9,878,703	5,181,735	4,696,968	358,412	9.7	3.63%
477.00	MEASURING AND REGULATING EQUIPMENT	2050	40-R2	-10%	950,956,098	367,887,432	678,164,276	32,432,104	19.9	3.41%
477.01	CUSTOMER M&R EQUIPMENT	2050	35-R3	0%	143,726,981	52,094,469	91,632,512	5,183,135	17.7	3.61%
478.00	METERS	2050	15-S2.5	0%	1,020,910,894	469,525,898	551,384,996	104,686,352	6.4	10.25%
TOTAL DISTRIBUTION PLANT					**14,994,747,798**	**4,751,912,857**	**15,497,322,370**	**765,521,994**		5.11%
GENERAL PLANT										
482.00	STRUCTURES AND IMPROVEMENTS - OTHER	2050	40-R1.5	0%	13,255,572	8,677,610	4,577,962	234,463	19.6	1.77%
482.01	STRUCTURES AND IMPROVEMENTS - VPC	2033	40-R1.5	0%	53,463,354	19,270,729	34,192,626	3,400,629	10.0	6.36%
482.04	STRUCTURES AND IMPROVEMENTS - THOROLD	2022	40-R1.5	0%	15,678,640	6,391,978	9,286,662	9,286,663	0.5	59.23%
482.05	STRUCTURES AND IMPROVEMENTS - MARKHAM	2046	40-R1.5	0%	36,671,818	6,852,980	29,818,839	1,544,848	19.3	4.21%
482.51	STRUCTURES AND IMPROVEMENTS - KEIL HEAD OFFICE	2049	40-R1.5	0%	69,558,675	11,589,939	57,968,736	3,906,954	16.4	5.62%

ENBRIDGE GAS INC.

TABLE 1. ESTIMATED SURVIVOR CURVE, ORIGINAL COST, BOOK DEPRECIATION RESERVE AND

CALCULATED ANNUAL DEPRECIATION ACCRUALS RELATED TO PLANT IN SERVICE AT DECEMBER 31, 2021

Related to Total Expense

Account	Description	Truncation Date	Estimated Survivor Curve	Net Salvage Percent	Surviving Original Cost as of 12/31/2021	Book Reserve	Future Accruals	Annual Accrual Amount	Composite Remaining Life	Annual Accrual Rate
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
482.52	STRUCTURES AND IMPROVEMENTS - BLOOMFIELD TRAINING CENTER	2028	40-R1.5	0%	19,237,692	1,664,764	17,572,928	2,814,701	6.2	14.63%
483.00	OFFICE FURNITURE AND EQUIPMENT	2050	15-SQ	0%	29,776,062	20,323,396	9,452,666	1,200,881	6.0	4.03%
484.00	TRANSPORTATION EQUIPMENT	2050	12-L2.5	0%	134,722,078	89,525,829	45,196,249	6,201,577	5.7	4.60%
485.00	HEAVY WORK EQUIPMENT	2050	17-L1.5	0%	44,128,921	12,811,266	31,317,655	3,664,830	8.6	8.30%
486.00	TOOLS AND WORK EQUIPMENT	2050	15-SQ	0%	79,966,854	26,128,214	53,838,641	9,529,666	7.6	11.92%
487.70	RENTAL - REFUEL APPL	2050	15-SQ	0%	864,755	92,164	772,591	86,895	9.3	10.05%
487.80	RENTAL - NGV STATIONS	2050	20-SQ	0%	7,774,175	2,397,143	5,377,032	288,265	18.4	3.71%
488.00	COMMUNICATION STRUCTURES AND EQUIPMENT	2050	10-SQ	0%	11,224,609	4,990,530	6,234,079	2,946,627	2.6	26.25%
490.00	COMPUTER EQUIPMENT	2050	4-SQ	0%	30,306,679	20,774,567	9,532,112	4,041,429	1.7	13.34%
	COMPUTER EQUIPMENT - POST 2023	0	4-SQ	0%	0	0	0	0	0.0	25.00%
490.30	COMPUTER EQUIPMENT - WAMS	2050	10-SQ	0%	4,680,899	2,418,465	2,262,435	502,763	4.5	10.74%
491.01	SOFTWARE ACQUIRED INTANGIBLES	2050	4-SQ	0%	155,164,785	107,550,337	47,614,448	13,604,128	2.0	8.77%
	SOFTWARE ACQUIRED INTANGIBLES - POST 2023	0	4-SQ	0%	0	0	0	0	0.0	25.00%
491.02	SOFTWARE DEVELOPED INTANGIBLES	2050	4-SQ	0%	38,776,288	25,519,357	13,256,930	3,892,471	2.2	10.04%
	SOFTWARE DEVELOPED INTANGIBLES - POST 2023	0	4-SQ	0%	0	0	0	0	0.0	25.00%
491.03	CIS ACQUIRED SOFTWARE	2050	10-SQ	0%	87,626,214	20,250,171	67,376,042	7,217,716	8.4	8.24%
	** SOFTWARE INTANGIBLES - 10 YEAR	0	10-SQ	0%	0	0	0	0	0.0	10.00%
491.04	WAMS	2050	10-SQ	0%	85,221,905	44,031,318	41,190,587	9,153,464	4.5	10.74%
TOTAL GENERAL PLANT					**918,099,975**	**431,260,756**	**486,839,219**	**83,518,970**		9.10%
TOTAL UTILITY PLANT STUDIED					**21,693,291,183**	**7,125,714,397**	**20,550,649,476**	**1,042,619,645**		**4.81%**
PLANT NOT STUDIED										
401.00	Franchises and Consents - Total Comp				1,175,081					
402.04	Other Intangibles - Lakeland Acquisition Adjustment				494,761					
458.00	Base Pressure and Line Pack Gas				76,135,052					
	Land (Including MacLeod Property)				177,293,391					
	Plant Held for Future Use				1,670,861					
	Inventory Adjustment				59,309,971					
	** Post Study Adjustments				5,005,525					
TOTAL PLANT NOT STUDIED					**321,084,642**					
TOTAL UTILITY PLANT IN SERVICE					**22,014,375,825**					

* Annual Accrual Rates for new major structures in Account 472.00 after 2023 are 4.02%.
** New depreciation rate for major longer term intangible asset additions post 2023
** Adjustments between regulated and unregulated storage operations to align with updated exhibits in Enbridge Gas's 2021 Utility Earnings and Disposition of Deferral & Variance Account Balances proceeding (EB-2022-0110), as filed on September 2, 2022

ACCOUNT	Booked Reserve	TRUNC DATE	ASL	FirstOfCurveType	NET SALVAGE	ORGINAL COST	CALCULATED ACCUMULATED DEPRECIATION	ANNUAL ACCRUAL	COMPOSITE ANNUAL ACCRUAL RATE	REMAINING LIFE	THEORETICAL	Age
442	2,805,060.39	2050	40	S5	0	6,282,181.09	2418318.17	125758	0.020018207	20.68125622	0.446510591	17.79686158
443.01	4,023,543.84	2050	45	R4	0	5,804,412.46	3300033.37	70878	0.012211055	15.83675374	0.6931871	28.99933383
443.02	11,363,395.92	2050	55	R4	0	21,554,521.93	7452428.94	366664	0.017011001	24.46333896	0.527193132	16.55540421
451	45,841,824.51	2050	55	R4	0	74,762,353.60	44754952.24	1306142	0.017470584	20.16823894	0.61316722	32.09977418
452	47,148,031.88	2050	40	R3	-0.11	104,433,820.29	56141776.31	4739050	0.045378499	17.40405032	0.45146325	21.27804842
453	50,040,539.74	2050	45	R2.5	-0.34	143,144,394.64	69709680.81	7057598	0.049304047	20.76489448	0.349580854	16.36301175
454	8,575,935.56	2050	40	R2	0	13,364,517.02	5494383.24	215267	0.016107354	18.42970739	0.641694387	17.35301613
455	53,298,115.35	2050	55	R3	-0.11	201,920,080.43	85691203.58	7264186	0.03597555	23.77661605	0.263956488	18.42240012
456	228,311,195.54	2050	40	R4	-0.06	682,328,756.58	249504770.6	23065924	0.033804707	21.61976349	0.334605853	13.5309549
457	51,829,827.64	2050	35	R3	-0.15	77,194,132.88	48127058.59	2303495	0.029840286	14.72248082	0.671421852	20.48106531
461	20,599,533.02	2050	60	R4	0	88,171,401.75	25042738.21	2473684	0.028055401	27.14957665	0.233630549	12.57133955
462	40,353,630.51	2050	50	S4	-0.06	163,351,957.93	44967354.84	5017376	0.030715126	26.1768375	0.247034875	10.83944174
463	7,167,268.35	2050	55	S4	-0.07	11,252,283.90	6414778.09	206037	0.018310683	21.08046756	0.636961208	28.34370159
464	523,641.78	2050	50	S4	-0.06	2,920,217.56	661816.87	100528	0.034424832	26.31783679	0.179316016	9.302436925
465	919,330,147.09	2050	60	R4	-0.16	2,783,251,797.20	1004646137	86187728	0.030966558	25.95282573	0.330307933	15.26308144
466	331,530,581.56	2050	30	R4	-0.07	1,005,060,038.76	338500450.1	38321598	0.038128665	19.16651399	0.32986147	9.588623385
467	119,798,511.87	2050	40	R4	-0.17	395,646,541.68	132783710.3	14756768	0.037297857	23.0767217	0.302791758	10.80656737
471	12,099,618.74	2050	60	R4	0	63,907,559.65	17190754.12	1904842	0.029806208	27.06898747	0.189330007	11.79658458
472	64,014,227.29	2050	40	S0.5	0	220,832,605.09	75080262.18	8303384	0.037600353	18.28834384	0.289876702	15.67941283
472.31	5,056,170.71	2046	40	S0.5	0	29,662,114.81	9379387.26	1325428	0.044684204	18.55448023	0.170458875	9.088522567
472.32	5,549,954.69	2046	40	S0.5	0	23,216,545.94	9567161.82	991735	0.042716733	17.88025371	0.239051696	12.80156837
472.33	9,778,917.49	2026	40	S0.5	0	19,789,902.04	13708093.74	2365393	0.119525251	4.159202467	0.49413673	26.76712538
472.34	4,069,504.11	2046	40	S0.5	0	16,737,575.95	6824520.76	704663	0.04210066	17.97628253	0.243135811	12.39818872
472.35	3,958,251.83	2023	40	S0.5	0	15,937,296.63	14257282.86	8045939	0.504849673	1.48881443	0.248364068	13.24226987
473.01	268,325,814.99	2050	45	S1	-0.36	549,648,294.42	330700800.5	25654986	0.046675276	18.6076003	0.48817729	23.36027206
473.02	1,384,833,503.55	2050	55	S3	-0.32	4,458,883,264.63	2076925059	179929092	0.04035295	24.98231889	0.310578551	16.26198445
474	59,858,893.21	2050	25	SQ	0	488,870,931.00	184821829.1	43329780	0.088632351	15.54853657	0.122443143	9.451463434
475	59,887,548.43	2050	25	SQ	0	181,264,676.42	92823432.31	10469399	0.057757525	12.1978046	0.330387308	12.8021954
475.21	1,051,359,035.75	2050	55	R3	-0.53	3,320,418,328.48	1705357259	176679582	0.053210037	23.56132226	0.316634512	16.90720786
475.3	928,431,883.06	2050	60	R4	-0.51	3,480,106,028.12	1677734610	163157768	0.046882988	26.4849557	0.266782643	15.18088204
476	5,181,734.81	2050	17	S2.5	0	9,878,702.74	3801952.94	358412	0.036281282	9.671572773	0.524535958	8.664771329
477	367,887,431.83	2050	40	R2	-0.1	950,956,097.61	363550373	32432104	0.034104733	19.87302619	0.386860585	13.22723181
477.01	52,094,469.16	2050	35	R3	0	143,726,981.14	58245804.21	5183135	0.036062366	17.67305851	0.362454347	14.91795962
478	469,525,897.51	2050	15	S2.5	0	1,020,910,893.69	567033864.8	104686352	0.102542105	6.368236434	0.459908794	11.32310326
482	8,677,609.61	2050	40	R1.5	0	13,255,571.99	3700900.2	234463	0.017687883	19.57329467	0.654638639	9.98460138
482.01	19,270,728.51	2033	40	R1.5	0	53,463,354.35	26098479.06	3400629	0.063606727	9.96788704	0.360447427	15.24467565
482.04	6,391,978.16	2022	40	R1.5	0	15,678,639.98	14572514.74	9286663	0.592313046	0.5	0.407687029	7.53814838
482.05	6,852,979.62	2046	40	R1.5	0	36,671,818.30	11418658.28	1544848	0.042126299	19.30251528	0.186873189	8.861006312
482.51	11,589,939.39	2049	40	R1.5	0	69,558,675.16	26196142.88	3906954	0.056167746	16.39262546	0.166621049	18.52897199
482.52	1,664,764.01	2028	40	R1.5	0	19,237,692.27	10612390.61	2814701	0.14631178	6.243041832	0.086536576	9.635458624
483	20,323,395.93	2050	15	SQ	0	29,776,061.72	17837150.38	1200881	0.040330417	6.014350447	0.682541436	8.985649553
484	89,525,828.90	2050	12	L2.5	0	134,722,077.69	66324106.74	6201577	0.046032374	5.717862024	0.66452233	6.49961254
485	12,811,265.76	2050	17	L1.5	0	44,128,920.96	19210570.15	3664830	0.083048258	8.551705658	0.290314503	8.174934811
486	26,128,213.52	2050	15	SQ	0	79,966,854.36	39611956.58	9529666	0.1191702	7.569679607	0.326738043	7.430320393
487.7	92,163.80	2050	15	SQ	0	864,754.61	328834.18	86895	0.100485154	9.296055008	0.106577981	5.703944992
487.8	2,397,143.13	2050	20	SQ	0	7,774,174.86	640766.77	288265	0.037079819	18.35155042	0.308346953	1.648449583
488	4,990,529.78	2050	10	SQ	0	11,224,609.20	8319312.34	2946627	0.262514886	2.588327847	0.444606105	7.819464643
490	20,774,567.11	2050	4	SQ	0	30,306,678.69	17212894.06	4041429	0.133351102	1.728171505	0.685478185	2.271828495
490.3	2,418,464.59	2050	10	SQ	0	4,680,899.13	2574494.52	502763	0.107407356	4.5	0.516666675	5.5
491.01	107,550,337.34	2050	4	SQ	0	155,164,785.39	76224300.99	13604128	0.087675357	2.035010308	0.693136249	1.984108778
491.02	25,519,357.38	2050	4	SQ	0	38,776,287.63	17163628.64	3892471	0.100382766	2.229471702	0.658117601	1.770528298
491.03	20,250,171.19	2050	10	SQ	0	87,626,213.57	13898150.73	7217716	0.08236937	8.413927731	0.231097184	1.586072269
491.04	44,031,317.98	2050	10	SQ	0	85,221,905.36	46872047.95	9153464	0.107407408	4.5	0.516666669	5.5

ENBRIDGE GAS INC.

Answer to Interrogatory from
Green Energy Coalition (GEC)

Interrogatory

Reference:

Ex.3, Tab 2, S5, Figures 1 through 6

Question(s):

a) Please provide the actual numeric values for each year in each figure. Please provide them in the Excel files used to generate the graphs.

b) Please provide Enbridge's best estimate of the portion of normalized residential gas consumption per year for each graph that was, is and is forecast to be associated with space heating (i.e., data comparable to what is in each graph, but just for space heating instead of for all gas end uses).

Response:

a) Please see response at Exhibit I.3.2-EP-45, Attachment 1, Figure 1 and Figures 3 to 7 respectively for the actual numeric values for each year as well as the Excel file used to generate the graphs.

b) Please see Table 1 for the estimated portion of the historical and forecasted heat load portion of the annual residential average use. Heat load estimations are produced using Enbridge Gas general service residential average use weather coefficients as well as degree days produced using the proposed methodologies as provided at Exhibit 3, Tab 2, Schedule 5 and Exhibit 3, Tab 2, Schedule 3 of evidence respectively.

Table 1
Enbridge Gas: Estimated Historical Annual Residential and Forecasted Heat Load (m3)

Line No.	Year	Central	East	West	South	North	EGI
		(a)	(b)	(c)	(d)	(e)	(f)
1	2006	1,693	1,497	1,387		1,561	1,545
2	2007	1,942	1,704	1,598		1,767	1,772
3	2008	1,980	1,696	1,628		1,826	1,809
4	2009	1,946	1,695	1,651		1,807	1,777
5	2010	1,781	1,473	1,546	1,491	1,587	1,633
6	2011	1,883	1,589	1,564	1,540	1,726	1,719
7	2012	1,601	1,538	1,361	1,321	1,545	1,491
8	2013	1,963	1,720	1,664	1,631	1,851	1,813
9	2014	2,159	1,770	1,830	1,812	1,966	1,981
10	2015	1,955	1,711	1,679	1,643	1,796	1,807
11	2016	1,781	1,629	1,509	1,474	1,671	1,648
12	2017	1,815	1,655	1,530	1,482	1,735	1,676
13	2018	1,967	1,727	1,676	1,645	1,849	1,819
14	2019	2,052	1,811	1,736	1,671	1,919	1,883
15	2020	1,780	1,585	1,486	1,452	1,683	1,636
16	2021	1,718	1,535	1,462	1,435	1,621	1,591
17	2022F	1,819	1,640	1,558	1,540	1,748	1,695
18	2023F	1,819	1,640	1,558	1,540	1,748	1,695
19	2024F	1,819	1,640	1,558	1,540	1,748	1,695

ENBRIDGE GAS INC.

Answer to Interrogatory from
Ginoogaming First Nation (GFN)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 6
Framework for Energy Innovation Working Group, Report to the OEB (the "FEI Report"), p. 10

Preamble:

EGI describes federal, provincial, and municipal climate change policies and greenhouse gas ("**GHG**") emission reduction targets relevant to the energy transition that may impact demand for natural gas and notes the uncertainty around energy transition pathways for reducing GHG emission by the various levels of government.

The Application also describes EGI's Energy Transition Plan (the "**ETP**"). The ETP provides actions that EGI is proposing "to move forward with during the rebasing term despite current policy uncertainty."

EGI states that "energy system planning in Ontario can be done in a more coordinated and collaborative manner, involving assessments of how developing regional energy needs can be met by both the gas and electricity systems together."

The FEI Report notes that "[c]oncurrent with the energy transition, Ontario is seeing increasing Indigenous economic participation in the energy sector, particularly among communities that have been underserved or experience ongoing reliability challenges where DER solutions may be appropriate."

Question(s):

a) Does EGI recognize First Nations governments as a level of government that may have climate change policies that could affect natural gas demand over the rebasing period and beyond? If not, please explain why not.

b) Did EGI consider the climate change policies of any First Nation governments in developing the ETP? If yes, please provide details of which First Nations climate change policies EGI considered in developing (i) the Application and (ii) the ETP. If no, please explain why not.

c) Did EGI consult with its First Nations customers, including GFN, in developing the ETP? If yes, please provide EGI's consultation log with First Nations documenting the consultation with First Nations. If no consultation log exists, please provide a detailed response regarding all First Nations consultation that EGI undertook in preparing the ETP. If EGI did not consult with its First Nations customers in developing the ETP, please explain why not.

d) Did EGI's assessment of the energy transition and supporting the integration of gas and electric system planning take into account (i) Indigenous equity participation (ii) the energy reliability challenges in many First Nations communities? If yes, please provide details and explain how EGI incorporated First Nations concerns regarding the energy transition into the ETP. If no, please explain why not.

<u>Response:</u>

a) Yes, Enbridge Gas recognizes First Nation governments as a level of government that may have climate change policies.

b) Enbridge Gas did not consider the specific climate change policies of First Nations governments in the development of the Energy Transition Plan (ETP); however, Enbridge Gas appreciates that many First Nation communities are making decisions to reduce their greenhouse gas (GHG) emissions. Enbridge Gas offers Demand Side Management (DSM) programs to support the reduction in GHG emissions in First Nations communities. In 2018, GFN was offered the opportunity to participate in the Indigenous Home Winterproofing Program (IHWP). Since 2017, 12 Ontario First Nations communities have participated in the IHWP, reducing their natural gas consumption.

   Enbridge Gas would be happy to re-engage with GFN if the community is interested in the IHWP program and in other solutions that could support GHG emissions reductions.

c) Enbridge Gas consulted with customers in the development of specific proposals within the ETP through the customer engagement process for this Application, which included questions about the ETP. The customer engagement was completed with Enbridge Gas ratepayers including Indigenous customers as provided in response at Exhibit I.1.6-Three Fires-1 part f).

   As the ETP evolves, as noted in paragraph 107 of Exhibit 1, Tab 10, Schedule 6, Enbridge Gas intends to gather energy transition insights that can be considered within its forecasting through stakeholder engagement with municipalities and Indigenous communities, in addition to integrated resource planning (IRP) specific Indigenous engagement activities.

d) Enbridge Gas's energy transition approach is based on GHG emissions reduction, maximizing energy efficiency and investing in lower-carbon energy solutions, interests that are common among all people, including Indigenous peoples.

Enbridge Gas provides customers with the reliable, resilient, secure, and affordable energy that they need and want, which are key priorities for both the provincial government and energy consumers alike. Enbridge Gas understands that many First Nations communities are seeking reliable energy solutions and continues to have requests from First Nations communities to expand the existing natural gas infrastructure on reserve. Enbridge Gas is working with other Ontario First Nations communities to connect into the current system.

When and where feasible, Enbridge Gas is meeting with and discussing the interests and priorities of Indigenous groups in an effort to explore opportunities to advance innovative partnerships and economic inclusion.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Ontario Greenhouse Vegetable Growers (OGVG)

Interrogatory

Reference:

Exhibit 1 Tab 10 Schedule 4 Pages 18 and 19

Question(s):

. . . energy transition has become the most significant factor contributing to increased business risk for Enbridge Gas, as evidenced by findings in the Equity Ratio Study:

. . .

There is increased risk of stranded assets. This risk could be mitigated by accelerating depreciation rates (e.g., through an EPH), however this will increase rate pressure for customers and may result in natural gas becoming less competitive than alternative energy sources;

. . .

a) When does an EGI asset become stranded? For example, does it become stranded when the asset becomes unused by any customers, or does it become stranded when the costs of that asset is no longer allocated for recovery from any customers?

b) Please explain the status quo accounting and regulatory treatments of stranded assets and provide an example of how those treatments are applied.

c) Please confirm that EGI is not proposing any changes to the regulatory and accounting frameworks with respect to the treatment of stranded assets. If not confirmed, please explain how EGI is proposing to change those treatments.

d) Please provide EGI's actual annual stranded asset costs from 2013 to 2022. Please forecast EGI's stranded asset costs from 2023 to 2028.

e) Please provide the stranded asset costs included in the forecast 2024 revenue requirement, if any.

f) Please confirm that based on EGI's forecast of customer behaviour over EGI's 10-year forecast period (2023-2032) the risk of stranded assets relates almost exclusively to distribution level assets as opposed to storage or transmission assets; if not confirmed, please describe the circumstances that underpin a material risk of stranded storage and/or transmission assets in the 2024 to 2028 period.

Response:

a) Enbridge Gas defines the term stranded asset as an investment that becomes no longer used or useful in the provision of service to customers before the end of its expected physical life due to changes in market conditions or government policies.

   The recovery of costs related to stranded assets is a separate issue from the determination of whether an asset is stranded. Costs of stranded assets which are found not to be recoverable, would become stranded costs.

b) From a regulatory perspective, to Enbridge Gas's knowledge, there is no prescribed treatment for stranded assets or the costs related to stranded assets. While Enbridge Gas believes that prudently incurred cost of assets which become stranded should be recoverable, the manner in which they could be recovered could be dependent upon the circumstances leading up to the time they become stranded/abandoned. For instance, where the stranding of assets is seen well in advance, the costs could be charged to ratepayers through higher depreciation rates (e.g. through an economic planning horizon) included within rates, for a period of time leading up to, and/or after, the stranding (where other assets/customers continue to exist). Another possible option could be that at the time the assets become stranded, the retirement is treated as an extraordinary retirement, and a loss would be included within rates. It is also possible that should such a situation arise, the OEB could order or approve some other mechanism for recovery.

   From an accounting perspective, Enbridge Gas is not able to answer this question with certainty because it would depend upon the circumstances leading up to the assets becoming stranded and the costs related to stranded assets. Enbridge Gas follows the provisions of US GAAP for the accounting treatment of property, plant and equipment and, in the event of a stranded asset, would generally rely on the guidance found in ASC 360 (Property, Plant and Equipment) and ASC 980 (Regulatory Operations) for determining the accounting treatment of stranded asset costs.

c) Confirmed. However, as noted above, to Enbridge Gas's knowledge there is no definitive prescribed regulatory treatment in relation to stranded asset costs.

d) Enbridge Gas does not have actual stranded asset costs for the 2013 to 2022 period and is not forecasting any stranded asset costs from 2023 to 2028 related to its distribution, storage or transmission assets.

e) There are no stranded asset costs included in the 2024 Forecast revenue requirement.

f) Enbridge Gas interprets the 'forecast of customer behaviour' to mean the Company's forecasted design hour demand and design day demand over the 10-year forecast period (2023 to 2032). Enbridge Gas confirms that, based on this forecast, its distribution, transmission and storage assets will be used or useful in the 2024 to 2028 period. In addition, Enbridge Gas does not foresee any set of circumstances where there would be a material risk of stranded storage and/or transmission assets during this time.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Ontario Greenhouse Vegetable Growers (OGVG)

Interrogatory

Reference:

Exhibit 1 Tab 10 Schedule 4 Pages 17, 18

Question(s):

Enbridge Gas and Concentric concluded that introducing an EPH is not appropriate at this time. There remains uncertainty around the impacts that energy transition could potentially have on Enbridge Gas's system as discussed above. However, future depreciation studies may warrant the introduction of regional or system wide EPHs, as the energy transition unfolds and more information on the future utilization of Enbridge Gas's assets becomes available.

If a diversified pathway to net-zero is not adopted in Ontario, Enbridge Gas would seek to introduce an EPH on its system to mitigate the risk of stranded assets. For illustrative purposes, if a system-wide 2050 EPH were to be implemented starting 2024, the 2024 Test Year depreciation expense would increase by $282 million from $921 million to $1.2 billion. The depreciation study used to calculate this is provided at Exhibit 4, Tab 5, Schedule 1 Attachment 1.

a) Please confirm that regional EPHs in conjunction with EGI's one rate zone proposal would mean that customers in regions where natural gas use remains robust enough to obviate the need for an EPH would nevertheless experience increased rates associated with the more rapid depreciation of assets in regions with EPHs. If not confirmed, please explain how customers in a non-EPH region would be protected against the increased depreciation costs associated with a region where an EPH has been implemented.

b) Please confirm that were EGI to maintain separate rate zones for both cost allocation and rate design purposes, an EPH implemented in one (regionally based) rate zone would not adversely impact rates in any of the other rate zones.

Response:

a-b) Enbridge Gas agrees that in principle, under one rate zone the introduction of an EPH to one region would likely have an impact of increased rates to customers in all other regions. However, it should be noted that the Company has not evaluated the practicality of regional EPH's versus a system wide approach should the Company move to applying an EPH in a subsequent rate application. Please see response at Exhibit I.1.10-OGVG-1 part b).

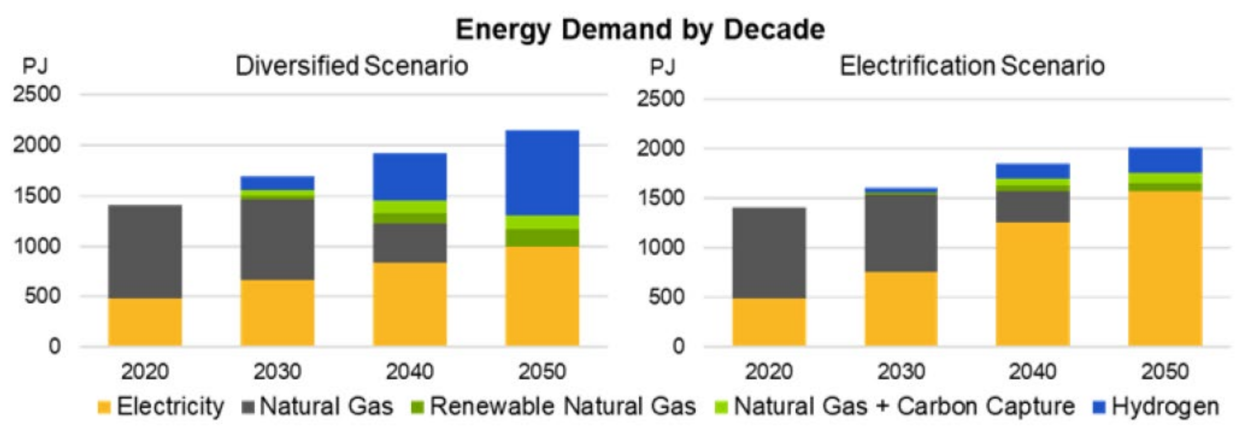
ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

Figure 4 Exhibit 1, Tab 10, Schedule 5, Page 15



Question(s):

a) Please provide a table (or source spreadsheet) showing PJ and percent of total by energy type shown in legend (for each time period and scenario shown in the table).

b) For the hydrogen shown in each scenario please indicate the expected source of the hydrogen and whether it would be transmitted/distributed via a pure hydrogen pipeline or a blend. If it is a blend, please indicate the percent blending for each scenario and by time period shown in the graph.

c) Please provide the expected lifecycle emissions (e.g. lifecycle Kg CO_2e per PJ). for the hydrogen included in Figure 4 above. Please provide calculations or references that provide the source of the emission intensity assumptions.

d) Please provide details on how carbon capture would occur (e.g. technology/process for capture and where would the captured CO_2 be stored) in the scenarios Enbridge has identified.

e) Does Enbridge have a reference on the potential geological sequestration of CO2 in Ontario? If yes, what is the total in tonnes of CO2 storage available? Please provide the report or related references.

f) Please explain the difference between “natural gas” and “natural gas with carbon capture” outlined in the Energy Transition scenarios provided by Enbridge.

g) For the “natural gas with carbon capture” scenario, please explain what “carbon capture” assets (if any) Enbridge would expect to be in rate base as part of the regulated utility business.

Response:

The following response was provided by Guidehouse Canada Ltd.:

a) The data supporting the referenced figure is provided in response at Exhibit I.1.10-SEC-26 Attachment 1, page 2.

b) Please see response at Exhibit I.1.10-ED-42, which provides for both scenarios, by decade: (i) the amounts of hydrogen supplied as pure hydrogen, (ii) the amounts of hydrogen blended in natural gas supplies, and (iii) the maximum hydrogen blending concentration by volume and by energy.

c) The analysis assumes that hydrogen supplied in Ontario will be a mix of green hydrogen, blue hydrogen, and hydrogen imports from neighbouring regions. The analysis assumes that green hydrogen has lifecycle emissions of 0.0 kg CO2e/PJ because it is produced from renewable electricity, and

   Blue hydrogen lifecycle emissions are estimated to be 0.066 kg CO_2e per m3 hydrogen output. This figure includes residual emissions from the process of steam methane reformation with CCS (assuming a 95% rate of carbon capture), plus upstream fugitive methane emissions from methane transmission. Upstream methane transmission emissions are the sum of Scope 1 and Scope 2 emissions, as defined in the *Resilient Energy Infrastructure* Report published by Enbridge Inc.[1]

d) The analysis conducted for the P2NZ study did not specify a particular type of CCS technology (e.g., pre-combustion, post-combustion, oxyfuel, or others). The CCS technology deployed at individual sites will be selected based on the particulars of the process that is generating the CO_2 emissions. The analysis assumed that

[1] Enbridge (2019). “Resilient Energy Infrastructure: Addressing Climate-Related Risks and Opportunities”. Available at:
https://www.enbridge.com/~/media/Enb/Documents/Reports/Resilient_Energy_Infrastructure_report_FINAL.pdf.

captured carbon would be stored underground in a geological formation. Ontario's Ministry of Natural Resources has published findings regarding potential sites for geological sequestration of carbon dioxide.[2] The P2NZ analysis did not specify a particular geographic destination for captured carbon to be stored.

The following response was provided by Enbridge Gas.:

e) See response to Exhibit I.1.10 ED-38 part a). The 2007 Ontario Ministry of Natural Resources report estimated 730 million tonnes of CO_2 storage potential in Ontario[3]. In Canada's Carbon Dioxide Capture and Storage Technology Roadmap[4], the South West Ontario Basin was ranked as third out of eleven for carbon dioxide storage suitability.

f) Natural gas with carbon capture refers to natural gas delivered to a customer that has deployed a carbon emission capture system, as opposed to natural gas delivered to customers that have not deployed a carbon emission capture system.

g) As provided at Exhibit 1, Tab 10, Schedule 6, paragraph 69, "Enbridge Gas may take additional steps to explore the commercialization of CCUS in Ontario and may come forward at a future date with specific proposals regarding CCUS".

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[2] Ontario Ministry of Natural Resources (2007). "Geological Sequestration of Carbon Dioxide: A Technology Review and Analysis of Opportunities in Ontario." Available at: https://climateontario.ca/MNR_Publications/276925.pdf

[3] Government of Ontario. (2007) Geological Sequestration of Carbon Dioxide: A Technology Review and Analysis of Opportunities in Ontario. Ontario Ministry of Natural Resources. https://climateontario.ca/MNR_Publications/276925.pdf

[4] Government of Canada. (2006) Canada's CO2 Capture & Storage Technology Roadmap. Natural Resources Canada. https://publications.gc.ca/collections/collection_2014/rncan-nrcan/M154-16-2008-eng.pdf

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Question(s):

a) Please provide examples of Enbridge customers that have made a commitment to move to natural gas with carbon capture.

b) Please explain who regulates hydrogen in Ontario and under what authority.

c) For the scenario including 100% hydrogen, please provide what responsibility and regulatory authority the OEB would have in regulating pure hydrogen production and/or infrastructure (e.g. hydrogen pipelines) in Ontario, if any.

Response:

a) Enbridge Gas has held discussions with several large volume customers on the potential for carbon capture; however, currently none have committed to move forward pending the development of further government regulations required to permit these activities within Ontario.

b) Hydrogen pipelines and facilities in Ontario fall under the jurisdiction of the Technical Standards and Safety Authority (TSSA). Depending on application, the applicable regulations are O. Reg. 210/01: Oil and Gas Pipeline Systems, O. Reg. 212/01: Gaseous Fuels, O. Reg. 220/01: Boilers and Pressure Vessel Regulation, or O. Reg. 219/01: Operating Engineers Regulation.

c) The OEB does not currently have a mandate to regulate 100% hydrogen. As provided at Exhibit 1, Tab 10, Schedule 6, par. 93, the Government of Ontario would have to implement an expanded mandate for the Ontario Energy Board to enable it to regulate hydrogen pipelines.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Question(s):

a) As part of Sustainability efforts as outlined in the evidence, Enbridge established Scope 3 emission metrics to track performance. Please provide the Scope 3 metrics, goals and current results against target. [Enbridge Sustainability Report - Exhibit 1, Tab 10, Schedule 3, Page 1]

b) As part of Sustainability efforts as outlined in the evidence, Enbridge has linked emissions goals to compensation and financing [Enbridge Sustainability Report - Exhibit 1, Tab 10, Schedule 3, Page 1]. Please provide the details Enbridge is using to link emission goals to compensation and financing. Please also provide the most recent results and their impact on compensation and financing.

c) According to the Sustainability Report referenced in Enbridge evidence, Enbridge has achieved 20% of its goal to reach Net Zero by 2050 [Enbridge Sustainability Report - Exhibit 1, Tab 10, Schedule 3, Page 1]. Please provide a copy of the plan and related materials (e.g. scorecards, PowerPoint reporting, etc.) to achieve Net Zero by 2050 and provide the current progress against the plan.

d) Please also provide any materials (reports, PowerPoint decks, etc.) outlining how the 20% progress against the Net Zero 2050 goal was achieved (i.e. what activities have been undertaken and the contribution of each activity).

e) Please provide details on what additional progress against the Net Zero by 2050 goal will be achieved by implementing the proposed Rebasing plan as outlined in the application.

Response:

a) Enbridge Gas reports customer natural gas consumption as a Scope 3 metric. Enbridge Gas has not set Scope 3 emissions reduction goals.

b) Beginning in 2021, the Gas Distribution and Storage (GDS) business unit's scorecard, which includes Enbridge Gas, included a Scope 1 and 2 emissions related objective. This scorecard objective has been reviewed and updated annually to ensure alignment with strategic priorities. The Scope 1 and 2 emissions related scorecard objective makes up 5% of the GDS scorecard. The achievement of this scorecard objective is directly linked to Enbridge Gas's Short-Term Incentive Plan (STIP). In 2022, the target for GDS's Scope 1 and 2 emissions reduction key performance indicator was exceeded, please see response at Exhibit I.1.2-SEC-79, Attachment 1, page 4. Enbridge Inc. has sustainability linked financings outstanding which link its cost of debt to the achievement of meeting a selection of corporate ESG targets, including diversity and emissions intensity reduction. While Enbridge Gas is working to support the achievement of Enbridge's corporate ESG targets, Enbridge Gas does not have any sustainability linked financings.

c) Enbridge Inc. has a corporate target of net-zero by 2050 and Enbridge Gas is working to support the achievement of this ESG goal. The broader Enbridge Inc. activities and reporting is not relevant to this Application. Please see Exhibit 1, Tab 10, Schedule 8, Table 1 and 2 for Enbridge Gas Scope 1 and 2 emissions reductions opportunities identified to date. Table 1 contains the Scope 1 and 2 emissions reductions initiatives, including the initiative's associated emissions reductions, that have an in-service date prior to 2022 that Enbridge Gas has implemented and that are contributing to the achievement of the Enbridge Inc. net-zero target. In addition, Enbridge Gas, along with other business units, is continuing to identify new emissions reduction opportunities and assess them for technical feasibility and cost-effectiveness. Those that are technically feasible and cost-effective may be integrated into the AMP and managed through the approved capital envelope. Please note Enbridge Gas has identified an error in Table 1 of Exhibit 1, Tab 10, Schedule 8. The Forecasted Project Emissions Reductions for the Direct Inspection and Maintenance Program/Leak Detection and Repair (LDAR) project should be 8,200 tCO2e, not 118,200 tCO2e.

d) As an enterprise, Enbridge Inc. has achieved 20% of its goal to reach Net Zero by 2050. Please see response at part c) for description of Enbridge Gas activities. The broader Enbridge Inc. activities and reporting is not relevant to this Application.

e) Enbridge Gas will implement the Tier A Scope 1 and 2 emissions reduction opportunities, please see Exhibit 1, Tab 10, Schedule 8, Table 1, during the rebasing period, as well as both the Hagar boil-off and the portable blowdown recovery emissions reduction opportunities, please see Exhibit 1, Tab 10, Schedule 8, page 6, paragraph 10. Implementation of these initiatives will enable Enbridge Gas to achieve 80,500 tCO2e in emission reductions, which will support Enbridge Inc.'s corporate net-zero target. Enbridge Gas will also continue to identify new emissions reduction opportunities and assess these opportunities for technical feasibility and cost-effectiveness. Those that are technically feasible and cost-effective may be integrated into the AMP, as discussed in Exhibit 1, Tab 10, Schedule 8, Page 6, paragraph 11.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

PollutionProbe_IR_AppendixB_Enbridge2022Q3Presentation_20230209

Question(s):

Please provide a copy of the strategy documents for both Core Growth and Low Carbon Growth per slide 5 of the Enbridge presentation noted above.

Response:

The strategies for utility assets within Enbridge Gas's regulated operations are discussed in the Asset Management Plan, provided at Exhibit 2, Tab 6, Schedule 2. Strategies affecting or affected by low-carbon growth opportunities in the AMP include RNG Station Strategy described on page 139 of 288 in Section 5.2.4.6.1.7 and the Hydrogen Strategy described on page 74 of 288 in Section 5.1.9.5.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

“The OEB expects that, at a minimum, the level of natural gas savings from DSM programs during the next multi-year term will be the equivalent of at least 0.6% of sales in 2026, 0.8% of sales in 2027 and 1.0% of sales in each year from 2028 through to the end of 2030, relative to the prior year on a weather normalized basis”. [EB-2021-0002 Decision and Order, Page 4]

Question(s):

a) Please explain how Enbridge’s Rebasing application and related load forecast complies with the OEB direction to reduce net natural gas volumes beginning in 2026?

b) If the Enbridge Rebasing application is not in alignment with OEB direction for annual net reductions in natural gas throughput, please provide what elements of the application will need to change and when Enbridge would be in a position to provide those updates.

c) The Posterity Group analysis appears to be the fastest way to provide modelling results in alignment with OEB direction (i.e. reductions of at least 0.6% of sales in 2026, 0.8% of sales in 2027 and 1.0% of sales in each year from 2028 through to the end of 2030, relative to the prior year on a weather normalized basis). Please provide an updated scenario from Posterity Group to reflect the net throughput modeling assumption starting in 2026.

Response:

a-b) Please see response at Exhibit I.1.10-STAFF-2 parts b-c).

c) The following response was provided by Posterity Group:

Additional analysis, modelling effort and expense are required to answer this question. The associated additional level of effort cannot be undertaken within the IR timeframe.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

"Enbridge Gas is excited and confident about the role the Company can play in supporting customers, the province, and municipalities in achieving their GHG emission reduction goals."

Question(s):

a) Please provide specific examples of where Enbridge has helped municipalities reach their emission reduction goal?

b) Has Enbridge partnered with any municipalities to develop and/or deliver an IRP Plan to deliver on a municipality's energy and emission plan goals? If yes, please provide details.

c) Please provide a summary of Enbridge collaboration with Ontario municipalities related to their energy and emission plans. Please include specific results achieved (reduction of energy and GHG emissions) per municipality.

d) Please provide a breakdown by Ontario municipality of the incremental energy and emission reductions that will be achieved based on Enbridge's Rebasing application.

e) Please provide an update (since the EB-2020-0091 OEB Decision in 2021) on development and implementation of IRP alternatives in coordination with the City of Ottawa. Please also describe the timing of additional IRP alternatives to be implemented in alignment with the City of Ottawa's Energy Evolution Plan based on Enbridge's Rebasing application.

Response:

The full paragraph in evidence this interrogatory is referencing includes: "*The evidence presented in Exhibit 1, Tab 10 is provided to detail how energy transition has been integrated within Enbridge Gas's business and planning processes, and to support the various proposals in this Application related to energy transition. Enbridge Gas is filing this energy transition evidence for the first time to reflect the changes rapidly occurring within the energy sector. <u>Although a great deal of uncertainty exists with regards to how</u>*

Ontario's energy transition will unfold, Enbridge Gas is excited and confident about the role the Company can play in supporting customers, the province, and municipalities in achieving their GHG emission reduction goals." [emphasis added to show complete sentence] (Exhibit 1, Tab 10, Schedule 1, par. 3)

a) For most municipalities, the earliest GHG emission reduction goal that they have is a 2030 midterm target; therefore, it is premature to evaluate or report on whether the municipalities have met their GHG reduction goal and how Enbridge Gas supported this achievement.

That said, Enbridge Gas has, and continues, to play a meaningful role in supporting municipalities in the development of their Community Energy Plans (CEPs) and in the identification and implementation of GHG reduction opportunities. These reduction opportunities include both energy efficiency programs and low-carbon solutions for some of the largest emitting sectors within a municipality, including buildings, transportation, and industry.

Specific details of Enbridge Gas's CEP support were outlined in EB-2021-0002 2022-2027 DSM proceeding[1] and include Energy Planning Consultation; Financial Support; Promotion of Collaborative Programs; Web Development/Data Access and Collaborative Initiatives and Programs[2]. Additional examples include Enbridge Gas offering compressed natural gas (CNG) and renewable natural gas (RNG) for fleets and heavy transport that cannot be easily electrified, and Enbridge Gas offering reliable, cost-effective, and sustainable heating solutions such as hybrid heating, geothermal, CHP, Solar PV, and waste heat recovery. Finally, for energy intensive processes that can't be electrified, clean and low emission gases can be offered.

Some additional examples of Enbridge Gas's collaboration with municipalities on energy efficiency and low carbon solutions are noted below.

- Enbridge Gas's work with Durham Region[3]. Enbridge Gas and the Region of Durham executed a collaboration agreement in 2022 that included Enbridge Gas providing financial support[4] to a key pillar of the Durham Greener Homes (DGH)

[1] EB-2021-0002
[2] EB-2021-0002, Exhibit E Tab 4 Schedule 1, May 3, 2021 para 12-14
[3] https://www.durham.ca/en/living-here/low-carbon-pathway.aspx
[4] https://www.durham.ca/en/regional-government/resources/Documents/Council/CIP/CIP-2022/CIP-03042022.pdf

program[5] an offering that provides homeowners with energy coaching, including providing information on incentives and rebates, direction on retaining a contractor of choice, and project management assistance.

- Another example is Enbridge Gas's work with the City of Toronto to install infrastructure at one of its solid waste management facilities to create RNG from green bin organics. This aligns with the strategy[6] approved by City Council and has generated GHG reductions across the organization. The City of Toronto is planning on installing RNG infrastructure at another solid waste facility and to have the site operational by early 2024. The City has also identified potential biogas/landfill gas upgrading opportunities at two other City waste facilities including the Green Lane Landfill, and Keele Valley Landfill. All sites combined would have the potential to produce enough gas to fulfill the City's entire natural gas needs annually (excluding City Agency, Boards and Commissions).[7]

- In addition, the City of Hamilton and Enbridge Gas partnered on the first renewable natural gas (RNG) fueled bus in Ontario. "Renewable natural gas provides an excellent opportunity for the HSR and City of Hamilton to continue our efforts to lower corporate GHG emissions and move toward targets outlined in our Climate Change Emergency declaration and Corporate Energy and Sustainability Policy. We are proud to partner with Enbridge Gas on this innovative initiative that will pave the way to ensure the future of transit in our community is energy efficient and sustainable," [8]

- Enbridge Gas also collaborated with the City of London and London Hydro to provide a time-limited program that offered up to $3,200 in incentives for homeowners to install a hybrid heating system with smart controls in an effort to a help residents reduce their greenhouse gas emissions,[9]

b) Enbridge Gas is in the process of designing two IRP Pilots, one in the Parry Sound area and the second in the Southern Lake Huron area. As part of designing these IRP Pilots, Enbridge Gas has initiated and will continue collaboration with the

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[5] https://www.durhamgreenerhomes.ca/rebates/durham-region/
[6] https://secure.toronto.ca/council/agenda-item.do?item=2020.IE14.7
[7] https://www.toronto.ca/services-payments/recycling-organics-garbage/solid-waste-facilities/renewable-natural-gas/
[8] https://www.hamilton.ca/city-council/news-notices/news-releases/enbridge-gas-partners-city-hamilton-fuel-ontarios-first
[9] New incentive program for London homeowners helps reduce emissions and save money with a hybrid heating system | City of London

municipalities, local electricity distribution companies, Hydro One and the IESO. Through this process, Enbridge Gas is reviewing all locally available energy and emission reduction programs to determine if there's an opportunity to support their goals via the IRP Plan. As additional IRP Plans are designed, this same approach will be used.

c) Enbridge Gas has partnered with many municipalities to identify and implement GHG emissions reductions. Please see response to part a) and b) where examples of Enbridge Gas's collaboration with a number of municipalities are provided.

d) The Company declines to respond to this question, as it does not have a forecast, by Ontario municipality, of the incremental energy and emission reductions that will be achieved based on Enbridge's rebasing application.

e) Since the OEB issued its Decision and Order on the Company's St. Laurent Ottawa North Replacement Project application (EB-2020-0293), Enbridge Gas has engaged and continues to engage with the City of Ottawa to explore the potential for investment in Integrated Resource Planning alternatives, including understanding how it can partner on the initiatives set out within the City's Energy Evolution Plan. In these engagements, Enbridge Gas and the City of Ottawa are exploring various facility and non-facility investment scenarios to determine the potential to defer or reduce the natural gas system needs/constraints associated with the St. Laurent Pipeline System. These engagements with the City of Ottawa have also included Hydro Ottawa and the IESO on several occasions to discuss Enbridge Gas's demand forecast, the programs offered by the City, the potential for IRP alternatives and the potential for electrification of customers on the St. Laurent System. At this time, these conversations are still ongoing.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Question(s):

In EB-2022-0086 Enbridge indicated that it has an internal policy requirement to purchase offsets to ensure that any new pipeline project align with Enbridge's Net Zero policy.

a) Please provide a copy of the policy requiring Enbridge to offset emissions for projects.

b) Please provide an update on the purchase of offsets related to the Corunna project approved by the OEB in EB-2022-0086 and when they were (or plan to be) purchased.

c) Please provide Enbridge's estimated cost to purchase an offset per tonne of CO_2e.

Response:

a) A formal Enbridge Inc. policy to offset emissions for projects is under development.

b-c) There was no assessment of the cost of offsets or associated plan to purchase offsets for the Dawn to Corunna project, as there is a net decrease in GHG emissions as a result of this project.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Question(s):

In EB-2022-0203 Enbridge indicated that the Project was not assessed as an individual project with respect to its greenhouse gas ("GHG") emissions impacts. However, the emissions associated with these facilities will be included as part of Enbridge Gas's overall GHG emissions inventory and will be addressed as part of the Company's overall GHG strategy to reduce emissions [EB-2022-0203 Exhibit I.PP.10b]. Please explain which budget line item in the current filing includes funding to offset emissions to these kinds of projects and provide a list of the projects where emissions are estimated to be mitigated.

Response:

There is no budget item in the current filing for funding that would be used to mitigate or offset emissions from specific projects in order for them to achieve net-zero.

As provided at Exhibit 1, Tab 10, Schedule 8, Table 1, Enbridge Gas has identified a list of Scope 1 and 2 emission reduction opportunities that are being undertaken as part of the Company's on-going emission reduction strategy. There are no incremental costs identified to achieve these emission reductions as they are already being undertaken as part of Enbridge Gas's AMP as part of updated operating practices, equipment modernization/innovation, compliance with regulatory requirements.

In addition, Enbridge Gas is continuing to identify new emissions reduction opportunities and assess them for technical feasibility and cost-effectiveness. Those that are technically feasible and cost-effective may be integrated into the AMP and managed through the approved capital envelope.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Question(s):

a) Please provide all examples in Ontario or North America where gas distribution pipelines have been converted for blending hydrogen with natural gas.

b) Please provide all examples in Ontario or North America where gas transmission pipelines have been converted for blending hydrogen with natural gas.

c) Please provide all examples in Ontario or North America where gas distribution pipelines have been converted for distributing pure (100%) hydrogen with natural gas.

d) Please provide all examples in Ontario or North America where gas transmission pipelines have been converted for transmitting pure (100%) hydrogen.

Response:

a) Since late 2021, Enbridge Gas has been operating a hydrogen blending pilot in Markham, Ontario that is injecting up to 2% hydrogen by volume into a closed-loop natural gas distribution network serving approximately 3,600 customers[1]. This pilot project did not require conversion of the existing pipeline system to be able to accept up to 2% hydrogen. In addition to this project, other blending projects of which Enbridge Gas is aware are listed in the response at Exhibit I.2.6-PP-36. Enbridge Gas is not privy to whether these systems required or will require conversion prior to accepting hydrogen blends.

b) Currently Enbridge Gas is not aware of any gas transmission systems in North America that have been converted for blending hydrogen with natural gas.

c-d) Currently Enbridge Gas is not aware of any natural gas pipelines in North America that have been converted to transport pure hydrogen.

[1] Enbridge Gas. Clean Hydrogen. New Energy Technologies. https://www.enbridge.com/about-us/new-energy-technologies/clean-hydrogen

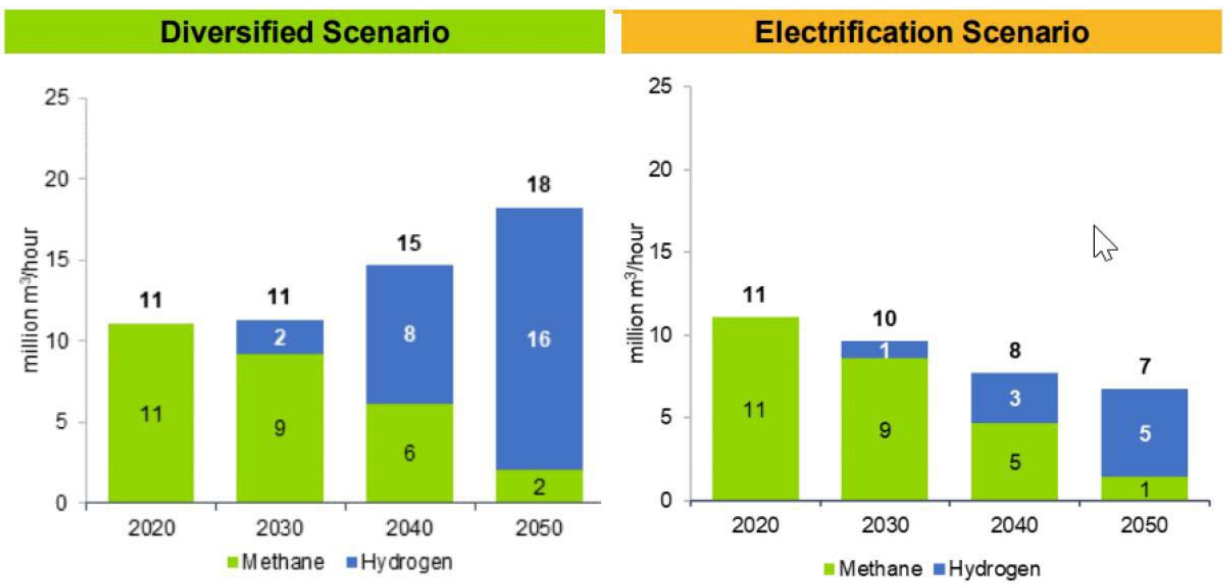
ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

Figure 5 Exhibit 1, Tab 10, Schedule 5, Page 16



Question(s):

For the hydrogen shown in each scenario please indicate the expected source of the hydrogen and whether it would be transmitted/distributed via a pure hydrogen pipeline or a blend. If it is a blend, please indicate the required percent blending for each scenario and by time period shown in the graph.

Response:

The following response was provided by Guidehouse Canada Ltd.:

The question references the gas volume peak demand presented in Figure 15 of the Pathways to Net Zero (P2NZ) report. Guidehouse's analysis projected the hydrogen sources and supply concentrations on an annual basis. Figure 15 of the Pathways to Net Zero Emissions for Ontario Study details the expected sources of hydrogen that would be supplied to meet Ontario's annual hydrogen demand. Please see the response at Exhibit I.1.10-ED-42 for a table that provides annual hydrogen consumption by scenario, showing hydrogen delivered as a blended gas and as 100% hydrogen.

Guidehouse declines to provide the sources and shares of pure and blended hydrogen at the gas volume peak indicated in Figure 15, because the sources and shares of peak volume gas supply were not calculated in the analysis.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

Canadian Standards Association Guidance – see PollutionProbe_IR_AppendixA_CSA

Question(s):

a) Has Enbridge consulted with Canadian Standards Association on its application and evidence? If yes, please provide a copy of related correspondence.

b) Please confirm Enbridge's understanding of the CSA notice for delivery and use of hydrogen in Ontario.

c) Did Enbridge analyze CSA codes & standards in its consideration for low carbon fuels such as hydrogen? If yes, please provide a copy of the materials (e.g. reports, analysis, presentations, email confirmations, etc.)

Response:

a) Enbridge Gas has not consulted with Canadian Standards Association on this rate rebasing application and evidence. Enbridge Gas has been working with the CSA Technical Committee team and other stakeholders on developing standards for higher levels of hydrogen blending.

b) Please see response at Exhibit I.1.10-ED-41 part a).

c) Enbridge Gas reviewed CSA codes and standards in its consideration for hydrogen as a low carbon fuel. This was done for the Low Carbon Energy Project leave to construct application, EB-2019-0294, Exhibit B, Tab 1, Schedule 1, Attachment 1.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

"The OEB expects that Enbridge Gas will monitor developments and bring their learnings to the rebasing application or a future stand-alone application for the Program" [EB-2020-0066 Decision, Page 21]

Enbridge Gas indicated that it will provide "reporting on Program results (participation, costs, RNG volumes etc.), RNG procurement approaches and experience, observations on the competitive market, discussion of the impact of the CFS, and details relating to go-forward proposals for the future of the Program" [EB-2020-0066 Enbridge Gas reply argument, paragraph 61]

Question(s):

a) Please provide all developments and learnings related to environmental attributed for Ratepayer funded RNG, in accordance with the OEB's direction.

b) Please provide Enbridge's RNG Program report on its experience in accordance with its commitment in EB-2020-0066.

Response:

a-b) This issue will be addressed in Phase 2 of the proceeding in accordance with the OEB's Decision on Issues List dated January 27, 2023.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Question(s):

a) Please confirm that hydrogen gas is less energy dense than natural gas and show what calculation Enbridge is using to calculate the additional volume of hydrogen gas required to replace each cubic meter of natural gas.

b) Please indicate what incremental pipeline capital costs (due to hydrogen transmission/distribution) are included in the Diversified Scenario for each timeframe.

Response:

a) While hydrogen contains the highest gravimetric energy of any non-nuclear fuel, hydrogen gas on a volumetric energy basis is less than that of natural gas.

The ratio of the volumetric energy densities of each gas is:

NG ~= 39.08MJ/m3 (subject to change at each QRAM reporting)
H2 ~= 12.78MJ/m3

Equivalent volume of hydrogen required for a unit of NG at similar conditions = (39.08MJ/m3)NG/(12.78MJ/m3) H2 = ~3.1 units of H2 to 1 Unit of NG.

The following response was provided by Guidehouse Canada Ltd.:

b) Please see response at Exhibit I.1.10-GEC-20 for the cost of hydrogen transmission /u
pipelines to and within Ontario. Costs for upgrading methane distribution pipelines to accept hydrogen blending and for the hydrogen distribution system within Ontario are outside the scope of the P2NZ analysis and not included. This is because a more detailed regional analysis is needed to understand how new hydrogen networks would develop depending on projections of regional demand centers and potential opportunities for collocating supply with demand.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

Reference: Guidehouse Pathways to Net Zero Emissions for Ontario Report
“While this study aims to adequately simulate an increasingly integrated electricity and gas system in Ontario, the results of this analysis are not intended to dictate when and where infrastructure investments will take place.” [Exhibit 1, Tab 10, Schedule 5, Attachment 2, Page 2]

Question(s):

a) Please confirm that the Guidehouse report referenced by Enbridge in its Energy Transition evidence is only a simulation and not intended to dictate infrastructure or timing. If that is incorrect, please explain why this disclaimer has been applied to the modelling and report.

b) Please explain how Enbridge has translated information from the Guidehouse report into specific infrastructure investments in the USP, AMP and other investment planning documents (e.g. capital plan, revenue plan, etc.).

c) Please provide a copy of the RFP, contract and statement of work for the Pathways to Net Zero Emissions for Ontario project and report.

d) Please confirm that the Pathways to Net Zero Emissions for Ontario Report was funded and/or under-taken in partnership with IESO and if not, please explain why not given the significant assumptions on electricity use in Ontario.

e) Please provide which accounts (e.g. O&M, Capital, DSM, IRP Deferral Account, etc.) were used to pay for the Pathways to Net Zero Emissions for Ontario Report and the percent of funding per account if funding was split between accounts.

Response:

a) Confirmed. As provided at Exhibit 1, Tab 10, Schedule 5, Attachment 2, pages 2 to 3, the Pathways to Net-Zero Emissions for Ontario (P2NZ) Report was intended to evaluate two different scenarios that achieve net-zero emissions for Ontario by 2050, and to examine the feasibility of these scenarios based on overall feasibility, energy system capacity, system reliability and resiliency, GHG reductions and costs. The purpose of the report was not to dictate when and where infrastructure investments would take place.

b) Enbridge Gas used the P2NZ Report to support the development of its Energy Transition Plan, including the safe bet actions, driving the proposed investments in hydrogen and RNG as provided at Exhibit 1, Tab 10, Schedule 6. The safe bet actions and the related investments will support energy transition in Ontario regardless of the pathway to net-zero. Costs related to Enbridge Gas's safe bet actions are included in the Utility System Plan and the Asset Management Plan.

c & e) Please see Attachment 1 for the RFP. Response at Exhibit I.1.2-CCC-3 provides the consultant contracts and costs.

d) Not confirmed. The P2NZ Report was paid for and undertaken by Enbridge Gas. Due to the timelines for preparing the P2NZ Report in advance of this Rebasing Application, Enbridge Gas did not have adequate time to coordinate with the IESO. The report found, however, that integrated energy planning is required, and this is a safe bet action outlined in Enbridge Gas's Energy Transition Plan provided at Exhibit 1, Tab 10, Schedule 6, Pages 28 to 31.

Request for Proposal

ENBRIDGE
Life Takes Energy™

Project Name:	**Decarbonization Pathways Study**
Enbridge Gas Inc. Contacts:	Project Manager: Heidi Steinberg Laxton, heidi.steinberglaxton@enbridge.com (main contact) Project Lead: Jennifer Murphy, jennifer.murphy@enbridge.com
Proposal Due:	July 14, 2021 by 5 pm
Anticipated Contract Award/Start Date:	August 9, 2021
Draft Decarbonization Pathways Study Required by:	November 1, 2021 (based on the below proposed schedule, and dependent on the actual contract award/start date)
Final Decarbonization Pathways Study Required by:	January 4, 2022 (based on the below proposed schedule, and dependent on the actual contract award/start date)

Enbridge Gas Inc. (EGI) is seeking a consultant to prepare a Decarbonization Pathways Study (the Study) which will be used to facilitate external discussions with key stakeholders and to support EGI's business planning for the next rate-rebasing period (2024-2028). The following provides an outline of the scope of work for the requested Study.

Project Purpose:
The Government of Canada has recently committed to a 40-45 percent reduction of greenhouse gas (GHG) emissions to below 2005 levels by 2030, which enhances Canada's efforts to achieve the Paris Agreement commitments. Canada has further committed to achieving Net Zero emissions by 2050. To that end, provincial and federal decision makers are looking to achieve significant GHG emission reductions in the coming years and are establishing policies to meet these goals.

Approximately 76 percent of Ontario's GHG emissions are generated from energy use with approximately 24 percent of the total GHG emissions coming from stationary combustion in residential and commercial buildings, which is assumed to be predominately from combustion of natural gas. As such, there are increased public attention and political pressures in Ontario to make significant changes to reduce and/or eliminate the use of fossil fuels, particularly in buildings. Some advocacy groups and municipalities in Ontario are promoting aggressive electrification of the energy system as an ideal solution to meet climate change targets; however, this position is largely unsupported by data on the feasibility and cost effectiveness.

The Decarbonization Pathways Study (the Study) is intended to evaluate different decarbonization pathways in Ontario. The two decarbonization pathways for evaluation in this Study are aggressive electrification of the energy system and a diversified pathway that includes decarbonization solutions using both the electric and natural gas systems.

The Study will compare each decarbonization pathway strategy and the associated impact in Ontario in terms of overall feasibility, energy system capacity, system reliability, GHG emission reduction and cost. The Study will help inform internal energy transition planning efforts related to, but not limited to, rebasing regulatory proceedings, Scope 3 emission reduction targets, and Integrated Resource Planning (IRP) work (i.e. the consideration of non-pipe solutions as alternatives instead of our traditional infrastructure). The Study will also provide EGI with supporting material to educate government, regulators and external stakeholders who are making energy transition decisions.

The goal of the Study is to provide a comprehensive solution-focus approach on how Ontario can reduce GHG emissions that meet the 2030 emission reduction targets and the Net Zero target by 2050, specifically related to the energy sector. Other sectors that impact GHG emissions, such as agricultural, waste, etc. <u>will not be included</u> in this Study.

The outputs of the Decarbonization Pathways Study will provide:

A. A comprehensive review of two decarbonization pathway strategies and the associated impacts (i.e. feasibility, GHG emission reduction potential, etc.) of each option for the short term (by 2030) and long term (by 2050) time horizons. The Study will provide an unbiased review of decarbonization pathways that include natural gas and no/low carbon fuels such as renewable natural gas (RNG) and hydrogen. The Study will provide a practical approach that meets Ontario's current and growing energy needs while considering feasibility and cost. The Study will be based on current available information and data, and;
B. A high-level cost analysis of how the decarbonization pathways impact Ontario both in the short and long term. Costs to be considered will be high-level estimates for engineering, planning, construction, procurement, and energy system improvements for the decarbonization pathways. The Study shall also identify financial opportunities and risks related to full electrification of the energy system, increases in the carbon prices and the increase in use of no/low carbon fuels.

Drivers:

- Policy makers at all levels of government are developing new climate policies:
  - *Federal: various policies under Pan-Canadian Framework, Net-Zero Carbon by 2050 target*
  - *Provincial: Climate Change Impact Assessment Study, Made-in-Ontario Environment Plan*
  - *Municipal: Community Energy Plans, climate emergencies*
- According to the Ontario Clean Air Alliance, more than 22 municipalities have passed resolutions requesting that the Government of Ontario phase-out natural gas-fired power plants in order to decarbonize the electricity supply in Ontario. Municipalities are also creating municipal energy plans that may include assumptions regarding electrification of the energy system. Currently, the electric system cannot support the full future energy needs of the province. Import of electricity from other provinces like Quebec may be an option but are not currently feasible as the transmission infrastructure are not in place and would require long lead times, which are estimated to extend beyond 2030. Further, with growing energy needs, energy imports to Ontario may not be a reliable electricity source as Quebec and other provinces or states may have their own future energy deficits to address. Innovative electricity generation technologies, such as Small Modular Reactors (SMRs) are currently under evaluation and development in Ontario and other provinces. Ontario is completing research and development of the technology, but there are no SMRs built or in commercial use in Ontario at this time.
- Energy transition discussions often focus solely on electrification of the energy system as a "magic bullet" pathway to achieve significant GHG emission reductions without consideration to other key drivers, such as:

the feasibility of energy replacement of the natural gas system that it currently provides, and the associated cost of energy replacement and the timeframe to implement a full electricity solution.

- Additional resources are needed to broaden energy transition and decarbonization discussions and to provide regulators, government and other external stakeholders the information and data to understand the opportunities of the natural gas distribution infrastructure as it relates to storage and distribution of low and zero-carbon intensity fuels, such as RNG and hydrogen, in order to make informed decisions.

Additional advocacy on energy transition strategies is needed with external decision makers related to GHG emission reduction strategies and policies, in order to:

- Enhance transparent discussions by obtaining a third-party study of the energy and electric system in Ontario. The Study will provide supporting information on the opportunities and cost implications of different decarbonization pathway scenarios, and specifically indicate which pathways provides the most cost-effective approach to meet climate related goals and provincial energy needs by 2030 and 2050. The Study may prove useful for IESO's long term energy planning and forecast work. The Study will also assist municipalities in gaining a better understanding of the impacts of different decarbonization pathways, which would have a direct impact on their communities. A third-party study will allow for more directed and thoughtful discussions with decision makers and allow for more informed discussions on a full electrification of the energy system in Ontario. The Study will evaluate if natural gas, RNG and hydrogen in the energy system can yield meaningful GHG emission reductions in line with climate related targets while continuing to support peak energy demand in a cost-effective manner.
- Strengthen relationships among stakeholders that are supportive of emissions reduction initiatives (i.e. Clean Fuel Regulation, Paris Climate Agreement, Community Energy Plans, etc.) and have more in-depth information and data on decarbonization opportunities under one cover.

EGI's Energy Transition Scenario Analysis (ETSA) Project:

EGI is currently undertaking an Energy Transition Scenario Analysis (ETSA) project to understand the potential impacts of different future scenarios related to emerging climate change policies on the operation of the EGI natural gas system, including impact on annual natural gas demand, peak day demand, number of customers and GHG emissions. ETSA scenarios that were reviewed are: a Reference Case (business as usual), Steady Progress Scenario (gradual evolution towards decarbonization), Electric Pathway Scenario (aggressive decarbonization and transition into an electric dominant system) and Diversified Pathway Scenario (aggressive decarbonization and transition into a diverse energy system). The intent of ETSA was to facilitate internal discussions and to quantify potential future scenarios to assist EGI in long term planning efforts (i.e. rebasing regulatory filing, IRP, etc.). The Decarbonization Pathways Study will compliment ETSA by conducting an Ontario-wide analysis on the implications of two of the scenarios developed in the ETSA project. The key difference with ETSA and the Study is that the ETSA study did not review the cost or feasibility of the scenarios. Further, findings from the ETSA project are intended for EGI internal planning use only, while the Study is intended to be shared with third parties, such as regulators, policy makers, industry partners, etc., for informational purposes to support their decision making. The Study will also provide support for EGI's plans regarding energy transition, particularly in the upcoming rate rebasing application. The ETSA report (or currently available draft report) will be provided to the selected consultant for review upon contract award. The input data, assumptions and output data will also be provided, as needed.

Scope of the Decarbonization Pathways Study:
The selected consultant will prepare a comprehensive report that includes:

- Identification of two decarbonization pathways for the energy system in Ontario that will result in meaningful GHG emission reductions for meeting the 2030 and the Net Zero 2050 emission targets while also meeting future projected energy demands. Currently, there are no sector based GHG emission reduction targets legislated for the energy sector, and as such the Study will look at opportunities to achieve a significant reduction of GHG emissions in the energy sector. GHG emission reductions from other industries, such as agriculture and waste, etc. will not be considered as part of this Study; however, the additional electricity demand anticipated from the electrification of the transportation sector will be factored into the Study as it may have a significant impact on the future energy demand on the electricity system.
- Decarbonization pathways should include:
  - aggressive electrification of the energy system, and,
  - a diversified energy system with electric and low carbon gaseous fuels.

  A review of the ETSA scenarios developed by EGI will be completed by the selected consultant to determine if the scenarios and the Study can be aligned, and if so, it will reduce internal discussions and review during the Study; however, detailed discussions with the selected consultant will confirm if the ETSA scenarios are representative and consistent with the consultant's review and recommendations for the Study. The ETSA report (or currently available draft report) will be provided to the selected consultant for review upon contract award.

- Evaluation of the decarbonization pathways by reviewing options for:
  - Energy conservation opportunities, including natural gas and electric heat pumps and hybrid heating (dual fuel space heating)
  - Low/no-carbon gaseous fuels, such as RNG, hydrogen, etc.
  - Low/no-carbon electricity generation, such as wind, solar, etc.
  - Pollution control measures such as carbon capture technologies, etc.
  - Other solutions such as geothermal heat pumps, district energy microgeneration, battery storage, etc.
- Evaluation of different decarbonization pathways by reviewing of the following:
  - Overall pathway opportunities and risks
  - System reliability - opportunities, challenges, limitations
  - Peak energy demand and system response capabilities to extreme weather conditions and/or events
  - Energy capacity building in Ontario – opportunities, challenges, limitations
  - High level environmental considerations – including impacts and/or benefits to the environment other than climate-related impacts (i.e. to land, water, waste management, etc.)
  - Cost, including short (2030) and long (2050) term projections of decarbonization pathway implementation, impacts of regulatory carbon pricing, impacts of sustainable finances and a cost sensitivity analysis. Each decarbonization pathway will be evaluated in terms of costs related to engineering, planning, construction of new and/or existing system, and system improvements, such as modernization and emission abatement/control.

  The above items shall be reviewed for both short term (2030) and long term (2050) time horizons.

- Review of Ontario's current energy systems, and to provide a summary of current and future energy demands and means to support current energy needs (i.e. current energy mix in Ontario in 2021).

- Review of the current energy imports/exports in Ontario and the associated dependencies, assumptions, opportunities, and risks for 2030 and 2050 targets.
- Review of opportunities and feasibility of RNG, hydrogen, and other low carbon fuels to support Ontario's energy needs while achieving GHG emission reduction targets.
- Assessment of decarbonization pathways and the ability for pathways to adjust to sudden and extreme weather conditions and events (i.e. heat waves, flash freezes, flash floods, etc.).
- Complete characterization of key critical drivers that will likely drive change in Ontario to adopt different decarbonization pathways.
- Provide evidence of how a harmonized and complimentary electricity and low carbon gas system can work together to achieve energy needs in Ontario while meeting GHG emission reduction targets and remaining cost effective for energy rate payers.

The scope of work does not include consideration of 'Black Swan' events, such as unpredictable events with severe consequences (i.e. Coronavirus). The above scope may be expanded upon further discussions with the selected consultation based on their feedback. EGI notes that the final report will likely be filed with the rate rebasing application.

Project Assumptions:

This Study will focus solely on the energy sector and the possible decarbonization pathway opportunities to reduce GHG emissions while meeting current and future energy demands in Ontario. Currently, there are no sector based GHG emission reduction targets and/or legislative requirements, and as such, this Study will provide decarbonization pathways that could achieve significant GHG emission reductions in the energy sector.

The Study will rely on current information, data, and commitments. Any assumptions made in the Study will be backed by data, conservative estimates and/or predictions, if and as necessary.

The Study will use EGI assumptions developed and included as part of EGI's ETSA project. These assumptions can be sound proofed by the selected consultant; however, any changes to the ETSA assumptions will need to be discussed and confirmed with EGI's Project Manager and Project Lead. Based on the ETSA project, EGI does not anticipated that the selected consultant will require a significant amount of effort to meet with EGI' internal subject matter experts (SMEs) over and above the periods suggested in the below proposed Schedule; however, meetings can be arranged as necessary/requested.

Project Dependencies:

- The project will use the underlying input data and outputs from the ETSA project, IESO Achievable Potential Study (APS) 2019 Study, and IESO Annual Planning Outlook.
- The Study will include other EGI studies related to innovative technology that may play a role in the energy transition space in the future (i.e. hybrid heating, no/low carbon applications in new build residential, etc.) based on discussions with internal stakeholders during the Project Charter and Discovery Sessions with the Core Working Group Team.
- This project relies on EGI's internal SMEs to provide knowledge, expertise, and data.

Project Deliverables/High Level Schedule:
The Decarbonization Pathways Study is targeting a **start date of no later than Monday, August 9, 2021**. The below schedule provides a rough timeframe for anticipated tasks. EGI would like to receive the **Draft Decarbonization Pathways Study no later than Monday, November 1, 2021**. The Study will assist with EGI internal business decisions related to our rate rebasing application, so an expedited schedule is paramount. Schedule modifications (i.e. reductions) can be included by the perspective consultant in proposal and are encouraged, if feasible.

Proposed Schedule – Deliverables & Resource Requirements

Phase	Key Deliverable	Start Date	End Date	Key Resources
Project Execution				
Initiation	Initial Communications	Week 1	Week 1	Project Lead, Project Manager
	Team Confirmed & Kickoff	Week 1	Week 2	Project Sponsor, Project Lead, Project Manager, Core Project Team, **Consultant**
Planning	Project Charter – Review & Finalize	Week 1	Week 2	Project Sponsor, Project Lead, Project Manager, **Consultant**
	Discovery Sessions (as needed)	Week 2	Week 4	Core Project & Extended Team
	3rd Party Stakeholder Engagement Strategy – for Study Review and Final Study Distribution (EGI Task – no consultant supported required)	Week 2	Week 6	Executive Sponsor, Project Sponsor, Project Lead, Project Manager
Study Execution	Develop High Level Decarbonization Pathways Definitions	Week 2	Week 4	**Consultant**, Project Lead, Project Manager
	Input and Assumption Evaluation (Impacts on Pathways) and Information/Data Collection	Week 2	Week 5	**Consultant**, Project Manager
	Pathway Evaluation and Analysis	Week 4	Week 9	**Consultant**

	Review of Pathway Evaluation, Analysis and Assessment of Data Gaps, etc.	Week 9	Week 10	**Consultant**, Core Project Team
Study Review	Delivery of the Draft Decarbonization Pathways Study – **due November 1, 2021**	Week 11	Week 12	**Consultant**
	Internal Review (meetings, feedback sessions, etc.)	Week 12	Week 14	EGI
	3rd Party Stakeholder Engagement, as necessary	Week 14	Week 16	EGI
	Deliver EGI and Stakeholder comments to **Consultant** on the Draft Decarbonization Study	Week 17	Week 18	EGI
Close	Deliver Final Decarbonization Pathways Study – **due January 4, 2022**	Week 18	Week 21	**Consultant**
Post-project	Execute External Stakeholder Engagement Strategy	Week 21	Week 21, and beyond	EGI

Items to be provided by EGI upon contract award:

- ETSA report (or currently available draft ETSA report), which contains a lot of information and assumptions on EGI's natural gas system throughput to 2038.
- Additional information from the ETSA project including data input, assumptions, and output (as needed).

Proposal and Study Communications:
Any questions and/or submissions shall be provided to **both**:

- Heidi Steinberg Laxton, Project Manager, heidi.steinberglaxton@enbridge.com
- Jennifer Murphy, Project Lead, jennifer.murphy@enbridge.com

We appreciate your interest and time in the preparation of a proposal for the Decarbonization Pathways Study. The selected consultant will be notified by email and will receive a Schedule of Work (SOW) for the scope of work provided herein. This SOW will be appended to the Consulting Agreement (CA) that EGI already has in place with the selected consultant, so all terms and conditions of the CA will apply.

Appendix A – Description of Roles

Role	Accountabilities
Project Sponsor	Identifies priority, governance & approves Project Charter (scope, resources, time) Provides timely availability of resources (people and funding required) Endorses & supports Project Management processes Champions the project for buy in, builds a coalition for change Act as "coach" for Project Lead Reviews Project Deliverables (communication schedules & budgets) Ensures Project meets intended benefits and endorses project closure Participate in a post-project (~6 months) review of benefits achieved and sustainment
ETP/IRP Steering Committee Member	Represents their areas perspective on the project and secures required resources Ensures support for solution from their area Provide messaging for the management of change in their area Ensures the delivery and acceptance of the project results Clears the path and warns of roadblocks - Resolves political and cross organizational escalations Takes responsibility for the ongoing operation of the solution Makes decisions about related project priorities Sets performance targets and schedule deadlines Acts in the best interest of all stakeholders
Project Lead – Jennifer Murphy	Leads the project team, the "face" of the project for the team & organization Accountable for the project solution design, development, and implementation Ensures project meets requirements & delivers expected value Represents Sponsor and keeps stakeholders apprised of status When formalized Management of Change is required, ensures its completion
Project Manager – Heidi Steinberg Laxton	Delivers project with consistent project methodologies and tools Reports and tracks project status and provides portfolio updates Develops and manages the project plans (schedule, risk, communication plans) Manage project inter-dependencies, risks, and critical path Facilitates change management approaches and issue resolution Mentors Project team members to develop project management skillset
Project Core Team Member	Commits to understanding the project charter (scope, deliverables, timeline) Brainstorms ideas, develops solutions, and addresses key issues Provides subject matter expertise and completes tasks as assigned Engages their represented area in the project
Extended Team Member	Brings specialist knowledge and perspective to the analysis and evaluation Helps define solution Acts as agent of change Advises Core team on acceptability

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

References: “Enbridge Gas commissioned Guidehouse to evaluate two different scenarios that achieve net zero emissions for Ontario by 2050” [Exhibit 1, Tab 10, Schedule 5, Attachment 2, Page 3].

Question(s):

a) Please explain how Enbridge identified the two scenarios that formed the scope for the Guidehouse analysis/report and if they are custom scenarios for Enbridge or if they were selected from existing publicly available scenarios.

b) Please explain why Enbridge developed the two scenarios for assessment rather than have Guidehouse select the scenarios based on Enbridge criteria.

Response:

a-b) The two scenarios modeled in the Pathways to Net-Zero for Ontario (P2NZ) Report were developed as part of the Energy Transition Scenario Analysis (ETSA) Project. Enbridge worked with Posterity Group to develop the scenarios based on their expertise and a review of other similar studies. Please see Exhibit 1, Tab 10, Schedule 5, Page 3. The scenarios in the P2NZ Report are derived from the diversified portfolio and electricity centric scenarios from the ETSA Report. These scenarios were identified as being on a trajectory that could achieve net-zero emissions by 2050, please see Exhibit 1, Tab 10, Schedule 5, page 7 and page 10. This approach provided consistency between reports and provided cost-saving as compared to starting from scratch.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

Guidehouse (2021). European Hydrogen Backbone: Analysing the future demand, supply and transport of hydrogen. Available:
https://gasforclimate2050.eu/wp-content/uploads/2021/06/EHB_Analysing-the-future-demand-supply-and-transportof- hydrogen_June-2021.pdf

Question(s):

a) Guidehouse references the above Guidehouse report to suggest that existing gas pipelines can be used to transport pure hydrogen. It appears that Guidehouse is referencing transmission pipelines and not distribution pipelines in the report referenced. Please confirm this understanding or provide the reference that provides the full range of existing natural gas infrastructure that could be operated with 100% hydrogen.

b) Is the Guidehouse 2021 European report the only reference Guidehouse has to support pipeline compatibility assumption or are there third party report references Guidehouse can provide to validate this assumption? Please provide copies (or links to) all reports Guidehouse has related to this assumption.

c) If this assumption is not correct and new pipelines would be needed instead of leveraging existing pipeline infrastructure. Please confirm what impact that would have on the cost of the Diversified Scenario.

Response:

The following response was provided by Guidehouse Canada Ltd.:

a) Confirmed. Guidehouse references the 2021 European Hydrogen Backbone report for the costs for conversion of natural gas transmission pipelines to carry hydrogen.

b) The 2021 European Hydrogen Backbone report is not the only reference that supports Guidehouse's assumptions regarding pipeline conversion. The publicly available reports listed and linked below comment on (and are supportive of) the feasibility of repurposing gas pipelines to transport hydrogen.

i. European Union Agency for the Cooperation of Energy Regulators (2021). "Transporting Pure Hydrogen by Repurposing Existing Gas Infrastructure: Overview of existing studies and reflections on the conditions for repurposing." Available at: https://acer.europa.eu/Official_documents/Acts_of_the_Agency/Publication/Transporting%20Pure%20Hydrogen%20by%20Repurposing%20Existing%20Gas%20Infrastructure_Overview%20of%20studies.pdf

ii. GRTGaz and other Gas Operators (2019). "Technical and economic conditions for injecting hydrogen into natural gas networks." Available at: https://www.storengy.fr/sites/default/files/mediateque/pdf/2019-11/2019-06-28%20Mesure%207%20-%20Rapport%202_final_EUK.pdf

iii. DNV (2021). "Study on the reuse of oil and gas infrastructure for hydrogen and CCS in Europe." Available at: https://www.concawe.eu/wp-content/uploads/Re-stream-final-report_Oct2021.pdf

iv. Agora Energiewende (2019). "No-regret hydrogen Charting early steps for H_2 infrastructure in Europe." Available at: https://static.agora-energiewende.de/fileadmin/Projekte/2021/2021_02_EU_H2Grid/A-EW_203_No-regret-hydrogen_WEB.pdf

v. Agora Energiewende, Guidehouse (2020). "Making renewable hydrogen cost-competitive Policy instruments for supporting green H_2." Available at: https://static.agora-energiewende.de/fileadmin/Projekte/2020/2020_11_EU_H2-Instruments/A-EW_223_H2-Instruments_WEB.pdf

vi. IEA (2019). "The Future of Hydrogen." Available at: https://iea.blob.core.windows.net/assets/9e3a3493-b9a6-4b7d-b499-7ca48e357561/The_Future_of_Hydrogen.pdf

c) The capacity expansion modeling conducted for the P2NZ study found that Ontario's hydrogen trade with neighbouring regions through 2050 can be fully supported by retrofitting existing pipeline infrastructure and that new interprovince pipelines would not be required. Guidehouse's assessment of energy system costs for each scenario included the cost of converting a portion of existing transmission pipelines to carry hydrogen.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

Guidehouse Pathways to Net Zero Emissions for Ontario Report

Question(s):

a) Please provide a list of stakeholders consulted in development of the Guidehouse Report.

b) Please provide a list of stakeholders and their related feedback based on Enbridge sharing (via presentation, email, meeting or other approach) the Guidehouse Report and/or related information and findings.

c) Have any stakeholders identified concerns or issues with the Guidehouse Report (report, information, analysis or findings)? If yes, please provide a summary of stakeholder feedback and any actions Enbridge intends to take to address the feedback.

Response:

a) Enbridge Gas did not conduct external stakeholder consultation in the development of the Guidehouse Report.

b) Feedback from stakeholders has generally been positive and the report has been well received. Stakeholders have noted that both pathways seem aggressive and will require funding and action to begin now in order to be achievable. Enbridge Gas has shared the Guidehouse Report via:

   Meetings with the following external stakeholders:

   Association of Power Producers of Ontario (APPrO)
   Building Knowledge
   Canadian Gas Association (CGA)
   City of Kingston
   City of Ottawa
   City of Toronto

Canadian Manufacturers and Exporters (CME)
Environment and Climate Change Canada (ECCC)
Halton Hills Chamber of Commerce
Independent Electric System Operator (IESO)
Industrial Gas Users Association (IGUA)
Enbridge's external rebasing session
National Energy Roundtable
Natural Resources Canada
Ontario Electrification and Energy Transition Panel
Ontario Energy Association (OEA)
Ontario Energy Board (OEB)
Ontario Ministry of Energy
Ontario Ministry of Environment, Conservation and Parks
Ontario Power Generation (OPG)
Ottawa Hydro
The Atmospheric Fund (TAF)
Windsor Chamber of Commerce

In addition, broad based communications were used to share the report, including news articles, social media posts and conferences.

c) Some parties expressed that a more consultative approach would have been preferable and that some additional, not yet fully commercialized solutions, could have been considered for inclusion.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

Posterity Group - Energy Transition Scenario Analysis [Exhibit 1, Tab 10, Schedule 5, Attachment 1,]

Question(s):

a) Is the Diversified Scenario in the Posterity Energy Transition Scenario Analysis the same as the Diversified Scenario in the Guidehouse Pathways to Net Zero Emissions for Ontario Report? If not, please identify the differences.

b) Please provide a copy of the RFP, contract and statement of work for Posterity Group work related to this application including the Energy Transition Scenario Analysis project.

c) Please provide which accounts (e.g. O&M, Capital, DSM, IRP Deferral Account, etc.) were used to pay for the Energy Transition Scenario Analysis project and the percent of funding per account if funding was split between accounts.

Response:

a) The Diversified Scenario in the Guidehouse Pathways to Net Zero Emissions for Ontario (P2NZ) Report and the Diversified Scenario in the Posterity Energy Transition Scenario Analysis (ETSA) are based on the same premise of leveraging low and zero-carbon fuels in conjunction with electrification to achieve net-zero. The scopes of the two studies are different, as provided at Exhibit 1, Tab 10, Schedule 5, Attachment 2, page 77. The P2NZ Report uses the ETSA as a starting point and expands upon sectors and energy demands included. The P2NZ Report includes energy demand for sectors outside of the current gas system, demand for electricity and presents scenarios reflective of economy-wide net-zero futures by 2050.

b- c) Please see response at Exhibit I.1.2-CCC-3.

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Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

Posterity Group - Energy Transition Scenario Analysis [Exhibit 1, Tab 10, Schedule 5, Attachment 1,] - “the Diversified Portfolio scenario has the highest gas volume as this scenario has the most hydrogen volumes, which are driven by low carbon gas mandates and enhanced support for deployment of hydrogen.”

Question(s):

a) Posterity Group’s footnote indicates that “The volumetric energy density of hydrogen was captured in the model: blending hydrogen increases annual volume (m3) even if energy demand (PJ) remains the same”. Is the increased gas demand in the Diversified Scenario entirely due to the fact that more gas is required when hydrogen is blended or also due to other factors? If it is due (in part) to other factors, please explain.

b) What factor did Posterity Group use to model the increase in gas demand capacity for blended hydrogen vs. natural gas?

Response:

The following response was provided by Posterity Group:

a) The increased gas demand in the Diversified scenario is entirely due to hydrogen’s low energy density, and the fact that hydrogen contributes a much larger share of the energy provided by the blend of gaseous fuels in this scenario. At the same pressure and temperature, hydrogen’s volume is approximately three times higher than methane’s per GJ of energy content.

b) We used a factor of approximately 3.03. This implies that for the same amount of energy, hydrogen requires 3.03 times as much volume as natural gas. Conversely, for the same amount of gas volume, hydrogen provides only 0.33 times as much energy as natural gas.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

Posterity Group - Energy Transition Scenario Analysis (ETSA) project. “Annual gas volume decreases 8% by 2030, 21% by 2038, and 29% by 2050, relative to 2019 in the ETI scenario, whereas an overall increase in annual gas volume is observed in the Diversified Portfolio scenario.” [Exhibit 1, Tab 10, Schedule 6, Attachment 1]

Question(s):

a) Posterity indicates that for 2050 there is a 29% decrease in gas volumes in Enbridge’s Energy Transition Initiative (ETI) scenario and a net increase for the Diversified Scenario. The Diversified Scenario indicates that the is no natural gas and only a very limited amount of “natural gas and carbon capture”. Please explain why the natural gas volumes in 2050 are not at or near zero under that scenario.

b) Please confirm that Posterity’s reference to “gas volumes” for the purposes of assessing Enbridge’s scenarios and rebasing application do not equate to natural gas volumes. If that is correct, please provide a description of what is included and what percent of each component is included in Posterity’s analysis.

c) Please explain the gas volume impact for the Posterity analysis if all hydrogen in the scenarios was removed (i.e. not distributed through the regulated natural gas infrastructure)

d) Please provide a copy of the RFP, contract and statement of work for Posterity Group work related to this application including the Energy Transition Scenario Analysis project.

e) Please provide which accounts (e.g. O&M, Capital, DSM, IRP Deferral Account, etc.) were used to pay for the Energy Transition Scenario Analysis project and the percent of funding per account if funding was split between accounts.

Response:

The following response was provided by Posterity Group:

a) It is not clear whether the question is asking about the Diversified Portfolio scenario or the ETI scenario. We have provided responses for both:

<u>*i)Diversified Scenario response*</u>

The Diversified Portfolio scenario is defined in more detail in Exhibit 1, Tab 10, Schedule 5, Attachment 1. Posterity Group modelled the scenarios developed by the ETSA project team and finalized with input from the internal and external stakeholders.

Because the end of the forecast period for the Diversified Scenario is 2038, we are unable to comment on specific assumptions about gas volumes in 2050 for this scenario. In the Diversified Portfolio scenario, annual volume decreases 4% by 2030 and then increases 11% by 2038 relative to 2019. The increase in volume by 2038 is due to hydrogen replacing natural gas, as provided at Exhibit I.1.10-PP-22 part a).

<u>*ii)ETI scenario response*</u>

The ETI scenario is not a ‘net-zero’ scenario. Please see Exhibit 1, Tab 10, Schedule 6, Attachment 1, page 5: “The ETI scenario reflects a future where GHG reductions are achieved by some decarbonization of the gas grid in combination with electrification in specific sectors. In contrast, the Diversified Portfolio is intended to represent one possible pathway to achieve net zero by 2050. The ETI scenario has limited deployment of hydrogen, RNG, and CCS unlike the Diversified Portfolio scenario.”

Input assumptions for the ETI scenario are provided in more detail in the table at Exhibit 1, Tab 10, Schedule 6, Attachment 1, pages 6 to 10.

b) Confirmed. The term ‘gas volumes’ that is used in the statement quoted in the IR question refers to any gaseous energy carrier flowing through Enbridge’s transmission and distribution systems.

All scenarios include assumptions for natural gas, renewable natural gas, and hydrogen. The Steady Progress, Diversified Portfolio and Electricity Centric scenarios also include assumptions for CCS. The bullets below reference sections of the report that present annual volume composition by fuel, for each scenario:

- Reference Case: Please see Exhibit 1, Tab 10, Schedule 5, Attachment 1, pages 48 to 49. On these pages of the report, Exhibits 29 and 30 present details of the annual volume composition by fuel in 2019, 2030, and 2038.

- Steady Progress: Please see Exhibit 1, Tab 10, Schedule 5, Attachment 1, pages 55 to 56. On these pages of the report, Exhibits 39 and 40 present details of the annual volume composition by fuel in 2019, 2030, and 2038.
- Diversified Portfolio: Please see Exhibit 1, Tab 10, Schedule 5, Attachment 1, page 62. On these pages of the report, Exhibits 48 and 49 present details of the annual volume composition by fuel in 2019, 2030, and 2038.
- Electricity Centric: Please see Exhibit 1, Tab 10, Schedule 5, Attachment 1, page 70. On these pages of the report, Exhibits 59 and 60 present details of the annual volume composition by fuel in 2019, 2030, and 2038.
- ETI: Please see Exhibit 1, Tab 10, Schedule 6, Attachment 1, page 15. On this page of the report, Exhibits 4 and 5 present details of the annual volume composition by fuel in 2019, 2030, 2038 and 2050.

c) The answers below assume the question is asking about volume impacts of hydrogen being removed (and not being replaced by another fuel):

- If the hydrogen were removed from the Reference Case, the volume in 2038 would be reduced by approximately 0.004% of the total.
- If the hydrogen were removed from the Steady Progress scenario, the volume in 2038 would be reduced by approximately 0.9% of the total.
- If the hydrogen were removed from the Diversified Portfolio scenario, the volume in 2038 would be reduced by approximately 39% of the total.
- If the hydrogen were removed from the Electricity Centric scenario, the volume in 2038 would be reduced by approximately 0.04% of the total.
- If the hydrogen were removed from the Energy Transition Initiatives scenario, the volume in 2038 would be reduced by approximately 0.004% of the total. The volume in 2050 would be reduced by approximately 0.004% of the total.

d-e) Please see response at Exhibit I.1.2-CCC-3.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

Posterity Group - “The 2050 end-user GHG emissions were modeled at 33 Mt CO2/yr, with the annual gas volumes being composed of 97% natural gas, about 3% RNG, and <1% of hydrogen in the ETI scenario. In contrast, the 2038 end-user emissions for the Diversified Portfolio Scenario were 22 Mt CO2/yr, which highlight the emission reduction effectiveness of measures assumed within the Diversified Portfolio scenario.” [Exhibit 1, Tab 10, Schedule 6, Attachment 1]

Question(s):

Please confirm that the ETI and Diversified Scenario modeling referenced by Posterity Group does not achieve Net Zero end-use emissions by 2050. If incorrect, please explain how that is achieved in the scenarios modelled by Posterity Group.

Response:

The following response was provided by Posterity Group:

Partially confirmed.

The ETI scenario does not achieve net-zero end-use emissions by 2050.

The forecast period for the Diversified Portfolio scenario only goes to 2038. However, the scenario assumes a trajectory that could achieve net-zero emissions by 2050. It assumes implementation of policies to support a widespread use of low-carbon gases, including renewable natural gas (RNG) and hydrogen, and carbon capture utilization and storage (CCUS), in addition to electrification to position Enbridge Gas’s distribution system for net-zero emissions by 2050.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

Posterity Group - Energy Transition Scenario Analysis (ETSA) project. [Exhibit 1, Tab 10, Schedule 6, Attachment 1]

Question(s):

a) Posterity Group removed CCS due to current uncertainty over when and how it will be implemented in Ontario. Please provide Posterity Group's rationale and explain why this represents a prudent modelling assumption.

b) Posterity Group adjusted demand-side management (DSM) program spending to be a 3% increase year-over-year (similar to application EB-2021-0002 currently in front of the Ontario Energy Board). The OEB (EB-2021-0002) Decision only provided a three year approval to Enbridge based on the need to significantly increase DSM results (i.e. net system throughput reductions) starting in 2026 and beyond. Did Posterity Group flatline DSM for 2026 and beyond or include escalation factors to align with the OEB's direction. Please explain.

Response:

The following response was provided by Posterity Group:

a) Posterity Group developed the ETI scenario assumptions in collaboration with the Enbridge Gas ETSA study team. The intent of the ETI scenario was to model the gas demand and GHG emissions between 2019 and 2050 based on the energy transition initiatives proposed by Enbridge Gas within the rebasing application, as well as energy transition initiatives under review or already approved by the OEB In separate applications. As provided at Exhibit 1, Tab 10, Schedule 6, page 28 "Enbridge Gas may take additional steps to explore the commercialization of CCUS in Ontario and may come forward at a future date with specific proposals regarding CCUS", and therefore did not have a specific CCS proposal and estimates to include in the ETI Scenario.

b) The OEB Decision was released after the ETI scenario analysis was completed. As indicated in the quoted text in the question's preamble, for the ETI scenario "Posterity Group adjusted Demand Side Management (DSM) Program spending to be a 3% increase year-over-year (similar to application EB-2021-0002 currently in front of the Ontario Energy Board)".

   Please see Exhibit 1, Tab 10, Schedule 6, Attachment 1, page 11 for the ETI scenario DSM budget assumptions. Please see Exhibit 1, Tab 10, Schedule 5, Attachment 1, page 45 for the DSM budget assumptions for the Reference Case, Steady Progress, Diversified Portfolio, and Electricity Centric scenarios.

   The Reference Case is the only scenario in which the budget is "flatlined." All the other scenarios have increasing budgets starting in 2021.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

"In the Diversified scenario, hydrogen plays a large role in building heat. Since hydrogen is less energy dense on a volumetric basis than natural gas, the volumetric peak demand in the Diversified scenario increases…" [Figure 4 Exhibit 1, Tab 10, Schedule 5, Page 15]

Question(s):

a) Please show the calculation comparing the volume of hydrogen required for 1 MJ compared the volume of natural gas required for 1 MJ of energy.

b) Please confirm what volume of hydrogen (as a gas in a pipeline) would be required to replace 1 cubic meter of natural gas to provide the same amount of energy.

Response:

The following response was provided by Guidehouse Canada Ltd.:

a) The volume of natural gas per MJ is 0.0258 m^3 (equivalent to 25.8 m^3 per GJ of CH4). This is an approximate average annual value based on the monthly high heating values (HHV) for natural gas provided by Enbridge Gas Inc. for the year 2021.[1] The volume of hydrogen per MJ of energy is 0.0826 m^3, or the ratio of volumetric energy density of methane to hydrogen[2] (3.2) multiplied by the volume of natural gas per MJ (0.0258 m^3 per MJ).

b) Approximately 3.2 cubic meters of hydrogen are needed to displace one cubic meter of natural gas and deliver the same amount of energy.

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[1] Enbridge Gas Inc. (2021). "Gas Composition and High Heating Value Data". Available at: https://www.enbridgegas.com/-/media/Extranet-Pages/About-Enbridge-Gas/learn-about-natural-gas/gas-composition-and-high-heating-value-data.ashx.

[2] Bossel and Eliasson (2003). "Energy and the Hydrogen Economy". Available at: https://afdc.energy.gov/files/pdfs/hyd_economy_bossel_eliasson.pdf .

ENBRIDGE GAS INC.

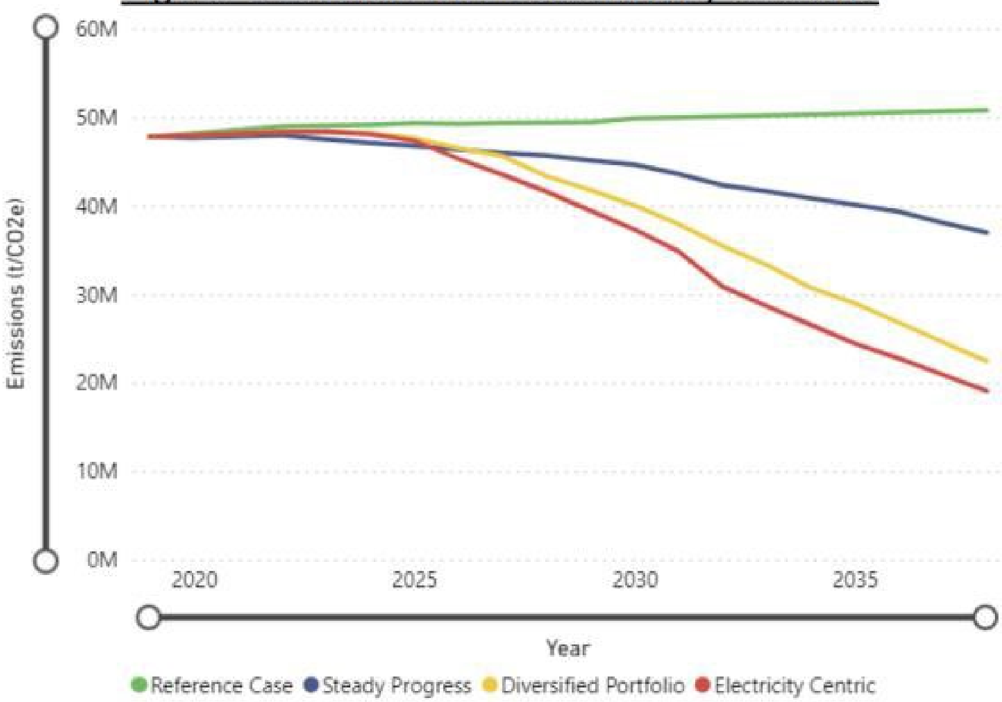
Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

Figure 1, Exhibit 1, Tab 10, Schedule 5, Page 7 (pg 9 is volume gas)

Figure 1: Annual GHG Emissions by Scenario



Question(s):

a) Which scenario does Enbridge recommend for consideration and why?

b) Are the emissions reductions in Figure 1 due to decreased natural gas usage? If not, please explain.

<u>Response:</u>

a) As provided in Exhibit 1, Tab 10, Schedule 5, Attachment 1, page 5 “The ETSA Project provides Enbridge Gas with theoretical scenarios of the future to help assess the potential impacts from climate policies and economic conditions that Enbridge Gas’s system could experience over the next 20 years.” Guidehouse leveraged the ‘Diversified Portfolio’ and the “Electricity Centric” theoretical scenarios in developing the Diversified and Electrification scenarios within their Pathways to Net-Zero Emissions for Ontario (P2NZ) Report. Enbridge Gas has developed the Company’s vision for Ontario’s energy system, which is the diversified pathway. As provided at Exhibit 1, Tab 10, Schedule 5, page 23, Enbridge Gas notes that the diversified pathway outlined in the ETSA and P2NZ studies are just one version of what a diversified pathway could look like.

b) Three of the scenarios shown in Figure 1, the Steady Progress, Diversified and Electricity Centric scenarios, demonstrate a decline in emissions over the modeled time period. Emission reductions are achieved in these scenarios through the reduction of natural gas use, while increasing the amounts of renewable natural gas (RNG), hydrogen and natural gas with carbon capture and storage (CCS). Each of the noted scenarios also includes varying assumptions related to increasing building and equipment energy efficiency and the portion of customers that switch away from gas use, which also contribute to emission reductions.

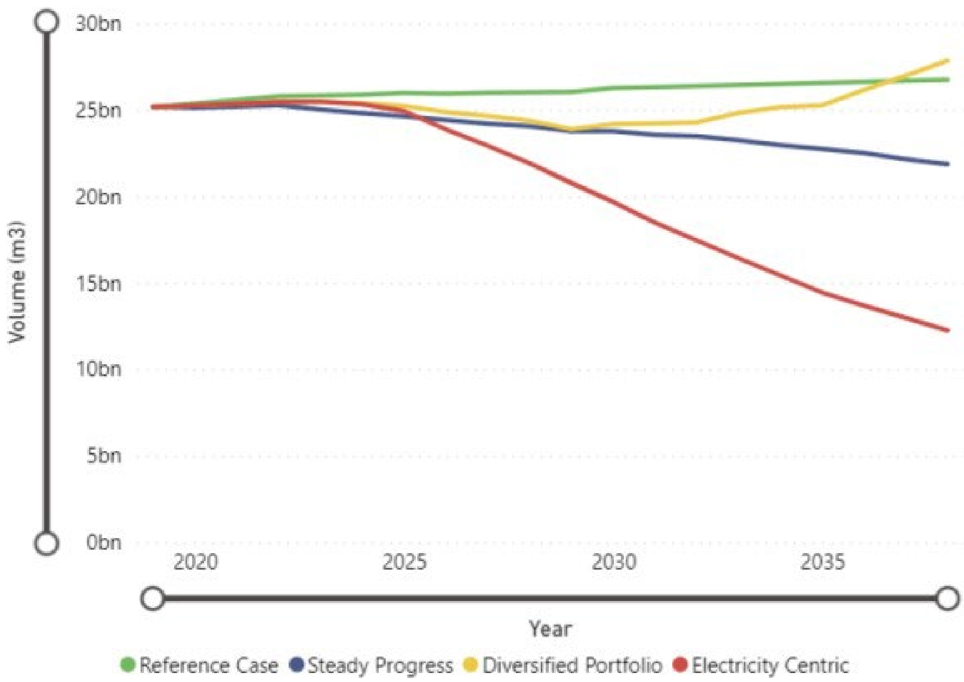
ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

Reference: Figure 1, Exhibit 1, Tab 10, Schedule 5, Page 9



Question(s):

a) Please replicate Figure 1 with PJ on the y-axis and all other information the same.

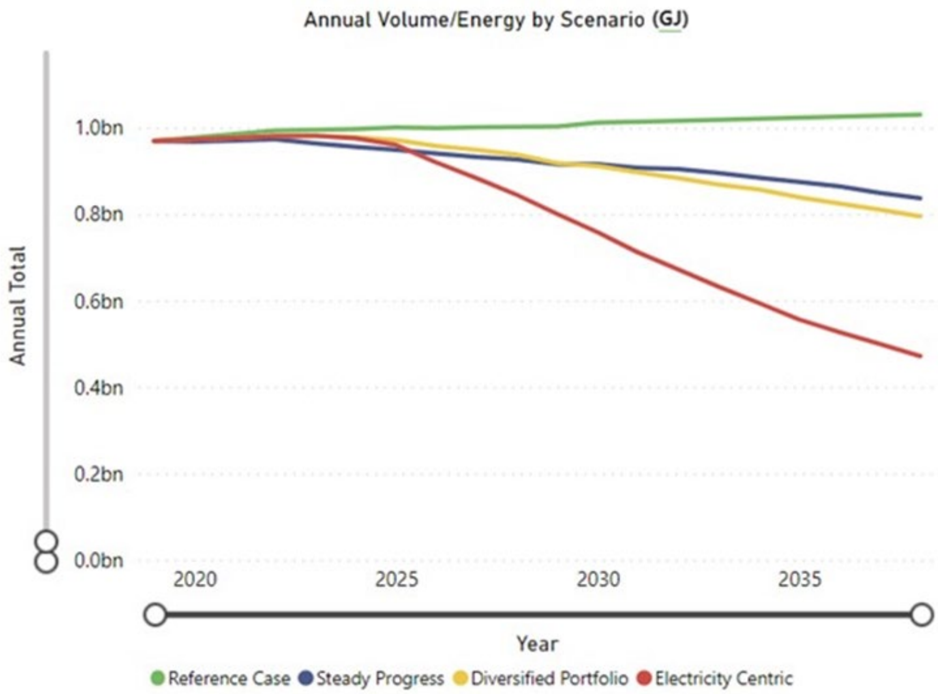
b) In 2028 what is the decreased use in natural gas (units and %) per scenario compared to the 2024 Reference Case?

c) Please provide a table showing the volume and percent by year of low carbon gas for each scenario.

Response:

The following response was provided by Posterity Group:

a) Figure 1 has been re-created with GJ on the y-axis (please note the units are GJ, not PJ).



b)

All Scenarios, Natural Gas Use (m3) in 2024-2028

Year	Reference Case	Steady Progress	Electricity Centric	Diversified Portfolio
2024	25,867,960,615	24,802,377,201	25,319,623,881	25,380,183,822
2025	25,971,253,622	24,621,157,655	24,918,073,182	25,074,920,347
2026	25,931,244,553	24,404,558,990	23,862,744,571	24,487,014,325
2027	25,981,172,253	24,192,919,474	22,915,009,704	24,018,949,027
2028	26,003,703,386	24,047,330,535	21,913,696,319	22,631,738,008

All Scenarios, Change in Year 2028 compared to Reference Case Natural Gas Use in Year 2024 (m3 and %)

	Reference Case	Steady Progress	Electricity Centric	Diversified Portfolio
Difference (m3)	135,742,771	(1,820,630,080)	(3,954,264,297)	(3,236,222,607)
Difference (%)	0.5%	-7.0%	-15.3%	-12.5%

c)

All Scenarios, Annual Volume of Low Carbon Gas (m3)

Year	Reference Case	Steady Progress	Electricity Centric	Diversified Portfolio
2019	-	-	-	-
2020	-	-	-	-
2021	587,114	588,653	589,201	589,887
2022	1,007,132	1,009,603	1,011,404	1,012,489
2023	1,077,935	1,081,941	1,084,627	1,085,500
2024	1,153,889	1,153,843	1,157,108	1,158,287
2025	1,226,354	1,225,621	1,230,555	145,713,996
2026	1,299,349	1,297,231	1,303,803	376,363,758
2027	1,803,443	1,795,467	1,810,314	621,224,123
2028	1,900,662	1,889,743	1,907,179	1,733,959,679
2029	1,997,144	1,983,095	2,003,909	2,084,245,598
2030	2,092,814	319,614,098	26,702,692	3,366,766,671
2031	2,190,064	715,074,131	130,550,801	4,609,529,482
2032	2,286,751	1,427,636,004	1,431,432,211	6,102,903,443
2033	2,383,436	1,554,315,858	1,559,298,549	7,797,498,819
2034	2,479,685	1,680,605,816	1,686,987,043	9,646,199,134
2035	2,576,378	1,855,567,290	1,818,141,356	10,660,119,024
2036	2,674,097	2,030,659,506	1,944,891,488	12,692,852,142
2037	2,770,730	2,332,807,765	2,199,668,298	14,714,233,112
2038	2,867,048	2,632,463,735	2,449,515,478	16,713,977,036

All Scenarios, Annual Volume of Low Carbon Gas (%)

Year	Reference Case	Steady Progress	Electricity Centric	Diversified Portfolio
2019	0.0%	0.0%	0.0%	0.0%
2020	0.0%	0.0%	0.0%	0.0%
2021	0.0%	0.0%	0.0%	0.0%
2022	0.0%	0.0%	0.0%	0.0%
2023	0.0%	0.0%	0.0%	0.0%
2024	0.0%	0.0%	0.0%	0.0%
2025	0.0%	0.0%	0.0%	0.6%
2026	0.0%	0.0%	0.0%	1.5%
2027	0.0%	0.0%	0.0%	2.5%
2028	0.0%	0.0%	0.0%	7.1%
2029	0.0%	0.0%	0.0%	8.7%
2030	0.0%	1.3%	0.1%	13.9%
2031	0.0%	3.0%	0.7%	19.0%
2032	0.0%	6.1%	8.2%	25.1%
2033	0.0%	6.7%	9.5%	31.4%
2034	0.0%	7.3%	10.9%	38.3%
2035	0.0%	8.2%	12.6%	42.2%
2036	0.0%	9.0%	14.2%	48.5%
2037	0.0%	10.5%	17.0%	54.5%
2038	0.0%	12.0%	20.0%	60.0%

ENBRIDGE GAS INC.

Answer to Interrogatory from
Quinte Manufacturers Association (QMA)

Interrogatory

Reference:

Ref: E1/T10/S4/p.15-16

Question(s):

Please explain the process Enbridge will follow to actively involve business customers in regional IRP consultations over the rebasing period.

Response:

Enbridge Gas is holding Regional Engagement sessions starting in April 2023. All interested parties are encouraged to register on the Regional Planning web page (see link below) to receive information on when each regional engagement session will be held. These public engagement sessions are open to all members of the public.

https://www.enbridgegas.com/sustainability/regional-planning-engagement

In areas where there are IRP pilots or IRP Plans developed, there will be additional geotargeted stakeholder engagements. Information about these sessions will also be communicated through the above noted Regional Planning web page to those that have registered to receive information about their region. These geotargeted engagements will seek feedback from those that may be interested in the IRP alternative being planned, including local municipalities, local distribution companies, Hydro One, IESO, local businesses, business and industry associations, private citizens, and any others in the local community that may be interested. These geotargeted engagement activities will take the form of public open houses, webinars, or “one-on-one” type discussions.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Quinte Manufacturers Association (QMA)

Interrogatory

Reference:

Ref: E1/T10/S6

Question(s):

Given the significant uncertainty and challenges concerning Ontario's energy pathway transition and Enbridge's proposed "safe bet" actions; and recognizing that related provincial go-forward policy is under development, how does Enbridge propose to keep its GS business customers up-to-date on what may become potentially fluid energy transition plans and directions that could have a direct impact on business and business activities that rely on Enbridge service?

Response:

Please see response at Exhibit I.1.10-QMA-9 and Exhibit I.1.10-QMA-11

ENBRIDGE GAS INC.

Answer to Interrogatory from
Quinte Manufacturers Association (QMA)

Interrogatory

Reference:

Ref: E1/T10/S6/p.39-40

Question(s):

Following QMA-10, please detail and explain what thoughts and plans are being considered now for “direct engagement” with customers by way of industry associations, municipalities, regions, and geo-targeting. How does Enbridge propose to roll-out this work during the rebasing period to 2030?

Response:

Please see response at Exhibit I.1.10-QMA-9.

In addition, Enbridge Gas will continue its direct engagement with customers by way of municipalities and industry associations.

For municipalities, these engagements will involve both one-on-one municipal discussions, as well as via engagement with those organizations supporting Municipalities, including the Association of Municipalities of Ontario (AMO) and the Rural Association of Municipalities of Ontario (ROMA).

In addition to direct engagement with Enbridge Gas’s large volume contract customers, Enbridge Gas will continue to use existing, and build new, relationships with key industry associations to share information relevant to their membership via participation in conferences, tradeshows, meetings and webinars.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-1, p. 2

Question(s):

Please file the load forecast filed by Enbridge in EB-2021-0002, and explain any differences between that load forecast and the current load forecast in this Application.

Response:

Please see Table 1 for the load forecast filed by Enbridge Gas in 2022-2027 Multi-Year DSM Plan[1] and in this Application.

Enbridge Gas's general service volume forecast in this Application is 0.2% to 0.9% lower compared to the volume forecast in 2022-2027 Multi-Year DSM Plan[2] for the forecast period of 2022 to 2024. The lower general service volume forecasts in this Application is driven by about 0.1% lower customer count (unlocks) forecast and 0.1%-0.7% lower average use forecast.

Enbridge Gas's distribution contract market volumes in this Application is 3.7% to 11.0% higher compared to the volume forecast in 2022-2027 Multi-Year DSM Plan for the forecast period of 2022 to 2024. Major drivers for the higher distribution contract market volume forecasts are customer load growth primarily in Power, Chemical, and Steel sectors.

[1] EB-2021-002.
[2] Ibid.

Table 1
Enbridge Gas Volumes - Net Forecast After DSM

Line No.	Particulars (10^6m^3)	2022 Forecast	2023 Forecast	2024 Forecast
		(a)	(b)	(c)
	2022-2027 Multi-Year DSM Plan (1)			
1	General Service Volumes (2)	15,647.7	15,727.4	15,823.1
2	Distribution Contract Market Volumes	10,791.6	10,996.9	11,024.2
3	Total Volumes	26,439.3	26,724.3	26,847.3
	2024 Rebasing (3)			
4	General Service Volumes (4)	15,623.7	15,675.0	15,688.2
5	Distribution Contract Market Volumes	11,190.6	12,026.8	12,234.7
6	Total Volumes	26,814.3	27,701.8	27,922.9
	Variance/Change (%) (5)			
7	General Service Volumes	(0.2%)	(0.3%)	(0.9%)
8	Distribution Contract Market Volumes	3.7%	9.4%	11.0%
9	Total Volumes	1.4%	3.7%	4.0%

Notes:
(1) EB-2021-0002, Exhibit I.1.EGI.SEC.1 part d).
(2) Normalized based on 2022 budget degree days.
(3) Exhibit 3, Tab 2, Schedule 7, Attachment 1 and Exhibit 3, Tab 2, Schedule 8, Attachment 1.
(4) Normalized based on proposed 2024 Forecast degree days.
(5) This Application compared to 2022-2027 Multi-Year DSM Plan.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-2, p.1

Question(s):

Please confirm that Enbridge has not prepared any contingency plans for a situation in which Enbridge is, by law or otherwise, prohibited from expanding their system, or is required to reduce the throughput on its system at some predetermined rate or levels. If any such contingency plans have been prepared, please provide them.

Response:

Confirmed.

Enbridge Gas's plan for a situation in which it is prohibited from expansion through government policy would be to address this through Asset Management Plan updates reflecting specifics of any such direction.

Enbridge Gas has not developed a contingency plan for requirements to reduce throughput at pre-determined rates or levels. To do so, Enbridge Gas would need to understand how these reductions will be funded and whether these reductions will impact future peak capacity or units of energy delivered. Enbridge Gas is requesting to implement rates that will decouple recovery of fixed costs of providing service from volumetric exposure.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-2, p.2

Question(s):

Please provide the same comparison of gas and electricity peak demand as is provided for January 9, 2022, but using the summer electricity peak day in 2022

Response:

Enbridge Gas assumes that the question is referring to January 22, 2022, as shown at Exhibit 1, Tab 10, Schedule 2, page 2. Enbridge Gas notes that there is an error in the evidence at Exhibit 1, Tab 10, Schedule 2, page 2. The date on which the most recent winter peak (highest hourly flow measured during the winter) occurred was January 20, 2022, not January 22, 2022 as shown.

The IESO indicates that the summer peak demand occurred on July 19, 2022, in the hour ending at 18:00 (6:00 pm), and was approximately 22.6 GW[1]. The electricity generated in Ontario at the same time was approximately 22 GW[2]. The amount of electricity generated was close to 79% of the 28 GW effective summer capacity.[3] The gas system demand at the same time was approximately 2,187 10^3m^3/hr or 23.8 GW[4]. Comparing the energy provided by the gas system to the electricity generation and electricity demand demonstrates that the gas system provided approximately 1.8 GW more energy.

[1] Electricity demand was 22,607 MW on July 19, 2022, for the hour ending at 18 (6pm), this is ~ 22.6 GW, IESO. Peak Tracker, https://www.ieso.ca/en/Sector-Participants/Settlements/Peak-Tracker

[2] Electricity generation was 22,073 MW on July 19, 2022, for the hour ending at 18(6pm), this is ~ 22 GW, Source Generator Output by Fuel Type Hourly Report, 2022, http://reports.ieso.ca/public/GenOutputbyFuelHourly/

[3] Source: IESO. Annual Planning Outlook, December 2021, p. 29. https://www.ieso.ca/en/Sector-Participants/Planning-and-Forecasting/Annual-Planning-Outlook

[4] 2,187 10^3m^3/hr x 1 hr x 39.12MJ/m3 ÷ 3,600 MJ/MWh = 23,771 MW or ~ 23.8 GW.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-2, p.5, 23

Question(s):

Please provide Enbridge's assumptions for gas-fired electrical generation in Ontario for each year from 2021 to 2030.

Response:

The IESO has planned actions, provided at Exhibit 1, Tab 10, Schedule 2, pages 21 to 23, to meet needs the IESO has identified, provided at Exhibit 1, Tab 10, Schedule 2, pages 19 to 20. Based on those actions, Enbridge Gas assumes that the natural gas system will continue to provide reliability and resilience to the electricity system through the energy and storage services the Company provides for gas-fired generation over the time horizon coincident with the period of this Application.

Please see response at Exhibit I.1.10-ED-9 for the design day and annual demands the Company is forecasting for gas-fired power generation in Ontario.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-2, p.5

Question(s):

Please provide all studies, memoranda, presentations and other documents in the possession of Enbridge comparing the probability of a resilience-related energy crisis in Ontario to the probability of a GHG-related crisis in Ontario.

Response:

Enbridge Gas is not aware of any studies, memoranda, presentations or other documents that compare the probability of a resilience-related energy crisis in Ontario to the probability of a GHG-related crisis in Ontario; however, the Pathways to Net-Zero for Ontario Study (please see Exhibit 1, Tab 10, Schedule 5, Attachment 2) examined the resiliency of Ontario's energy system under the two pathways to net-zero that were evaluated.

As provided at Exhibit 1, Tab 10, Schedule 5, Attachment 2, page 5, Guidehouse noted "Energy system resilience will be a key consideration as peak electric demand grows in both scenarios. The Diversified Pathway provides resilience and reliability benefits and provides solutions for hard-to-electrify sectors, such as industrial customers and heavy transport vehicles."

As provided at Exhibit 1, Tab 10, Schedule 5, Attachment 2, page 60 Guidehouse noted "As peak electric demand grows, energy system reliability and resilience will be key considerations. Significant growth in energy production from intermittent renewable resources, such as wind and solar, requires energy storage and dispatchable electricity generation capabilities to ensure that energy system reliability can be maintained. An American Gas Foundation study published in January 2021 demonstrates that "Utilities, system operators, regulators, and policymakers need to recognize that resilience will be achieved through a diverse set of integrated assets … policies need to focus on optimizing the characteristics of both the gas and electric systems."[1] The IESO examined the possibility of phasing-out natural gas generation by 2030 and concluded that, "Diversity in energy supply strengthens the reliability and resilience of Ontario's power system, as different types serve different functions in order to meet needs…. Maintaining a diverse supply mix, where the different forms of supply complement each other, is an effective way to balance supply and demand to maintain the reliability of Ontario's power system."[2]"

Finally, Hydro Ottawa, in a blog on the devastating derecho climate event in its franchise in 2022, identified the cost of burying its electrical infrastructure at $2 to $4M per kilometer, approximately 11 times that of overhead infrastructure with an execution timeline of 90 years. Enbridge's 150,000 kms of underground infrastructure across the province with a net book value of $16B represent tremendous value as long as the probability of a resilience event is non zero, which it demonstrably is based on actual experience. Please also see response at Exhibit I.1.10-SEC-28.

[1] American Gas Foundation (2021). "Building a Resilient Energy Future: How the Gas System Contributes to US Energy System Resilience" Available at: https://gasfoundation.org/2021/01/13/building-a-resilient-energy-future/

[2] IESO (2021). Decarbonization and Ontario's Electricity System: Assessing the impacts of phasing out natural gas generation by 2030. p.7. Available: https://www.ieso.ca/en/Learn/Ontario-Supply-Mix/Natural-Gas-Phase-Out-Study

[3] Hydro Ottawa (2022) Between the lines: Overhead vs. underground. Available at https://hydroottawa.com/en/blog/between-lines-overhead-vs-underground#:~:text=For%20a%20full%20scope%20look,about%2090%20years%20to%20complete.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-2, p.13

Question(s):

Please estimate at what price of carbon is the unit cost of gas at current market prices equal to the unit cost of electricity at current market prices.

Response:

Enbridge Gas currently has four rate zones, with the price of natural gas ranging from 23 ¢/m^3 to 33.6 ¢/m^3. Please see Table 1 for the estimated price of carbon that is required to achieve parity between natural gas and electricity on a unit cost basis.

Table 1

	Price of Natural Gas (¢/m^3)	Estimated Carbon Price ($/ tCO_2e)
Low end of price range	23	440
High end of price range	33.6	386

Hypothetically, if natural gas commodity prices were to drop by 25 percent, this would increase the carbon price required by approximately $30 to $43 for the low and high end of the natural gas price range respectively.

The estimate is based on the following information:

i. Natural gas rates in Ontario as of January 1, 2023, as found on the OEB's website.[1]

[1]Ontario Energy Board, Natural gas rates, Consumer Information and Protection, https://www.oeb.ca/consumer-information-and-protection/natural-gas-rates#rates

ii. Weighted average electricity rate, accounting for weekends and holidays based on time of use rates for electricity in Ontario, as of November 1, 2022, as found on the OEB's website.[2]

iii. Stationary combustions emissions factor for natural gas of 1.932×10^{-3} tCO_2e/m^3.[3]; and

iv. The heating value of natural gas as 39.12 MJ/m^3.

[2] Ontario Energy Board, Electricity rates, Consumer Information and Protection,https://www.oeb.ca/consumer-information-and-protection/electricity-rates
[3] National Inventory Report, 2022

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

Bridge to a Cleaner Energy Future 2021 Sustainability Report; 1-10-3, p.4, fn 5

Question(s):

With respect to Enbridge Inc.'s Bridge to a Cleaner Energy Future, 2021 Sustainability Report:

a) [p.5] Enbridge Inc. states that "our planning process places significant emphasis on understanding changes in energy systems and evaluating trends to help inform our approach." Other than the implementation of the IRP Framework, please explain how Enbridge implemented this "significant emphasis" in the preparation of the load forecast and the Asset Management Plan.

b) [p.5] Enbridge Inc. states that ""…we test the resilience of our businesses with a 1.5 C scenario analysis." Please provide all studies, reports, presentations, memoranda and other documents, not already on the record, that carried out or reported on that resilience with respect to the Enbridge (EGI) business.

Response:

a) Enbridge Gas has put significant emphasis on understanding changes in energy systems and evaluating trends to inform our forecasting and planning processes. Enbridge Gas undertook an Energy Transition Scenario Analysis (ETSA) Study as summarized in Exhibit 1, Tab 10, Schedule 5, Section 1. The resulting ETSA Report was provided as Exhibit 1, Tab 10, Schedule 5, Attachment 1. Enbridge Gas used the ETSA Study, a review of current climate policies and input from stakeholder engagement to develop energy transition adjustment factors that were incorporated into the forecasting and planning process related to our customer and volume forecasts as well as design hour and design day, as summarized in Exhibit 1, Tab 10, Schedule 4. These forecasts and design elements are used in downstream planning processes, such as Enbridge Gas's Asset Management Plan, Gas Supply Plan and rate setting processes, and as a result, energy transition trends are explicitly or inherently included within our business approach.

b) In addition to the ETSA Study, described in response to part a), Enbridge Gas undertook the Pathways to Net-Zero for Ontario (P2NZ) Study to evaluate how net-zero could be achieved via two different pathways in Ontario. Enbridge Gas believes that these scenarios, both of which can achieve net-zero by 2050, are consistent with the International Energy Agency Net Zero Emissions by 2050 Scenario (NZE) and therefore a 1.5 C scenario.

Enbridge Gas also notes that in addition to the 2021 Sustainability Report referenced in the question, Enbridge Inc. has also released two related reports:

- 2021 Datasheet Bridge to a Cleaner Energy Future[1]
- Resilient Energy Infrastructure Addressing Climate-Related Risks and Opportunities[2]

[1] Bridge to a Cleaner Energy Future, 2021, https://www.enbridge.com/-/media/Enb/Documents/Reports/Sustainability-Report-2021/Enbridge-ESG-Datasheet_2021.pdf?rev=719a8f6b73564b66981d9b9b5905fa1c&hash=8B28BE65CF26E2423A0D51A8B2FB84D9
[2] Resilient Energy Infrastructure Addressing Climate-Related Risks and Opportunities, September 2019, https://www.enbridge.com/~/media/Enb/Documents/Reports/Resilient_Energy_Infrastructure_report_FINAL.pdf

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-3, p.7

Question(s):

Please file the draft regulations referred to when they are available.

Response:

Draft regulations have not been published at this time.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-3, p.8

Question(s):

Please confirm that the impact on the price of gas from the carbon charge is expected to increase by 2.94 cents per cubic meter annually starting in 2023, and reach an aggregate of 33.29 cents per cubic meter by 2030.

Response:

Not confirmed. In December 2022, the federal government released draft regulations amending the Greenhouse Gas Pollution Pricing Act to include the federal carbon charge rates from 2023 to 2030.[1] Based on these rates, the price impact of the federal carbon charge on marketable natural gas will be an increase of 2.60 cents/m^3 in 2023 and 2.86 cents/m^3 each year from 2024 to 2030. The federal carbon charge rate will reach 32.40 cents/m^3 in 2030.

[1] Government of Canada. (2022 December 06). Draft Regulations Amending Part 1 of Schedule 1 and Schedule 2 to the Greenhouse Gas Pollution Pricing Act and the Fuel Charge Regulations, No.2. https://fin.canada.ca/drleg-apl/2022/raggppafc-rmtpgesrc-1222-fra.html

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-3, p.10

Question(s):

Please provide all studies, memoranda, presentations and other documents in the possession of Enbridge relating to the potential generation, sale, or other use by Enbridge of CFR credits.

Response:

The requested items can be categorized into three main areas as follows:

i. Enbridge submissions to Environment and Climate Change Canada
ii. Internal Presentations on CFR
iii. Internal CFR Records

There is a large number of documents related to the CFR and it is not feasible for Enbridge Gas to ensure that all documents have been provided. Enbridge Gas is providing a sample of documents within each of the noted categories that it considers representative of the information being requested.

The following Attachments are included with this response:

Attachment 1: Enbridge Written Submission on Clean Fuel Regulation (CFR): Target and Trajectory (Submitted to Environment and Climate Change Canada, April 2022)

Attachment 2: Enbridge Gas "Clean Fuel Regulation" presentation (presented to Energy Transition Steering Committee on October 20, 2021), parts of which have been redacted for reasons set out in the Company's accompanying request for confidential treatment of certain information filed in this proceeding.

Attachment 3: Enbridge Gas "Clean Fuel Regulation Credit Creation and Administration Program" Charter (completed August 2022)

For further information regarding Enbridge Gas's intended use of CFR credit proceeds, please see response at Exhibit I.1.10-APPrO-18 part a).

Written Submission on Clean Fuel Regulation (CFR): Target and Trajectory

Submitted by Enbridge

April 8, 2022

About Enbridge

Enbridge is a leading North American energy infrastructure company. Enbridge has a strategic network of oil and gas pipelines, North America's third-largest gas distribution utility, and significant renewable power generation assets. We exist to fuel people's quality of life. We do so by safely delivering nearly two-thirds of Canada's crude oil exports to the U.S. and approximately 19 per cent of natural gas consumed in the United States. We also have nearly 2,075 megawatts (MW) of net renewable generation capacity, based on projects in operation or under construction. With assets in multiple jurisdictions, we make investment decisions to do business where it makes sense to do so.

Enbridge believes that climate change requires serious solutions, and that Enbridge can be part of those solutions. Across our business, we've committed to net-zero greenhouse (GHG) emissions by 2050 and to reduce our emissions intensity 35 per cent by 2030. To drive results and accountability, incentive compensation is tied to meeting these commitments.

Introduction

Enbridge submits these comments in response to the Clean Fuel Regulation (CFR): Target and Trajectory update provided by Environment and Climate Change Canada (ECCC) on March 25, 2022.

ECCC has proposed changes to the 2030 target carbon intensity (CI), increasing the target from 12 g/MJ reduction to 14 g/MJ reduction. This change is in response to the federal government's announcement of 40% to 45% emissions reduction in Canada by 2030 and announced zero emission vehicle mandates. ECCC has also proposed extending the early action crediting period from 6 months to 1 year based on stakeholder feedback and to allow time for liquid fuel primary suppliers to prepare for the proposed increase in stringency. Additionally, ECCC has indicated there is a change to baseline fossil fuel carbon intensities for liquid and gaseous class fuels following data quality control and assurance activities.

The coming into force of the liquid fuel primary suppliers' compliance obligation which was expected to begin at the end of 2022 has now been pushed back to July 1, 2023. In order to meet the more stringent target within a shorter timeframe, primary suppliers will be expected to reduce the carbon intensity of liquid fuels or procure CFR credits at a faster annual rate of 1.5 g/MJ, an increase from the 1.2 g/MJ increments stated in Canada Gazette I in December of 2020. Enbridge is supportive of the extended early action crediting period to one year and the later compliance start date to give participants more time to prepare and for emerging low carbon technologies (which are expected to play a larger role in meeting the more stringent goal) to ramp up.

The proposed changes to CI targets are a significant change to the program and very little details of the analysis have been shared with stakeholders. Enbridge recommends that ECCC release a revised regulatory impact analysis statement (RIAS) and provide ample time for participants to review which will allow them to be fully aware of the impact of the changes. Additional time would also allow obligated parties to perform their own economic analysis on impacts to their business and provide meaningful consultation and feedback.

The updated reference CIs that were shared on March 25, 2022, lower the liquid class CIs and also increase the gaseous class CI. The proposed carbon reference intensity for biogas, RNG or H2 suggests that the baseline CI for natural gas has increased from 62 to 68 g/MJ. Enbridge recommends that ECCC provide clarity on whether the default natural gas and compressed natural gas CIs have also changed in Schedule 5 of the CFR. Enbridge also recommends greater transparency related to the lifecycle assessment (LCA) model, associated datasets, modeling methodology and quality control and assurance (QA/QC) process to allow for greater investment and program certainty. Greater clarity is also being requested as it relates to the potential for future changes to baseline fossil fuel values where updates to the LCA model may occur. Enbridge recommends that potential changes to baseline fossil fuel CIs be limited to the mid-program review to decrease program uncertainty. Consideration should also be provided where the establishment of new regulations or policies may affect the calculation of carbon intensities (i.e., requirements to divert organic waste that affect eligibility of avoided methane), where a “grandfathering” period of at least ten years may be applied to registered low-carbon fuels that may be subject to new policies.

Enbridge recommends a revised RIAS to accompany the final regulation in Canada Gazette II. The rationale, considering all the changes ECC has proposed since Gazette I including the determination by ECCC that 6 million additional credits will be required to meet compliance. The information provided on March 25, suggested that fewer credits would be created from the Category 1 pathway because the scope of the pathways was reduced in a previous update. Also, 1 million fewer credits would be created from Category 2; however this change was not explained. Additional credit creation from Category 3 was anticipated due to an expected increase in ZEV sales. Enbridge recommends that ECCC also consider hydrogen fuel cell vehicle and CNG vehicles having a larger role in credit creation. Emerging technologies are expected to provide 6 million more credits than previously projected, but greater details concerning these technologies should be provided.

Conclusion

Thank you for this opportunity to provide input on the Clean Fuel Regulation. If you have any questions, please do not hesitate to contact amanda.affonso@enbridge.com

Clean Fuel Regulation (CFR)

Jennifer Murphy / Cora Carriveau / Lana Phan

ENBRIDGE
Life Takes Energy

Agenda

- Recommendation overview
- Introduction to CFR
- CFR opportunities
- Rebasing recommendation
- Decision approval

Recommendation overview

Recommendation: EGI to enter Clean Fuel Regulation (CFR) credit market with a phased approach beginning in 2022.

Today's objectives:

Phase	Activity	Today's objectives
Phase 1: 2022	Credit creation from existing Enbridge activities	Discussion for input
Phase 2: 2023	Credit creation from CFR offering for customers	Discussion for input
Phase 3: 2024	Credit creation from future Enbridge activities	Approval needed for treatment of CFR in rebasing

Federal Clean Fuel Regulation (CFR) Introduction

- Objective: to lower the carbon intensity of liquid fossil fuels along 3 pathways
  - Lower emissions from production and combustion of fuels across the lifecycle (e.g., carbon capture, renewable self-power, methane reduction)
  - Incorporate use of low carbon fuels (i.e, ethanol, biodiesel, RNG, H2)
  - Switch to alternative vehicles (e.g., EV, CNG, FCEV)
- CFR is anticipated to be finalized in Dec 2021
- Compliance obligation begins 1 year later (Dec 2022) for Primary Suppliers (liquid fossil fuel producers and importers)
  - 3.8 Mt of credits required in 2022 increasing to 28.2 Mt credits in 2030
  - Expecting credit surplus for first 5 years of program (2022-2027)
- Early action credit generation can begin when CFR is finalized
- California and BC have similar low-carbon fuel standards since 2007 and 2010, respectively, but credits are not tradable between systems

CFR market players

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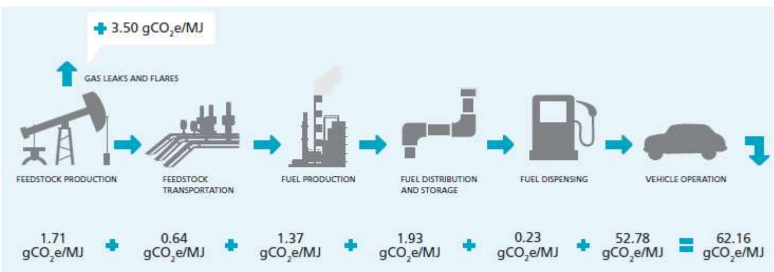
- Obligated Parties (Primary Suppliers): liquid fossil fuel producers and importers
  - 39 entities that refine, upgrade or import liquid fuels in Canada will be regulated under CFR (e.g., Shell, Suncor, Imperial Oil), (estimate ~100,000 t credit per entity for 2023)
  - Can generate own credits or buy credits from other market participants
- Credit Generators (Voluntary Participants):
  - EI and EGI activities are eligible to generate credits, but are not obligated to participate
  - Biofuel producers (e.g., Greenfield Global) expected to be main fuel and credit suppliers in near term
  - EV network operators role and credit supply expected to grow over time
- Service Providers:
  - Lifecycle Assessment Reporting
  - Validation and Verification Bodies
  - Credit brokers

CFR Obligation

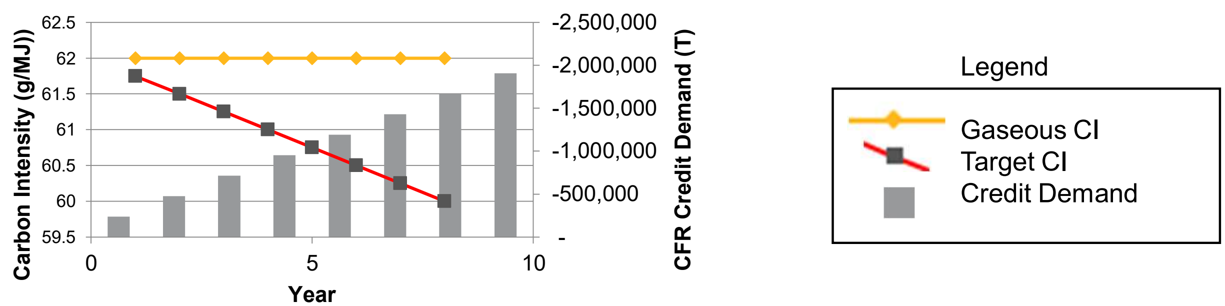
- CFR is based on the carbon intensity (CI) of fuels, which is determined over the fuel's lifecycle
- The compliance obligation is based on the delta between carbon intensity of fuel and targets set by government, multiplied by annual energy supplied



(Fuel CI Value (gCO2e/MJ) - CI Target (gCO2e/MJ)) x Annual Energy Supplied (PJ) = Annual Compliance Obligation (T credit/debits)

- As the annual CI target declines (red line), the number of credits required to achieve compliance increases (grey bars)

Example CFR Compliance Demand*



*For illustrative purposes only

CFR Credits

- CFR credits allow for the monetization of the environmental attributes associated with a project
  - Value can be used by EGI to reduce costs for RNG, H2 and CCUS for rate payers
- Each credit is equal to one tonne of avoided emissions
- The CFR program allows “stacking” with other regulatory programs, however other regulations may not allow it
  - The federal offset program does not allow an offset credit to be created if a CFR credit is created
- Sale of CFR credits does not impact reporting and compliance under the federal and provincial GHG reporting programs, Federal Carbon Charge, Output-Based Pricing System (OBPS) or Emission Performance Standards (EPS)
- There is no standard regarding the sale of CFR credit and corporate voluntary GHG reporting and targets
  - Delphi Group (consultant to EI) has stated that CFR credits can be sold and the GHG reduction benefits can be claimed as part of corporate voluntary GHG reporting. This has also been supported by Fortis and Energir.
  - We are seeking legal opinion, and input from Trevor McLeod and Sarah Burns

Credit generation process

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Prework

- Agreement to create credits (Section 21)
- Register as CFR credit creator (Dec 2021)
- Apply for approval of CI* (if applicable)

Reporting

- Quarterly credit creation report* (if applicable)
- Annual credit creation report*
- Annual CI pathway report* (if applicable)
- Annual Material balance report* (foreign supplier)
- Annual Compliance credit balance report

Credit transfer

- Engage Credit Buyers
- Agreement to transfer credits
- Complete form in CFR to transfer credits

Enbridge's responsibility

External LCF producer responsibility

Optionality in responsibility – Enbridge or Producer

* Verification required

Summary of CFR credit opportunity

Phase 1 – 2022

Credit creation from existing Enbridge activities

[redacted]

Phase 2 – 2023

Credit creation from a CFR offering for customers

[redacted]

- [redacted]

Phase 3 – 2024+

Credit creation from new Enbridge activities

[redacted]

- [redacted]

1. Estimated annual report/verification costs: includes costs for consulting for credit creation and verification, which would begin in 2022. Costs associated with phase 2 and 3 are incremental.
2. Additional O&M costs: annual costs to administer CFR program. [redacted] Credit revenue will not be realized until 2023/2024 due to timing of issuance and sales of credits. Revenue in phase 2 and 3 is incremental.

Summary of CFR credit opportunity

[redacted]

	2022	2023	2024	2025
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[redacted]

	2022	2023	2024	2025
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

[redacted]

Benefits and Risks of Phased Approach

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Benefits	Risks
• Gain experience and become early market player • Enbridge will be in a position to quickly scale approach to later phases when greater revenue generating opportunity will be available • Enbridge should be an attractive counterparty for obligated parties • Creates internal resource that can potentially support other BU credit opportunities • Pragmatic approach to reduce risk of new business • Encourages and supports customer adoption of lower-carbon solutions (CNG, RNG, H2) • Enhances customer satisfaction • Credit sales from RNG or H2 procurement may lower cost of gas for customers or emission reduction activities.	• Credit revenue is uncertain and may be lower than administrative costs during early years of market set up • Where EGI is the credit creator, we assume credit the risk of replacement if errors or invalidation occurs • Delay in offering service may lead to customers developing credits on their own • EGI assumes some risk and costs when creating credits on customers behalf • May take numerous transactions to sell large volume of gaseous credits

RNG/H2 Proposal in Rebasing

Decision Needed

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Recommendation: Assume zero impact of CFR credits from RNG and H2 in rebasing proposals

- Price of RNG/H2 assumed to be the same whether or not we participate in CFR
- If we do participate in CFR, assuming that incremental cost to generate/procure CFR credits is equal to revenue from selling credits

Rationale:

- This proposal allows flexibility for a decision to be made at a later date regarding whether EGI will become a voluntary participant to generate CFR credits
- It is difficult to estimate the cost to procure RNG/H2 with CFR credits attached and the price at which EGI might be able to sale credits
  - CFR market has yet to be established and there are no publicly available forecasts of CFR credit prices
  - CFR credit prices are likely to be published by ECCC in the future once trading begins, but this may not be until mid-2023 at the earliest or into 2024

Next Steps:

- Meet with EI to gather input and ensure alignment with any other related BU activity
- Present final recommendation for approval at the Nov ETSC

Project Charter

Project Name:	Clean Fuel Regulation Credit Creation and Administration Program
Project Sponsor:	**Exec. Sponsor:** Malini Girdhar **Sponsor:** Cara-Lynne Wade/Jennifer Murphy
Project Lead:	Cora Carriveau
Project Manager:	Lana Phan

Project Purpose

The purpose of this project is to establish an administration program (allocate resources and develop processes and procedures) to create and sell Clean Fuel Regulation (CFR) credits from EGI and EGI customer activities to increase the cost effectiveness of lower-carbon initiatives and fuels (e.g, CNG, RNG and H2) for EGI and its customers. This program may also support CFR credit creation activities for affiliate business where appropriate.

Once the administration program is established, credit creation activities are expected to be undertaken in three distinct phases: 1) create early action credits from existing eligible EGI activities; 2) create a credit creation service offering for EGI customers undertaking CFR eligible activities, and generate credits on behalf of EGI customers; 3) create credits from future EGI activities.

Credits created will be sold to CFR obligated parties (primary suppliers) to generate revenue that can reduce the cost of low carbon fuels (RNG and hydrogen) and may incent fuel switching to CNG/RNG or hydrogen vehicles.

End objectives for CFR Project:

- August 1, 2022 – Establish Roles and Responsibility with Project Charter Approval
- August 20, 2022 – Establish CFR Account in CATS for credit transactions
- Dec 2022 – Document program budget, process and procedures
- July 2023 – Generate and sell early action credits
- Mid-2023 – Launch credit service product offering for customers
- Early 2025 – Generate continuous revenue

Project Approach:

- ❑ Project team (Carbon Strategy) to lead and manage CFR program development activities at EGI
  - Develop a workplan and schedule
  - Assign roles and responsibilities
  - Develop and document Processes & Procedures
  - Develop and implement Record Management System
  - Contract with service providers
  - Develop service offering for customers

- ❑ Project team (Carbon Strategy) to manage CFR credit generation activities and sale of credits at EGI
  - Undertake market research as needed
  - Provide contract provisions for credit sales and ownership
  - Administrate CFR credit account (undertake credit registration and transfer activities)

Drivers: Safety, Compliance, Lifecycle, Strategic-Financial (growth, revenue, productivity), Strategic-Reputation (license to operate, brand image, customer satisfaction)

- **Strategic-Financial**: Large revenue potential from Energy Transition projects already taking place or expected to occur in the near future
- **Strategic-Reputation**: supporting Enbridge and customer lower carbon opportunities
- **Extend Growth**: Invest in low-risk business model, diversify business and respond to energy transition
- **Adapt to Energy Transition over time**: Pursue targeted investments and develop capabilities in complimentary new energies

Strategic Alignment: Include strategic alignment for EGI goals/ vision

- Extend growth: Invest in new assets that fit well within our low-risk business model and help diversify our business and respond to energy transition
- Adapt to energy transition over time: Pursue targeted investments and develop capabilities in complimentary new energies

Project Background: Relevant background

The Carbon Strategy Team at EGI has been a member of Environment and Climate Change Canada's (ECCC) Technical Working Group (TWG) since 2018 when ECCC announced its intention to develop a national Clean Fuel Regulationment. During its experience as a TWG member, the Carbon Strategy Team has developed a detailed knowledge of CFR requirements and credit generation opportunities available to EGI, its customers, and other Enbridge business units, and is well suited to manage activities related to CFR credit generation.

The basic premise of the CFR is to lower the lifecycle carbon intensity of liquid fossil fuels distributed in Canada over time, where compliance is achieved through the submission of CFR credits. During the initial stages of CFR development, it was proposed that natural gas distribution companies would be obligated parties with their own compliance obligations. As of December 2020, the scope of the CFR was reduced where only distributors of liquid fossil fuels were identified as obligated parties with a compliance obligation. Despite the reduction in scope, natural gas distributors continue to be eligible to participate in the CFR on a voluntary basis, where the displacement of natural gas with hydrogen or RNG in non-transportation related activities can create CFR credits, as well as the use of CNG (including RNG) /LNG or hydrogen vehicles where they displace gasoline or diesel vehicles. Opportunities also exist to create CFR credits from carbon capture and sequestration and integration of renewable power at facilities within the liquid fossil fuel supply chain (i.e., oil pipelines).

The final Clean Fuel Regulation was published on June 20, 2022. Parties that register as a credit creator prior to August 20, 2022, have the opportunity to generate credits as of the publication date. The first issuance of credits from activites undertaken in 2022, will occur after June 30, 2023 following approval by ECCC. Once CFR credits are deposited in EGI credit accounts, they may be transferred and sold to obligated parties.

In May 2022, the Energy Transition team provided recommendations to the Energy Transition Steering Committee (ETSC) to approach CFR credit generation in three phases. The ETSC provided approval to register projects to generate CFR credits. EGI activities that generate CFR credits include: EGI CNG fleet vehicles, affiliate CNG fueling stations, the Voluntary RNG (OptUp) program, and the Low Carbon Energy Project (hydrogen injection). Customer and future EGI credit generating activities include: customer CNG (RNG) vehicle fueling and use of RNG as compressor fuel or delivered to EGI customers.

Project Scope

Describe what the project will address and what it will not address. (include key in-scope/ out-of-scope paramet

In Scope	Out of Scope
1) Establish Administrative Requirements for Program a. Assign roles and accountabilities b. Establish and track project budget c. Develop workplan and schedule	• Procurement of H2, RNG, and CNG fleet vehicles for EGI

d. Document processes and procedures e. Procure legal and consulting services as needed f. Allocate revenues from credit sales g. Develop customer service offering h. Program reporting for ESG reporting 2) Fulfil CFR Registration and Reporting Requirements a. Create CFR CATS Account b. Data collection c. Credit creation d. Coordinate reporting requirements from Consultants 3) Negotiation and Execute Credit and Service Sales Agreements a. Develop terms and conditions for services or credit sales b. Coordinate legal review of contracts c. Support BD Sales teams with service offering	• Execution of BD strategies related to RNG, H2, and CNG

Project Deliverables:

- Program Documentation
- Executed Credit Sales and Service Contracts
- Revenue Reciepts
- Quarterly and Annual Program Performance Reports

Areas Impacted –

- Business Development
- Gas Supply
- Corporate ESG reporting
- Operations (fleets, Markham H2 facility)
- Finance/Accounting
- Legal

For a detailed list of stakeholders, refer to "Stakeholder Analysis" on sharepoint.

Critical Success Factors - Describe the key factors that will ensure the success of this project.

- Commitment from leaders from impacted areas of the organization and their team members and stakeholders as described in the project Overview "resources required"
- The support from the department & project leadership
- Access & availability to internal data

Project Assumptions - Describe key assumptions to start the project (e.g. organization, technology, process).

- Resources (people) will be available as per project timelines
- Data to support future potential of intitatives is available (internally or online)

- CFR Credit Market Demand

Project Dependencies - Describe dependencies with other projects/ work that will impact the project deliverables/timelines.

- Availability of data from Phase 1, 2 and 3 projects go ahead as expected
- Lifecycle assessment model – OpenLCA will have data required to calculate carbon intensity of RNG and H2 in final regulation
- Buyers will be interested in credits and agree to reasonable price
- Perceived double counting does not become an issue
- Gaseous credit stream remains a pathways within the CFR

Project Deliverables/High Level Schedule

Schedule – Deliverables & Resource Requirements Identify process documentation, training, tools, measures, EIR tool

Phase	Key Deliverable	Start Date	End Date	Key Resources
Initiation	Initial Communications	November 2021	June 2022	Cora, Lana
Planning	Project Charter (team, resources, timing, scope)	May 18, 2022	June 31, 2022	Cora, Lana
	Sharepoint Site & Access Management	May 18, 2022	May 31, 2022	Lana
	Implementation Plan Approval	May 25, 2022	Aug 5, 2022	Lana, Cora, Jenn
	Project Plans for each Project	June 1, 2022	June 15, 2022	Lana
Implementation	Register as credit creator and register projects	June 30, 2022	Aug 20, 2022	Lana, Cora
	Engage Consultants	June 30, 2022	Sep 1, 2022	Lana, Cora
	LCA for Hydrogen/RNG	Sept 14, 2022	Oct 14, 2022	Lana, Cora, Consultant
	Credit Creation Report Submissions		June 30, 2023	Lana, Cora
	Quarterly/Annual Reporting	Quarterly/Annually	Quarterly/Annually	Lana, Cora
	Verification Reporting	Annually	Annually	Lana, Cora, Consultants
Close	Sale of Credits	January 31, 2023	Quarterly	Project Team

Project Organization/Resources * include cross functional resources needed

Project Roles/Assignments

Role	Name(s)	Expected Time Commitment
Project Sponsor	Exec Sponsor : Malini Girdhar Sponsor : Cara-Lynne Wade	Exec Sponsor 2 h/month Sponsor 2h/week

Steering Committee Member	ETSC	4h/year
Project Lead	Cora Carriveau	2.5d/week
Project Manager	Lana Phan	2.5d/week
Project Core Team Member (subject matter expert)	Lana Phan Cora Carriveau	2.5d/week (as above)
Extended Team Member (initiative leads)	Sam McDermott (hydrogen) Gord Lau (RNG) Nicole Brunner (RNG) Steve Kay (CNG) Gazifere representative (Sonja)	1-2d/month
Extended Team Member (support)	Legal (TBD) Finance (TBD) CNG Station Operators (TBD) Hydrogen Plant Operators (TBD) RNG Producers (TBD)	2-4 h/month

Project Team Approach

Describe how the project team will operate – how the work will get done. (eg working meeting, homework with checkins, other), meeting date preferences, etc.

- Project team meets with lead bi-weekly meeting (1 hour)
- Steering committee quarterly meeting (1 hour)
- Meetings with Extended team as needed

Project Risks

Identify potential risks to the project and assign consequence/ probability

Project Change Control Process

Once the project charter is approved, all changes impacting scope, time, resources will be handled through the following Change Control Procedures:

After the approval, the team members have to submit a Change Request via sharepoint and ensure they get the change approved by the appropriate stakeholders.

Project Communications

Key project messaging and timing. Include Public Affairs for support as required.

For a detailed list of stakeholders, refer to "Stakeholder Analysis" .

Document Control				
Version #	Version Date	Modified by:	Approved by:	Method of Approval:
1	August 2, 2022	Cora Carriveau	Jennifer Murphy	Veral

Appendix B– Description of Roles

Role	Accountabilities
Project Sponsor	Identifies priority, governance & approves Project Charter (scope, resources, time) Provides timely availability of resources (people and funding required) Endorses & supports Project Management processes established Champions the project for buy in, builds a coalition for change Act as "coach" for Project Lead Reviews Project Deliverables (communication schedules & budgets) Ensures Project meets intended benefits and endorses project closure Participate in a post-project (~6 months) review of benefits achieved and sustainment
Steering Committee Member	Represents their areas perspective on the project and secures required resources Ensures support for solution from their area Provide messaging for the management of change in their area Ensures the delivery and acceptance of the project results Clears the path and warns of road blocks - Resolves political and cross organizational escalations Takes responsibility for the ongoing operation of the solution Makes decisions about related project priorities Sets performance targets and schedule deadlines Acts in the best interest of all stakeholders
Project Lead	Leads the project team, the "face" of the project for the team & organization Accountable for the project solution design, development and implementation Ensures project meets requirements & delivers expected value Represents Sponsor and keeps stakeholders apprised of status When formalized Management of Change is required, ensures its completion
Project Manager	Delivers project with consistent project methodologies and tools Reports and tracks project status and provides portfolio updates Develops and manages the project plans (schedule, risk, communication plans) Manage project inter-dependencies, risks and critical path Facilitates change management approaches and issue resolution Mentors Project team members to develop project management skillset
Project Core Team Member	Commits to understanding the project charter (scope, deliverables, timeline) Brainstorms ideas, develops solutions, and addresses key issues Provides subject matter expertise and completes tasks as assigned Engages their represented area in the project

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-3, p.10; 1-10-6, p.12

Question(s):

Please provide all studies, memoranda, presentations and other documents in the possession of Enbridge relating to the risk of new targets, plans, strategies and policies impacting Enbridge, and/or strategies for Enbridge to minimize or mitigate those impacts. Please provide a detailed explanation of how Enbridge proposes that the ratepayers should be protected in the OEB's decision in this proceeding if the changing targets, plans, strategies and policies of governments result in Enbridge's forecast operating and capital plans being inconsistent therewith.

Response:

Please see response at Exhibit I.1.3-SEC-7 and Exhibit I.5.3-IGUA-29 for materials related to how Enbridge Gas plans to adapt to the evolving energy transition and mitigate risk.

As part of this Rebasing proceeding, Enbridge Gas has engaged Concentric to determine if the Company's overall risk profile has materially changed in the face of the evolving energy and policy environment in Ontario, Canada and internationally. Concentric's analysis and conclusions are provided at Exhibit 5, Tab 3, Schedule 1, Attachment 1.

Please see response at Exhibit I.1.10-STAFF-34 a) for a discussion on the strategies Enbridge Gas has identified to help mitigate the risk of changing targets, plans and policies.

The Company notes that as part of this Application it is requesting approval of 2024 rates, established on a cost-of-service basis, as well as a price cap rate setting mechanism for 2025 to 2028 IR term. The Company does not anticipate that federal or provincial climate targets, plans, and policies will change, such that they would materially impact near-term planned or forecast 2024 capital or operating costs. Energy transition assumptions that have been included are discussed at Exhibit 1, Tab 10, Schedule 4.

With regards to the 2025 to 2028 IR term where rates are proposed to be established through a price cap mechanism, rates will not be tied to an explicit forecast of capital or operating costs; however, to the extent that federal or provincial climate targets, plans, and policies change, which materially impact (decrease or increase) Enbridge Gas's operating and capital plans over that period, the proposed incentive rate-setting mechanism provides several protection measures for ratepayers and the Company, including:

- Earnings sharing mechanism – under the proposed earnings sharing mechanism ratepayers would share in any overearnings greater than 150 basis points above the allowed ROE, which could result from efficiencies or cost reductions brought on by changing market conditions.

- Leave-to-Construct proceedings – a large portion of Enbridge Gas's capital expenditures over the 2025 to 2028 IR term will be subject to leave-to-construct proceedings, which will provide the opportunity to incorporate any changing market conditions, ensuring the appropriateness of the expenditures.

- Off-ramp mechanism – under the proposed off-ramp mechanism, a regulatory review of the rate-setting mechanism could be triggered if utility earnings are +/- 300bp from the OEB-approved formula ROE.

- Generic proceedings initiated by the OEB – to the extent that federal or provincial climate targets, plans, and policies change, the OEB may initiate generic proceedings to allow input by ratepayers and utilities as to how to address the changing environment.

- Z factor adjustments – a mechanism to address material changes (increases or decreases) in costs associated with unforeseen events outside of the control of management.

- Deferral accounts – existing deferral accounts, such as the carbon related deferral accounts, or newly requested or ordered deferral accounts could potentially capture impacts if climate or policies regulations change.

The Company notes that the Z-factor, Earning Sharing and Off-ramp mechanisms are parameters of the Incentive Rate-Setting Mechanism proposal which will be addressed in Phase 2 of the proceeding in accordance with the OEB's Decision on Issues List dated January 27, 2023.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-4, p.1

Question(s):

Please provide the load, average use, design day, design hour, and distribution contract customer demand forecasts before the review referred to was undertaken, and explain any changes made to each of those forecasts to reflect climate policies and energy transition.

Response:

The requested load forecast has been interpreted as the general service volume forecast. The general service volume forecast, which includes energy transition adjustments, and the impacts related to energy transition assumptions can be found in response at Exhibit I.1.10-STAFF-31, Attachment 1, Tables 1 and 7, respectively.

The time required to provide the average use forecast prior to the energy transition adjustment (i.e., carbon pricing increasing by $15/tonne of carbon dioxide equivalent (tCO_2e) per year after 2022 to $170/$tCO_2e$ in 2030) exceeds the time available to respond.

Please see response at Exhibit I.1.10-SEC-23 that shows design hour demand over time with and without energy transition adjustments, as provided at Exhibit 1, Tab 10, Schedule 4, Table 1. The adjustment factors were derived from the Energy Transition Scenario Analysis (ETSA) Reference Case (Exhibit 1, Tab 10, Schedule 5, Attachment 1), where the scenario model outputs for peak hour were divided by number of accounts for new and existing residential, commercial, and industrial sectors to derive a peak hour per customer factor. The ETSA Reference Case peak hour per customer factor was selected as it represented enshrined policies and regulations, where other ETSA scenarios (Steady Progress, Diversified Portfolio and Electricity Centric) contained uncertain policy assumptions (e.g., uncertain performance requirements and timing of Ontario Building Code changes).

The winter 2023/2024 design day demand provided at Exhibit 4, Tab 2, Schedule 3, Attachment 1 incorporates energy transition adjusted customer addition forecast with the energy transition adjusted design hour demand on those customers as well as the historical declining use per customer for the existing general service customers (please see Exhibit 4, Tab 2, Schedule 3, paragraph 51).

Attachment 1 has been updated with additional rows (lines 9 to 13) to reflect the scenario where no energy transition influence (as described above) is incorporated within existing customers or forecast customer demands. Please compare lines 9 to 13 to lines 4 to 8.

The distribution contract demand and customer forecast is provided at Exhibit 3, Tab 2, Schedule 8, Attachments 1 and 2. As provided at Exhibit 1, Tab 10, Schedule 4, page 8 ”the distribution contract market customer and volume forecasts are derived from customer and sector level intelligence, energy transition impacts are inherent and specific to customers in the proposed forecast methodology and do not require additional consideration or adjustment. Enbridge Gas, therefore, did not make any additional energy transition-related adjustments in the distribution contract market forecast.”

Table 3
Winter 2023/2024 Design Day Demand

Line No.	Particulars (TJ/d)	EGD CDA	EGD EDA	Union MDA	Union WDA	Union NDA	Union NCDA	Union SSMDA	Union EDA	Union South	Total
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)
	Existing										
1	Firm Bundled / Semi-unbundled	3,372	715	6	88	167	42	42	179	3,327	7,939
2	Firm Unbundled	584	0	0	31	103	3	61	207	0	987
3	Firm Total	3,956	715	6	119	270	45	103	386	3,327	8,926
	Proposed										
4	Firm Bundled / Semi-unbundled	3485	698	6	88	155	45	42	173	3283	7973
5	Firm Unbundled	584	0	0	31	103	3	61	207	0	987
6	Firm Total	4,069	698	6	119	257	47	102	379	3,283	8,960
7	Difference (line 6 – line 3)	113	(17)	(0)	1	(13)	3	(1)	(7)	(44)	34
8	% of Firm Total (line 7 / line 3)	2.9%	(2.4%)	(0.5%)	0.7%	(4.7%)	5.7%	(0.8%)	(1.8%)	(1.3%)	0.4%
	Proposed - without Energy Transition Influence										
9	Firm Bundled / Semi-unbundled	3,522	703	6	90	156	45	42	174	3,300	8,038
10	Firm Unbundled	584	0	0	31	103	3	61	207	0	987
11	Firm Total	4,106	703	6	121	259	47	102	381	3,300	9,025
12	Difference (line 11 – line 3)	150	(12)	0	2	(11)	2	(1)	(5)	(27)	99
13	% of Firm Total (line 12 / line 3)	3.8%	(1.6%)	0.5%	1.7%	(4.1%)	4.4%	(0.9%)	(1.4%)	(0.8%)	1.1%

Note:
(1) Includes firm demands. Interruptible demand has been curtailed.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-4, p.4

Question(s):

Please confirm that the average use forecast does not include any assumptions about future changes to energy efficiency codes and standards. Please provide all studies, memoranda, presentations and other documents in the possession of Enbridge dealing with future changes in energy efficiency codes and standards.

Response:

Confirmed. Enbridge Gas's average use forecast at the time of forecasting did not include any assumptions or adjustments about future changes to energy efficiency codes and standards in accordance with the Ontario Building Code (OBC). Updating and harmonization of the OBC with the National Building Code of Canada (NBC) 2020 and the National Energy Code of Canada for Buildings (NECB) 2020 is expected to occur in March 2024[1]. Enbridge Gas's proposed forecast only assumes the continuation of historical energy efficiency trends through the vintage variable included in residential models. The release of the 2020 NECB occurred on March 28, 2022 and was subsequent to Enbridge Gas's forecasting of average use used within the rebasing application. Please see Exhibit 3, Tab 2, Schedule 5, paragraphs 22-24 for the details about the vintage variable.

Proposed changes and harmonization of the Ontario Building Code with the 2022 NECB are available at: https://prod-environmental-registry.s3.amazonaws.com/2022-02/Proposed%20Building%20Code%20Changes%20to%20Align%20with%202020%20National%20Construction%20Codes.pdf

The National Energy Code of Canada for Buildings 2020 is available at: https://nrc-publications.canada.ca/eng/view/ft/?id=af36747e-3eee-4024-a1b4-73833555c7fa

[1] Executive Summary: Proposed Changes for the Next Edition of Ontario's Building Code (Winter 2022 Consultation), January 2022, https://prod-environmental-registry.s3.amazonaws.com/2022-01/Executive%20Summary%20-%20OBC%20Next%20Edition%20Winter%20Consultation.pdf

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-4, p.6

Question(s):

Please confirm Enbridge has assumed in its customer forecast that:

a) Conversions to natural gas from other energy sources for home heating will continue at its current pace until 2029, and;

b) After 2029, such conversions will continue into the foreseeable future at a rate of 90% of the current pace.

Response:

a) Confirmed.

b) Not confirmed. To clarify, after 2029, such conversions will continue at a level that is 90% of what it would otherwise be in absence of energy transition.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-4, p.11

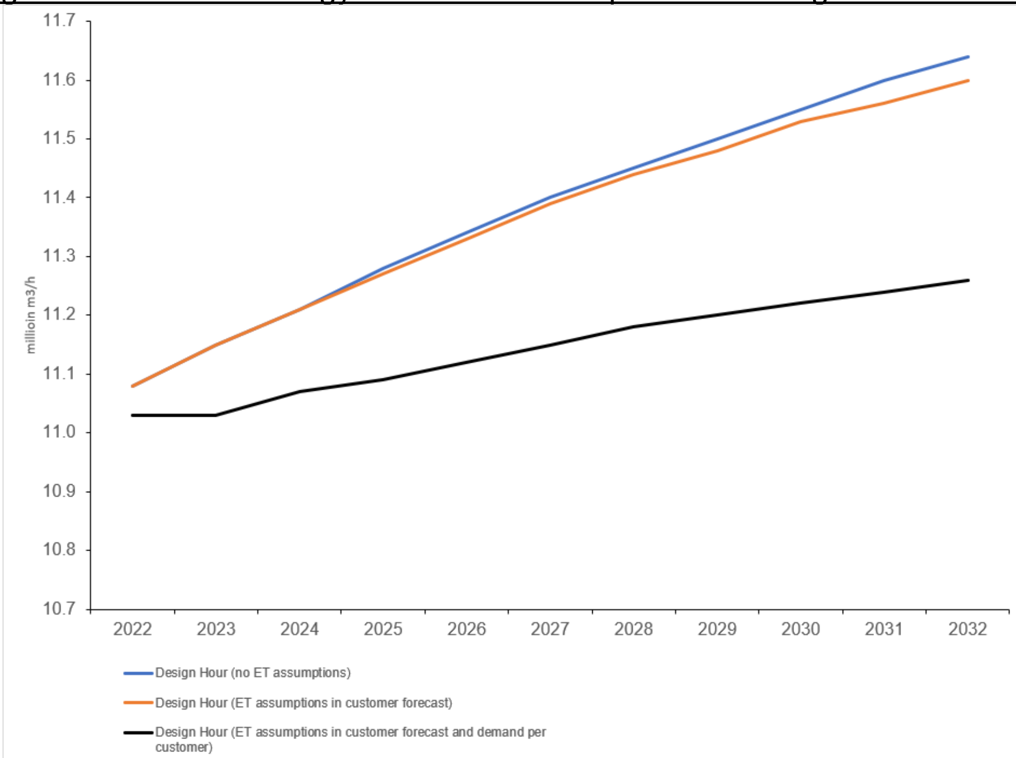
Question(s):

Please provide the numerical data behind Figure 3 in Excel format.

Response:

The data that underpinned Figure 3 in Exhibit 1, Tab 10, Schedule 4, page 11 included interruptible demands for a portion of the system. As the design condition is with interruptible demands off these demands should not have been included. Please see the updated Figure 3 below and Attachment 1 for the Excel.

Figure 3: Effects of Energy Transition Assumptions on Design Hour Demand



Effects of Energy Transition Assumptions on Design Hour Demand

Line No.	Year	Design Hour (no ET assumptions) (Mm3/hr)	Design Hour (ET assumptions in customer forecast) (Mm3/hr)	Design Hour (ET assumptions in customer forecast and demand per customer) (Mm3/hr)
		(a)	(b)	(c)
1	2022	11.08	11.08	11.03
2	2023	11.15	11.15	11.03
3	2024	11.21	11.21	11.07
4	2025	11.28	11.27	11.09
5	2026	11.34	11.33	11.12
6	2027	11.40	11.39	11.15
7	2028	11.45	11.44	11.18
8	2029	11.50	11.48	11.20
9	2030	11.55	11.53	11.22
10	2031	11.60	11.56	11.24
11	2032	11.64	11.60	11.26

Notes:

ET= Energy Transition

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-4, p.12

Question(s):

Please confirm that the design day demand forecast relied on in this Application includes zero impact of the energy transition.

Response:

Not Confirmed. The design day demand forecast does include assumptions around energy transition.

The design day demand includes the following energy transition impacts for both general service and contract rate customer demand.

Existing General Service Customer Design Day Demand

Exhibit 1, Tab 10, Schedule 4, paragraph 33 explains how energy transition has been incorporated into the existing customers' general service design day demand:

> As provided at Exhibit 4, Tab 2, Schedule 3, the design day demand forecast incorporates historical trends for existing general service customers in Transmission Planning's use per customer, which have been observed to decline over time.

This is restated in Exhibit 4, Tab 2, Schedule 3, paragraph 51, part g) ii.

> The existing customer general service design day demand is adjusted using the ratio of general service demand divided by the number of general service customers. The use per customer has a gradual downward trend over time which reflects observed energy efficiency gains or processes or behavioural changes.

New General Service Customer Design Day Demand

Exhibit 1, Tab 10, Schedule 4, paragraph 9 explains that energy transition assumptions were considered for the general service number of customers forecast and the average use per customer. The general service number of customers forecast is then used in the design hour demand, as explained in Section 1.4. Details of the energy transition assumptions are further explained in Section 1.2.

Exhibit 1, Tab 10, Schedule 4, paragraph 33 explains how energy transition assumptions in the customer additions forecast impact the new customers general service design day demand:

> Since the customer additions forecast and assumptions for design hour demand are inputs for design day demand, the energy transition assumptions that have been applied to those inputs are also accounted for in the design day demand forecast.

This is restated in Exhibit 4, Tab 2, Schedule 3, paragraph 51, part i):

> Company's demand forecasts for new and existing customers are added to the existing customers design day demand to become the estimated forecast design day demand.

<u>New and Existing Contract Rate Customer Design Day Demand</u>

Exhibit 1, Tab 10, Schedule 4, paragraphs 24 and 25 explains how energy transition is incorporated into the contract rate customer and volume forecast (Distribution Contract market). This forecast for new and existing contract rate customer demand is included in the design day demand forecast.

> As the distribution contract market customer and volume forecasts are derived from customer and sector level intelligence, energy transition impacts are inherent and specific to customers in the proposed forecast methodology and do not require additional consideration or adjustment. Enbridge Gas, therefore, did not make any additional energy transition-related adjustments in the distribution contract market forecast.

The process by which the contract rate customer demand forecast is incorporated into the design day demand is explained in Exhibit 4, Tab 2, Schedule 3, paragraph 51, part i):

> Company's demand forecasts for new and existing customers are added to the existing customers design day demand to become the estimated forecast design day demand.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-4, p.13

Question(s):

Please provide Enbridge's forecast, by rate class, of the number of customers annually converting from natural gas to other energy sources for the period 2024-2030. Please provide all studies, memoranda, presentations and other documents in the possession of Enbridge dealing with future conversions away from natural gas.

Response:

Enbridge Gas does not prepare a forecast of customers disconnections by rate class. Please see response at Exhibit I.1.10-STAFF-31, Attachment 1, Table 4 for a forecast of the energy transition assumptions related to voluntary fuel-switching amongst existing customers that is assumed to begin in 2026.

Enbridge Gas reviewed the 2020 Residential Single Family Natural Gas End Use Study (percentage of customers who are likely to replace equipment and its fuel source on pages 11 and 17 and number of gas appliances per customer on page 37) to inform the forecast assumption related to customers converting from natural gas. Please see Attachment 3 provided in response at Exhibit I.1.10-GEC-7 part b) for the specific survey report that was used as an input to the forecast (2020), as well as other annual versions.

Trends in natural gas penetration rates for home heating have remained very stable between 2010 and 2020 at rates of 94 percent to 96 percent and 80 percent to 86 percent for water heating. The 2020 Residential Single Family Natural Gas End Use study showed that of surveyed customers who are fairly likely to replace their furnace and water heaters, 94 percent and 82 percent respectively would choose natural gas as the fuel source for their replacement equipment. The 2020 study also indicated that 90 percent of customers have two or more gas appliances. The lifespan of home heating equipment was assumed to be 20 years. At the time of forecasting in 2021, it was assumed that trends related to the penetration rates of natural gas home and water heating would stay constant for the near term as Ontario continued its recovery from the pandemic.

There is no discrete forecast, for the contract market, of customers annually converting from natural gas to other energy sources. As provided at Exhibit 3, Tab 2, Schedule 8, paragraph 16, energy transition impacts are inherent in the proposed forecast methodology for the contract market. Conversions to other energy sources were not explicitly or discreetly tracked for the contract market.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, p.9,12, 15-16

Question(s):

Please provide the numerical data behind each of Figures 2 through 5 in Excel format.

Response:

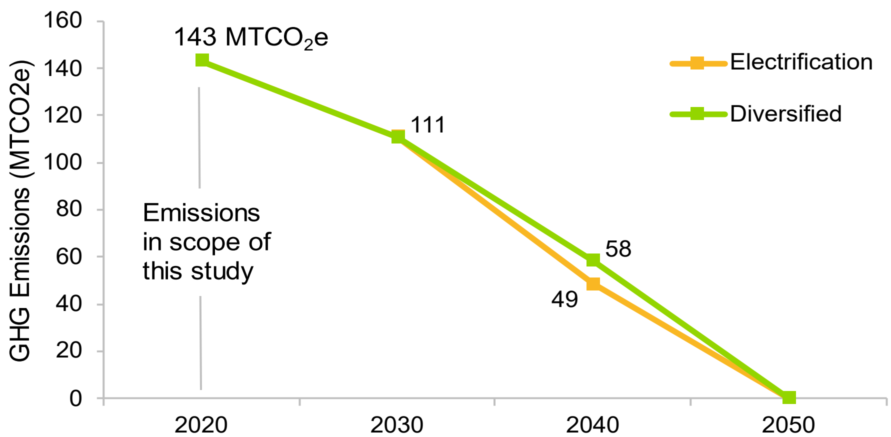
The following response was provided by Guidehouse Canada Ltd.:

Attachment 1 provides the data requested for Figures 3 through 5.

The following response was provided by Posterity Group:

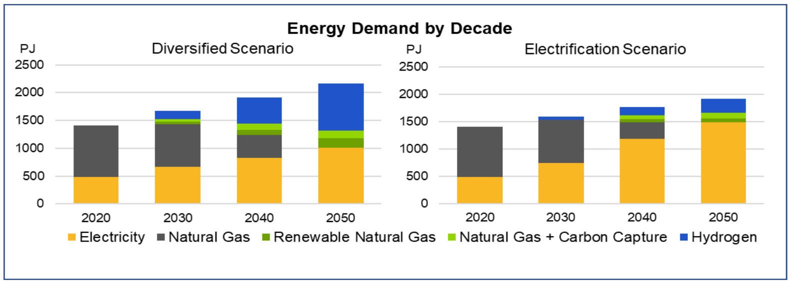
Attachment 2 provides the data requested for Figure 2.

Figure 3: Ontario Emissions Pathways



GHG Emissions (MTCO2e)				
	2020	**2030**	**2040**	**2050**
Diversified	143.1	110.8	58.5	0.0 /u
Electrified	143.1	110.9	48.7	0.0 /u

Figure 4: Energy Demand by Decade

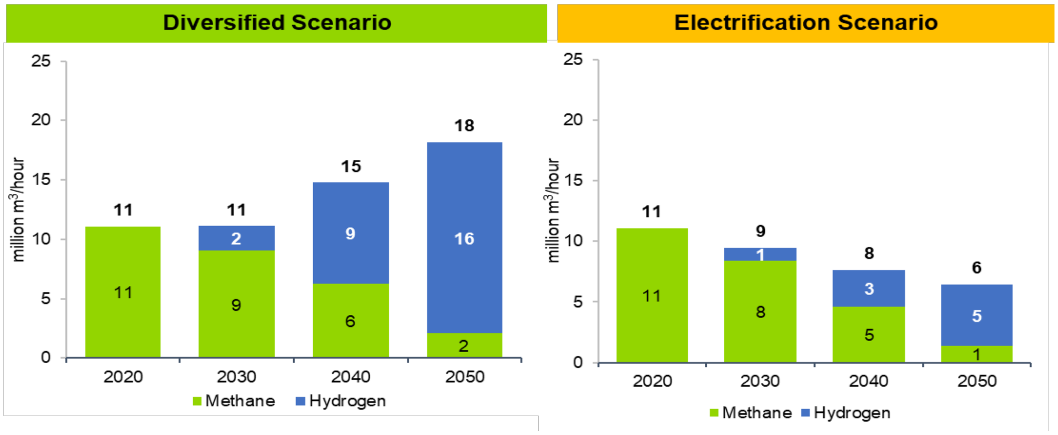


Energy Demand by Decade (PJ)

Diversified Scenario					
Electricity	486.9	663.5	829.5	1,010.1	/u
Hydrogen	0.0	144.2	466.5	844.0	/u
Natural Gas	921.8	772.5	413.9	0.0	/u
Renewable Natural Gas	0.0	44.1	90.9	170.0	/u
Natural Gas + Carbon Capture	0.0	47.6	114.2	134.0	/u
Total	**1,408.6**	**1,671.9**	**1,915.0**	**2,158.0**	/u

Electrification Scenario					
Electricity	486.9	741.5	1,180.6	1,488.3	/u
Hydrogen	0.0	54.9	151.1	253.4	/u
Natural Gas	921.8	786.8	314.5	0.0	/u
Renewable Natural Gas	0.0	0.0	58.7	72.1	/u
Natural Gas + Carbon Capture	0.0	0.0	64.1	103.1	/u
Total	**1,408.6**	**1,583.1**	**1,769.0**	**1,916.9**	/u

Figure 5: Volumetric Gas System Peak Demand



Volumetric Peak Demand (Mm3/hr)

Diversified Scenario	2020	2030	2040	2050	
Hydrogen	0.0	2.1	8.5	16.1	
Methane	11.1	9.0	6.2	2.1	/u
Gas Total	**11.1**	**11.1**	**14.7**	**18.2**	/u

Electrification Scenario	2020	2030	2040	2050	
Hydrogen	0.0	1.0	3.0	5.1	/u
Methane P	11.1	8.4	4.6	1.3	/u
Gas Total	**11.1**	**9.4**	**7.6**	**6.4**	/u

Figure 2: Annual Volumetric Gas Demand by Scenario (m3)

Year	Steady Progress	Reference Case	Electricity Centric	Diversified Portfolio
2019	25,162,554,893	25,162,553,580	25,162,554,699	25,162,554,774
2020	25,115,879,327	25,360,221,687	25,257,208,162	25,257,136,202
2021	25,182,659,402	25,570,675,761	25,349,529,231	25,348,981,389
2022	25,259,393,250	25,780,886,392	25,450,388,613	25,471,602,632
2023	25,011,983,148	25,824,098,754	25,473,541,920	25,457,064,561
2024	24,803,531,044	25,869,114,505	25,320,780,989	25,381,342,109
2025	24,622,383,275	25,972,479,976	24,919,303,737	25,220,634,343
2026	24,405,856,221	25,932,543,902	23,864,048,374	24,863,378,083
2027	24,194,714,941	25,982,975,696	22,916,820,018	24,640,173,150
2028	24,049,220,277	26,005,604,048	21,915,603,498	24,365,697,688
2029	23,759,714,605	26,026,425,887	20,768,422,130	23,884,083,152
2030	23,763,857,757	26,259,383,371	19,678,077,493	24,167,638,404
2031	23,542,398,233	26,310,851,594	18,470,132,000	24,210,005,455
2032	23,469,060,953	26,368,140,367	17,441,750,581	24,270,464,347
2033	23,232,737,162	26,428,573,641	16,409,951,355	24,817,168,435
2034	22,948,928,085	26,491,522,802	15,422,665,691	25,153,232,324
2035	22,729,542,173	26,555,283,897	14,435,406,326	25,255,385,800
2036	22,496,117,450	26,618,871,983	13,676,532,249	26,146,504,223
2037	22,134,353,076	26,680,676,993	12,961,539,180	26,974,717,238
2038	21,848,810,518	26,739,843,947	12,248,785,986	27,842,707,794

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, p.15; 1-10-6, p.32

Question(s):

Please provide all studies, memoranda, presentations and other documents in the possession of Enbridge dealing with the feasibility and/or cost of repurposing the Enbridge pipeline network and associated equipment to distribute hydrogen. Please describe in detail why a pipeline network, as opposed to an alternate delivery system, is the best way to deliver hydrogen to end users.

Response:

The feasibility and/or cost of repurposing of Enbridge Gas's pipeline network and associated equipment to distribute hydrogen will be part of the scope of the Hydrogen Blending Grid Study provided at Exhibit 4, Tab 2, Schedule 6, pages 16-18.

In Enbridge Gas's opinion, leveraging existing gas pipelines and new hydrogen pipelines is the preferred means of hydrogen delivery to end users. This is supported by Canada's Hydrogen Strategy:

> Hydrogen will be critical to achieving a net-zero transformation for oil and natural gas industries. It provides an opportunity to leverage our valuable energy and infrastructure assets, including fossil fuel reserves and natural gas pipelines, providing a pathway to avoid underutilizing or stranding these assets in a 2050 carbon neutral future. Leveraging these valuable assets will not only be instrumental in achieving the projected economic growth for the domestic market, but also presents the opportunity for Canada to position to become a leading global clean fuels exporter.[1]

Canada's Hydrogen Strategy furthermore recognizes that "where pure hydrogen is required, dedicated hydrogen pipeline systems may become an attractive option for low cost transportation of hydrogen at scale… a backbone network of hydrogen pipelines

[1] Hydrogen Strategy for Canada. Seizing the Opportunities for Hydrogen. A Call to Action, December 2020, p.86 https://natural-resources.canada.ca/sites/nrcan/files/environment/hydrogen/NRCan_Hydrogen%20Strategy%20for%20Canada%20Dec%2015%202200%20clean_low_accessible.pdf

could be a strategic infrastructure asset for Canada. This backbone would be fundamental to facilitating trade and cooperation across provinces. Once the infrastructure is in place, this is by far the lowest cost and lowest emissions means of bulk transportation"[2]

[2] Hydrogen Strategy for Canada. Seizing the Opportunities for Hydrogen. A Call to Action, December 2020, p.41 https://natural-resources.canada.ca/sites/nrcan/files/environment/hydrogen/NRCan_Hydrogen%20Strategy%20for%20Canada%20Dec%2015%202200%20clean_low_accessible.pdf

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, p.23

Question(s):

Please provide a detailed analysis of the risk responsibilities of customers, shareholders, and any others for the costs associated with the natural gas system if the transition does not move from natural gas to hydrogen/RNG, as Enbridge proposes.

Response:

As noted in paragraph 71 of Exhibit 1, Tab 10, Schedule 5, the diversified pathway described in the P2NZ Study is only one version of a diversified energy transition pathway that may unfold. Enbridge Gas looks forward to working with the electricity sector, its customers and its stakeholders to ensure customers have access to reliable, resilient, affordable and lower emissions energy based on the government's energy transition policies.

Enbridge Gas has invested shareholder capital to serve its customers under a regulatory compact that allows the Company to earn a fair rate of return and for the recovery of prudently invested capital through the rates charged to its customers. Enbridge Gas expects its underground storage, transmission and distribution assets to be used or useful for the foreseeable future due to their current capacity to deliver vast amounts of energy annually, and on a peak basis, inherent resiliency and reliability and the low cost of connecting to the gas system.

The Company notes that the current cost of staying connected to the system for its low volume customers provides unparalleled resiliency relative to the electricity system at under $50/month for the average customer. In particular, Table 1 shows that the unit capital cost of delivering annual and peak hour energy in the form of natural gas is approximately a quarter of the unit cost of delivering annual and peak hour electricity in Ontario. These unit costs do not include the much higher cost of building out the electric system in today's dollars, nor do they reflect the much higher cost of burying electrical infrastructure underground to provide equivalent resiliency. Hydro Ottawa, for instance, states on its website that burying its electrical wires will cost $10 billion and take 90 years and that burying electrical infrastructure costs 11 times more than overhead infrastructure at $2-$4 million per kilometre.[1] It is Enbridge Gas's view that the 150,000 kilometres of buried gas transmission, storage and distribution infrastructure, with a net book value of $16.7 billion in 2021, is an extremely valuable asset for Ontario that must be factored into energy transition policies. Please also see response at Exhibit I.1.10-SEC 13.

Table 1

Unit Cost to build out today's energy systems		
	Gas System	Electricity System
Net Property, plant and equipment ($)(1)	16,661,687,725	25,550,529,231
Annual Energy (kWh)(2)	272,242,600,000	117,804,064,413
Peak Energy(3)	82,262,906	24,341,946
Annual $/kWh (4)	0.06	0.22
Peak $/kW (5)	202.54	1,050

Notes:

(1) Net property plant and equipment from the 2021 OEB Yearbooks for gas and electricity systems
(2) Annual energy from 2021 OEB Yearbook, cubic metres of gas expressed in KWh by adjusting for calorific value of 39.12 divided by 3.6

(3) Highest peak hour flow measured on Feb 16, 8 a.m converted to kW

(4) Net property, plant and equipment divided by annual energy

(5) Net property, plant and equipment divided by peak energy

References:
2021 OEB Year book for Gas Distributors:
https://www.oeb.ca/oeb/_Documents/RRR/2021_Yearbook_of_Natural_Gas_Distributors.pdf
2021 OEB Year book for Electricity Distributors, Pivot Table Tab :
https://www.oeb.ca/sites/default/files/yearbook-Unitized-Statistics-and-Other-2021.xlsx

Enbridge Gas expects to fully recover from its customers the cost of prudently invested long-lived capital and operating and maintenance costs of providing safe, reliable and affordable energy to them. Increasing the fixed charges to connect to the system as proposed in this application will provide cost recovery even if the amount of natural gas consumed is gradually displaced by non-emitting electricity. Should the government institute a policy mandating disconnection from the gas system, the Company expects that it will accelerate recovery of its invested capital through regulatory measures such as higher depreciation rates and other tools including cost allocation changes to reflect a changing customer mix over time.

[1] Hydro Ottawa (2022) Between the lines: Overhead vs. underground. Available at https://hydroottawa.com/en/blog/between-lines-overhead-vs-underground#:~:text=For%20a%20full%20scope%20look,about%2090%20years%20to%20complete.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 1, p.5

Question(s):

Please provide a copy of the referenced Posterity Group's "end-use model".

Response:

The following response was provided by Posterity Group:

The code that comprises Posterity Group's model, Posterity Group Navigator, is confidential proprietary information. Users can hire Posterity Group to run the Navigator or license it for their own use, but we are unable to provide a copy of the model because the Navigator model consists of confidential intellectual property in the form of the model's software stack and code. Providing the confidential intellectual property may harm Posterity Group's business operations or expose our operations to unacceptable risk.

We interpret the intent of the question as a request to explain in detail how Navigator works. To answer this question, we are providing a functional specification document entitled "Navigator Energy and Emissions Simulation Suite – Functional Specification Document", provided as Attachment 1. The document has been written as a guide for technical client staff, and to support our client regulatory filings. It answers questions about how the Navigator model works and how the model parameters interact with each other.

POSTERITY GROUP

Navigator™ Energy and Emissions Simulation Suite

Functional Specification Document

Version: 1.0
Date: December 2022

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Definitions & Acronyms

BI	Bill Increase
CCE	Cost of Conserved Energy
CO_2e	Carbon Dioxide Equivalent Emissions
HVAC	Heating, Ventilation and Air Conditioning
INC	Incentive Paid by the Administrator
MTRC	Modified Total Resource Cost
Nf	Number of Fuels
NPV	Net Present Value
O&M	Operation and Maintenance
PAC	Program Administrator Cost
PCN	Participant Costs Net
PCT	Participant Cost Test
PJ	Peta-Joule
PRC	Program Administrator Program Costs
RAC	Resource Avoided Costs
RBI	Resource Bill Increase
RBR	Resource Bill Reduction
RG	Revenue Gain
RIC	Resource Increase Costs
RIM	Ratepayer Impact Measure
RL	Revenue Loss
RNG	Renewable Natural Gas
TRC	Total Resource Cost
UAC	Utility Avoided Costs
UCT	Utility Cost Test
UEC	Unit Energy Consumption
UIC	Utility Increase Costs
UICm	Utility Increase Costs - Modified
ZEEA	Zero-Emissions Energy Alternative

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1 About this Document

This document describes how the Posterity Group Navigator™ Energy and Emissions Simulation Suite (Navigator) processes input information to produce the desired simulation results. The document describes the key Navigator components, process steps, and arithmetic. It seeks to inform client forecasters and planners, regulators, and regulatory interveners about the capabilities and inherent logic of the simulation suite. While this information facilitates readers' understanding of how best to apply Navigator modules and functions to achieve the desired outcomes, this document is not a user guide.

Sections 2 through 4 comprise structural information about Navigator. Section 2 provides an overview, Section 3 outlines the Navigator model structure, and Section 4 characterizes the input and output files that are required to run simulations. The remaining Sections 5 through 7 explain how Navigator's key modules function.

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2 Overview of the Navigator Model

2.1 Purpose and Application

Posterity Group's Navigator™ Energy and Emissions Simulation Suite enables complex, multi-variable modelling not possible with traditional approaches. It lets planners quickly explore the energy landscape, investigate an unlimited range of scenarios, optimize to targets, and resolve vexing strategic challenges. All backed by Posterity Group's expert energy and emissions consulting services. Navigator incorporates over 20 years of modelling expertise into a powerful platform for:

- Integrated resource planning
- Energy efficiency potential estimates
- Demand side management (DSM) program planning
- Decarbonization pathway analysis
- Policy impact analysis, and greenhouse gas (GHG) emissions studies

Navigator uses a "bottom up" approach to develop demand scenarios. It starts with granular information about how energy is used at the end-use level (e.g., how natural gas is used to heat a home) and builds on this data to describe how energy is used at the segment (e.g., detached homes), sector (e.g., residential), regional (e.g., Vancouver Island) and provincial or state level (e.g., British Columbia).

Detailed data from census and other government sources, utility customer data, end use surveys and research reports are compiled by a powerful processing engine to produce a comprehensive dataset for analysis. Every calculated value is stored and can be filtered and rolled-up for maximum flexibility of analysis and presentation.

Easy access to detailed, "high-resolution" datasets plus fast processing power, ensure the simulation is a powerful means of performing complex scenario analysis such as:

- Load scenarios under a variety of demand growth, pricing, regulatory and technology adoption assumptions
- Demand Side Management potential savings from efficiency and distributed resource measures
- Peak demand impact
- GHG emissions and reductions

As well, users can perform sophisticated optimization tasks such as:

- Fuel switching in response to price and policy signals
- Substitution of a system-wide fuel (such as renewables) in specified amounts
- Efficiency program spending within annual budgets

Navigator can be used to model consumption of energy and associated GHG emissions for any fuel type (e.g., fossil-based gas, electricity, renewables, etc.) for jurisdictions of any size from the community and small utility level to entire states or provinces. Please see here for case studies.

2.2 Navigator Components

Navigator has four key components:

1. **Configuration Layer**: this layer identifies all the parameters under study (e.g., the range of years in the scenario, the regions, sectors and scenarios, the energy end-uses, etc.). It also tells the simulation engine what to calculate (e.g., peak demand, GHG emissions, DSM potential, etc.).
2. **Data Input Layer**: the data input layer contains the unique information about the future evolution of the segments, sectors and regions under study. The data input layer drives the simulation engine in conjunction with the configuration layer.
3. **Simulation Engine**: the simulation engine is the model processing software that conducts the calculations specified by the user (e.g., annual energy consumption, peak demand, GHG emissions, DSM potential, etc.).
4. **Presentation Layer**: the presentation layer contains the simulation results (often referred to as "output"). Output files are assembled in Excel and data visualization platforms (e.g., PowerBI) to generate exhibits to visualize the raw output data and help users understand and use the results.

2.3 Sector-Based Models

Navigator models are sector-based to reflect the unique way energy is used and regulated. Typical sector models are residential, commercial, industrial, and transportation. Within each sector-model, the data (inputs and outputs) are divided up by rate class, region, segment (i.e., sub-sector), vintage, and end-use. The specifics of the sector-based models are custom made for each client. Exhibit 1 provides examples of regions, segments, end-uses, and vintages for sector-models.

Exhibit 1 – Examples of Navigator sector-model structure

	Residential	Commercial	Industrial	Transportation
Regions	• South • North • East • West	• South • North • East • West	• South • North • East • West	• South • North • East • West
Segments	• Detached • Attached • Mobile	• Apartments • Food Retail • Hospital • Hotels • Non-Food Retail • Nursing Home • Offices • Restaurant • Schools • University/College • Warehouse	• Agriculture • Chemical • District energy providers • Mining • Pulp & Paper • Utilities • Wood Products	• Personal light duty vehicles • Fleet light duty vehicles • Medium duty vehicles • Heavy duty vehicles • Domestic short sea marine vessels • Coastal freight marine vessels

	Residential	Commercial	Industrial	Transportation
				• Trans-ocean marine vessels
End Uses	• Clothes dryer • Cooking • Domestic hot water • Fireplace • Pool & spa heaters • Space cooling • Space heating • Ventilation and circulation	• Cooking • Domestic Hot Water • Pools, Spas & Hot tubs • Space Heating	• Direct-fired heating • Heat Treating • Kilns • On-Site Power Generation • Ovens • Process Boilers • Product Drying • Space Heating • Water Heating	• Transportation
Vintages/ Existence [1]	• Pre-1950 • 1950-1985 • 1986-2016 • 2016 or newer	• Existing • New	• Existing • New	• Existing • New

[1] The residential sector has Vintages to define time periods when residential dwellings are built. Existence Categories also apply to the residential vintages, as there is conversion of existing dwellings into new homes (i.e., renovations). ‘New’ residential dwellings do not appear until the first year of the reference case.

3 Model Structure

This section provides an overview of how models are structured and developed for use by Navigator.

3.1 Model Parameters

Exhibit 2 defines the six parameters[2] that provide the basic structure for Navigator models. A model is populated with data or assumptions for each parameter.

Exhibit 2 – Navigator Model Parameters

Parameter	Definition
Accounts[3]	Number of energy-using accounts.
Units	The basis for how energy consumption is expressed. The unit of analysis is unique to each sector (e.g., dwellings in the residential sector, square metres or square feet in the commercial sector and production capacity in the industrial sector).
Size	The change in average number of units per account, relative to the first year the account appears.
Saturation	For most end uses, saturation is the extent to which an end-use is present in a region and segment. [4]
Fuel Share	The percentage of the energy end-use that is supplied by each fuel.
Unit Energy Consumption (UEC)	The amount of energy used by each end-use per unit.

Navigator calculates energy consumption at the sector, segment, existence category and end-use level using the following equation:

Consumption = Units x Saturation x Fuel Share x UEC

Accounts and Size are used to scale Units, which appears in the consumption equation.

[2] Some of the model parameters are adjusted when necessary to reflect a distinct characteristic of a sector.
[3] Because Posterity Group often builds models for utility clients, 'Accounts' refers to customer accounts. For models that are built for non-utility clients, an Account represents the relevant energy-using item such as houses, vehicles, or floor area.
[4] A segment is a grouping or category of buildings (e.g., single-family detached in Residential, large offices in Commercial). Segments reflect the main purpose of the building and helps to differentiate between energy use intensity or patterns across building types within a sector.

3.2 Navigator Modules

Navigator has ‘modules’ to conduct specific sets of calculations depending on the analysis required. For any analysis, the Scenarios module is required because it provides the detailed breakdown of energy demand (and the basis for GHG emissions calculations) over the specified time horizon. Subsequent modules are used as required for each analysis. Each module contains functions that comprise the calculation arithmetic for processing the required inputs and producing the desired outputs. In addition to the components displayed in the diagram below (and explained by the subsequent sections of this document), Navigator also contains an aggregator function that allows users to output summarized results files whose file size is smaller than that of non-summarized results. The Energy Costs function can run and provide results independently from the Conservation Potential module, but this document presents the function under the Conservation Potential module because it is necessary for calculating the Conservation economic potential results.

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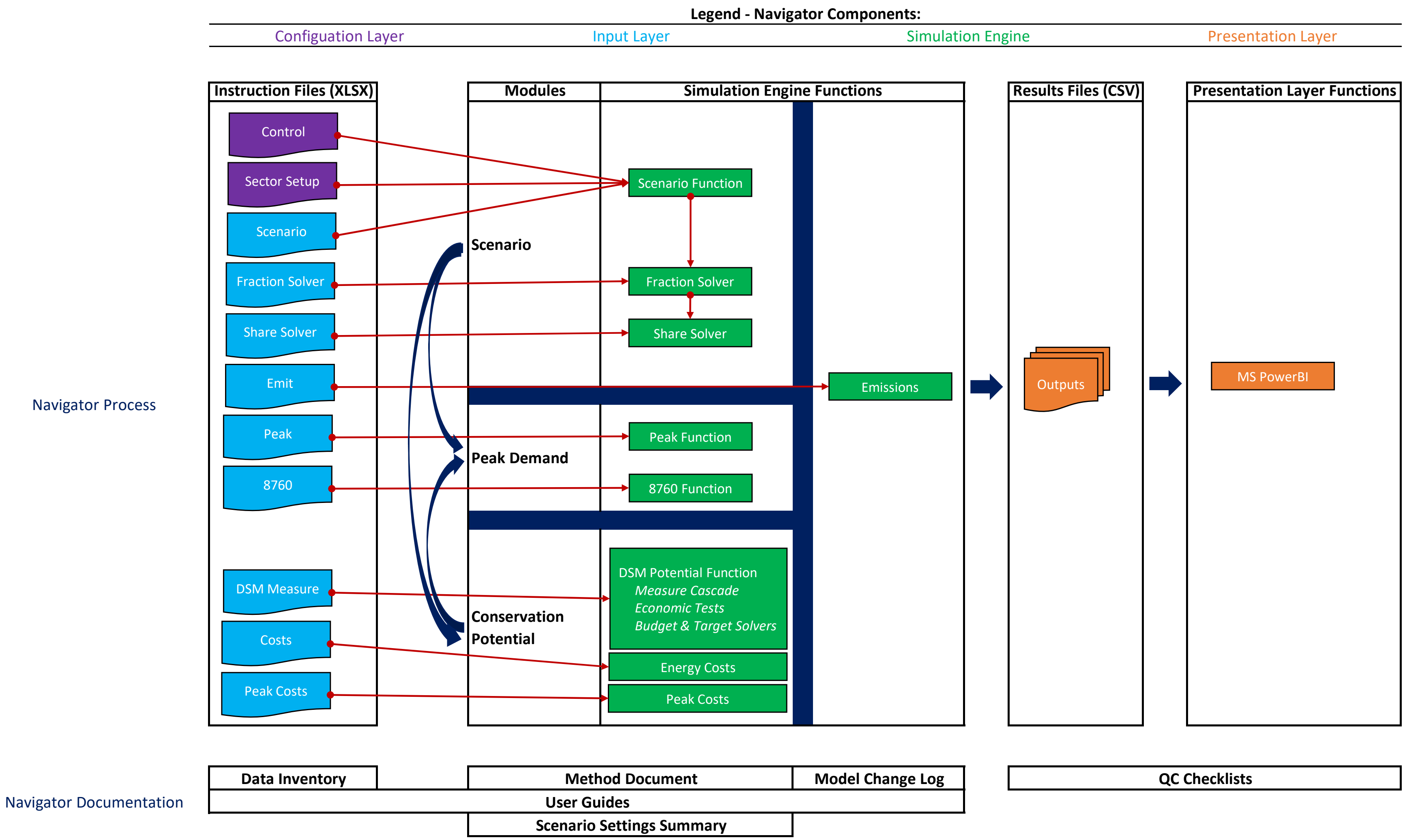
Exhibit 3 – Illustration of Navigator Layers, Modules, Functions, and Documentation



4 Input and Output Files

This section explains the input files read by Navigator and the output information that Navigator produces. As many of the inputs and outputs are common to all modules, this information is provided in one section ahead of the module-specific sections. In each module-specific section, the input files required for the module are listed (and the reader is encouraged to refer back to Section 4.1 Input Files for details of the input file purpose and contents).

4.1 Input Files

Input data is assembled and organized in Excel then converted into comma-delimited text files to be read by the Navigator software. The following table provides the input files read by Navigator in terms of their purpose, an overview of the contents, and applicable modules (as some input files are applicable to all modules, while some are specific to certain modules only).

Exhibit 4 – Navigator Input Files

Input File Name	Purpose and Contents	Contents	Applicable Modules
Control	The Control File provides Navigator with the 'structural' information of the analysis and specifies the files the simulation engine will process. One Control File is required for each sector-model.	• The years of the scenario horizon • The number of regions and their names • The name of the sector model • The number of scenarios and their names • The modules to be used • Names of the Sector Setup and Scenario files • Input and output file locations	All
Sector Setup	The Sector Setup file provides Navigator with the specific information for the sector model and how to structure the output. One Sector Setup file is required per sector.	For each sector model: • Number and names of the fuels, rate classes, existence categories, segments, and end uses for the sector model. • The header text for the columns in the output files	All

Input File Name	Purpose and Contents	Contents	Applicable Modules
Scenario	The Scenario File provides the numerical input data for each parameter specific to the sector and scenario.	For each sector and scenario, annual values for every combination of region, rate class, existence category, segment, end use, and fuel: • Number of accounts • Number of existing accounts to be demolished each year (if applicable) • Number of units • Size factor • Saturation • Fuel share for each fuel • UEC for each fuel	All
Emit	Provides the pollutants/GHG emissions and the associated emission factors to calculate emissions associated with energy demand by fuel	• The number of emitted substances and their names • A code number to assign each emission factor to the right combination of fuel, region, rate class, segment, existence category, and end use. • A flag to determine whether emission factors need to be able to vary by year or should be held constant. • The number of different emission factors per emitted substance (and year, if applicable). • The emission factor for each code and emitted substance (and year, if applicable).	Scenario
Fraction Solver	Provides the information Navigator needs to solve for the correct fuel shares to produce the target amounts in absolute terms (i.e., PJs or kWh) of a new fuel.	• The “mother fuel”, the fuel which is intended to lose fuel share to the new fuel. • The new fuel that is supposed to reach the target amounts. • The number of bins that must be solved. The user can split the targets up by region, segment, existence category, and end use.	Scenario

Input File Name	Purpose and Contents	Contents	Applicable Modules
		• A row of annual targets for each bin. • A set of "WHICHBIN" rows that tell Navigator which regions, segments, existence categories, and end uses belong in which bin.[5]	
Share Solver	Provides the information Navigator needs to solve for the correct fuel shares to produce the target amount of change in a fuel's consumption (i.e., 5% reduction in natural gas by 2040).	• 'Scenario type' which can be Low or High, depending on whether the fuel share is being decreased or increased. • The "target fuel", the fuel which is intended to be changed. • The "excluded fuels" which are fuels whose share is part of the calculation of how much change should occur, but whose share is excluded from changing, so that all the change is applied to the target fuel.[6] • An array of responsiveness values by year to vary the strength of the response in each year (it is an array of relative slopes.) For example, it might be proportional to the strength of the price signal in each year. • The average equipment lifetime, by region, segment, existence category, and end use. This limits the	Scenario

[5] If any group of segments and end uses is omitted from all the bins, FractionSolver will leave the fuel shares in that "default bin" unchanged and will not direct any more of the new fuel to those segments and end uses. Whatever amount of the new fuel those segments had before FractionSolver, they will have the same amount after.

[6] As an example, if customers are supplied with a mix of traditional natural gas and renewable natural gas, the customer will respond to a pricing signal as it is applied to the combined volume of both gases. If the utility would respond to the change in demand by keeping the renewable fuel constant and only changing the amount of traditional gas distributed, then renewable natural gas should be an excluded fuel. If the user specifies an excluded fuel but does not specify a separate excluded fuel input file, Navigator will treat the fuel as an excluded fuel but will use the fuel shares for it that were read in from the scenario input file.

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Input File Name	Purpose and Contents	Contents	Applicable Modules
		amount of fuel share change that can occur in a year (no more than 1/lifetime of equipment). • The number of bins that must be solved. The user can split the targets up by region, segment, existence category, and end use. • A target change for each bin, along with the target year by which this change is supposed to occur and the year when the fuel changes are permitted to start. • A set of "WHICHBIN" rows that tell Navigator which regions, segments, existence categories, and end uses belong in which bin.[7]	
Peak		• The number of peak periods to model • The peak IDs, names, and length in hours[8] of each of the peak period. • Header text for the peak columns. • A code number to facilitate assigning the right factor to the right categories of energy consumption. Codes can be assigned to each combination of fuel, region, rate class, segment, existence category, and end use. • The number of different peak factors per peak period. • The peak factor for each code and peak period	Peak (required); DSM (optional)
8760	Enables Navigator to calculate consumption by hour for every hour in a year (8760 hours).	• Which years 8760 output should be calculated for	8760 (required);

[7] If any group of segments and end uses is omitted from all the bins, ShareSolver will leave the fuel shares in that "default bin" unchanged. Whatever amount of the target fuel those segments had before ShareSolver, they will have the same amount after.

[8] Length in hours only comes into play if one of the factors is left as zero. In that case, the factor will default to 8760 (the number of hours in a year) divided by the peak period's length in hours. That factor assumes a completely flat load throughout the year.

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Input File Name	Purpose and Contents	Contents	Applicable Modules
		• Load shapes: a row for each day of the year with fractional values for the consumption in each hour (i.e., the values for every hour in the year add up to 1). • Load Shapes: name and code number to assign each load shape to the applicable fuel, region, rate class, segment, existence category, and end use. • Number of bins in which to report the results and header text for each of their columns. • Specification for which fuels, regions, rate classes, segments, existence categories, and end uses to include in each bin/column.	DSM (optional)
DSM Measure	Details of the measures to reduce energy consumption and the ways they are to be analyzed.	The list of DSM inputs is long; broadly these inputs comprise the following categories of information: • Specifications for the potential scenarios (e.g., technical, economic, achievable potential, etc.). • Specifications for the economic tests (e.g., TRC, UCT, etc.) and how such tests should be combined.[9] • Budgetary constraints for program potential, if any. • Measure costs, lifetimes, applicability, reference adoption, savings, and participation assumptions. • Program incentive and non-incentive costs, net-to-gross assumptions, etc. • Measure cascading instructions, i.e., when the savings from one measure may (or may not) affect the savings possible for a subsequent measure.	

[9] This includes instructions on whether the measure screening tests should be conducted based on the stream of energy costs that start in the first year, or whether they should use the variable stream of energy costs that start in each year when the measure might be installed.

Input File Name	Purpose and Contents	Contents	Applicable Modules
		• Details of any fuel switching measures • Specifications on how measures that reduce internal buildings loads interact with the HVAC system.	
Costs[10]	The cost file provides the information required to add energy costs data to the output and to evaluate whether DSM measures pass their specified cost effectiveness thresholds.	• A series of flags to turn on the output of each of the three cost columns: avoided costs, MTRC avoided cost, and customer cost. • The avoided cost of energy by year, for each fuel, by region and end use. [11] • The avoided cost of a zero-emissions energy equivalent (as used in the MTRC cost test) by year, for each fuel, by region and end use. • The customer cost (retail rate) of energy by year, for each fuel, by region and rate class. • The avoided cost of other resources (such as water) that may be used in economic tests for the DSM module, by year, resource, region, and end use.[12] • The customer cost (retail rate) of other resources (such as water) that may be used in economic tests for the DSM module, by year, resource, region, and rate class.	DSM

4.2 Output Files

The Navigator model outputs files in CSV format. There is one file per sector and fuel (e.g., Residential-Electricity, Industrial-RNG, etc.).

Available outputs depend on the functionality of Navigator used in the model run. Some outputs are common in all model runs (i.e., associated sector, scenario, segment, fuel, region, end-use, consumption, etc.) while some outputs are only provided if specific modules are used. For

[10] And Peak Costs, where applicable, for peak demand cost impacts.
[11] Navigator can handle both the average as well as the marginal costs of energy in its scenario calculations.
[12] These values are not currently reported in Navigator's output. They are used only in the DSM calculations.

example, if peak-related outputs are not required in the output for a model run, the feature can be disabled which reduces model run time and output file size. “Tombstone” outputs are provided for all model runs, with additional outputs added as needed, as more columns to the right of the standard ones.

Exhibit 5 outlines the output data produced by a Navigator model run, a brief description of the output, and the associated modules used to produce the output.

Exhibit 5 – Navigator Model Outputs

Output Data	Description	Associated Modules
Model Run	Model run version (e.g., v5).	All
Dataset Name	Concatenation of current Sector and current Scenario.	All
Sector	Name of sector.	All
Scenario	Name of scenario.	All
Region	Name of region.	All
Summary Region	Name of summary region.	All
Fuel	Name of fuel	All
Rate Class	Name of the rate class.	All
Rate Fraction	The fraction of units in a segment that are in this rate class.	All
End Use	Name of the end use.	All
Parent End Use	Parent end-use. This enables end-use to be essentially a sub end-use (e.g., showers is the end-use and the parent end-use is domestic hot water).	All
Summary End Use	Summary end-use, typically used for grouping end-uses together.	All
Year	Integer value of the current year	All
Existence	Current existence category (i.e., new or existing). Indicates whether the account existed in the base year.	All
Segment	Name of the segment.	All
Segment Fuel	Predominant fuel used for heating in the current segment.	All
Segment Vintage	When the current segment was constructed (e.g., range of years).	All
Segment Size	Size of the current segment (e.g., small buildings vs large).	All

Output Data	Description	Associated Modules
Segment Nickname	Nickname of the segment – can be used for grouping, but may also be used to combine segment, heating fuel, and vintage into one field.	All
Summary Segment	Summary segment, typically used for grouping segments together.	All
Accounts	Number of accounts in this segment (fuel-vintage-size), region, rate class and existence category, for this year.	All
Units	Number of units in this segment (fuel-vintage-size), region, rate class and existence category, for this year. For example, units may be dwellings in the residential sector, square metres, or square feet of floor area in the commercial sector, vehicles in the transportation sector, and production volume in the industrial sector.	All
End-Use Count	This is the number of sector units multiplied by the end-use saturation multiplied by the fuel share. Can be used, for example, to total up the number of gas dryers in a segment.	All
Consumption	Annual energy consumption in this segment (fuel-vintage-size), region, rate class and existence category, for this year.	All
Tertiary Load	Annual energy consumption, if the end-use appliances were 100% efficient, in this segment (fuel-vintage-size), region, rate class and existence category, for this year. It is Consumption divided by Efficiency.	All
Unit Tertiary Load	Annual energy consumption, if the end-use appliances were 100% efficient and there were exactly 1 end-use count per unit, in this segment (fuel-vintage-size), region, rate class and existence category, for this year. It is Tertiary divided by End-Use Saturation.	All
GHG Emissions	Emissions in this segment (fuel-vintage-size), region, rate class and existence category, for this year, for one emitted pollutant. Note: Output can be for $C0_2e$ or for specific GHGs by fuel.	All
Avoided Energy Cost[13]	Avoided cost of energy in this segment, region, rate class and existence category, for this year, for this fuel.	All
MTRC Avoided Energy Cost[13]	MTRC avoided cost of energy in this segment, region, rate class and existence category, for this year, for this fuel.	All

[13] Posterity Group is currently adding the functionality to disaggregate the energy cost output to separate the cost of carbon from the rest of the energy cost.

Output Data	Description	Associated Modules
Retail Energy Cost[13]	Retail cost of energy in this segment, region, rate class and existence category, for this year, for this fuel.	All
Daily Peak Consumption	Daily peak consumption/demand in this segment (fuel-vintage-size), region, rate class and existence category, for this year, for one peak period.	Peak
Hourly Peak Consumption	Hourly peak consumption/demand in this segment (fuel-vintage-size), region, rate class and existence category, for this year, for one peak period.	Peak
Measure Name	Name of the measure.	DSM
Measure ID	This is the unique ID for the measure or technology, which can be useful to distinguish the different savings for different varieties of technologies/measures when they all have the same name.	DSM
Measure Type	Type of technology or measure, i.e., fuel switching, energy efficiency, demand response, etc.	DSM
Replacement Type	Replacement type of the technology or measure (i.e., replace on burnout, retrofit, full cost basis, incremental cost basis).	DSM
Potential Savings[14]	Annual savings from a measure for this segment (fuel-vintage-size), region, rate class and existence category, for this year and potential scenario.	DSM
Potential Consumption[14]	Resulting annual consumption for this potential scenario and year after all the savings are applied for this segment (fuel-vintage-size), region, rate class, and existence category.	DSM
Potential Units Affected[14]	Units affected by the measure, in order to achieve the calculated savings.	DSM
TRC[15]	The Total Resource Cost (TRC) test compares the benefits and costs of a technology or measure from the point of view of all society stakeholders. It accounts for all the direct financial costs of the measure and compares them to the actual costs of the fuels and resources it saves over its lifetime. If money changes hands between stakeholders (such as an incentive paid by the utility to the customer) it is not counted, because it is a positive for one stakeholder and a negative for another and is therefore not a net cost.	DSM

[14] Output column can be produced for Technical, Economic, Achievable and Program Potential.
[15] Any of these five tests can be expressed as a benefit cost ratio, a net present value, a payback period, or a cost per unit of energy savings. Posterity Group is currently adding a fifth option, cost per unit of carbon reduction.

Output Data	Description	Associated Modules
MTRC[15]	The Modified Total Resource Cost (MTRC) test is similar to the TRC test except that the actual cost of the fuel is replaced by the cost of a Zero-Emissions Energy Alternative (ZEEA) fuel, and the benefits are multiplied by a non-energy benefits factor.	DSM
UCT[15]	The Utility Cost Test (UCT) or Program Administrator Cost (PAC) test compares the benefits and costs of a technology or measure from the point of view of the utility (or other program administrator). It accounts for the costs of the measure incurred by the utility, such as incentives or non-incentive program costs, and compares those to the actual costs of the utility's fuel(s) it saves over its lifetime. Measure costs incurred by the customer are not included if the utility doesn't pay them.	DSM
RIM[15]	The Ratepayer Impact Measure (RIM) test is intended to determine if the technology or measure is worth installing from the point of view of non-participating ratepayers. It accounts for the costs and benefits to the utility, including changes in the avoided costs of fuels, changes in the revenue from bill reductions, and the incentive and non-incentive costs of the program. It is usually the most difficult test for a technology or measure to pass.	DSM
PCT[15]	The Participant Cost Test (PCT) compares the direct financial cost of the technology or measure less any incentive received by the participant to the bill reductions the participant receives over the life of the measure. It is often expressed as a simple payback in years.	DSM
Daily Peak Reduction[14]	Daily peak demand reduction from this technology or measure for this segment (fuel-vintage-size), region, rate class and existence category, for this year and potential scenario.	DSM
Daily Peak[14]	Resulting peak day demand for this potential scenario and year after all the peak reductions are applied for this segment (fuel-vintage-size), region, rate class, and existence category.	DSM
Hourly Peak Reduction[14]	Hourly peak demand reduction from this technology or measure for this segment (fuel-vintage-size), region, rate class and existence category, for this year and potential scenario.	DSM
Hourly Peak[14]	Resulting peak hour demand for this potential scenario and year after all the peak reductions are applied for this segment (fuel-vintage-size), region, rate class, and existence category.	DSM
Potential GHG Reduction[14]	Emission reduction from the adoption of a technology or measure for each segment (fuel-vintage-size), region, rate class and existence category, for this year and potential scenario.	DSM
Potential GHG Emissions[14]	Resulting emissions for this potential scenario and year after all the emission reductions are applied	DSM
Incentive Cost[14]	The incentive spending required to achieve the savings for the technology or measure, for a given segment (fuel-vintage-size), region, rate class and existence category, for this year and potential scenario.	DSM

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Output Data	Description	Associated Modules
Non-Incentive Cost[14]	The non-incentive spending required to achieve the savings for the technology or measure, for a given segment (fuel-vintage-size), region, rate class and existence category, for this year and potential scenario.	DSM

5 Scenario Module

5.1 Overview

Navigator's Scenario module produces a detailed breakdown of jurisdictional energy demand over a specific time horizon. The granular output dataset contains the calculated energy demand values for each sector, region, fuel, rate class, end use, segment, and year. Each sector model begins with a base year that is calibrated to actual data (e.g., historical energy consumption or GHG emissions) then a scenario is generated for the specified time horizon using trends and assumptions about how each model parameter may change over time.

5.2 Input Files

The following input files are required for this module:

- Control, Sector Setup and Scenario
- Emit (optional)
- Fraction Solver (optional)
- Share Solver (optional)

5.3 Simulation Engine Processing Method & Calculations

5.3.1 Process Control, Sector Set Up and Scenario Input Files

Navigator reads in the input files in the following order: Control, Sector Setup, and then the Scenario File for each sector and scenario. The Control file provides information on the identification number of the model run, the folder locations for input and output files, the names of the other input files that are included in the model run, and the configuration of the sectors, scenarios, and regions for the model run. The Sector Setup file provides the numbers of accounts, the number of units (e.g., commercial floor space or number of residential dwellings), a size variable if units per account change over time, saturation of end uses, fuel share, unit energy consumption, and end use efficiency.

Once all the input data is read in, the scenario module in Navigator calculates accounts, units, end use count, energy consumption, tertiary load, and unit tertiary load, and emissions (optional) for every fuel required in the output. The following sub-sections provide details of the calculation method for each element of the Scenario module processing.

5.3.2 Calculate Accounts

First, the number of accounts for each year by region, rate class and segment are calculated. If the number of accounts increases, those present in the base year are be treated as existing accounts and the additional ones are be treated as new accounts.

5.3.3 Calculate Units

Units are the basis of analysis for Navigator. Units can be dwellings, appliances, vehicles, floor area, etc., and can be customized to the sector model and specific analysis. The unit energy consumption values (UEC) are expressed in terms of energy consumption per unit.

The scenario input file includes values for units for each combination of region, segment, and rate class, in the first year that contains accounts for that combination.

The other key input variable for units is the SIZE. The size factor allows the modeler to change the average size, in units, of the accounts over time in a given region, segment and rate class. For example, if the average size of schools in a region is expected to increase, the size factor can be adjusted to reflect this change. The input file has a row of SIZE numbers for all the years for each region (and, optionally, rate class) and segment. The SIZE number for the first year in which accounts occur is the starting point for the size factor calculation. In many cases, that will be the base year, but in cases where accounts in a region (and rate class) and segment do not appear until later in the scenario period, the SIZE number in that year will be the starting point and the earlier ones will be ignored. Subsequent size factors are always relative to the SIZE number in the first year where there are accounts.

Navigator separates units into existing units and new units, so that different saturations, fuel shares, and UECs can be applied to each. Existing units and accounts are defined as units and accounts that exist in the base year.

5.3.4 Calculate Energy Consumption

Finally, Navigator calculates end use count, energy consumption, tertiary load, and unit tertiary load which are defined by the following equations:

$$EndUseCount = Units * EndUseSaturation * FuelShare$$

Where: EndUseCount is the number of instances of this end use in this region, rate class, segment, existence category, and year
EndUseSaturation is a value read from the Scenario input file
FuelShare is a value read from the Scenario input file

$$Consumption = EndUseCount * UEC$$

Where: Consumption is the energy consumption of this end use in this region, rate class, segment, existence category, and year
EndUseCount is the number of instances of this end use in this region, rate class, segment, existence category, and year
UEC, or Unit Energy Consumption, is a value read from the Scenario input file

Calculate Tertiary, using the following equation:

$$Tertiary = Consumption * Efficiency$$

Where: Tertiary is the tertiary energy consumption, or useful energy supplied, for this end use in this region, rate class, segment, existence category, and year
Consumption is the energy consumption of this end use in this region, rate class, segment, existence category, and year
Efficiency is a value read from the Scenario input file

Calculate UnitTertiary, using the following equation:

$$UnitTertiary = Tertiary/EndUseSaturation$$

Where: UnitTertiary is the tertiary energy consumption for this end use in this region, rate class, segment, existence category, and year, if the end use saturation were 100% (exactly one instance of the end use per unit) and all of it were met by the current fuel.

Tertiary is the tertiary energy consumption, or useful energy supplied, for this end use in this region, rate class, segment, existence category, and year
EndUseSaturation is a value read from the Scenario input file

5.3.5 Emissions Function

If the emissions feature is being used, Navigator calculates annual emissions by multiplying the emission factor for each fuel by the annual consumption for that fuel.

5.3.6 Fraction Solver Function - Fuel Share Calculations

The fraction solver function is used when consumption of an existing fuel needs to be partially replaced with a new fuel at a *specific amount* (e.g., PJs of RNG). The Fraction Solver function solves for the fraction of the existing fuel's fuel share that it needs to shift to the new fuel to hit the specific targets.

The fraction solver begins with fuel shares for the original fuel and calculates a total initial fuel share that is the sum of the original (or mother) fuel plus the initial fuel share of the new (or target) fuel for all applicable regions, segments, existence categories, end uses, and years. The fraction fuel share solver uses a simple binary search to find a factor for each bin and year that can be multiplied by the total mother fuel share values to reduce them. The amount of the reduction in all these fuel shares is given to the target fuel. When the consumption of the target fuel is equal to the target for a bin and year, that bin and year is solved. Simple binary solve is used because there tend to be a lot of step functions and nonlinearities in Navigator models, so more sophisticated solvers often will not converge.

The output of the Fraction Solver is a scenario input file, with the revised fuel shares. This 'new' scenario input file is processed by the simulation engine to produce output that meets the desired consumption amount for the specified fuels.

5.3.7 Share Solver Function - Fuel Share Calculations

The share solver function is designed to change the consumption of an existing fuel, to reach a target *percentage* change in the existing fuel by a target year (i.e., 5% blend of RNG). The target may be set based on an expected change due to a price signal or may be based on a policy objective.

The targets can be divided into different "bins" (for different regions or segments, for example). Navigator solves for the series of annual changes it needs to make to the existing fuel's share, to meet the change for each bin in the target year. The user can vary the relative amount of change in the intervening years by providing an array of responsiveness values – effectively an array of relative slopes.

Within a bin, the amount of change applied to a given end use and segment will vary depending on how "mobile" the fuel share is estimated to be for the end use in that specific segment. The assumption is that a fuel share that is close to 0% or 100% reflects a difficult end-use and segment to fuel switch, and the fuel share is therefore more difficult to change than for an end use with a starting fuel share near 50%.

The change in share for this fuel is taken from (or given to) the fuels that follow it in the sequence of fuel shares. In typical use, the fuel that is expected to absorb the change is placed at the end of the sequence of fuel share input rows and given a default share of 100%, so it will use whatever fuel share is left over after all the shares are specified for all the previous fuels.

An additional function the share solver can use to reach the target reduction in fuel use for a bin is to change the proportion of different new accounts being added to the population. The way this feature is typically used is when a given segment (vintage-size) is divided between those mainly heated by the target fuel and those mainly heated by other fuels. The user specifies which segments are in matched pairs (for example, new gas-heated detached homes and new non-gas-heated detached homes), and the Navigator will modify the proportion of accounts it adds within the pair, to help meet the target reduction.

The Fuel Share Solver uses a simple binary search to find a factor for reducing the fuel share in each bin so that it reaches the target value in the target year. This factor becomes part of an equation for reducing the fuel share for the target fuel in each year, region, segment, and end use that is part of the bin. The reduction varies by year and by the starting value of the fuel share in each region, segment, and end use. In some cases, it is also used to change the percentage of newly constructed accounts that are heated primarily by the target fuel. When the consumption of the target fuel is equal to the objective in the target year, that bin is solved. If Navigator can't reach the target, for reasons such as limitations on how quickly equipment can be changed, the solving attempt for that bin stops. Simple binary solve is used because there tend to be a lot of step functions and nonlinearities in Navigator models, so more sophisticated solvers often will not converge.

In situations where the model will be adjusting the proportion of newly constructed accounts served by the target fuel, the fuel share solver is called twice. The first call solves the bins directly affected by the new construction adjustments – generally space heating – and leaves the other bins alone. Then the second call holds the new construction proportions constant and solves all the remaining bins. This is because if the proportion of new accounts is varying from one iteration to the next, the other bins generally cannot converge on a solution.

The output is a scenario input file, with the revised fuel shares for the existing fuel. This 'new' scenario input file is run through the simulation engine to produce output that reflects the revised fuel shares.

6 Peak Demand Module

6.1 Overview

The Navigator software treats peak demand as a function of annual consumption. The peak module produces additional columns of output for the energy that will be used during specific peak periods when energy is used annually in the scenario. Peak periods can be defined as needed, from peak hour for a year to as specific as "weekdays 7 am to 11 am and 5 pm to 7 pm from May 1 to October 31", for example.

An "hours-use factor" for each peak period is provided as an input to the peak demand module for each combination of fuel, region, rate class, segment, and end use. The factor is the ratio of annual consumption to the average demand during the peak period. Once the annual consumption for an end use in a group of units is calculated, the model divides by the hours-use factor for each peak period to calculate the peak demand in that period. Hours-use factors for the peaks in a typical year can be derived from end-use load shapes. Factors for design year peak may require calibration to produce peak demand values consistent with measured results in extreme years.

The Navigator model can also produce peak demand for every hour in a year ("8760 output"), if more complete load shapes are required. The 8760 Function calculates and outputs consumption for each hour of the year, for each subset of segments and end uses in the scenario. The sum of the values in all the hours of a year will be equal to the annual energy consumption value for the same year, for the same group segments and end uses in the bin.

Navigator can calculate the reductions in consumption for each hour caused by the energy savings in a DSM potential scenario and the resulting changed value of the consumption for that hour after DSM is applied. Navigator has the capability to include hours-use factors for measures, in the event the shape of the savings is different from the shape of the affected end use. The model will calculate the resulting peak demand after these differently-shaped measures are applied. Navigator can also apply peak shifting measures that do not save net annual energy consumption.

Once the model is calibrated with load shapes and hours-use factors, it will calculate the peak demand for each peak period under different scenarios. This provides an estimate of supply, transmission, and distribution requirements at various geographic scales

6.2 Input Files

The following input files are required for this module:

- Control, Sector Setup and Scenario
- Peak
- 8760 (if peak demand results are required for every hour in a year)

6.1 Simulation Engine Processing Method & Calculations

6.1.1 Process the Control, Sector Setup, and Scenario file

As explained in the Scenario Module, all Navigator model runs begin by processing the control, sector setup and scenario file to generate annual energy consumption and GHG emissions (if applicable).

6.1.2 Peak Function – Calculate the peak demand for the peak period

Navigator reads the peak input file to establish a peak factor that is assigned to each fuel, region, rate class, segment, existence category and end use for each of the peak periods.

Then, as Navigator proceeds through the normal scenario calculations, it uses the peak factors to calculate peak demand for each peak period. This results in the calculated peak demand for the peak period defined (i.e., hour or day), which is output at the same level of granularity as the other scenario values. For example, Residential Space Heating Annual Consumption divided by Peak Factor for Residential Space Heating (for the applicable fuel type, region, and segment) results in the Residential Space Heating Component of the defined peak period (for the applicable fuel type, region, rate class, and segment).

6.1.3 Calculate peak reductions associated with DSM (if applicable)

If the DSM module is also being used, the peak module can also calculate the peak reductions associated with individual measures, and report on the resulting reduced peaks after all the DSM measures are applied.

6.1.4 8760 Function – Process the 8760 input file and calculate the 8760 values

Navigator processes the load shape information provided in the 8760 input file to calculate demand in each hour of each year across the scenario horizon. Navigator produced this result by multiplying the applicable annual consumption by the 8760 factor for each target hour.

The 8760 input file includes a set of load shapes, which are sets of fractional values for the portion of an end use's annual consumption that occurs in each hour of the year. A complete load shape includes seven leap years and seven non-leap years, because the consumption pattern for many end uses is different on the weekend. The input file also includes the assignment of the right load shape to each fuel, region, rate class, segment and existence category, and end use. Separately, the input file also assigns each fuel, region, rate class, segment and existence category, and end use to a bin, for output to one of the columns in the 8760 output file. Finally, the input file specifies which years to provide in the output.

6.1.5 Calculate hourly reductions associated with DSM measures (if applicable)

8760 calculations can occur in the context of a DSM potential run of the Navigator. In this case, Navigator can calculate the reductions in each hour associated with the accumulation of measures, and report on the resulting reduced 8760 after all the DSM measures are applied. It cannot report on the 8760 results of individual measures.

7 Conservation Potential Module

7.1 Overview

The DSM potential function produces additional columns of output for the energy savings and resulting energy consumption when DSM measures, such as energy conservation or fuel switching measures, are applied in the scenario. Besides the energy savings and resulting consumption, the Navigator reports the number of units affected by each measure, the results of various economic tests applied to the measures, and in some cases the program expenditures to achieve the reductions. Each jurisdiction may apply different economic tests; such tests are designed to check whether implementing DSM measures or programs leaves stakeholders better off than not implementing them. Different test types exist that draw their screening boundaries across differing sets of stakeholders (e.g., representing the perspective of the program administrator as opposed to the program participant). Such economic tests are often used to inform utility DSM program planning and implementation.

Navigator can produce estimates for several different potential scenarios, including technical potential, economic potential, achievable (or market) potential, and program potential (defined below). There can be multiple different achievable and program potential scenarios with different settings. If peak inputs are provided, Navigator can calculate the peak reductions from the measures and the resulting peak values after they are applied. If emissions inputs are provided, Navigator can calculate the emissions reductions associated with the implemented measures.

The Navigator has four built-in types of potential scenarios: technical, economic, achievable, and program:

Technical Potential: This is the potential savings that result if every measure is adopted as soon as possible with no regard to its cost. The only concession made to market forces (in most scenarios) is that measures are implemented when baseline equipment reaches end of life (i.e., default is replace on burnout).

Economic Potential: This is the potential savings that result if every measure that passes an economic test (or multiple tests) is adopted as soon as possible. Measures whose implementation usually has to wait for something to wear out still have to wait; measures that can be immediate retrofits are allowed to occur in the first year.[16] 100% of customers for whom the measure passes the economic test(s) are assumed to participate.

Achievable Potential: Also called market potential, this scenario applies the economic test(s) but also limits participation based on some assessment of expected market uptake. For each achievable potential scenario, the assumed incentive and non-incentive spending for each measure can also be specified. Often participation is assumed to be related to these spending levels, and participation levels will tend to spread out adoption over the scenario time horizon. As with the other scenarios, some measures need to wait for some existing equipment to wear out while others can be implemented immediately.

Program Potential: Navigator allows a program potential scenario to be constructed out of several component achievable potential scenarios. In the input file, the user specifies how many achievable

[16] Navigator permits measures to be specified as "either" full cost measures or incremental cost measures, so that they get implemented whichever way they pass the economic tests.

scenarios can contribute to a given program potential, and in what order. The Navigator will test each measure using the economic screen, but then also cycle through the achievable potential scenarios and test each measure using the additional program test(s) and whatever program costs are specified for the measure in each achievable scenario. The last scenario in the sequence for which the measure passes the additional screen then becomes the version of the measure included in the program scenario. For program scenarios, Navigator reports on the program incentive and non-incentive costs. For this reason, a program scenario is sometimes used with just one achievable scenario in it, just to get output of the program costs. The results for such a program scenario would be the same as for its single achievable component, but it provides the additional cost columns.

Historically, conservation potential modelling treated economic potential as a subset of technical potential and achievable potential was a subset of economic potential. The economic potential was found by simply screening out all the technical potential results that fail the economic screen. The achievable potential was found by multiplying the economic results by the participation rates. The Navigator instead evaluates each scenario separately, so that the measures' potential is calculated in the context of that scenario. This can have results that are unexpected for those accustomed to the old style of models. For example, if there are some very large measures in the technical potential scenario and they fail the economic screen, other measures may well have larger potential in the economic scenario than they had in the technical scenario. This happens because the energy that was formerly being saved by the big measures that failed the screen is now available for these other measures to save. Similarly, if a big measure has low participation, it can leave more savings available for other measures in an achievable scenario.

7.2 Input Files

The following input files are required for this module:

- Control, Sector Setup and Scenario
- DSM Measure
- Costs
- Peak Costs (optional)

7.3 Simulation Engine Processing Method & Calculations

The Conservation Potential module is the most complex Navigator module and processes input data via a multi-step process that relies on a series of subroutines.

7.3.1 Process the Control, Sector Setup, and Scenario file

As explained in the Scenario Module, all Navigator model runs begin by processing the control, sector setup and scenario file to generate annual energy consumption and GHG emissions (if applicable).

7.3.2 Subroutine – Process the Measure file

This subroutine processes the following information provided by the DSM Measure file:

- Specifications for the potential scenarios (e.g., technical, economic, achievable potential, etc.).
- Specifications for the economic tests (e.g., TRC, UCT, etc.).

- Budgetary constraints for program potential, if any.
- Measure costs, lifetimes, applicability, reference adoption, savings, and participation assumptions.
- Program incentive and non-incentive costs, net-to-gross assumption, etc.
- Measure cascading instructions, i.e., when the savings from one measure may (or may not) affect the savings possible for a subsequent measure.
- Details of any fuel switching measures.
- Specifications on how measures that reduce internal building loads interact with the HVAC system .

7.3.3 Subroutine – Process the Cost file

This subroutine reads the avoided costs from the energy cost file and applies them to the relevant fuels, regions and end uses across the years of the scenario horizon. In addition to the avoided cost of energy normally used in a TRC test, the cost file can include separate avoided costs to use for the MTRC test. For economic tests such as the PCT, the input file can include retail rates, which may vary by fuel, region and rate class but not by end use. It can also include avoided costs and retail rates for non-fuel resources (e.g., water). The energy cost input file can include both marginal costs for evaluating DSM measures and average costs for reporting on the overall energy costs for a scenario. Navigator stores the annual results from this subroutine for further processing.

7.3.4 Subroutine – Process the Peak Costs file (optional)

This subroutine works similarly to the previous subroutine but reads peak (rather than average) cost data from the Peak Cost file. Peak avoided costs and peak retail charges are processed and stored similarly to the energy costs and rates, but vary by peak period as well. They are used if the value of peak reductions are to be included in the economic tests, and also if the model run includes “pure play” peak reduction measures that do cause a net reduction in annual energy consumption. Navigator stores the annual results from this subroutine for further processing.

7.3.5 Subroutine – Build the Cascade

The cascade is a system that specifies the order of application for all the measures. It uses the cascade IDs specified for each measure in the DSM measure input file to build a cascade of measures for each end use. If a cascade ID is not included in the set of cascade rows in the input file, none of the measure variants with that cascade ID will be applied during the modeling.

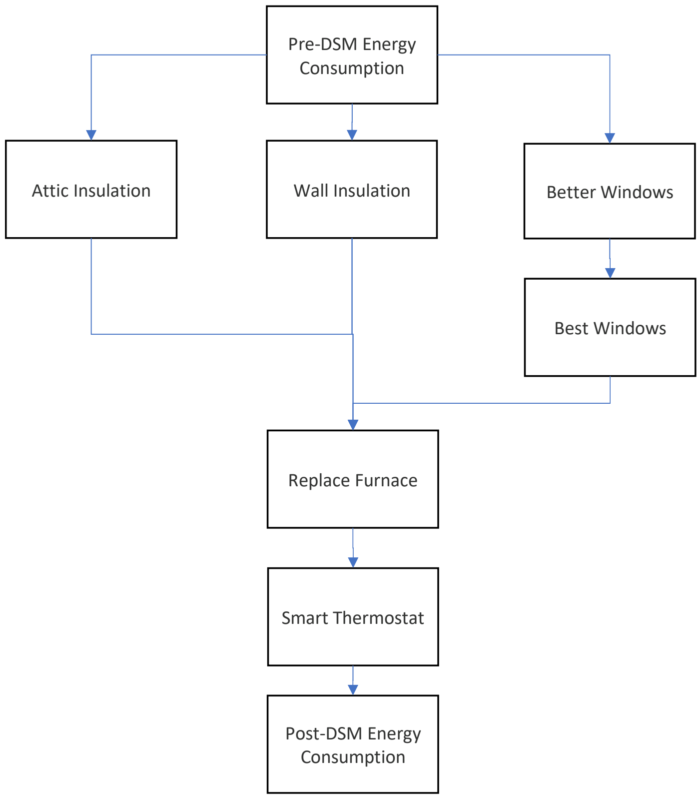
Measures can cascade in several ways:

- The cascade can be turned off[17], so that all measures save energy relative to the original reference case or pre-DSM consumption for the end use (either as a percentage or as an absolute number).

[17] Turning off the cascade means measures don’t influence each other’s savings.

- Measures can cascade in sequence, so that the first measure in sequence saves energy relative to the reference case and the second one saves energy relative to the energy consumption after the first measure is applied. As an example, assume in Exhibit 6 that only the furnace and thermostat measures are included in the program. If the furnace saves 10% and the thermostat saves 6%, the sum of the savings should not be 16%. The thermostat should save 6% of only 90% of the original consumption. This is "normal" cascading.
- Measures can be in parallel. The attic insulation and wall insulation measures in Exhibit 6 essentially have no effect on each other.
- Measures can cascade after a summation point that rolls up the savings of all the previously applied measures. In Exhibit 6 there is a summation point below the insulation and windows measures.
- Measures can cascade "net" of each other. This is used specifically for measures that have the same application but where one is a more efficient choice than the other. The second measure must be more efficient than the first and apply to the same segments as the first or a subset of the segments the first applies to. In Exhibit 6, the two windows measures provide an example of this.

Exhibit 6 – Measure Cascade Illustration



Accordingly, this subroutine uses the cascading inputs from the DSM Measure file to check what combination of measures should be applied to each combination of region, rate class, segment, and existence category and their cascading order. The Navigator stores the results from this subroutine for further processing.

7.3.6 Subroutine – Make Discounted Cost Streams

This subroutine applies the desired discount rates to the annual costs for the applicable fuel types in each model bin (a bin represents each combination of region and end use for avoided fuel costs and each combination of region and rate class for avoided retail rates from the subroutine in Section 7.3.3). This can include the annual Operations & Maintenance (O&M) costs of the measures (such as the administrative costs for deploying the measures), the avoided cost of energy for the different fuels, the retail rates paid by the customers for the different fuels, and the costs of other resources. Because the discount rate may be different for each of the economic tests, the calculation is repeated for each test.

For the O&M costs, the routine populates the O&M cost array which is indexed by test and by measure life. The annual O&M cost for each measure can be multiplied by the correct DiscountStream value to get the discounted value of the O&M costs for its lifetime. The routine calculates the DiscountStream values using the following equation:

$$DiscountStream_{iTest,Life} = \sum_{k=1}^{Life} \left(\frac{1}{1 + DiscountRate_{iTest}}\right)^{k}$$

For the fuel costs, the stream of avoided costs can be different for each region and end use. Because of varying discount rates, it can be different for each test. It can vary not only by how long the measure lasts, but also by when it is installed. The routine therefore cycles through all the economic tests, all the fuels, the regions, and the end uses, and all the possible installation years from the first year to the end of the scenario horizon. For each measure life between year 1 and the maximum life of any measure, it uses the following summation equation to populate the avoided cost array:

$$AvoidedCostStream_{iTest,iFuel,iRegion,iUse,Life,iYear} = \sum_{k=1}^{Life} AvoidedCost_{iFuel,iRegion,iUse,iYear} \left(\frac{1}{1 + DiscountRate_{iTest}}\right)^{k}$$

The MTRC test (discussed below) has a separate set of avoided costs. The routine uses the same process and a similar equation as above to populate the MTRC avoided cost array.

The stream of retail rates can be different for each region and rate class. The routine cycles through all the tests, all the fuels, the regions, and the rate classes, and all the possible installation years. For each measure life, it uses the following equation to populate the avoided retail rate array:

$$RetailRateStream_{iTest,iFuel,iRegion,iRate,Life,iYear} = \sum_{k=1}^{Life} RetailRates_{iFuel,iRegion,iRate,iYear} \left(\frac{1}{1 + DiscountRate_{iTest}}\right)^{k}$$

If the measures conserve other resources, such as water, the routine also populates avoided resource cost and avoided resource rate arrays using the same approach.

7.3.7 Subroutine – Conduct the Economic Tests

This subroutine calculates all the results of the economic tests. The economic tests are used to determine if a measure is applied in the economic potential, achievable potential, or program potential scenarios. Additional tests may apply to the program potential scenarios. Navigator can perform five types of economic tests: TRC, MTRC, PAC (or UCT), RIM, and PCT. Each of these will be discussed separately below. Navigator can use the results of any of these tests to screen measures or can combine tests in different ways.

The EconomicTests routine manages the application of all the applicable tests, stores the results, and records which measures pass in which applications. This routine loops through all applicable combinations of region, segment, year, rate class, and existence category, and for each determines if the measure passed the test. The input information specifies a threshold for each test and a flag to indicate whether the test value must be larger or smaller than the threshold for the measure to pass. Typically, if the test is in the style of a benefit/cost ratio, the measure must exceed a threshold (such as 1) to pass. If the test is in the style of payback period, the measure must be below a threshold (such as 2 years) to pass. The input information also specifies whether measures must pass the economic test on an incremental or a full cost basis.

TRC Tests

For each test it needs to perform, the EconomicTests routine checks what type of test is applicable. If the type is "TRC" the routine uses the TRCTest equation to output the desired results values.

The TRCTest equation applies a standard economic test called the Total Resource Cost test. This test is intended to find out if a measure is worth installing from the point of view of all societal stakeholders. It is supposed to account for all the direct financial costs of the measure and compare those to the actual costs of the fuels and non-fuel resources it saves over its lifetime. If money changes hands between stakeholders (such as an incentive paid by the utility to the customer) it is not counted, because it is a positive for one stakeholder and a negative for another and is therefore not a net cost. The equation for TRC benefit/cost ratio is as follows:

$$TRC_{Ratio} = \frac{\sum_{t=1}^{N} \frac{PAC_t + \sum_{f=1}^{Nf} UAC_{f,t} + \sum_{r=1}^{Nr} RAC_{r,t}}{(1+d)^{t-1}}}{\sum_{t=1}^{N} \frac{PCN_t + PRC_t + \sum_{f=1}^{Nf} UIC_{f,t} + \sum_{r=1}^{Nr} RIC_{r,t}}{(1+d)^{t-1}}}$$

Where: TRC_{Ratio} is the Total Resource Cost test expressed as a benefit/cost ratio[18]
N is the expected lifetime of the measure
PAC_t is the participant avoided costs in year t (such as reduced annual maintenance

[18] Navigator can calculate the TRC result as a Net Present Value (NPV), which is essentially the numerator in this equation minus the denominator, with units typically in dollars. It can also calculate TRC as a Cost of Conserved Energy (CCE). The equation is rearranged to exclude the value of savings of the target fuel (the fuel the program administrator or utility supplies) and use the remaining terms to calculate a net annualized cost for the measure. This is divided by the annual energy savings for the target fuel. As an example, units might be in dollars per gigajoule of savings. Finally, TRC can be expressed as a payback period.

costs)
Nf is the number of fuels for which the measure changes consumption
$UAC_{f,t}$ is the savings in utility avoided costs for fuel f in year t
d is the discount rate
Nr is the number of other resources (such as water) for which the measure changes consumption
$RAC_{r,t}$ is the savings in resource avoided costs for resource r in year t
PCN_t is the net participant costs in year t (such as the upfront measure implementation cost)[19]
PRC_t is the program administrator program costs in year t
$UIC_{f,t}$ is the increase in utility avoided costs for fuel f in year t
$RIC_{r,t}$ is the increase in resource avoided costs for resource r in year t

In general, any term that reduces spending appears as a positive value in the numerator and any term that increases spending appears as a positive value in the denominator. As a concrete example, a fuel switching measure could reduce gas use and increase electricity use. In that case, the avoided cost of the gas saved would appear in the numerator and the avoided cost of the electricity consumption increase would appear in the denominator.

The TRCTest equation in Navigator makes use of the discounted cost streams calculated ahead of time (described in Section 7.3.6). The equation above does not show either of the following additional complexities that the Navigator can accommodate:

- The terms for decreases or increases in the cost of meeting peak demands for the fuels, which can be included in the TRC calculation if the user chooses to do so.
- The effects of a net to gross ratio that is not 1. Most terms in the equation are multiplied by the same net to gross ratio, but the program administrator program costs are not.[20] A lower net to gross ratio would therefore tend to make the TRC result worse.

MTRC Test

If the EconomicTests routine determines that the test type is “MTRC” the routine uses the MTRCTest equation to output the desired results values.

The MTRCTest equation applies a modified version of the standard TRC economic test. The test uses an alternative avoided cost for the target fuel (the one supplied by the program administrator or utility). In some jurisdictions, this alternative cost reflects the cost of obtaining a zero-emission energy alternative (ZEEA). In addition, the MTRC test can apply a “non-energy benefits” factor to the benefits terms in the equation. This increases the value of the numerator to reflect the value of non-energy benefits that are

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[19] If a measure is evaluated on an incremental cost basis, net participant cost will be the cost of the upgrade measure minus the cost of the baseline measure. If it is evaluated on a full cost basis, the net participant cost is just the cost of the upgrade measure. If the baseline measure has a different life expectancy than the upgrade, Navigator calculates a LifeRatio value, which is the ratio of $1 of spending discounted over the two different lifetimes. This is used to express the equivalent cost of the baseline measure as if it had the same life expectancy as the upgrade.
[20] Navigator can include incentives paid to free riders as a cost term, if the client is including that term in the TRC calculation. Most regulatory regimes do not require this, so it is an option that by default is turned off.

hard to quantify. Most of the rest of the equation is the same as for the TRC test. The equation for MTRC benefit/cost ratio is as follows:

$$mTRC_{Ratio} = \frac{NEB * \sum_{t=1}^{N} \frac{PAC_t + UACm_{1,t} + \sum_{f=2}^{Nf} UAC_{f,t} + \sum_{r=1}^{Nr} RAC_{r,t}}{(1+d)^{t-1}}}{\sum_{t=1}^{N} \frac{PCN_t + PRC_t + UICm_{1,t} \sum_{f=2}^{Nf} UIC_{f,t} + \sum_{r=1}^{Nr} RIC_{r,t}}{(1+d)^{t-1}}}$$

Where: $mTRC_{Ratio}$ is the Modified Total Resource Cost test expressed as a benefit/cost ratio[21]
NEB is the non-energy benefits factor
N is the expected lifetime of the measure
PAC_t is the participant avoided costs in year t (such as reduced annual maintenance costs)
$UACm_{1,t}$ is the savings in utility alternative avoided costs for the target fuel (1) in year t
Nf is the number of fuels for which the measure changes consumption
$UAC_{f,t}$ is the savings in utility avoided costs for fuel f in year t
d is the discount rate
Nr is the number of other resources (such as water) for which the measure changes consumption
$RAC_{r,t}$ is the savings in resource avoided costs for resource r in year t
PCN_t is the net participant costs in year t (such as the upfront measure implementation cost)[22]
PRC_t is the program administrator program costs in year t
$UICm_{1,t}$ is the increase in utility alternative avoided costs for the target fuel (1) in year t
$UIC_{f,t}$ is the increase in utility avoided costs for fuel f in year t
$RIC_{r,t}$ is the increase in resource avoided costs for resource r in year t

In general, any term that reduces spending appears as a positive value in the numerator and any term that increases spending appears as a positive value in the denominator.

The MTRCTest function in Navigator makes use of the discounted cost streams calculated ahead of time (described in Section 7.3.6). The equation above does not show either of the additional complexities briefly described in the TRC section, but they can be accommodated in the MTRC calculation as well.

PAC (or UCT) Test

If the EconomicTests routine determines that the test type is "PAC" the routine uses the PACTest equation to output the desired results values.

The PACTest equation applies a standard economic test called the Program Administrator Cost test. If the program administrator is a utility, this test is often referred to as the Utility Cost Test (UCT). This test is intended to find out if a measure is worth installing from the point of view of the program administrator (or utility). It is supposed to account for all the measure costs incurred by the administrator (or utility), such as incentives or non-incentive administrative costs, and compare those to

[21] Navigator can calculate the MTRC result in the other three formats, NPV, CCE, and payback, as described in the TRC section.
[22] Measure costs can be full or incremental, as described in the TRC section. A different baseline measure life is handled the same way as in the TRC section.

the actual costs of the fuels and other resources it saves over its lifetime. Measure costs incurred by the customer are not included if the administrator doesn't pay them. The equation for PAC in the form of a CCE is as follows:

$$PAC_{CCE} = \frac{\sum_{t=1}^{N} \frac{PRC_t + INC_t}{(1+d)^{t-1}}}{\sum_{t=1}^{N} \frac{UFS_{1,t}}{(1+d)^{t-1}}}$$

Where: PAC_{CCE} is the Program Administrator Cost test (or Utility Cost Test) expressed as a cost of conserved energy (CCE)[23]
N is the expected lifetime of the measure
PRC_t is the program administrator program costs in year t (typically these are incurred in year 1)
INC_t is the incentive paid by the administrator in year t (typically paid in year 1)
d is the discount rate
$UFS_{1,t}$ is the savings in the fuel supplied by the utility (or the fuel the program administrator is targeting for savings) in year t, in units of energy (not money)

This equation produces an average cost per unit of energy savings, which can be compared against the marginal cost of acquiring additional energy supply. A discount rate is applied to the savings stream (if d is not zero), so that savings occurring later in the measure life are less valued than savings that occur early. The CCE formula does not account for future variations in the avoided cost of energy, however, so it sometimes gives a different pass/fail rate than the benefit/cost ratio.

The PACTest equation in Navigator makes use of the discounted cost streams calculated ahead of time (described in Section 7.3.6). The equation above does not show either of the following additional complexities that the Navigator can accommodate:

- The terms for decreases or increases in the cost of meeting peak demand for the target fuel, which can be included in the PAC calculation if the user chooses to do so.
- The effects of a net to gross ratio that is not 1. The savings term (the denominator above) would be multiplied by the net to gross ratio, but the program administrator program costs and incentives are not. A lower net to gross ratio would therefore tend to make the PAC result worse.

RIM Test

If the EconomicTests routine determines that the test type is "RIM" the routine uses the RIMTest equation to output the desired results values.

The RIMTest equation applies a standard economic test called the Ratepayer Impact Measure test. This test is intended to find out if a measure is worth installing from the point of view of nonparticipating ratepayers. It is supposed to account for all the financial costs and benefits to the utility, including changes in the avoided costs of fuels, changes in revenue from billing, and the incentive and non-

[23] Navigator can calculate the PAC result as a Benefit/Cost Ratio, a Net Present Value (NPV), or a Payback in years, just as with the other tests.

incentive costs of the program. The RIM test is often the most difficult test for a measure to pass, and regulators rarely require it as an economic screen. The equation for RIM net present value is as follows:

$$RIM_{NPV} = \sum_{t=1}^{N} \frac{\sum_{f=1}^{Nf} UAC_{f,t} + \sum_{f=1}^{Nf} RG_{f,t}}{(1+d)^{t-1}} - \sum_{t=1}^{N} \frac{INC_t + PRC_t + \sum_{f=1}^{Nf} UIC_{f,t} + \sum_{f=1}^{Nf} RL_{f,t}}{(1+d)^{t-1}}$$

Where: RIM_{NPV} is the Ratepayer Impact Measure test expressed as a net present value[24]
N is the expected lifetime of the measure
Nf is the number of fuels for which the measure changes consumption, but limited to fuels sold by the utility (or included in the program administrator's programs)
$UAC_{f,t}$ is the savings in utility avoided costs for fuel f in year t
$RG_{f,t}$ is the gain in year t of utility revenue from increased billing for any fuel whose sales increase
d is the discount rate
INC_t is the incentive paid by the administrator in year t (typically paid in year 1)
PRC_t is the program administrator program costs in year t
$UIC_{f,t}$ is the increase in utility avoided costs for fuel f in year t
$RL_{r,t}$ is the loss in year t of utility revenue from increased billing for any fuel whose sales decrease

In general, any term that reduces spending or increases revenue appears as a positive value in the first summation and any term that increases spending or reduces revenue appears as a positive value in the second summation. As a concrete example, a fuel switching measure could reduce gas use and increase electricity use. For a utility that sells both fuels, the avoided cost of the gas saved would appear in the first summation along with the increased billing from selling more electricity. The avoided cost of the electricity consumption increase would appear in the second summation along with the loss in revenue from decreased gas sales.

The RIMTest equation in Navigator makes use of the discounted cost streams calculated ahead of time (described in Section 7.3.6). The equation above does not show either of the following additional complexities that the Navigator can accommodate:

- The terms for decrease or increases in the cost of meeting peak demands for the fuels, which can be included in the RIM calculation if the user chooses to do so.
- The effects of a net to gross ratio that is not 1. Most terms in the equation are multiplied by the same net to gross ratio, but the incentives and program administrator program costs are not. A lower net to gross ratio would therefore tend to make the RIM result worse.

PCT Tests

If the EconomicTests routine determines that the test type is "PCT" the routine uses the PCTTest equation to output the desired results values.

The PCTTest equation applies a standard economic test called the Participant Cost Test. This test is intended to find out if a measure is worth installing from the point of view of the participant. It is supposed to account for all the direct financial costs of the measure less any incentives the participant

[24] Navigator can calculate the RIM result as a Benefit/Cost Ratio, a Cost of Conserved Energy (CCE), or a Payback period in years, just as with the other tests.

receives and compare those to the changes in bills the participant pays for fuels and other resources over its lifetime. The equation for PCT as a payback is as follows:

$$PCT_{Payback} = \frac{PCN_1 - INC_1}{\sum_{t=1}^{N} \frac{PAC_t + \sum_{f=1}^{Nf} BR_{f,t} + \sum_{r=1}^{Nr} RBR_{r,t} - \sum_{f=1}^{Nf} BI_{f,t} - \sum_{r=1}^{Nr} RBR_{r,t}}{(1+d)^{t-1}} \div N}$$

Where: $PCT_{Payback}$ is the Participant Cost Test expressed as a payback period in years[25]

PCN_1 is the net participant costs in year 1 (such as the upfront measure implementation cost)[26]

INC_1 is the incentive paid to the participant in year 1 (the equation assumes all incentives are paid upfront)

N is the expected lifetime of the measure

PAC_t is the participant avoided costs in year t (such as reduced annual maintenance costs)

Nf is the number of fuels for which the measure changes consumption

$BR_{f,t}$ is the participant's bill reduction for fuel f in year t

Nr is the number of other resources (such as water) for which the measure changes consumption

$RBR_{r,t}$ is the participant's bill reduction for resource r in year t

$BI_{f,t}$ is the participant's bill increase for fuel f in year t

$RBI_{r,t}$ is the participant's bill increase for resource r in year t

d is the discount rate

In general, the upfront costs or benefits for the participant appear in the numerator, and all the other changes in spending appear in the denominator. The values in the denominator are turned into an annualized value, so that the result is in units of years. In most cases, there is a positive net cost in year one and positive net savings per year, resulting in a payback that is a positive number of years. It is very common to express PCT as a "simple payback", which means a payback period with a discount rate of 0.

The PCTTest equation in Navigator makes use of the discounted cost streams calculated ahead of time, as described in Section 7.3.6, to reduce runtime. The equation above does not show the accommodation of participant costs for peak demand, but that can be included in the PCT calculation if the user chooses to do so.

7.3.8 Subroutine – Conduct the Program Tests

The ProgramTests routine performs the tests required to screen the measures for program potential scenarios. These may be the same as the ones used for screening in the economic and achievable potential scenarios, but often they are not. Although only the economic tests are used to screen

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[25] Navigator can calculate the PCT result as a Benefit/Cost Ratio, a Net Present Value, or a Cost of Conserved Energy (CCE), just as with the other tests.

[26] If a measure is evaluated on an incremental cost basis, net participant cost will be the cost of the upgrade measure minus the cost of the baseline measure. If it is evaluated on a full cost basis, the net participant cost is just the cost of the upgrade measure. If the baseline measure has a different life expectancy than the upgrade, Navigator calculates a LifeRatio value, which is the ratio of $1 of spending discounted over the two different lifetimes. This is used to express the equivalent cost of the baseline measure as if it did have the same life expectancy as the upgrade.

measures in or out of an achievable scenario, if Navigator is constructing a program potential out of one or more achievable scenarios, it must further screen the measures in the achievable scenarios using the program tests. The ProgramTests routine uses the same set of five tests as the EconomicTests routine. Navigator can use the results of any of these tests to screen measures, or can combine them in different ways.

The ProgramTests routine manages the application of all the applicable tests, stores the results, and records which measures pass in which applications. This routine loops through all applicable combinations of region, segment, year, rate class, and existence category, and then determines if the measure passed the test. The input information specifies a threshold for each test and a flag to indicate whether the test value must be larger or smaller than the threshold for the measure to pass. Typically, if the test is in the style of a benefit/cost ratio, the measure must exceed a threshold (such as 1) to pass. If the test is in the style of payback period, the measure must be below a threshold (such as 2 years) to pass. The input information also specifies whether measures must pass the program test on an incremental or a full cost basis.

7.3.9 Subroutine – Calculate the Potential

The calculation and reporting of DSM potential is performed by the PotentialWriter subroutine. This subroutine performs the following main steps which process the results from the previous subroutines:

- Read in the economic test results and program test results produced by the previous routines.
- Pre-calculate fuel savings values .
- Calculate the total units.
- Calculate the scenario pre-DSM energy values.
- Use the cascade to determine the next measure to apply.
- For each potential scenario, determine whether the measure passes the appropriate tests and find the amount of participation.
- Calculate the number of units affected by each measure in each potential scenario.
- Calculate the savings per unit for each measure in each potential scenario.
- Calculate the savings for each measure and calculate the resulting consumption in each potential scenario.
- Produce output rows for each measure and for each end use after all the measures are applied.

The following sub-sections further explain certain of the above key steps.

Pre-Calculate Fuel Savings Values

PotentialWriter calls a helper routine called PreCalcFuelSavings to calculate the part of the fuel savings calculation for each measure that would otherwise be repeated multiple times throughout the Conservation Potential module. The savings basis for a measure can be either percentage or absolute. If the savings basis is absolute, PreCalcFuelSavings uses the following equation:

$$FuelSavings = EndUseFraction * (BaseConsump - UpConsump)$$

Where: FuelSavings is the savings for the measure for this fuel, region, segment, existence category, and end use
EndUseFraction is the fraction of the end use the measure would affect if installed in a facility
BaseConsump is the base energy consumption for the measure for this fuel, region, segment, existence category and end use, as specified in the Measure input file
UpConsump is the upgrade energy consumption for the measure for this fuel, region, segment, existence category and end use, as specified in the Measure input file

If the savings basis is percentage, PreCalFuelSavings uses the following equation:

$$FuelSavings = \frac{EndUseFraction * (BaseConsump - UpConsump)}{BaseConsump}$$

The fuel savings values are stored for each measure, fuel, existence, category and end use for every combination of region and segment.

Calculate the Units

The PotentialWriter then calculates the number of accounts and units for each rate class, end use, existence category and year for every combination of fuel, region, and segment. This process relies on the same methods described in Sections 5.3.2 and 5.3.3.

Calculate the Scenario Pre-DSM Energy Values

The PotentialWriter uses the same procedure described in Section 5.3.4 to calculate the end use count, consumption, tertiary load, and unit tertiary load.

Use the Cascade to Determine the Measures to Apply

The Navigator applies the measure cascade to each combination of end use, region, rate class, segment, and existence category.

Screen the Measures and Find the Participation Rates

The Navigator loops through the different potential scenarios, screens the measures, and finds how much participation should occur for each of the scenarios. As described previously, scenarios can be of four types: technical, economic, achievable, and program, and each has a different screening and participation pattern:

Technical Potential Scenarios: No measures are screened out. Participation is set to 100% of the opportunity available in the current year.

Economic Potential Scenarios: Measures are screened in based on the results from the economic tests described in Section 7.3.7. If they are screened in, participation is set to 100% of the opportunity available in the current year. If not, participation is set to 0%.

Achievable Potential Scenarios: Measures are screened in based on the results from the economic tests described in Section 7.3.7. If they are screened in, participation is assigned from the participation inputs[27] that are processed as described in Section 7.3.2. If the measure is not screened in, participation is set to 0%.

Program Potential Scenarios: Individual measures are first screened in based on the results from the economic tests described in Section 7.3.8. If they are screened in, the Navigator then cycles through each of the achievable potential scenarios that is included as a possible component contributing to this program potential scenario, in the order they were specified for this program scenario in the DSM Measure input file. For each of them, the participation is assigned based on whichever achievable scenario is the last one that gets screened in.[28] If none of them get screened in based on program or measure-level economic tests, participation is set to 0%.[29]

Calculate the Units Affected by the Measure

This sub-section describes the equation used to calculate units affected by a measure for the key adoption situations that may apply to a measure.

Measures with NEW adoption basis in new accounts, no reference adoption, first year of applicability:

The equation for a measure that applies to new accounts, with a NEW adoption basis, with no reference adoption, in its first year of applicability, is as follows:

$$UnitsAffected_{i,j,k} = Max\left(0, Participation_{i,j,k} * \ Applicability_j * (EndUseCount_i - EndUseCount_{i-1})\right)$$

Where: $UnitsAffected_{i,j,k}$ is the number of units affected by the measure in year i for measure j in potential scenario k (in a specific group of units)

$Participation_{i,j,k}$ is the participation rate for in year i for measure j in potential scenario k (in the specific group of units)

$Applicability_j$ is the technical applicability of measure j

$EndUseCount_i$ is the product of units x end use saturation x fuel share for the group of units in year i

$EndUseCount_{i-1}$ is the product of units x end use saturation x fuel share for the group of units in the previous year

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[27] Measure payback acceptance curves and measure diffusion curves that inform participation inputs can be developed from a variety of sources. For example, curves can be developed using estimates from jurisdiction specific research (including workshops and interviews with market actors) and historic program performance, or from research undertaken in comparable jurisdictions.

[28] The user can specify multiple achievable scenarios that can contribute to the program potential, so that the Navigator can pick the level of incentive for each individual measures based on the highest incentive level that passes the program test (e.g. incentives accounting for 25%, 50% and 100% of incremental measure cost, respectively, with progressively higher participation). Navigator will pick the incentive level for each individual measure from the specific achievable scenario that provides the highest participation and yet still passes the selected Program Potential cost tests.

[29] Program scenarios are also used to produce programs that are limited by a specific annual budget, using an iterative solver routine.

Other Measures, no reference adoption, first year of applicability:

The equation for a measure for existing accounts, or a retrofit to a new account, with no reference adoption, in its first year of applicability, is as follows:

$$UnitsAffected_{i,j,k} = Max\left(0, \frac{Participation_{i,j,k} * Applicability_j * EndUseCount_i}{MeasureBaseLife_j}\right)$$

Where: $UnitsAffected_{i,j,k}$, $Participation_{i,j,k}$, $Applicability_j$, and $EndUseCount_i$ are as above

$MeasureBaseLife_j$ is the average expected life of the equipment the measure replaces if adopted. If it is a retrofit measure that can be implemented immediately without waiting for anything to burn out, MeasureBaseLife is 1.

The two equations above are nearly identical, except that the "rate-limiting" for the NEW measures is provided by the rate of increase in EndUseCount, which is driven by the amount of new construction. In the second equation, the "rate-limiting" is provided by the MeasureBaseLife.

Measure with NEW adoption basis in new accounts, no reference adoption, other years:

In the more general case of other years, the new uptake of the measure in the current year must be added to the adoption that is still persisting from previous years. The persistent adoption is given by the equation for BaseUnitAdoption, as follows:

$$BaseUnitAdoption_{i,j,k} = \left(UnitsAffected_{i-1,j,k} - UnitsNotPersisting_{i-1,j,k}\right) * Max(1, \frac{EndUseCount_i}{EndUseCount_{i-1}})$$

Where: $BaseUnitAdoption_{i,j,k}$ is the number of units still affected by the measure in year i for measure j in potential scenario k, because of previous adoption (in a specific group of units)

$UnitsAffected_{i-1,j,k}$ is the number of units affected by the measure in year i-1 for measure j in potential scenario k (in a specific group of units)

$UnitsNotPersisting_{i-1,j,k}$ is the number of units where the measure was previously adopted but reached end of life and the customers will not readopt it without new program encouragement, in year i-1 for measure j in potential scenario k (in a specific group of units)

$EndUseCount_i$ is the product of units x end use saturation x fuel share for the group of units in year i

$EndUseCount_{i-1}$ is the product of units x end use saturation x fuel share for the group of units in year i-1

This equation is accounting for previous adoption, previous adopters whose measure reached end of life and who won't readopt without new program incentives or other encouragement, and possible decreases in the number of available opportunities. The latter can occur, for example, because accounts are being demolished or because customers are switching fuels away from the fuel the measure saves.

The UnitsAffected are now given by the following equation:

$$UnitsAffected_{i,j,k} = Max\big(0, Min(Applicability_j * EndUseCount_i, BaseUnitAdoption_{i.j,k} + Participation_{i,j,k} * Applicability_j * (EndUseCount_i - EndUseCount_{i-1}))\big)$$

Where: all variables are previously defined.

Other Measures, no reference adoption, other years:

For measures that are applicable to existing accounts, or are retrofits to new accounts, again the uptake for the current year must be added to the adoption that is still persisting from previous years. The equation for BaseUnitAdoption is exactly the same as above. The equation for UnitsAffected is as follows[30]:

$$UnitsAffected_{i,j,k} = Max\left(0, Min(Applicability_j * EndUseCount_i, BaseUnitAdoption_{i.j,k} + \frac{Participation_{i,j,k} * Applicability_j * EndUseCount_i}{MeasureBaseLife_j})\right)$$

Where: all variables are previously defined.

Measure with NEW adoption basis in new accounts, with reference adoption:

These are the general case equations for measures with NEW adoption basis in new accounts, with reference adoption. These equations cover the first year of program adoption: previous year's values may be zeroes in that case. Reference adoption is the level of adoption the measure is assumed to have if there is no program activity in the marketplace. It starts at a current baseline adoption of the measure but can vary from year to year. The full equation for BaseUnitAdoption with reference adoption is as follows:

$$BaseUnitAdoption_{i,j,k} = Max\big(RefAdopt_{i,j} + (UnitsAffected_{i-1,j,k} - UnitsNotPersisting_{i-1,j,k}\big) * Max\left(1, \frac{EndUseCount_i}{EndUseCount_{i-1}}\right), RefAdopt_{i,j})$$

Where: $BaseUnitAdoption_{i.j,k}$ is the number of units still affected by the measure in year i for measure j in potential scenario k, because of previous adoption (in a specific group of units)

$RefAdopt_{i.j}$ is the number of units that would have been affected by the measure in year I for measure j if there is no program activity (in a specific group of units)

$UnitsAffected_{i-1,j,k}$ is the number of units affected by the measure in year i-1 for measure j in potential scenario k (in a specific group of units)

$UnitsNotPersisting_{i-1,j,k}$ is the number of units where the measure was previously adopted but reached end of life and the customers will not readopt it without new program encouragement, in year i-1 for measure j in potential scenario k (in a group of units)

[30] The equation shown assumes that measures are targeted to replace the oldest equipment currently installed, so that the savings reflect an improvement from the efficiency of equipment at end of life to the upgraded equipment. It is a First In First Out (FIFO) model. If the user specifies that the measure does not follow a FIFO pattern, the equation is changed to reflect that some measures will be targeted at previously upgraded equipment, reducing the savings. That version of the equation is not shown here.

$EndUseCount_i$ is the product of units x end use saturation x fuel share for the group of units in year i

$EndUseCount_{i-1}$ is the product of units x end use saturation x fuel share for the group of units in year i-1

The equation for UnitsAffected is as follows:

$$UnitsAffected_{i,j,k} = Max\big(0, Min(Applicability_j * EndUseCount_i, BaseUnitAdoption_{i.j,k} + Participation_{i,j,k} * \ Applicability_j * ((EndUseCount_i - RefAdopt_{i,j}) - (EndUseCount_{i-1} - RefAdopt_{i-1,j}))) - RefAdopt_{i,j}\big)$$

Where: all variables are previously defined.

Other measures, with reference adoption:

These are the general case equation for measures in existing accounts and retrofits in new accounts, with reference adoption. These equations cover the first year of program adoption: previous year's values may be zeroes in that case. The equation for BaseUnitAdoption is as above.

The equation for UnitsAffected is as follows:

$$UnitsAffected_{i,j,k} = Max\left(0, Min(Applicability_j * EndUseCount_i, BaseUnitAdoption_{i.j,k} + Participation_{i,j,k} * \frac{Max(0, Applicability_j * EndUseCount_i - RefAdopt_{i,j})}{MeasureBaseLife_j} - RefAdopt_{i,j}\right)$$

Where: all variables are previously defined.

Calculate the Savings per Unit

The savings per unit for a measure often varies, depending on what measures have been implemented before in the same group of units. The preceding measures that have been implemented will vary from one scenario to another, depending on the measures that pass or fail the economic tests and the amount of participation for each of them. The Navigator begins with the pre-calculated fuel savings values from the *Pre-Calculate Fuel Savings Values* step. The equation for a measure whose savings use the Percent savings basis is as follows:

$$SavingsPerUnit_{i,j,k} = Min(1, FuelSavings) * \frac{CascadedConsumption_{i,j-1,k}}{EndUseCount_i}$$

Where: $SavingsPerUnit_{i.j,k}$ is the savings per unit for year i for measure j in potential scenario k (in a specific group of units)

FuelSavings is the savings percentage calculated for the measure in the *Pre-Calculate Fuel Savings Values* step

$CascadedConsumption_{i,j\text{-}1,k}$ is the overall consumption for the group of units in year i in potential scenario k after the preceding measures have been applied (in a specific group of units)[31]

$EndUseCount_i$ is the product of units x end use saturation x fuel share for group of units in year i

The equation for a measure whose savings use the Absolute savings basis is as follows:

$$SavingsPerUnit_{i,j,k} = Min\left(FuelSavings, \frac{CascadedConsumption_{i,j-1,k}}{EndUseCount_i}\right)$$

Where: all variables are previously defined.

Calculate the Measure Savings and the Resulting Consumption

The measure savings are simply the units affected multiplied by the savings per unit, as in the following equation:

$$MeasureSavings_{i,j,k} = UnitsAffected_{i,j,k} * SavingsPerUnit_{i,j,k}$$

Where: $MeasureSavings_{i,j,k}$ is the savings in year i for measure j in potential scenario k (in a specific group of units)

$UnitsAffected_{i,j}$ is the number of units affected by the measure in year i for measure j in potential scenario k

$SavingsPerUnit_{i,j,k}$ is the savings per unit for year i for measure j in potential scenario k, calculated as described in Section 0 (in a specific group of units)

The resulting consumption for the group of units must be decremented by the savings from each measure in turn. After each measure, the resulting consumption is updated using the following equation:

$$ResultingConsumption_{i,k} = ResultingConsumption_{i,k} - MeasureSavings_{i,j,k}$$

Where: $ResultingConsumption_{i,k}$ is the resulting consumption in year i after the application of all the measures so far, in potential scenario k (in a specific group of units)

MeasureSavings previously defined in the MeasureSavings equation above.

The equation above shows that the ResultingConsumption values are updated with each successive measure. For the cascade process to work properly, various interim values at different points need to be preserved, to calculate the savings of each measure. The equation used to calculate the cascaded consumption at each point is as follows:

$$CascadedConsumpion_{i,j,k} = ResultingConsumpion_{i,j,k}$$

[31] The index j-1 is used here, but it is misleading to say that it is simply the energy consumption of the units after the application of all the measures before measure j. It is more accurate to say it is the energy consumption after the preceding point in the cascade. In cases where measures are applied in sequence, this is the consumption after the preceding measure. In cases where measures are applied in parallel, several measures may all refer to a specific previous consumption number from earlier in the cascade.

Where: $CascadedConsumption_{i,j,k}$ is the consumption in year i after the application of measure j in potential scenario k, for use in the cascade (in a specific group of units)

$ResultingConsumption_{i,k}$ is the resulting consumption in year i after the application of all the measures so far, in potential scenario k (in a specific group of units)

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 1, p.5

Question(s):

Please describe in detail the assumptions (including numerical assumptions) in each of the scenarios with respect to:

a) Changes to building codes and appliance standards.

b) Innovation in electrical storage, hydrogen equipment, CCS and low-carbon fuels.

Response:

The following response was provided by Posterity Group:

a) Appendix C of the report provides detailed assumptions (including numerical assumptions) for ‘high stringency’ and ‘medium stringency’ settings with respect to changes to building codes and appliance standards. Please see Exhibit 1, Tab 10, Schedule 5, Attachment 1, pages 100 to 107.

   Exhibit 1, Tab 10, Schedule 5, Attachment 1, page 43 maps ‘stringency’ settings to each of the modelled scenarios. Steady Progress assumes ‘medium stringency’, while Diversified Portfolio and Electricity Centric assumes ‘high stringency’.

b) The sentence “This scenario assumes innovation in electrical storage, hydrogen equipment, CCS, and low-carbon fuels.” in the report was part of the general narrative that described high-level assumptions about policies and advancements in technologies and fuels in the Diversified Portfolio scenario.

   The Diversified Scenario implicitly assumes:

   i) Innovations in electric storage (or some other supply side electric technology or resource) will occur, and this technology would be available to facilitate additional load on the electricity grid resulting from fuel switching

ii) Hydrogen-ready equipment will be available and is installed (when equipment reaches its effective useful life) for industrial end-uses that switch to hydrogen
iii) Some residential and commercial customers install hydrogen-ready equipment (when equipment reaches its effective useful life)
iv) Carbon Capture and Storage (CCS) will be available and will be retrofitted on existing equipment for some industrial end-uses.
v) Low-carbon fuels, and the technology required to upgrade and inject these fuels in the grid, will be available.

Specific numerical assumptions regarding innovation in individual electric storage technologies, hydrogen-ready equipment technologies, CCS technologies or specific low-carbon fuels were not made.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 1

Question(s):

Please provide the numerical data behind each of Exhibits 1-4, 1-25, 50-7,1 in Excel format.

Response:

The following response was provided by Posterity Group:

The request is assumed as referring to Exhibits 1-4, 16-25, and 50-71.

Please see Attachment 1 for the Excel.

Exhibit 1 - Annual Volume (m3), All Scenarios

Year	Steady Progress	Reference Case	Electricity Centric	Diversified Portfolio
2019	25,162,554,893	25,162,553,580	25,162,554,699	25,162,554,774
2020	25,115,879,327	25,360,221,687	25,257,208,162	25,257,136,202
2021	25,182,659,402	25,570,675,761	25,349,529,231	25,348,981,389
2022	25,259,393,250	25,780,886,392	25,450,388,613	25,471,602,632
2023	25,011,983,148	25,824,098,754	25,473,541,920	25,457,064,561
2024	24,803,531,044	25,869,114,505	25,320,780,989	25,381,342,109
2025	24,622,383,275	25,972,479,976	24,919,303,737	25,220,634,343
2026	24,405,856,221	25,932,543,902	23,864,048,374	24,863,378,083
2027	24,194,714,941	25,982,975,696	22,916,820,018	24,640,173,150
2028	24,049,220,277	26,005,604,048	21,915,603,498	24,365,697,688
2029	23,759,714,605	26,026,425,887	20,768,422,130	23,884,083,152
2030	23,763,857,757	26,259,383,371	19,678,077,493	24,167,638,404
2031	23,542,398,233	26,310,851,594	18,470,132,000	24,210,005,455
2032	23,469,060,953	26,368,140,367	17,441,750,581	24,270,464,347
2033	23,232,737,162	26,428,573,641	16,409,951,355	24,817,168,435
2034	22,948,928,085	26,491,522,802	15,422,665,691	25,153,232,324
2035	22,729,542,173	26,555,283,897	14,435,406,326	25,255,385,800
2036	22,496,117,450	26,618,871,983	13,676,532,249	26,146,504,223
2037	22,134,353,076	26,680,676,993	12,961,539,180	26,974,717,238
2038	21,848,810,518	26,739,843,947	12,248,785,986	27,842,707,794

Exhibit 2 - GHG Emissions (tCO2e), All Scenarios

Year	Steady Progress	Reference Case	Diversified Portfolio	Electricity Centric
2019	47,792,623	47,792,623	47,792,623	47,792,623
2020	47,703,971	48,168,064	47,972,269	47,972,404
2021	47,829,699	48,566,681	48,145,601	48,146,643
2022	47,974,647	48,965,153	48,377,703	48,337,413
2023	47,504,589	49,047,092	48,349,951	48,381,248
2024	47,108,530	49,132,452	48,205,988	48,090,963
2025	46,764,330	49,328,643	47,627,648	47,328,279
2026	46,352,931	49,252,651	46,513,628	45,323,835
2027	45,950,954	49,347,482	45,627,211	43,523,751
2028	45,674,430	49,390,278	43,335,103	41,621,902
2029	45,124,378	49,429,643	41,793,297	39,442,814
2030	44,643,236	49,871,931	40,048,224	37,325,231
2031	43,586,391	49,969,504	37,920,320	34,834,848
2032	42,322,295	50,078,133	35,463,997	30,867,723
2033	41,633,627	50,192,731	33,321,058	28,665,826
2034	40,855,458	50,312,113	30,730,464	26,548,746
2035	40,107,068	50,433,035	28,992,696	24,424,959
2036	39,331,603	50,553,627	26,817,726	22,743,077
2037	38,072,122	50,670,835	24,585,782	20,902,167
2038	36,961,293	50,783,032	22,424,218	19,072,959

Exhibit 3 - Hourly Peak (m3/hour), All Scenarios

Year	Reference Case	Steady Progress	Diversified Portfolio	Electricity Centric
2019	11,034,667	11,034,667	11,034,667	11,034,667
2020	11,129,353	10,970,732	11,066,572	11,066,587
2021	11,217,651	10,973,143	11,069,772	11,069,953
2022	11,323,717	11,006,771	11,104,264	11,100,014
2023	11,359,805	10,845,478	11,101,235	11,119,509
2024	11,396,604	10,731,380	11,074,868	11,056,843
2025	11,459,083	10,638,492	10,988,450	10,837,652
2026	11,494,201	10,556,125	10,836,202	10,328,236
2027	11,550,228	10,435,963	10,723,873	9,859,701
2028	11,592,149	10,384,063	10,562,888	9,362,550
2029	11,615,312	10,291,580	10,320,467	8,809,874
2030	11,714,521	10,307,212	10,439,826	8,294,994
2031	11,748,047	10,185,300	10,422,410	7,712,148
2032	11,782,157	10,128,973	10,374,178	7,156,090
2033	11,815,759	9,985,735	10,594,370	6,629,737
2034	11,848,862	9,804,331	10,651,954	6,127,629
2035	11,881,255	9,683,814	10,624,892	5,618,445
2036	11,912,523	9,551,527	10,967,772	5,196,861
2037	11,942,015	9,328,435	11,272,047	4,807,035
2038	11,969,433	9,176,888	11,576,263	4,425,659

Exhibit 4 - Daily Peak (m3/day), All Scenarios

Year	Reference Case	Steady Progress	Diversified Portfolio	Electricity Centric
2019	240,161,902	240,161,913	240,161,913	240,161,913
2020	242,188,764	238,811,533	240,831,019	240,831,625
2021	244,160,366	238,802,708	240,935,794	240,939,934
2022	245,772,797	238,765,787	241,059,979	240,987,653
2023	246,103,573	234,825,646	240,519,844	240,947,615
2024	246,630,795	231,885,723	239,482,599	238,995,815
2025	247,558,472	229,369,090	237,096,022	233,439,763
2026	248,019,375	227,222,107	233,241,434	221,130,182
2027	248,841,759	224,296,347	230,324,027	209,725,174
2028	249,510,171	222,863,054	226,566,549	197,990,936
2029	249,878,290	220,529,532	221,088,020	185,189,523
2030	251,618,145	220,550,377	223,320,402	173,774,632
2031	252,259,636	217,884,668	222,794,095	161,171,909
2032	252,928,138	216,670,489	221,602,143	149,292,571
2033	253,599,072	213,617,447	226,857,816	137,843,340
2034	254,270,732	209,777,638	228,356,016	126,999,881
2035	254,940,616	207,058,729	227,859,559	116,090,902
2036	255,605,374	204,033,508	236,097,796	106,958,017
2037	256,244,812	199,167,823	243,368,675	98,548,395
2038	256,849,099	195,828,340	250,676,449	90,396,597

Exhibit 16 - Upper Bound Annual Volume (m3)

Year	Reference Case Volume	Volume in Hypothetical Scenario
2019	25,177,177,547	25,177,340,157
2020	25,376,297,538	25,344,931,801
2021	25,586,392,565	25,620,622,876
2022	25,991,445,500	26,127,204,417
2023	26,255,099,332	26,488,309,813
2024	26,425,980,862	26,741,340,810
2025	26,646,636,789	27,054,023,149
2026	26,799,090,698	27,278,858,094
2027	27,019,392,802	27,579,275,831
2028	27,166,387,398	27,797,577,636
2029	27,276,363,531	27,988,913,285
2030	27,587,509,892	28,831,166,134
2031	27,695,134,544	29,418,445,878
2032	27,797,579,564	29,981,662,145
2033	27,895,374,535	31,119,745,350
2034	27,989,374,167	31,921,806,463
2035	28,078,432,496	32,663,862,532
2036	28,163,061,267	34,175,831,298
2037	28,241,754,560	35,621,105,593
2038	28,315,233,408	37,168,014,467

Exhibit 17 - Upper Bound Volume by Fuel (m3)

Year	Natural Gas	RNG	Hydrogen
2019	25,177,340,157	-	-
2020	25,344,931,801	-	-
2021	25,620,033,655	589,221	-
2022	26,126,193,647	836,829	173,940
2023	26,487,225,494	901,127	183,191
2024	26,740,183,525	965,205	192,081
2025	26,905,565,508	132,025,171	16,432,470
2026	26,893,730,208	368,776,156	16,351,730
2027	26,940,357,466	606,294,607	32,623,758
2028	26,908,718,436	840,171,048	48,688,151
2029	26,826,136,498	1,066,637,775	96,139,011
2030	26,730,394,024	1,302,974,105	797,798,005
2031	26,410,353,674	1,548,345,047	1,459,747,156
2032	26,096,840,443	1,785,202,720	2,099,618,983
2033	25,482,272,969	2,012,051,495	3,625,420,886
2034	25,030,464,711	2,229,566,599	4,661,775,153
2035	24,601,839,714	2,431,013,224	5,631,009,594
2036	23,773,954,216	2,626,818,608	7,775,058,474
2037	22,975,072,924	2,812,262,726	9,833,769,943
2038	22,128,824,148	2,981,535,435	12,057,654,885

Exhibit 18 - Upper Bound Hourly Peak (m3/hour)

Year	Resulting Projected Hourly Peak	Reference Case Hourly Peak
2019	11,043,519	11,042,993
2020	11,117,442	11,138,161
2021	11,216,408	11,226,725
2022	11,418,675	11,401,339
2023	11,548,341	11,505,240
2024	11,650,559	11,589,962
2025	11,772,395	11,689,622
2026	11,863,942	11,768,739
2027	11,972,502	11,863,216
2028	12,057,910	11,937,138
2029	12,120,992	11,986,134
2030	12,453,011	12,108,989
2031	12,695,982	12,166,714
2032	12,930,306	12,223,150
2033	13,416,704	12,279,046
2034	13,757,455	12,334,441
2035	14,071,559	12,388,791
2036	14,726,204	12,442,463
2037	15,353,390	12,494,964
2038	16,029,568	12,546,215

Exhibit 19 - Upper Bound Daily Peak (m3/day)

Year	Reference Case Daily Peak	Resulting Projected Daily Peak
2019	240,309,565	240,320,086
2020	242,344,154	241,950,311
2021	244,319,297	244,017,039
2022	247,789,694	247,962,361
2023	249,932,412	250,483,882
2024	251,826,832	252,602,929
2025	253,902,605	254,969,398
2026	255,654,267	256,805,638
2027	257,705,952	258,956,233
2028	259,413,758	260,717,752
2029	260,634,758	262,029,833
2030	263,146,331	268,852,051
2031	264,543,371	274,043,176
2032	265,917,739	279,061,740
2033	267,279,766	289,543,300
2034	268,631,018	296,890,725
2035	269,961,736	303,627,883
2036	271,277,728	317,816,903
2037	272,570,426	331,414,799
2038	273,840,280	346,073,592

Exhibit 20 - Upper Bound GHG Emissions (tCO2e)

Year	Emissions in Hypothetical Scenario	Reference Case Emissions
2019	47,820,707	47,820,398
2020	48,139,023	48,198,598
2021	48,661,546	48,597,643
2022	49,622,926	49,366,982
2023	50,308,654	49,867,754
2024	50,789,112	50,192,319
2025	51,104,720	50,611,423
2026	51,084,928	50,900,987
2027	51,176,187	51,319,419
2028	51,118,749	51,598,614
2029	50,964,468	51,807,497
2030	50,785,303	52,398,475
2031	50,180,219	52,602,892
2032	49,587,435	52,797,472
2033	48,422,729	52,983,219
2034	47,567,055	53,161,758
2035	46,755,231	53,330,911
2036	45,185,006	53,491,651
2037	43,669,753	53,641,118
2038	42,064,348	53,780,680

Exhibit 21 - Lower Bound Annual Volume (m3)

Year	Reference Case Volume (m3)	Volume in Hypothetical Scenario (m3)
2019	25,177,177,547	25,138,875,776
2020	25,376,297,538	24,903,282,532
2021	25,586,392,565	24,500,265,760
2022	25,991,445,500	24,296,492,071
2023	26,255,099,332	23,583,572,786
2024	26,425,980,862	22,767,067,342
2025	26,646,636,789	22,050,000,498
2026	26,799,090,698	20,540,615,102
2027	27,019,392,802	19,093,885,640
2028	27,166,387,398	17,632,426,551
2029	27,276,363,531	16,405,256,972
2030	27,587,509,892	15,367,776,650
2031	27,695,134,544	14,082,554,580
2032	27,797,579,564	12,911,569,443
2033	27,895,374,535	11,877,238,272
2034	27,989,374,167	10,839,056,779
2035	28,078,432,496	9,882,042,806
2036	28,163,061,267	8,952,442,233
2037	28,241,754,560	8,088,660,299
2038	28,315,233,408	7,522,116,313

Exhibit 22 - Lower Bound Volume by Fuel (m3)

Year	Natural Gas	RNG	Hydrogen
2019	25,138,875,776	-	-
2020	24,903,282,532	-	-
2021	24,499,676,536	589,224	-
2022	24,295,655,140	836,932	-
2023	23,582,671,494	901,292	-
2024	22,766,101,909	965,432	-
2025	21,917,936,404	132,064,094	-
2026	20,171,689,560	368,925,542	-
2027	18,487,293,378	606,592,262	-
2028	16,791,786,667	840,639,885	-
2029	15,337,926,166	1,067,330,806	-
2030	14,063,855,383	1,303,921,268	-
2031	12,532,953,839	1,549,600,742	-
2032	11,124,822,875	1,786,746,568	-
2033	9,863,348,801	2,013,889,471	-
2034	8,607,284,826	2,231,771,953	-
2035	7,455,696,489	2,426,346,317	-
2036	6,413,973,928	2,538,468,305	-
2037	5,495,174,899	2,593,485,399	-
2038	4,879,673,681	2,642,442,632	-

Exhibit 23 - Lower Bound Hourly Peak (m3/hour)

Year	Resulting Projected Hourly Peak	Reference Case Hourly Peak
2019	11,020,806	11,042,993
2020	10,903,653	11,138,161
2021	10,707,500	11,226,725
2022	10,591,999	11,401,339
2023	10,242,397	11,505,240
2024	9,853,149	11,589,962
2025	9,531,388	11,689,622
2026	8,783,278	11,768,739
2027	8,077,920	11,863,216
2028	7,371,406	11,937,138
2029	6,738,648	11,986,134
2030	6,194,349	12,108,989
2031	5,589,409	12,166,714
2032	5,052,265	12,223,150
2033	4,592,020	12,279,046
2034	4,120,383	12,334,441
2035	3,695,128	12,388,791
2036	3,274,218	12,442,463
2037	2,886,644	12,494,964
2038	2,607,844	12,546,215

Exhibit 24 - Lower Bound Daily Peak (m3/day)

Year	Reference Case Daily Peak	Resulting Projected Daily Peak
2019	240,309,565	239,782,519
2020	242,344,154	237,215,573
2021	244,319,297	233,155,056
2022	247,789,694	230,406,550
2023	249,932,412	222,801,339
2024	251,826,832	214,402,422
2025	253,902,605	207,309,302
2026	255,654,267	190,085,967
2027	257,705,952	173,991,952
2028	259,413,758	158,005,237
2029	260,634,758	143,779,693
2030	263,146,331	131,253,724
2031	264,543,371	117,807,433
2032	265,917,739	105,830,680
2033	267,279,766	95,454,896
2034	268,631,018	85,058,385
2035	269,961,736	75,652,844
2036	271,277,728	66,320,826
2037	272,570,426	57,832,084
2038	273,840,280	51,412,885

Exhibit 25 - Lower Bound GHG Emissions (tCO2e)

Year	Emissions in Hypothetical Scenario	Reference Case Emissions
2019	47,747,649	47,820,398
2020	47,300,174	48,198,598
2021	46,533,590	48,597,643
2022	46,146,084	49,366,982
2023	44,791,875	49,867,754
2024	43,240,920	50,192,319
2025	41,631,442	50,611,423
2026	38,317,389	50,900,987
2027	35,120,821	51,319,419
2028	31,903,109	51,598,614
2029	29,060,587	51,807,497
2030	25,710,576	52,398,475
2031	21,872,770	52,602,892
2032	17,418,421	52,797,472
2033	14,941,155	52,983,219
2034	11,069,791	53,161,758
2035	8,884,602	53,330,911
2036	6,907,333	53,491,651
2037	4,935,225	53,641,118
2038	3,766,280	53,780,680

Exhibit 50 - Diversified Portfolio Scenario: Annual volume by sector (m3)

Year	Residential	Commercial	Industrial
2019	9,984,086,861	4,749,622,426	10,428,845,487
2020	9,990,592,362	4,783,149,302	10,483,394,538
2021	9,982,403,879	4,807,557,985	10,559,019,525
2022	9,927,123,592	4,845,798,002	10,698,681,039
2023	9,913,786,654	4,801,515,350	10,741,762,557
2024	9,908,498,028	4,739,146,866	10,733,697,215
2025	9,843,693,444	4,640,136,526	10,736,804,373
2026	9,718,548,509	4,480,642,617	10,664,186,957
2027	9,612,470,437	4,373,477,379	10,654,225,334
2028	9,489,297,740	4,260,986,900	10,615,413,048
2029	9,306,702,638	4,131,772,362	10,445,608,152
2030	9,380,890,391	4,154,085,792	10,632,662,221
2031	9,399,080,295	4,105,809,550	10,705,115,610
2032	9,382,074,618	4,034,259,651	10,854,130,078
2033	9,742,545,843	4,117,114,058	10,957,508,534
2034	9,877,968,290	4,099,659,285	11,175,604,749
2035	9,941,415,358	4,053,549,093	11,260,421,349
2036	10,484,359,095	4,203,785,496	11,458,359,632
2037	10,966,928,715	4,328,550,574	11,679,237,948
2038	11,467,027,839	4,465,288,988	11,910,390,967

Exhibit 51 - Diversified Portfolio Scenario: Annual volume by fuel (m3)

Year	Hydrogen	Natural Gas	Natural Gas with Carbon Capture	Renewable Natural Gas
2019		25,162,554,774		
2020		25,257,136,202		
2021		25,348,391,502		589,887
2022	174,831	25,470,590,144		837,657
2023	183,452	25,455,979,060		902,049
2024	191,999	25,380,183,822		966,289
2025	15,973,479	25,074,920,347		129,740,516
2026	15,769,780	24,487,014,325		360,593,978
2027	31,226,057	24,018,949,027		589,998,065
2028	46,235,061	22,631,738,008	874,563,736	813,160,882
2029	90,538,933	21,799,837,554	966,708,733	1,026,997,932
2030	766,464,218	20,800,871,733	1,351,849,281	1,248,453,172
2031	1,397,416,305	19,600,475,973	1,736,188,258	1,475,924,919
2032	1,999,781,522	18,167,560,904	2,411,969,409	1,691,152,513
2033	3,400,506,962	17,019,669,616	2,501,951,330	1,895,040,527
2034	4,335,666,850	15,507,033,190	3,222,466,789	2,088,065,495
2035	5,194,941,118	14,595,266,775	3,201,924,364	2,263,253,542
2036	7,084,051,931	13,453,652,081	3,180,024,981	2,428,775,230
2037	8,866,571,425	12,260,484,126	3,263,693,482	2,583,968,204
2038	10,762,946,944	11,128,730,758	3,228,903,793	2,722,126,298

Exhibit 52 - Diversified Portfolio Scenario: Peak Hour by sector (m3/hour)

Year	Residential	Commercial	Industrial
2019	4,591,569	3,267,254	3,175,844
2020	4,587,255	3,287,431	3,191,887
2021	4,576,246	3,300,084	3,193,442
2022	4,541,950	3,314,864	3,247,451
2023	4,531,252	3,287,337	3,282,646
2024	4,524,570	3,248,825	3,301,473
2025	4,487,911	3,183,844	3,316,695
2026	4,429,967	3,077,687	3,328,548
2027	4,378,810	3,003,066	3,341,997
2028	4,317,750	2,922,337	3,322,802
2029	4,226,261	2,827,568	3,266,637
2030	4,257,758	2,835,025	3,347,042
2031	4,260,672	2,791,871	3,369,867
2032	4,246,833	2,728,819	3,398,527
2033	4,404,781	2,766,422	3,423,167
2034	4,458,900	2,736,391	3,456,662
2035	4,476,369	2,684,620	3,463,903
2036	4,711,741	2,760,024	3,496,007
2037	4,918,356	2,817,940	3,535,751
2038	5,128,580	2,880,811	3,566,872

Exhibit 53 - Diversified Portfolio Scenario: Peak Day by sector (m3/day)

Year	Residential	Commercial	Industrial
2019	114,775,266	70,870,962	54,515,685
2020	114,747,602	71,290,685	54,792,732
2021	114,476,172	71,550,303	54,909,319
2022	113,480,534	71,879,827	55,699,619
2023	113,123,204	71,215,772	56,180,868
2024	112,828,871	70,260,407	56,393,321
2025	111,848,033	68,731,698	56,516,290
2026	110,438,204	66,319,762	56,483,468
2027	109,135,866	64,638,823	56,549,338
2028	107,520,097	62,841,460	56,204,992
2029	105,151,791	60,773,027	55,163,203
2030	105,922,596	61,061,351	56,336,455
2031	105,976,228	60,113,395	56,704,473
2032	105,583,109	58,738,626	57,280,408
2033	109,552,082	59,569,465	57,736,269
2034	110,910,876	58,923,562	58,521,578
2035	111,314,842	57,808,118	58,736,598
2036	117,208,040	59,477,052	59,412,704
2037	122,375,261	60,766,408	60,227,006
2038	127,574,037	62,167,229	60,935,184

Exhibit 54 - Diversified Portfolio Scenario: Annual GHG emissions by fuel (tCO2e)

Year	Hydrogen	Natural Gas	Natural Gas with Carbon Capture	Renewable Natural Gas
2019		47,792,623		
2020		47,972,269		
2021		48,145,595		7
2022	-	48,377,694		10
2023	-	48,349,941		10
2024	-	48,205,977		11
2025	-	47,626,175		1,473
2026	-	46,509,534		4,095
2027	-	45,620,512		6,699
2028	-	42,985,704	340,166	9,233
2029	-	41,405,629	376,006	11,662
2030	-	39,508,239	525,809	14,176
2031	-	37,228,261	675,299	16,759
2032	-	34,506,647	938,148	19,203
2033	-	32,326,394	973,147	21,518
2034	-	29,453,360	1,253,395	23,710
2035	-	27,721,592	1,245,404	25,699
2036	-	25,553,260	1,236,887	27,579
2037	-	23,287,011	1,269,430	29,341
2038	-	21,137,410	1,255,898	30,910

Exhibit 55 - Diversified Portfolio Scenario: GHG emissions by fuel (tCO2e) in 2019, 2030, and 2038

Year	Hydrogen	Natural Gas	Natural Gas with Carbon Capture	Renewable Natural Gas	Total
2019		47,792,623			**47,792,623**
2030	-	39,508,239	525,809	14,176	**40,048,224**
2038	-	21,137,410	1,255,898	30,910	**22,424,218**

Exhibit 56 - Diversified Portfolio Scenario: GHG emissions by fuel (%) in 2019, 2030, and 2038

Year	% H2 Emissions	% RNG Emissions	% Natural Gas Emissions	% CCS Emissions
2019			100%	
2030	0%	0.04%	98.65%	1%
2038	0%	0.1%	94.3%	5.6%

Exhibit 57 - Diversified Portfolio Scenario: Annual GHG emissions by sector (tCO2e)

Year	Residential	Commercial	Industrial
2019	18,963,325	9,021,219	19,808,079
2020	18,975,682	9,084,898	19,911,688
2021	18,959,691	9,131,048	20,054,862
2022	18,854,293	9,203,482	20,319,928
2023	18,828,904	9,119,349	20,401,699
2024	18,818,795	9,000,864	20,386,329
2025	18,580,655	8,758,255	20,288,738
2026	18,173,290	8,377,155	19,963,183
2027	17,783,910	8,088,514	19,754,786
2028	17,365,990	7,794,167	18,174,946
2029	16,805,923	7,456,771	17,530,603
2030	16,165,167	7,151,118	16,731,939
2031	15,461,526	6,745,422	15,713,372
2032	14,733,724	6,324,429	14,405,844
2033	13,692,149	5,767,873	13,861,037
2034	12,830,974	5,299,789	12,599,701
2035	11,943,273	4,836,572	12,212,851
2036	10,692,168	4,240,510	11,885,047
2037	9,509,209	3,695,225	11,381,347
2038	8,271,164	3,154,709	10,998,345

Exhibit 58 - Electricity Centric Scenario: Annual volume by fuel (m3)

Year	Hydrogen	Natural Gas	Natural Gas with Carbon Capture	Renewable Natural Gas
2019		25,162,554,699		
2020		25,257,208,162		
2021		25,348,940,030		589,201
2022	174,839	25,449,377,209		836,565
2023	183,458	25,472,457,293		901,169
2024	191,766	25,319,623,881		965,343
2025	200,796	24,918,073,182		1,029,760
2026	209,774	23,862,744,571		1,094,030
2027	651,884	22,915,009,704		1,158,430
2028	684,089	21,913,696,319		1,223,090
2029	716,543	20,766,418,221		1,287,366
2030	749,173	19,651,374,801		25,953,519
2031	782,046	18,339,581,199		129,768,755
2032	814,351	16,010,318,370	1,171,079,872	259,537,989
2033	847,331	14,850,652,806	1,169,144,420	389,306,798
2034	879,850	13,735,678,648	1,167,031,158	519,076,035
2035	4,825,623	12,617,264,970	1,164,470,804	648,844,929
2036	4,998,094	11,731,640,761	1,161,279,807	778,613,588
2037	5,170,303	10,761,870,882	1,156,344,785	1,038,153,211
2038	5,342,791	9,799,270,508	1,146,482,754	1,297,689,934

Exhibit 59 - Electricity Centric Scenario: Annual Volume Composition (m3) in 2019, 2030, and 2038

Year	Hydrogen	Natural Gas	Natural Gas with Carbon Capture	Renewable Natural Gas	Total
2019		25,162,554,699			**25,162,554,699**
2030	749,173	19,651,374,801		25,953,519	**19,678,077,493**
2038	5,342,791	9,799,270,508	1,146,482,754	1,297,689,934	**12,248,785,986**

"The table in the report contained outdated data. The data in this updated table aligns with the data in the graphs"

Exhibit 60 - Electricity Centric Scenario: Annual Volume Composition (%) in 2019, 2030, and 2038

Year	% H2 Volume	% Natural Gas Volume	% RNG Volume	% CCS Volume
2019		100.00%		
2030	0.00%	99.86%	0.13%	
2038	0.04%	80.00%	10.59%	9.36%

Exhibit 61 - Electricity Centric Scenario: Annual volume by sector (m3)

Year	Commercial	Industrial	Residential
2019	4,749,622,426	10,428,845,292	9,984,086,980
2020	4,783,221,440	10,483,394,267	9,990,592,455
2021	4,807,846,576	10,559,278,600	9,982,404,055
2022	4,845,656,279	10,679,708,252	9,925,024,082
2023	4,825,008,798	10,726,262,271	9,922,270,850
2024	4,750,768,525	10,724,184,383	9,845,828,080
2025	4,585,058,259	10,758,159,260	9,576,086,219
2026	4,324,662,818	10,728,712,856	8,810,672,700
2027	4,103,371,869	10,725,203,475	8,088,244,674
2028	3,886,504,861	10,639,978,855	7,389,119,782
2029	3,658,403,641	10,437,209,745	6,672,808,744
2030	3,498,183,881	10,131,211,124	6,048,682,487
2031	3,292,693,019	9,732,192,819	5,445,246,161
2032	3,083,650,919	9,484,642,872	4,873,456,791
2033	2,879,000,363	9,130,027,306	4,400,923,686
2034	2,679,569,275	8,779,104,146	3,963,992,270
2035	2,477,417,950	8,419,040,012	3,538,948,364
2036	2,284,800,836	8,245,600,304	3,146,131,109
2037	2,104,795,009	8,067,988,688	2,788,755,483
2038	1,931,237,425	7,861,470,507	2,456,078,053

Exhibit 62 - Electricity Centric Scenario: Peak Hour by sector (m3/hour)

Year	Commercial	Industrial	Residential
2019	3,267,254	3,175,844	4,591,569
2020	3,287,445	3,191,887	4,587,255
2021	3,300,235	3,193,472	4,576,246
2022	3,314,590	3,244,682	4,540,741
2023	3,303,470	3,281,477	4,534,562
2024	3,256,478	3,304,485	4,495,881
2025	3,144,556	3,326,471	4,366,625
2026	2,958,271	3,346,117	4,023,848
2027	2,797,135	3,363,820	3,698,746
2028	2,638,606	3,340,857	3,383,087
2029	2,472,060	3,280,590	3,057,224
2030	2,353,126	3,164,066	2,777,802
2031	2,203,474	3,001,834	2,506,841
2032	2,050,836	2,855,501	2,249,754
2033	1,902,096	2,700,763	2,026,878
2034	1,757,932	2,548,483	1,821,214
2035	1,611,467	2,386,569	1,620,410
2036	1,472,862	2,288,344	1,435,655
2037	1,344,020	2,195,032	1,267,982
2038	1,220,396	2,093,588	1,111,674

Exhibit 63 - Electricity Centric Scenario: Peak Day by sector (m3/day)

Year	Commercial	Industrial	Residential
2019	70,870,962	54,515,685	114,775,266
2020	71,291,291	54,792,732	114,747,602
2021	71,553,732	54,910,029	114,476,173
2022	71,874,363	55,664,476	113,448,815
2023	71,566,613	56,182,499	113,198,503
2024	70,428,895	56,455,473	112,111,447
2025	67,882,451	56,743,277	108,814,035
2026	63,746,685	56,919,256	100,464,241
2027	60,206,820	57,040,203	92,478,151
2028	56,740,213	56,577,599	84,673,125
2029	53,128,668	55,426,432	76,634,423
2030	50,664,116	53,307,838	69,802,678
2031	47,406,296	50,564,793	63,200,820
2032	44,085,435	48,282,711	56,924,425
2033	40,852,486	45,730,500	51,260,355
2034	37,721,792	43,218,229	46,059,861
2035	34,546,082	40,574,903	40,969,916
2036	31,542,883	39,132,171	36,282,964
2037	28,760,494	37,750,886	32,037,015
2038	26,095,237	36,231,263	28,070,097

Exhibit 64 - Electricity Centric Scenario: GHG emissions by fuel (tCO2e) in 2019, 2030, and 2038

Year	Hydrogen	Natural Gas	Natural Gas with Carbon Capture	Renewable Natural Gas	Total
2019		47,792,623			**47,792,623**
2030	-	37,324,937		295	**37,325,231**
2038	-	18,612,293	445,930	14,735	**19,072,959**

"The table in the report contained outdated data. The data in this updated table aligns with the data in the graphs"

Exhibit 65 - Electricity Centric Scenario: GHG emissions by fuel (%) in 2019, 2030, and 2038

Year	% H2 Emissions	% RNG Emissions	% Natural Gas Emissions	% CCS Emissions
2019			100.00%	
2030	0.00%	0.00%	100.00%	
2038	0.00%	0.08%	97.58%	2.34%

Exhibit 66 - Electricity Centric Scenario: Annual GHG emissions by fuel (tCO2e)

Year	Hydrogen	Natural Gas	Natural Gas with Carbon Capture	Renewable Natural Gas
2019		47,792,623		
2020		47,972,404		
2021		48,146,636		7
2022	-	48,337,403		9
2023	-	48,381,238		10
2024	-	48,090,952		11
2025	-	47,328,267		12
2026	-	45,323,823		12
2027	-	43,523,737		13
2028	-	41,621,888		14
2029	-	39,442,800		15
2030	-	37,324,937		295
2031	-	34,833,374		1,474
2032	-	30,409,279	455,497	2,947
2033	-	28,206,661	454,745	4,421
2034	-	26,088,930	453,923	5,894
2035	-	23,964,665	452,927	7,368
2036	-	22,282,550	451,686	8,841
2037	-	20,440,613	449,766	11,788
2038	-	18,612,293	445,930	14,735

Exhibit 67 - Electricity Centric Scenario: Annual GHG emissions by sector (tCO2e)

Year	Commercial	Industrial	Residential
2019	9,021,219	19,808,079	18,963,325
2020	9,085,035	19,911,688	18,975,682
2021	9,131,596	20,055,355	18,959,691
2022	9,203,212	20,283,894	18,850,306
2023	9,163,970	20,372,261	18,845,018
2024	9,022,935	20,368,260	18,699,767
2025	8,708,169	20,432,725	18,187,385
2026	8,213,561	20,376,708	16,733,567
2027	7,792,944	20,369,947	15,360,859
2028	7,380,988	20,207,980	14,032,933
2029	6,947,693	19,822,746	12,672,376
2030	6,635,055	19,217,496	11,472,680
2031	6,209,821	18,355,437	10,269,590
2032	5,769,217	15,980,134	9,118,373
2033	5,337,571	15,167,274	8,160,982
2034	4,916,411	14,354,878	7,277,457
2035	4,488,045	13,517,783	6,419,131
2036	4,084,787	13,021,352	5,636,938
2037	3,666,737	12,357,787	4,877,643
2038	3,265,160	11,627,916	4,179,882

Exhibit 68 - Scenarios Comparison: Annual Volume (m3)

Year	Steady Progress	Reference Case	Electricity Centric	Diversified Portfolio
2019	25,162,554,893	25,162,553,580	25,162,554,699	25,162,554,774
2020	25,115,879,327	25,360,221,687	25,257,208,162	25,257,136,202
2021	25,182,659,402	25,570,675,761	25,349,529,231	25,348,981,389
2022	25,259,393,250	25,780,886,392	25,450,388,613	25,471,602,632
2023	25,011,983,148	25,824,098,754	25,473,541,920	25,457,064,561
2024	24,803,531,044	25,869,114,505	25,320,780,989	25,381,342,109
2025	24,622,383,275	25,972,479,976	24,919,303,737	25,220,634,343
2026	24,405,856,221	25,932,543,902	23,864,048,374	24,863,378,083
2027	24,194,714,941	25,982,975,696	22,916,820,018	24,640,173,150
2028	24,049,220,277	26,005,604,048	21,915,603,498	24,365,697,688
2029	23,759,714,605	26,026,425,887	20,768,422,130	23,884,083,152
2030	23,763,857,757	26,259,383,371	19,678,077,493	24,167,638,404
2031	23,542,398,233	26,310,851,594	18,470,132,000	24,210,005,455
2032	23,469,060,953	26,368,140,367	17,441,750,581	24,270,464,347
2033	23,232,737,162	26,428,573,641	16,409,951,355	24,817,168,435
2034	22,948,928,085	26,491,522,802	15,422,665,691	25,153,232,324
2035	22,729,542,173	26,555,283,897	14,435,406,326	25,255,385,800
2036	22,496,117,450	26,618,871,983	13,676,532,249	26,146,504,223
2037	22,134,353,076	26,680,676,993	12,961,539,180	26,974,717,238
2038	21,848,810,518	26,739,843,947	12,248,785,986	27,842,707,794

Exhibit 69 - All Scenario Comparison: Hourly Peak (m3/hour)

Year	Reference Case	Steady Progress	Diversified Portfolio	Electricity Centric
2019	11,034,667	11,034,667	11,034,667	11,034,667
2020	11,129,353	10,970,732	11,066,572	11,066,587
2021	11,217,651	10,973,143	11,069,772	11,069,953
2022	11,323,717	11,006,771	11,104,264	11,100,014
2023	11,359,805	10,845,478	11,101,235	11,119,509
2024	11,396,604	10,731,380	11,074,868	11,056,843
2025	11,459,083	10,638,492	10,988,450	10,837,652
2026	11,494,201	10,556,125	10,836,202	10,328,236
2027	11,550,228	10,435,963	10,723,873	9,859,701
2028	11,592,149	10,384,063	10,562,888	9,362,550
2029	11,615,312	10,291,580	10,320,467	8,809,874
2030	11,714,521	10,307,212	10,439,826	8,294,994
2031	11,748,047	10,185,300	10,422,410	7,712,148
2032	11,782,157	10,128,973	10,374,178	7,156,090
2033	11,815,759	9,985,735	10,594,370	6,629,737
2034	11,848,862	9,804,331	10,651,954	6,127,629
2035	11,881,255	9,683,814	10,624,892	5,618,445
2036	11,912,523	9,551,527	10,967,772	5,196,861
2037	11,942,015	9,328,435	11,272,047	4,807,035
2038	11,969,433	9,176,888	11,576,263	4,425,659

Exhibit 70 - All Scenario Comparison: Daily Peak (m3/day)

Year	Reference Case	Steady Progress	Diversified Portfolio	Electricity Centric
2019	240,161,902	240,161,913	240,161,913	240,161,913
2020	242,188,764	238,811,533	240,831,019	240,831,625
2021	244,160,366	238,802,708	240,935,794	240,939,934
2022	245,772,797	238,765,787	241,059,979	240,987,653
2023	246,103,573	234,825,646	240,519,844	240,947,615
2024	246,630,795	231,885,723	239,482,599	238,995,815
2025	247,558,472	229,369,090	237,096,022	233,439,763
2026	248,019,375	227,222,107	233,241,434	221,130,182
2027	248,841,759	224,296,347	230,324,027	209,725,174
2028	249,510,171	222,863,054	226,566,549	197,990,936
2029	249,878,290	220,529,532	221,088,020	185,189,523
2030	251,618,145	220,550,377	223,320,402	173,774,632
2031	252,259,636	217,884,668	222,794,095	161,171,909
2032	252,928,138	216,670,489	221,602,143	149,292,571
2033	253,599,072	213,617,447	226,857,816	137,843,340
2034	254,270,732	209,777,638	228,356,016	126,999,881
2035	254,940,616	207,058,729	227,859,559	116,090,902
2036	255,605,374	204,033,508	236,097,796	106,958,017
2037	256,244,812	199,167,823	243,368,675	98,548,395
2038	256,849,099	195,828,340	250,676,449	90,396,597

Exhibit 71 - Scenarios Comparison: GHG Emissions (tCO2e)

Year	Steady Progress	Reference Case	Diversified Portfolio	Electricity Centric
2019	47,792,623	47,792,623	47,792,623	47,792,623
2020	47,703,971	48,168,064	47,972,269	47,972,404
2021	47,829,699	48,566,681	48,145,601	48,146,643
2022	47,974,647	48,965,153	48,377,703	48,337,413
2023	47,504,589	49,047,092	48,349,951	48,381,248
2024	47,108,530	49,132,452	48,205,988	48,090,963
2025	46,764,330	49,328,643	47,627,648	47,328,279
2026	46,352,931	49,252,651	46,513,628	45,323,835
2027	45,950,954	49,347,482	45,627,211	43,523,751
2028	45,674,430	49,390,278	43,335,103	41,621,902
2029	45,124,378	49,429,643	41,793,297	39,442,814
2030	44,643,236	49,871,931	40,048,224	37,325,231
2031	43,586,391	49,969,504	37,920,320	34,834,848
2032	42,322,295	50,078,133	35,463,997	30,867,723
2033	41,633,627	50,192,731	33,321,058	28,665,826
2034	40,855,458	50,312,113	30,730,464	26,548,746
2035	40,107,068	50,433,035	28,992,696	24,424,959
2036	39,331,603	50,553,627	26,817,726	22,743,077
2037	38,072,122	50,670,835	24,585,782	20,902,167
2038	36,961,293	50,783,032	22,424,218	19,072,959

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 1, p.15

Question(s):

Please provide:

a) The 10-year customer account forecast.

b) The 10-year consumption forecast.

c) The Residential end-use survey.

d) The workbook referred to containing “upper and lower possible volumes of RNG and hydrogen in their system”.

Response:

The following response was provided by Posterity Group:

a) Please see the following two documents, provided as Attachment 1 and Attachment 2:

“EGI General Service Actual and Forecast Customers"
"EGD Contract Market Customer Count actual from 2008 to 2019"

b) Please see the following document, provided as Attachment 3:

"EGI Forecast Volumes and DSM"

c) Please see the following two documents, provided as Attachment 4 and Attachment 5:

“2019 NG Residential End Use--Single Family"
" 2019 NG Residential End Use--New Housing"

d) The upper and lower volumes of RNG and hydrogen are included in an attachment to the original filing. Please see Exhibit 1, Tab 10, Schedule 5, Attachment 1, page 26 for the upper bound of RNG and hydrogen. This table presents the upper bound details. Lower bound for RNG and hydrogen are zero.

   Additional detailed input assumptions for RNG and Hydrogen for the Steady Progress, Diversified Portfolio and Electricity Centric scenarios are presented in Appendix F of the report. Please see Exhibit 1, Tab 10, Schedule 5, Attachment 1, pages 113 to 114.

EGI General Service Actual and Forecast Customers (Enbridge Gas Distribution) (number of customers)

Residential; Rate 1

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
2008								
2009								
2010	1,765,549	1,767,519	1,772,115	1,776,130	1,769,693	1,769,351	1,768,861	1,771,769
2011	1,792,234	1,795,395	1,799,789	1,799,377	1,801,411	1,799,375	1,796,089	1,798,310
2012	1,826,998	1,829,526	1,832,013	1,833,420	1,833,337	1,831,393	1,830,977	1,830,088
2013	1,859,938	1,862,355	1,864,894	1,866,664	1,867,428	1,865,681	1,864,592	1,866,038
2014	1,891,604	1,893,985	1,896,326	1,897,972	1,898,854	1,897,110	1,896,503	1,898,294
2015	1,922,452	1,925,319	1,926,841	1,928,304	1,927,836	1,926,372	1,926,248	1,926,985
2016	1,951,381	1,954,282	1,955,922	1,957,193	1,957,082	1,955,677	1,955,198	1,956,687
2017	1,979,523	1,982,319	1,984,838	1,984,897	1,987,234	1,986,835	1,987,294	1,988,892
2018	2,009,133	2,010,467	2,012,860	2,013,937	2,014,623	2,013,499	2,013,965	2,014,881
2019	2,033,912	2,035,194	2,036,974	2,038,012	2,038,640	2,037,603	2,037,537	2,038,565
2020	2,057,056	2,058,873	2,059,975	2,060,281	2,061,134	2,059,265	2,058,625	2,059,063
2021	2,074,273	2,075,516	2,077,746	2,078,750	2,079,390	2,078,342	2,078,775	2,079,629
2022	2,097,828	2,099,099	2,101,379	2,102,405	2,103,059	2,101,989	2,102,431	2,103,305
2023	2,121,764	2,122,990	2,125,186	2,126,175	2,126,805	2,125,773	2,126,201	2,127,042
2024	2,144,828	2,146,008	2,148,125	2,149,078	2,149,684	2,148,690	2,149,102	2,149,911
2025	2,167,022	2,168,149	2,170,174	2,171,086	2,171,668	2,170,718	2,171,112	2,171,887
2026	2,188,308	2,189,413	2,191,394	2,192,286	2,192,854	2,191,922	2,192,307	2,193,066
2027	2,209,111	2,210,177	2,212,090	2,212,951	2,213,502	2,212,604	2,212,977	2,213,709
2028	2,229,202	2,230,232	2,232,079	2,232,910	2,233,440	2,232,573	2,232,933	2,233,641
2029	2,248,599	2,249,594	2,251,377	2,252,179	2,252,690	2,251,852	2,252,199	2,252,882
2030	2,267,318	2,268,277	2,269,998	2,270,772	2,271,266	2,270,458	2,270,792	2,271,450

Sep	Oct	Nov	Dec	Average	Jan	Feb	Mar	Apr	May
1,773,813	1,775,361	1,783,522	1,789,228	**1,773,576**	7,210	7,214	7,227	7,234	7,251
1,803,083	1,808,433	1,815,424	1,822,016	**1,802,578**	7,261	7,241	7,370	7,297	7,353
1,834,396	1,845,680	1,851,488	1,855,883	**1,836,267**	7,390	7,394	7,369	7,392	7,383
1,868,191	1,875,671	1,882,365	1,888,078	**1,869,325**	7,420	7,432	7,445	7,436	7,449
1,901,935	1,908,615	1,914,298	1,918,986	**1,901,207**	7,448	7,454	7,459	7,447	7,452
1,929,810	1,936,781	1,942,612	1,948,325	**1,930,657**	7,455	7,456	7,457	7,453	7,454
1,958,986	1,965,100	1,971,419	1,975,901	**1,959,569**	7,439	7,461	7,456	7,476	7,471
1,991,783	1,997,213	2,003,071	2,006,483	**1,990,032**	7,428	7,430	7,432	7,424	7,437
2,017,462	2,024,113	2,028,898	2,031,697	**2,017,128**	7,435	7,443	7,442	7,447	7,442
2,040,880	2,047,063	2,051,850	2,052,288	**2,040,710**	7,425	7,430	7,428	7,421	7,424
2,061,061	2,066,208	2,069,912	2,071,802	**2,061,938**	7,356	7,419	7,412	7,419	7,418
2,082,034	2,088,233	2,092,693	2,095,302	**2,081,724**	7,272	7,271	7,270	7,271	7,269
2,105,765	2,112,103	2,116,663	2,119,331	**2,105,446**	7,266	7,265	7,264	7,265	7,263
2,129,412	2,135,519	2,139,913	2,142,484	**2,129,105**	7,260	7,259	7,257	7,258	7,256
2,152,193	2,158,074	2,162,305	2,164,780	**2,151,898**	7,253	7,251	7,249	7,250	7,248
2,174,070	2,179,696	2,183,744	2,186,113	**2,173,787**	7,245	7,243	7,241	7,242	7,240
2,195,204	2,200,712	2,204,675	2,206,993	**2,194,928**	7,237	7,235	7,233	7,234	7,232
2,215,773	2,221,091	2,224,917	2,227,156	**2,215,505**	7,228	7,226	7,224	7,226	7,224
2,235,633	2,240,768	2,244,463	2,246,624	**2,235,375**	7,220	7,218	7,216	7,218	7,215
2,254,805	2,259,761	2,263,327	2,265,413	**2,254,557**	7,211	7,209	7,207	7,209	7,206
2,273,303	2,278,083	2,281,523	2,283,536	**2,273,065**	7,202	7,200	7,198	7,200	7,197

Apartment; Rate 6

Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average	Jan	Feb	Mar
7,251	7,251	7,249	7,252	7,237	7,269	7,297	**7,245**	146,101	146,394	146,883
7,344	7,362	7,356	7,366	7,367	7,362	7,385	**7,339**	144,493	145,209	146,319
7,384	7,387	7,380	7,387	7,396	7,384	7,394	**7,387**	146,607	147,015	146,951
7,451	7,442	7,438	7,428	7,436	7,437	7,441	**7,438**	147,751	148,320	148,476
7,455	7,452	7,449	7,446	7,449	7,449	7,459	**7,452**	149,787	150,083	150,209
7,449	7,443	7,445	7,443	7,439	7,439	7,436	**7,447**	151,209	151,659	151,800
7,470	7,453	7,452	7,446	7,444	7,431	7,434	**7,453**	152,297	152,719	152,802
7,430	7,437	7,437	7,441	7,436	7,432	7,431	**7,433**	153,205	153,596	153,726
7,435	7,436	7,444	7,438	7,427	7,426	7,423	**7,437**	154,772	154,859	154,948
7,409	7,411	7,414	7,414	7,407	6,853	7,277	**7,359**	155,742	155,828	155,967
7,368	7,319	7,274	7,275	7,274	7,274	7,274	**7,340**	156,675	156,814	156,638
7,269	7,270	7,270	7,271	7,270	7,270	7,269	**7,270**	156,537	156,726	156,789
7,263	7,264	7,264	7,265	7,264	7,264	7,263	**7,264**	157,297	157,477	157,538
7,256	7,257	7,257	7,258	7,257	7,257	7,256	**7,257**	158,004	158,165	158,218
7,248	7,249	7,249	7,250	7,249	7,249	7,248	**7,249**	158,636	158,779	158,826
7,240	7,241	7,241	7,242	7,241	7,241	7,240	**7,241**	159,197	159,323	159,365
7,232	7,233	7,233	7,234	7,233	7,233	7,232	**7,233**	159,688	159,798	159,835
7,224	7,225	7,225	7,226	7,225	7,225	7,224	**7,225**	160,124	160,222	160,254
7,215	7,216	7,216	7,217	7,216	7,216	7,215	**7,217**	160,505	160,588	160,615
7,206	7,207	7,207	7,208	7,207	7,207	7,206	**7,208**	160,831	160,901	160,925
7,197	7,198	7,198	7,199	7,198	7,198	7,197	**7,199**	161,105	161,162	161,182

Commercial; Rate 6

Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Average
146,974	145,634	144,769	143,971	143,552	143,026	142,071	142,650	143,560	**144,632**
145,503	144,961	143,412	142,368	141,792	141,757	141,955	143,581	145,208	**143,880**
146,520	145,153	143,764	142,394	141,234	141,648	143,620	145,501	146,704	**144,759**
148,320	147,611	146,077	144,876	144,237	143,886	145,371	147,603	148,926	**146,788**
150,080	149,368	147,757	146,776	146,289	146,352	147,722	149,704	150,613	**148,728**
151,724	150,804	149,191	148,237	147,714	147,779	149,498	150,814	151,682	**150,176**
152,578	151,768	150,655	149,709	149,120	148,959	150,290	151,839	152,795	**151,294**
153,028	153,224	152,514	151,804	151,481	151,505	152,493	153,758	154,382	**152,893**
154,760	154,254	153,335	152,559	152,062	151,985	153,669	154,761	155,188	**153,929**
155,790	155,331	154,452	153,937	153,536	153,468	154,535	155,407	155,655	**154,971**
156,268	156,122	155,536	155,232	155,094	155,105	155,529	156,072	156,340	**155,952**
156,453	156,548	156,206	155,863	155,708	155,719	156,195	156,807	157,108	**156,388**
157,215	157,305	156,978	156,652	156,503	156,514	156,968	157,549	157,835	**157,153**
157,929	158,010	157,718	157,425	157,292	157,302	157,708	158,229	158,486	**157,874**
158,571	158,643	158,383	158,126	158,007	158,016	158,376	158,839	159,066	**158,522**
159,140	159,202	158,974	158,747	158,643	158,651	158,967	159,371	159,571	**159,096**
159,637	159,693	159,491	159,289	159,197	159,204	159,485	159,845	160,023	**159,599**
160,081	160,130	159,955	159,779	159,699	159,705	159,950	160,263	160,418	**160,048**
160,467	160,508	160,358	160,208	160,139	160,144	160,354	160,623	160,756	**160,439**
160,801	160,836	160,708	160,580	160,521	160,525	160,703	160,931	161,043	**160,775**
161,078	161,107	161,001	160,896	160,847	160,849	160,996	161,183	161,276	**161,057**

Industrial; Rate 6

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
6,254	6,261	6,289	6,249	6,258	6,224	6,189	6,169	6,139	6,082
6,142	6,189	6,234	6,191	6,180	6,091	6,063	6,039	6,023	6,023
6,165	6,183	6,157	6,133	6,088	6,037	5,964	5,940	5,935	6,006
6,128	6,123	6,124	6,109	6,079	6,013	5,957	5,934	5,906	5,963
6,110	6,130	6,127	6,117	6,100	6,031	5,999	5,975	5,957	5,992
6,094	6,095	6,091	6,091	6,049	5,984	5,955	5,942	5,929	5,967
6,031	6,041	6,029	6,016	5,985	5,933	5,900	5,869	5,846	5,881
5,950	5,959	5,954	5,904	5,923	5,901	5,863	5,850	5,842	5,867
5,925	5,920	5,911	5,908	5,881	5,832	5,797	5,766	5,766	5,816
5,853	5,844	5,843	5,828	5,803	5,776	5,761	5,741	5,749	5,777
5,738	5,775	5,747	5,764	5,759	5,709	5,658	5,638	5,618	5,618
5,618	5,618	5,618	5,617	5,617	5,617	5,616	5,616	5,616	5,616
5,617	5,617	5,617	5,616	5,616	5,616	5,615	5,615	5,615	5,615
5,616	5,616	5,616	5,615	5,615	5,615	5,614	5,614	5,614	5,614
5,615	5,615	5,615	5,614	5,614	5,614	5,614	5,614	5,614	5,614
5,614	5,614	5,614	5,613	5,613	5,613	5,613	5,613	5,613	5,613
5,613	5,613	5,613	5,614	5,614	5,614	5,614	5,614	5,614	5,614
5,614	5,614	5,614	5,615	5,615	5,615	5,615	5,615	5,615	5,615
5,615	5,615	5,615	5,616	5,616	5,616	5,616	5,616	5,616	5,616
5,616	5,616	5,616	5,617	5,617	5,617	5,617	5,617	5,617	5,617
5,617	5,617	5,617	5,618	5,618	5,618	5,618	5,618	5,618	5,618

								Total EGD		
Nov	**Dec**	**Average**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**
6,100	6,132	**6,196**	1,925,114	1,927,388	1,932,514	1,936,587	1,928,836	1,927,595	1,926,272	1,928,739
6,084	6,124	**6,115**	1,950,130	1,954,034	1,959,712	1,958,368	1,959,905	1,956,222	1,951,882	1,953,497
6,062	6,087	**6,063**	1,987,160	1,990,118	1,992,490	1,993,465	1,991,961	1,988,578	1,986,722	1,984,642
6,047	6,079	**6,039**	2,021,237	2,024,230	2,026,939	2,028,529	2,028,567	2,025,222	2,022,867	2,023,647
6,061	6,078	**6,056**	2,054,949	2,057,652	2,060,121	2,061,616	2,061,774	2,058,353	2,056,730	2,058,007
5,994	6,016	**6,017**	2,087,210	2,090,529	2,092,189	2,093,572	2,092,143	2,088,996	2,087,883	2,088,086
5,924	5,951	**5,951**	2,117,148	2,120,503	2,122,209	2,123,263	2,122,306	2,119,735	2,118,260	2,119,128
5,904	5,907	**5,902**	2,146,106	2,149,304	2,151,950	2,151,253	2,153,818	2,152,680	2,152,398	2,153,660
5,839	5,847	**5,851**	2,177,265	2,178,689	2,181,161	2,182,052	2,182,200	2,180,101	2,179,757	2,180,153
5,557	5,619	**5,763**	2,202,932	2,204,296	2,206,212	2,207,051	2,207,198	2,205,240	2,204,646	2,205,256
5,618	5,618	**5,688**	2,226,825	2,228,881	2,229,772	2,229,732	2,230,433	2,227,878	2,226,834	2,227,069
5,617	5,617	**5,617**	2,243,700	2,245,131	2,247,423	2,248,091	2,248,824	2,247,434	2,247,524	2,248,223
5,616	5,616	**5,616**	2,268,008	2,269,458	2,271,798	2,272,501	2,273,243	2,271,846	2,271,962	2,272,687
5,615	5,615	**5,615**	2,292,644	2,294,030	2,296,277	2,296,977	2,297,686	2,296,362	2,296,497	2,297,205
5,614	5,614	**5,614**	2,316,332	2,317,653	2,319,815	2,320,513	2,321,189	2,319,935	2,320,091	2,320,781
5,613	5,613	**5,613**	2,339,078	2,340,329	2,342,394	2,343,081	2,343,723	2,342,545	2,342,713	2,343,384
5,614	5,614	**5,614**	2,360,846	2,362,059	2,364,075	2,364,771	2,365,393	2,364,259	2,364,443	2,365,110
5,615	5,615	**5,615**	2,382,077	2,383,239	2,385,182	2,385,873	2,386,471	2,385,398	2,385,596	2,386,248
5,616	5,616	**5,616**	2,402,542	2,403,653	2,405,525	2,406,211	2,406,779	2,405,762	2,405,973	2,406,612
5,617	5,617	**5,617**	2,422,257	2,423,320	2,425,125	2,425,806	2,426,349	2,425,383	2,425,603	2,426,227
5,618	5,618	**5,618**	2,441,242	2,442,256	2,443,995	2,444,668	2,445,188	2,444,274	2,444,504	2,445,113

Sep	Oct	Nov	Dec	Average
1,930,230	1,930,751	1,939,541	1,946,217	**1,931,649**
1,958,229	1,963,778	1,972,451	1,980,733	**1,959,912**
1,989,366	2,002,702	2,010,435	2,016,068	**1,994,476**
2,025,411	2,034,441	2,043,452	2,050,524	**2,029,589**
2,061,690	2,069,778	2,077,512	2,083,136	**2,063,443**
2,090,961	2,099,685	2,106,859	2,113,459	**2,094,298**
2,121,237	2,128,715	2,136,613	2,142,081	**2,124,267**
2,156,571	2,163,009	2,170,165	2,174,203	**2,156,260**
2,182,651	2,191,025	2,196,924	2,200,155	**2,184,344**
2,207,511	2,214,782	2,219,667	2,220,839	**2,208,803**
2,229,059	2,234,629	2,238,876	2,241,034	**2,230,919**
2,250,640	2,257,314	2,262,387	2,265,296	**2,250,999**
2,275,159	2,281,950	2,287,092	2,290,045	**2,275,479**
2,299,586	2,306,098	2,311,014	2,313,841	**2,299,851**
2,323,073	2,329,313	2,334,007	2,336,708	**2,323,284**
2,345,576	2,351,517	2,355,969	2,358,537	**2,345,737**
2,367,256	2,373,044	2,377,367	2,379,862	**2,367,374**
2,388,319	2,393,881	2,398,020	2,400,413	**2,388,393**
2,408,610	2,413,954	2,417,918	2,420,211	**2,408,646**
2,428,155	2,433,288	2,437,082	2,439,279	**2,428,156**
2,446,969	2,451,895	2,455,522	2,457,627	**2,446,938**

EGI General Service Actual and Forecast Customers (Union Gas) (number of customers)

		Residential Rate M1	Residential Rate M2	Residential Rate 01	Commercial Rate M1
Actual	1/1/2008	903,645	-	270,257	74,690
Actual	2/1/2008	904,891	33	270,559	75,494
Actual	3/1/2008	906,291	34	270,693	75,203
Actual	4/1/2008	907,517	31	270,948	75,061
Actual	5/1/2008	910,513	32	271,443	75,131
Actual	6/1/2008	909,864	32	271,494	74,771
Actual	7/1/2008	909,924	32	271,818	74,498
Actual	8/1/2008	912,091	31	272,178	74,399
Actual	9/1/2008	913,454	31	272,336	74,270
Actual	10/1/2008	914,157	32	272,878	74,390
Actual	11/1/2008	916,979	32	273,748	74,786
Actual	12/1/2008	919,330	32	274,484	75,265
Actual	1/1/2009	919,119	31	274,413	75,530
Actual	2/1/2009	920,117	31	274,604	75,663
Actual	3/1/2009	921,384	32	274,723	75,708
Actual	4/1/2009	922,795	32	274,852	75,590
Actual	5/1/2009	923,976	30	275,125	75,247
Actual	6/1/2009	923,597	32	275,258	74,934
Actual	7/1/2009	924,487	35	275,663	74,630
Actual	8/1/2009	924,995	35	275,801	74,200
Actual	9/1/2009	925,214	38	275,566	74,205
Actual	10/1/2009	925,626	37	276,034	74,372
Actual	11/1/2009	927,796	37	276,948	74,777
Actual	12/1/2009	931,272	38	277,830	75,145
Actual	1/1/2010	930,752	38	277,670	75,376
Actual	2/1/2010	931,615	37	277,800	75,385
Actual	3/1/2010	933,225	37	278,068	75,507
Actual	4/1/2010	934,097	36	278,159	75,456
Actual	5/1/2010	935,624	36	278,421	75,322
Actual	6/1/2010	936,271	34	278,822	75,018
Actual	7/1/2010	940,079	33	279,823	75,076
Actual	8/1/2010	937,336	34	279,118	74,950
Actual	9/1/2010	938,967	34	279,385	74,729
Actual	10/1/2010	939,497	35	279,978	74,852
Actual	11/1/2010	941,507	35	280,725	75,156
Actual	12/1/2010	945,156	35	281,810	75,773
Actual	1/1/2011	944,329	35	281,621	76,081
Actual	2/1/2011	945,347	35	281,760	76,130
Actual	3/1/2011	946,149	31	281,939	76,253
Actual	4/1/2011	947,151	31	282,101	75,951
Actual	5/1/2011	949,356	31	282,640	75,998
Actual	6/1/2011	948,378	32	282,707	75,627
Actual	7/1/2011	949,585	32	283,347	75,476

		Residential Rate M1	Residential Rate M2	Residential Rate 01	Commercial Rate M1
Actual	8/1/2011	950,079	32	283,316	75,170
Actual	9/1/2011	951,893	32	283,804	75,159
Actual	10/1/2011	952,128	32	284,541	75,300
Actual	11/1/2011	954,162	32	285,568	75,657
Actual	12/1/2011	956,388	32	286,420	76,032
Actual	1/1/2012	956,538	32	286,623	76,306
Actual	2/1/2012	956,940	33	286,779	76,479
Actual	3/1/2012	957,918	32	287,004	76,402
Actual	4/1/2012	959,656	33	287,316	76,351
Actual	5/1/2012	961,809	31	287,715	76,199
Actual	6/1/2012	961,656	7	287,809	76,017
Actual	7/1/2012	963,072	2	288,365	75,869
Actual	8/1/2012	962,998	2	288,422	75,723
Actual	9/1/2012	964,756	2	288,638	75,738
Actual	10/1/2012	963,743	3	289,210	75,823
Actual	11/1/2012	966,925	3	290,505	76,250
Actual	12/1/2012	969,401	4	291,546	76,568
Actual	1/1/2013	969,013	5	291,557	76,772
Actual	2/1/2013	970,419	6	292,070	76,880
Actual	3/1/2013	971,377	6	292,069	76,995
Actual	4/1/2013	972,632	7	292,355	77,013
Actual	5/1/2013	975,302	7	292,876	77,060
Actual	6/1/2013	974,552	6	292,936	76,872
Actual	7/1/2013	976,114	6	293,522	76,732
Actual	8/1/2013	977,091	6	293,645	76,607
Actual	9/1/2013	978,583	5	294,137	76,514
Actual	10/1/2013	977,660	5	294,800	76,571
Actual	11/1/2013	980,183	5	296,089	76,997
Actual	12/1/2013	982,378	5	297,169	77,385
Actual	1/1/2014	981,876	5	297,379	77,644
Actual	2/1/2014	982,800	5	297,702	77,318
Actual	3/1/2014	983,539	5	297,853	77,825
Actual	4/1/2014	984,492	6	298,200	77,688
Actual	5/1/2014	987,185	6	298,471	77,674
Actual	6/1/2014	986,764	6	298,698	77,447
Actual	7/1/2014	988,836	6	299,396	77,316
Actual	8/1/2014	989,866	6	299,779	77,284
Actual	9/1/2014	991,168	6	300,246	77,038
Actual	10/1/2014	991,815	6	301,527	77,287
Actual	11/1/2014	993,052	6	302,531	77,578
Actual	12/1/2014	995,647	8	303,618	78,064
Actual	1/1/2015	995,102	6	303,845	78,276
Actual	2/1/2015	995,667	6	304,031	78,425
Actual	3/1/2015	996,627	7	304,182	78,548
Actual	4/1/2015	997,904	10	304,694	78,393

		Residential Rate M1	Residential Rate M2	Residential Rate 01	Commercial Rate M1
Actual	5/1/2015	1,000,071	14	305,121	77,926
Actual	6/1/2015	999,338	16	305,029	77,674
Actual	7/1/2015	1,001,975	16	305,912	77,535
Actual	8/1/2015	1,002,487	16	306,097	77,382
Actual	9/1/2015	1,003,135	16	306,048	77,321
Actual	10/1/2015	1,003,485	16	307,001	77,391
Actual	11/1/2015	1,005,608	16	308,214	77,704
Actual	12/1/2015	1,007,403	16	308,806	77,849
Actual	1/1/2016	1,008,016	16	309,168	78,302
Actual	2/1/2016	1,008,561	16	309,432	78,320
Actual	3/1/2016	1,009,504	159	309,684	78,404
Actual	4/1/2016	1,011,110	17	309,939	78,363
Actual	5/1/2016	1,013,277	11	310,121	78,066
Actual	6/1/2016	1,014,069	15	310,637	77,921
Actual	7/1/2016	1,015,899	16	311,338	77,908
Actual	8/1/2016	1,016,181	17	311,341	77,753
Actual	9/1/2016	1,017,856	18	311,762	77,765
Actual	10/1/2016	1,017,095	17	312,326	77,839
Actual	11/1/2016	1,020,113	18	313,826	78,426
Actual	12/1/2016	1,022,260	17	314,579	78,833
Actual	1/1/2017	1,021,882	17	314,505	78,930
Actual	2/1/2017	1,022,860	17	314,594	78,999
Actual	3/1/2017	1,024,285	17	314,787	78,932
Actual	4/1/2017	1,025,116	16	314,976	78,962
Actual	5/1/2017	1,028,391	12	315,549	78,851
Actual	6/1/2017	1,027,813	15	315,779	78,587
Actual	7/1/2017	1,029,561	13	316,329	78,797
Actual	8/1/2017	1,030,421	13	316,459	78,616
Actual	9/1/2017	1,032,052	13	316,989	78,512
Actual	10/1/2017	1,030,546	13	317,118	78,444
Actual	11/1/2017	1,032,778	13	318,102	78,725
Actual	12/1/2017	1,034,745	13	318,345	78,966
Actual	1/1/2018	1,036,369	13	319,108	79,409
Actual	2/1/2018	1,037,006	13	319,026	79,537
Actual	3/1/2018	1,038,197	13	319,249	79,519
Actual	4/1/2018	1,039,954	13	319,316	79,539
Actual	5/1/2018	1,042,860	12	320,127	79,586
Actual	6/1/2018	1,043,164	13	320,427	79,399
Actual	7/1/2018	1,044,919	17	320,936	79,189
Actual	8/1/2018	1,046,073	18	321,321	78,971
Actual	9/1/2018	1,047,459	19	321,482	79,057
Actual	10/1/2018	1,046,967	20	321,915	79,103
Actual	11/1/2018	1,048,840	19	322,801	79,592
Actual	12/1/2018	1,050,926	19	323,232	79,827
Actual	1/1/2019	1,051,274	19	323,467	80,028

		Residential Rate M1	Residential Rate M2	Residential Rate 01	Commercial Rate M1
Actual	2/1/2019	1,052,191	19	323,469	80,214
Actual	3/1/2019	1,053,014	19	323,668	80,243
Actual	4/1/2019	1,053,440	19	323,715	79,743
Actual	5/1/2019	1,056,059	19	324,087	80,271
Actual	6/1/2019	1,056,771	21	324,595	79,860
Actual	7/1/2019	1,057,203	23	325,188	79,593
Actual	8/1/2019	1,059,087	21	325,272	79,752
Actual	9/1/2019	1,059,606	20	325,554	79,607
Actual	10/1/2019	1,058,478	22	325,658	79,750
Actual	11/1/2019	1,062,419	23	326,979	80,112
Actual	12/1/2019	1,064,351	22	327,500	80,361
Bud-21	1/1/2020	1,064,187	20	327,361	80,627
Bud-21	2/1/2020	1,065,467	20	327,749	80,757
Bud-21	3/1/2020	1,065,801	22	327,622	80,862
Bud-21	4/1/2020	1,066,818	20	327,858	80,750
Bud-21	5/1/2020	1,068,761	20	328,114	80,616
Bud-21	6/1/2020	1,068,803	20	327,821	79,886
Bud-21	7/1/2020	1,069,674	20	328,255	79,542
Bud-21	8/1/2020	1,070,967	20	328,324	79,510
Bud-21	9/1/2020	1,071,360	20	328,600	79,444
Bud-21	10/1/2020	1,071,469	20	328,692	79,614
Bud-21	11/1/2020	1,072,794	20	330,014	80,050
Bud-21	12/1/2020	1,075,020	20	330,526	80,523
Bud-21	1/1/2021	1,076,496	20	330,426	80,792
Bud-21	2/1/2021	1,077,310	20	330,411	80,972
Bud-21	3/1/2021	1,078,097	20	330,598	80,995
Bud-21	4/1/2021	1,078,947	20	330,630	80,963
Bud-21	5/1/2021	1,081,459	20	330,994	80,906
Bud-21	6/1/2021	1,082,206	20	331,495	80,610
Bud-21	7/1/2021	1,083,454	20	332,101	80,341
Bud-21	8/1/2021	1,084,577	20	332,187	80,383
Bud-21	9/1/2021	1,085,140	20	332,495	80,361
Bud-21	10/1/2021	1,085,416	20	332,611	80,508
Bud-21	11/1/2021	1,086,900	20	333,970	80,875
Bud-21	12/1/2021	1,089,170	20	334,512	81,129
Bud-21	1/1/2022	1,089,394	20	334,386	81,167
Bud-21	2/1/2022	1,090,058	20	334,388	81,356
Bud-21	3/1/2022	1,090,767	20	334,594	81,384
Bud-21	4/1/2022	1,091,823	20	334,642	81,352
Bud-21	5/1/2022	1,094,550	20	335,027	81,295
Bud-21	6/1/2022	1,095,088	20	335,552	80,998
Bud-21	7/1/2022	1,096,702	20	336,165	80,727
Bud-21	8/1/2022	1,097,488	20	336,251	80,769
Bud-21	9/1/2022	1,098,053	20	336,560	80,747
Bud-21	10/1/2022	1,098,328	20	336,676	80,894

		Residential Rate M1	Residential Rate M2	Residential Rate 01	Commercial Rate M1
Bud-21	11/1/2022	1,099,807	20	338,049	81,262
Bud-21	12/1/2022	1,101,948	20	338,596	81,518
Bud-21	1/1/2023	1,101,701	20	338,418	81,491
Bud-21	2/1/2023	1,102,227	20	338,420	81,680
Bud-21	3/1/2023	1,102,872	20	338,628	81,710
Bud-21	4/1/2023	1,104,158	20	338,678	81,677
Bud-21	5/1/2023	1,107,105	20	339,066	81,619
Bud-21	6/1/2023	1,107,459	20	339,598	81,320
Bud-21	7/1/2023	1,109,446	20	340,218	81,049
Bud-21	8/1/2023	1,109,886	20	340,306	81,092
Bud-21	9/1/2023	1,110,480	20	340,625	81,065
Bud-21	10/1/2023	1,110,771	20	340,746	81,212
Bud-21	11/1/2023	1,112,257	20	342,140	81,580
Bud-21	12/1/2023	1,114,284	20	342,697	81,834
Bud-21	1/1/2024	1,114,323	20	342,345	81,779
Bud-21	2/1/2024	1,114,782	20	342,348	81,970
Bud-21	3/1/2024	1,115,362	20	342,558	81,998
Bud-21	4/1/2024	1,116,295	20	342,608	81,966
Bud-21	5/1/2024	1,118,967	20	343,002	81,908
Bud-21	6/1/2024	1,119,632	20	343,539	81,608
Bud-21	7/1/2024	1,120,847	20	344,165	81,336
Bud-21	8/1/2024	1,122,086	20	344,255	81,378
Bud-21	9/1/2024	1,122,679	20	344,574	81,353
Bud-21	10/1/2024	1,122,969	20	344,694	81,499
Bud-21	11/1/2024	1,124,442	20	346,102	81,869
Bud-21	12/1/2024	1,126,336	20	346,664	82,125
Bud-21	1/1/2025	1,126,556	20	346,125	82,039
Bud-21	2/1/2025	1,127,020	20	346,127	82,230
Bud-21	3/1/2025	1,127,546	20	346,339	82,259
Bud-21	4/1/2025	1,128,105	20	346,390	82,226
Bud-21	5/1/2025	1,130,541	20	346,787	82,168
Bud-21	6/1/2025	1,131,479	20	347,330	81,867
Bud-21	7/1/2025	1,131,879	20	347,965	81,593
Bud-21	8/1/2025	1,133,957	20	348,055	81,636
Bud-21	9/1/2025	1,134,591	20	348,431	81,610
Bud-21	10/1/2025	1,134,904	20	348,580	81,758
Bud-21	11/1/2025	1,136,389	20	350,031	82,129
Bud-21	12/1/2025	1,138,163	20	350,625	82,385
Bud-21	1/1/2026	1,138,568	20	349,981	82,275
Bud-21	2/1/2026	1,138,872	20	349,983	82,466
Bud-21	3/1/2026	1,139,344	20	350,198	82,495
Bud-21	4/1/2026	1,139,834	20	350,249	82,462
Bud-21	5/1/2026	1,142,183	20	350,651	82,404
Bud-21	6/1/2026	1,143,242	20	351,199	82,103
Bud-21	7/1/2026	1,143,448	20	351,841	81,827

		Residential Rate M1	Residential Rate M2	Residential Rate 01	Commercial Rate M1
Bud-21	8/1/2026	1,145,746	20	351,932	81,870
Bud-21	9/1/2026	1,146,378	20	352,303	81,846
Bud-21	10/1/2026	1,146,688	20	352,447	81,993
Bud-21	11/1/2026	1,148,161	20	353,908	82,365
Bud-21	12/1/2026	1,149,791	20	354,505	82,623
Bud-21	1/1/2027	1,150,285	20	353,756	82,487
Bud-21	2/1/2027	1,150,531	20	353,758	82,680
Bud-21	3/1/2027	1,150,978	20	353,975	82,709
Bud-21	4/1/2027	1,151,367	20	354,026	82,677
Bud-21	5/1/2027	1,153,780	20	354,432	82,618
Bud-21	6/1/2027	1,154,809	20	354,987	82,315
Bud-21	7/1/2027	1,154,766	20	355,635	82,041
Bud-21	8/1/2027	1,157,338	20	355,727	82,083
Bud-21	9/1/2027	1,157,944	20	356,066	82,056
Bud-21	10/1/2027	1,158,241	20	356,194	82,204
Bud-21	11/1/2027	1,159,688	20	357,651	82,578
Bud-21	12/1/2027	1,161,163	20	358,236	82,836
Bud-21	1/1/2028	1,161,806	20	357,362	82,673
Bud-21	2/1/2028	1,161,979	20	357,364	82,865
Bud-21	3/1/2028	1,162,307	20	357,583	82,895
Bud-21	4/1/2028	1,162,594	20	357,635	82,862
Bud-21	5/1/2028	1,164,922	20	358,046	82,803
Bud-21	6/1/2028	1,165,728	20	358,606	82,499
Bud-21	7/1/2028	1,166,025	20	359,259	82,224
Bud-21	8/1/2028	1,168,622	20	359,352	82,267
Bud-21	9/1/2028	1,169,214	20	359,684	82,237
Bud-21	10/1/2028	1,169,504	20	359,810	82,386
Bud-21	11/1/2028	1,170,934	20	361,277	82,759
Bud-21	12/1/2028	1,172,251	20	361,862	83,017
Bud-21	1/1/2029	1,173,049	20	360,864	82,828
Bud-21	2/1/2029	1,173,147	20	360,867	83,020
Bud-21	3/1/2029	1,173,355	20	361,088	83,050
Bud-21	4/1/2029	1,173,537	20	361,141	83,017
Bud-21	5/1/2029	1,175,780	20	361,554	82,958
Bud-21	6/1/2029	1,176,369	20	362,120	82,653
Bud-21	7/1/2029	1,177,000	20	362,780	82,378
Bud-21	8/1/2029	1,179,621	20	362,874	82,422
Bud-21	9/1/2029	1,180,217	20	363,205	82,391
Bud-21	10/1/2029	1,180,509	20	363,329	82,540
Bud-21	11/1/2029	1,181,927	20	364,808	82,914
Bud-21	12/1/2029	1,183,093	20	365,397	83,173
Bud-21	1/1/2030	1,184,061	20	364,276	82,957
Bud-21	2/1/2030	1,184,082	20	364,278	83,150
Bud-21	3/1/2030	1,184,169	20	364,501	83,179
Bud-21	4/1/2030	1,184,243	20	364,554	83,146

		Residential Rate M1	Residential Rate M2	Residential Rate 01	Commercial Rate M1
Bud-21	5/1/2030	1,186,398	20	364,972	83,088
Bud-21	6/1/2030	1,187,101	20	365,543	82,783
Bud-21	7/1/2030	1,187,404	20	366,210	82,507
Bud-21	8/1/2030	1,190,383	20	366,305	82,549
Bud-21	9/1/2030	1,190,966	20	366,640	82,520
Bud-21	10/1/2030	1,191,251	20	366,765	82,668
Bud-21	11/1/2030	1,192,649	20	368,259	83,043
Bud-21	12/1/2030	1,193,655	20	368,852	83,302

Commercial Rate M2	Commercial Tobacco M1	Commercial Tobacco M2	Commercial Rate 01	Commercial Rate 10
4,882	750	111	26,545	2,111
4,311	810	52	26,588	2,127
4,631	807	56	26,571	2,122
4,674	804	55	26,560	2,126
4,670	802	55	26,585	2,128
4,676	796	55	26,430	2,135
4,632	785	55	26,318	2,119
4,619	785	56	26,306	2,119
4,670	786	54	26,211	2,121
4,653	783	54	26,277	2,129
4,685	781	54	26,413	2,170
4,674	785	54	26,536	2,177
4,684	783	54	26,537	2,181
4,693	778	54	26,619	2,166
4,699	780	54	26,634	2,180
4,771	773	52	26,458	2,330
4,954	777	53	26,535	2,218
4,974	770	55	26,502	2,197
4,964	758	53	26,440	2,207
5,298	771	45	26,257	2,328
5,128	757	45	26,514	2,024
5,140	748	44	26,608	1,989
5,195	745	45	26,532	2,104
5,156	743	45	26,753	2,044
5,225	737	46	26,726	2,114
5,231	738	47	26,895	1,969
5,249	738	46	26,912	1,964
5,224	742	47	26,830	2,035
5,237	741	47	26,905	1,917
5,372	743	43	26,849	1,941
5,282	746	41	26,841	1,898
5,116	748	40	26,702	1,956
5,250	746	41	26,785	1,900
5,196	746	39	26,829	1,954
5,211	750	38	26,962	1,901
5,244	747	40	27,036	1,976
5,202	747	38	27,103	1,958
5,271	745	39	27,190	1,910
5,076	746	35	27,044	2,116
5,250	746	41	27,202	1,864
5,192	727	55	26,827	2,277
5,208	725	53	27,108	1,955
5,235	729	55	27,106	1,897

Commercial Rate M2	Commercial Tobacco M1	Commercial Tobacco M2	Commercial Rate 01	Commercial Rate 10
5,324	726	56	27,049	1,886
5,274	725	55	27,050	1,880
5,297	718	54	27,093	1,916
5,279	722	54	27,220	1,902
5,280	719	54	27,213	2,002
5,299	717	54	27,434	1,920
5,283	716	54	27,430	1,953
5,305	714	54	27,468	1,946
5,338	709	54	27,490	1,907
5,315	705	54	27,454	1,915
5,354	704	54	27,401	1,921
5,386	699	55	27,333	1,941
5,353	694	54	27,287	1,921
5,290	688	58	27,294	1,894
5,247	686	60	27,344	1,885
5,373	674	71	27,495	1,894
5,394	671	72	27,481	1,940
5,383	664	80	27,571	1,927
5,510	657	84	27,658	1,918
5,450	628	113	27,584	1,950
5,385	615	131	27,479	2,085
5,343	609	131	27,783	1,818
5,357	604	131	27,594	1,879
5,350	605	131	27,612	1,834
5,341	601	131	27,564	1,840
5,340	600	131	27,557	1,837
5,364	603	131	27,587	1,838
5,403	602	131	27,665	1,896
5,401	600	132	27,888	1,866
5,411	603	131	27,967	1,863
5,888	602	136	28,021	1,844
5,479	611	123	27,917	1,970
5,554	607	124	28,002	1,881
5,572	597	136	27,949	1,873
5,574	591	140	27,907	1,856
5,571	590	137	27,884	1,863
5,552	586	140	27,816	1,879
5,678	590	135	27,802	1,865
5,613	585	138	27,934	1,878
5,563	586	139	27,992	1,886
5,575	588	133	28,162	1,866
5,585	586	139	28,229	1,884
5,600	582	141	28,231	1,878
5,611	581	140	28,198	1,939
5,755	585	137	28,082	1,991

Commercial Rate M2	Commercial Tobacco M1	Commercial Tobacco M2	Commercial Rate 01	Commercial Rate 10
6,094	567	150	28,051	2,031
6,172	555	156	27,973	2,046
6,152	554	157	27,922	2,058
6,135	554	157	27,886	1,999
6,121	552	157	27,824	2,040
6,168	554	154	27,860	2,037
6,158	554	157	27,988	2,039
6,268	558	154	28,051	2,070
6,212	550	161	28,093	2,043
6,267	551	163	28,164	2,078
6,197	548	160	28,059	2,206
6,240	556	152	28,067	2,179
6,360	568	153	28,227	2,036
6,389	549	158	28,192	2,031
6,256	569	140	28,151	2,033
6,222	582	128	28,110	2,055
6,209	575	132	28,100	2,031
6,212	576	129	28,110	2,040
6,284	571	129	28,215	2,047
6,161	578	125	28,367	2,037
6,278	575	129	28,291	2,105
6,293	567	133	28,352	2,092
6,351	573	129	28,463	2,040
6,251	572	128	28,399	2,050
6,257	574	132	28,139	2,301
6,319	534	163	28,425	1,944
5,947	583	118	28,326	2,002
5,920	574	123	28,284	1,944
5,936	575	123	28,275	1,962
5,951	578	122	28,266	1,963
5,968	573	124	28,400	2,008
6,021	582	115	28,342	2,088
5,977	580	119	28,716	1,973
5,987	577	119	28,693	1,958
6,040	579	116	28,747	1,966
6,020	576	121	28,653	1,991
6,023	577	118	28,640	1,950
6,036	589	106	28,432	2,121
6,061	576	118	28,553	1,927
6,200	577	118	28,494	1,927
6,099	576	118	28,464	1,927
6,111	568	125	28,526	1,920
6,101	570	122	28,610	1,977
6,143	571	121	28,776	1,920
6,158	566	122	28,847	1,952

Commercial Rate M2	Commercial Tobacco M1	Commercial Tobacco M2	Commercial Rate 01	Commercial Rate 10
6,124	565	119	28,874	1,926
6,198	560	128	28,788	2,000
6,628	572	117	28,817	1,953
6,093	564	125	28,785	1,958
6,322	560	125	28,697	1,992
6,460	550	136	28,608	2,058
6,345	547	136	28,545	2,049
6,387	546	137	28,619	2,002
6,346	546	137	28,548	2,016
6,371	546	138	28,621	2,041
6,397	548	137	28,819	1,995
6,396	541	141	28,897	2,013
6,415	544	138	28,865	2,070
6,394	543	140	28,917	2,013
6,349	540	140	28,810	2,104
6,362	546	136	28,800	2,070
6,331	556	124	28,935	2,001
6,337	546	135	29,108	2,066
6,343	543	135	29,045	2,055
6,350	542	136	29,093	2,005
6,356	542	136	28,906	2,018
6,363	542	137	28,489	2,043
6,369	544	136	28,259	1,996
6,408	558	120	28,781	1,963
6,415	557	117	28,621	1,937
6,421	552	126	28,517	2,012
6,421	564	115	28,597	1,964
6,421	556	123	28,649	1,969
6,421	552	123	28,911	2,004
6,421	542	134	29,113	2,070
6,421	539	134	29,079	2,061
6,421	538	135	29,155	2,014
6,421	538	135	28,997	2,028
6,421	538	136	28,608	2,053
6,421	540	135	28,405	2,007
6,453	553	119	28,926	1,973
6,453	552	116	28,763	1,947
6,453	547	125	28,660	2,022
6,453	559	114	28,740	1,974
6,453	551	122	28,792	1,979
6,453	547	122	29,055	2,014
6,453	538	133	29,259	2,081
6,453	535	133	29,225	2,072
6,453	534	134	29,300	2,024
6,453	534	134	29,142	2,038

Commercial Rate M2	Commercial Tobacco M1	Commercial Tobacco M2	Commercial Rate 01	Commercial Rate 10
6,453	534	135	28,751	2,063
6,453	536	134	28,546	2,017
6,484	549	118	29,064	1,983
6,484	548	115	28,902	1,956
6,484	543	124	28,797	2,031
6,484	554	113	28,878	1,984
6,484	547	121	28,930	1,989
6,484	543	121	29,195	2,023
6,484	533	132	29,399	2,091
6,484	530	132	29,365	2,081
6,484	529	133	29,441	2,034
6,484	529	133	29,281	2,048
6,484	529	134	28,889	2,073
6,484	531	133	28,684	2,026
6,512	543	117	29,188	1,991
6,512	542	114	29,025	1,964
6,512	538	123	28,920	2,040
6,512	549	112	29,001	1,992
6,512	541	120	29,053	1,997
6,512	538	120	29,318	2,032
6,512	528	131	29,523	2,099
6,512	525	131	29,490	2,090
6,512	524	132	29,566	2,042
6,512	524	132	29,407	2,056
6,512	524	132	29,012	2,082
6,512	526	132	28,805	2,035
6,536	538	116	29,295	1,998
6,536	537	113	29,132	1,972
6,536	532	122	29,026	2,048
6,536	543	111	29,107	1,999
6,536	536	119	29,161	2,004
6,536	532	119	29,427	2,039
6,536	522	129	29,632	2,107
6,536	520	129	29,599	2,098
6,536	519	130	29,678	2,050
6,536	519	130	29,517	2,064
6,536	519	131	29,123	2,090
6,536	521	130	28,916	2,042
6,557	532	115	29,398	2,005
6,557	531	112	29,234	1,978
6,557	526	120	29,128	2,054
6,557	537	110	29,209	2,006
6,557	530	117	29,263	2,011
6,557	526	117	29,529	2,046
6,557	517	128	29,736	2,114

Commercial Rate M2	Commercial Tobacco M1	Commercial Tobacco M2	Commercial Rate 01	Commercial Rate 10
6,557	514	128	29,702	2,105
6,557	513	129	29,780	2,056
6,557	513	129	29,620	2,071
6,557	513	130	29,224	2,097
6,557	515	129	29,015	2,049
6,576	525	113	29,490	2,011
6,576	524	110	29,324	1,984
6,576	520	119	29,219	2,061
6,576	531	109	29,299	2,012
6,576	523	116	29,353	2,017
6,576	520	116	29,621	2,052
6,576	510	126	29,828	2,120
6,576	508	126	29,794	2,111
6,576	507	127	29,872	2,063
6,576	507	127	29,711	2,077
6,576	507	128	29,312	2,103
6,576	509	127	29,104	2,055
6,594	519	112	29,568	2,016
6,594	518	109	29,404	1,989
6,594	513	117	29,297	2,066
6,594	524	107	29,379	2,017
6,594	517	115	29,433	2,022
6,594	513	115	29,701	2,058
6,594	504	125	29,909	2,125
6,594	501	125	29,874	2,117
6,594	500	126	29,952	2,068
6,594	500	126	29,789	2,083
6,594	500	126	29,390	2,109
6,594	502	126	29,182	2,061
6,609	512	110	29,637	2,021
6,609	511	108	29,471	1,994
6,609	506	116	29,364	2,071
6,609	517	106	29,446	2,022
6,609	510	113	29,500	2,027
6,609	506	113	29,770	2,062
6,609	497	123	29,978	2,130
6,609	494	123	29,943	2,121
6,609	494	124	30,021	2,073
6,609	494	124	29,858	2,087
6,609	494	125	29,458	2,113
6,609	495	124	29,248	2,066
6,621	504	109	29,693	2,025
6,621	503	106	29,527	1,998
6,621	499	114	29,420	2,075
6,621	510	104	29,503	2,026

Commercial Rate M2	Commercial Tobacco M1	Commercial Tobacco M2	Commercial Rate 01	Commercial Rate 10
6,621	503	111	29,556	2,031
6,621	499	111	29,826	2,066
6,621	490	121	30,034	2,134
6,621	487	121	30,001	2,125
6,621	487	122	30,078	2,077
6,621	487	122	29,915	2,091
6,621	487	123	29,514	2,117
6,621	488	122	29,304	2,069

Industrial Rate M1	Industrial Rate M2	Industrial Rate 10	Industrial Rate 10 - CIA	**TOTAL CUSTOMERS**
4,103	1,301	150	87	**1,288,632**
4,222	1,183	148	85	**1,290,503**
4,164	1,248	149	82	**1,292,051**
4,159	1,242	151	80	**1,293,408**
4,135	1,242	151	78	**1,296,965**
4,124	1,229	152	76	**1,295,834**
4,091	1,239	152	76	**1,295,739**
4,093	1,232	151	77	**1,298,137**
4,071	1,225	150	76	**1,299,455**
4,066	1,231	151	77	**1,300,878**
4,086	1,223	150	78	**1,305,185**
4,110	1,230	151	77	**1,308,905**
4,121	1,236	150	76	**1,308,915**
4,116	1,244	151	76	**1,310,312**
4,116	1,246	151	77	**1,311,784**
4,089	1,263	151	75	**1,313,231**
4,035	1,291	152	74	**1,314,467**
4,010	1,310	151	74	**1,313,864**
3,982	1,321	150	76	**1,314,766**
3,940	1,339	141	74	**1,315,224**
3,929	1,334	139	73	**1,314,966**
3,924	1,331	139	72	**1,316,064**
3,987	1,302	137	74	**1,319,679**
3,987	1,327	130	73	**1,324,543**
4,032	1,326	137	71	**1,324,250**
4,013	1,336	133	71	**1,325,270**
4,028	1,322	133	71	**1,327,300**
4,022	1,333	134	72	**1,328,187**
4,010	1,328	134	70	**1,329,792**
4,006	1,327	132	70	**1,330,628**
4,006	1,305	131	70	**1,335,331**
3,995	1,284	129	70	**1,331,478**
4,020	1,263	130	70	**1,333,320**
3,974	1,301	129	58	**1,334,588**
3,997	1,293	129	52	**1,337,756**
4,022	1,288	128	50	**1,343,305**
4,004	1,335	129	53	**1,342,635**
4,043	1,294	127	47	**1,343,938**
4,039	1,274	127	37	**1,344,866**
4,026	1,287	128	34	**1,345,812**
4,009	1,292	129	33	**1,348,566**
4,017	1,275	128	33	**1,347,246**
4,008	1,261	128	34	**1,348,893**

Industrial Rate M1	Industrial Rate M2	Industrial Rate 10	Industrial Rate 10 - CIA	**TOTAL CUSTOMERS**
3,975	1,273	126	34	**1,349,046**
3,963	1,271	125	32	**1,351,263**
3,969	1,273	123	32	**1,352,476**
3,982	1,271	127	33	**1,356,009**
4,007	1,271	126	32	**1,359,576**
4,023	1,276	125	32	**1,360,379**
3,994	1,263	126	33	**1,361,083**
3,987	1,268	125	35	**1,362,258**
3,980	1,262	126	35	**1,364,257**
3,985	1,244	127	32	**1,366,585**
3,976	1,249	126	32	**1,366,306**
3,978	1,241	126	32	**1,368,099**
3,964	1,240	127	32	**1,367,817**
3,973	1,232	123	32	**1,369,718**
4,007	1,206	120	33	**1,369,367**
4,013	1,212	121	32	**1,374,568**
4,019	1,219	120	34	**1,378,469**
4,019	1,236	122	34	**1,378,383**
4,003	1,252	120	34	**1,380,611**
4,041	1,204	119	34	**1,381,570**
4,046	1,191	117	34	**1,383,090**
4,040	1,185	117	33	**1,386,304**
4,033	1,184	118	35	**1,385,301**
4,005	1,185	118	33	**1,387,247**
4,005	1,177	119	33	**1,388,160**
3,983	1,182	120	32	**1,390,021**
4,000	1,172	118	35	**1,389,884**
4,010	1,185	119	31	**1,394,316**
4,036	1,185	119	31	**1,398,195**
4,030	1,194	119	31	**1,398,253**
4,041	1,193	119	31	**1,399,700**
4,011	1,219	119	31	**1,400,702**
3,984	1,230	120	31	**1,401,919**
3,986	1,225	121	31	**1,404,826**
3,987	1,218	121	32	**1,404,341**
3,969	1,228	118	32	**1,406,946**
3,949	1,222	118	31	**1,408,228**
3,959	1,230	118	30	**1,409,865**
3,962	1,217	121	25	**1,412,108**
3,961	1,211	124	24	**1,414,653**
3,990	1,224	130	23	**1,419,028**
3,985	1,222	127	23	**1,419,009**
3,981	1,223	127	23	**1,419,915**
3,962	1,232	126	23	**1,421,176**
3,915	1,262	131	22	**1,422,881**

Industrial Rate M1	Industrial Rate M2	Industrial Rate 10	Industrial Rate 10 - CIA	**TOTAL CUSTOMERS**
3,858	1,318	128	24	**1,425,353**
3,832	1,314	129	23	**1,424,257**
3,810	1,328	128	22	**1,427,569**
3,808	1,320	128	22	**1,427,991**
3,797	1,317	127	22	**1,428,477**
3,786	1,313	128	23	**1,429,916**
3,821	1,313	128	22	**1,433,722**
3,823	1,314	130	20	**1,436,462**
3,845	1,304	126	21	**1,437,857**
3,835	1,309	130	21	**1,438,847**
3,827	1,313	130	21	**1,440,212**
3,837	1,299	133	20	**1,441,912**
3,800	1,321	131	21	**1,444,092**
3,801	1,320	131	20	**1,445,233**
3,798	1,311	128	22	**1,447,569**
3,800	1,297	128	21	**1,447,635**
3,800	1,290	128	20	**1,449,686**
3,784	1,298	130	20	**1,449,576**
3,808	1,311	131	21	**1,454,900**
3,826	1,305	132	21	**1,458,241**
3,829	1,312	130	21	**1,458,004**
3,835	1,316	131	20	**1,459,209**
3,827	1,315	131	20	**1,460,870**
3,812	1,326	132	19	**1,461,759**
3,815	1,306	131	19	**1,465,477**
3,822	1,287	131	19	**1,464,838**
3,848	1,256	134	19	**1,466,933**
3,831	1,255	130	20	**1,467,590**
3,836	1,261	129	19	**1,469,682**
3,768	1,299	130	18	**1,468,216**
3,820	1,260	134	18	**1,471,923**
3,856	1,238	133	17	**1,474,461**
3,850	1,256	163	17	**1,477,550**
3,856	1,249	164	14	**1,478,199**
3,846	1,265	139	14	**1,479,690**
3,842	1,259	136	15	**1,481,435**
3,832	1,254	137	16	**1,485,132**
3,822	1,273	136	15	**1,485,533**
3,817	1,265	135	15	**1,487,528**
3,806	1,269	135	13	**1,488,922**
3,801	1,267	137	14	**1,490,420**
3,783	1,283	133	14	**1,490,468**
3,802	1,288	134	13	**1,493,869**
3,799	1,293	134	13	**1,496,774**
3,825	1,287	134	15	**1,497,694**

Industrial Rate M1	Industrial Rate M2	Industrial Rate 10	Industrial Rate 10 - CIA	**TOTAL CUSTOMERS**
3,804	1,294	134	15	**1,498,748**
3,824	1,276	136	14	**1,499,868**
3,808	1,281	129	14	**1,500,236**
3,785	1,308	138	14	**1,503,206**
3,761	1,317	134	15	**1,504,170**
3,743	1,325	135	15	**1,505,037**
3,744	1,328	135	15	**1,506,976**
3,746	1,324	133	15	**1,507,696**
3,723	1,336	135	15	**1,506,710**
3,754	1,334	134	15	**1,512,487**
3,737	1,353	136	14	**1,515,370**
3,790	1,315	136	14	**1,515,438**
3,774	1,325	137	14	**1,517,275**
3,779	1,328	133	13	**1,517,567**
3,759	1,337	139	13	**1,518,637**
3,758	1,325	139	14	**1,520,661**
3,770	1,300	133	14	**1,519,694**
3,764	1,295	134	14	**1,520,890**
3,754	1,296	134	14	**1,522,140**
3,758	1,293	132	14	**1,522,747**
3,739	1,297	134	14	**1,522,937**
3,766	1,298	133	14	**1,525,663**
3,772	1,298	135	14	**1,528,612**
3,802	1,301	133	14	**1,530,814**
3,806	1,296	133	14	**1,531,609**
3,791	1,302	135	14	**1,532,580**
3,792	1,299	128	14	**1,533,454**
3,776	1,297	137	14	**1,536,321**
3,768	1,303	133	14	**1,537,560**
3,761	1,299	134	14	**1,539,404**
3,750	1,301	134	14	**1,540,600**
3,752	1,300	132	14	**1,541,477**
3,732	1,305	134	14	**1,541,859**
3,758	1,307	133	14	**1,544,733**
3,762	1,309	135	14	**1,547,559**
3,793	1,308	133	14	**1,548,239**
3,799	1,301	133	14	**1,548,900**
3,784	1,307	135	14	**1,549,812**
3,785	1,304	128	14	**1,550,908**
3,770	1,301	137	14	**1,554,011**
3,761	1,308	133	14	**1,555,065**
3,754	1,304	134	14	**1,557,284**
3,743	1,306	134	14	**1,558,143**
3,745	1,305	132	14	**1,559,021**
3,725	1,310	134	14	**1,559,402**

Industrial Rate M1	Industrial Rate M2	Industrial Rate 10	Industrial Rate 10 - CIA	**TOTAL CUSTOMERS**
3,751	1,312	133	14	**1,562,284**
3,756	1,313	135	14	**1,564,986**
3,786	1,313	133	14	**1,565,074**
3,792	1,306	133	14	**1,565,597**
3,777	1,312	135	14	**1,566,447**
3,778	1,309	128	14	**1,567,775**
3,763	1,306	137	14	**1,571,101**
3,756	1,312	133	14	**1,571,978**
3,749	1,308	134	14	**1,574,577**
3,737	1,310	134	14	**1,575,091**
3,739	1,309	132	14	**1,576,005**
3,718	1,315	134	14	**1,576,405**
3,745	1,316	133	14	**1,579,314**
3,749	1,318	135	14	**1,581,909**
3,779	1,318	133	14	**1,582,062**
3,785	1,311	133	14	**1,582,520**
3,771	1,316	135	14	**1,583,307**
3,773	1,313	128	14	**1,584,283**
3,757	1,311	137	14	**1,587,339**
3,749	1,317	133	14	**1,588,532**
3,742	1,313	134	14	**1,590,364**
3,731	1,315	134	14	**1,591,681**
3,732	1,314	132	14	**1,592,594**
3,713	1,319	134	14	**1,592,993**
3,739	1,321	133	14	**1,595,902**
3,743	1,323	135	14	**1,598,370**
3,773	1,322	133	14	**1,598,465**
3,779	1,315	133	14	**1,598,928**
3,764	1,321	135	14	**1,599,662**
3,765	1,318	128	14	**1,600,262**
3,750	1,315	137	14	**1,603,088**
3,742	1,322	133	14	**1,604,560**
3,735	1,318	134	14	**1,605,584**
3,725	1,320	134	14	**1,607,743**
3,726	1,319	132	14	**1,608,756**
3,707	1,324	134	14	**1,609,207**
3,732	1,326	133	14	**1,612,173**
3,737	1,327	135	14	**1,614,551**
3,767	1,327	133	14	**1,614,692**
3,773	1,320	133	14	**1,614,993**
3,759	1,325	135	14	**1,615,675**
3,761	1,322	128	14	**1,616,209**
3,745	1,320	137	14	**1,618,952**
3,737	1,326	133	14	**1,620,549**
3,730	1,322	134	14	**1,621,388**

Industrial Rate M1	Industrial Rate M2	Industrial Rate 10	Industrial Rate 10 - CIA	**TOTAL CUSTOMERS**
3,719	1,324	134	14	**1,623,765**
3,720	1,323	132	14	**1,624,771**
3,700	1,329	134	14	**1,625,215**
3,727	1,330	133	14	**1,628,179**
3,731	1,332	135	14	**1,630,416**
3,762	1,332	133	14	**1,630,504**
3,768	1,325	133	14	**1,630,747**
3,754	1,330	135	14	**1,631,410**
3,756	1,327	128	14	**1,631,842**
3,740	1,325	137	14	**1,634,651**
3,732	1,331	133	14	**1,636,226**
3,725	1,327	134	14	**1,636,822**
3,714	1,329	134	14	**1,639,474**
3,715	1,328	132	14	**1,640,420**
3,696	1,333	134	14	**1,640,834**
3,722	1,335	133	14	**1,643,767**
3,726	1,337	135	14	**1,645,838**
3,757	1,336	133	14	**1,645,910**
3,763	1,329	133	14	**1,646,081**
3,749	1,334	135	14	**1,646,624**
3,751	1,331	128	14	**1,646,956**
3,735	1,329	137	14	**1,649,687**
3,727	1,335	133	14	**1,651,043**
3,720	1,331	134	14	**1,651,984**
3,709	1,333	134	14	**1,654,662**
3,710	1,332	132	14	**1,655,583**
3,690	1,338	134	14	**1,655,988**
3,717	1,339	133	14	**1,658,912**
3,721	1,341	135	14	**1,660,826**
3,752	1,340	133	14	**1,660,889**
3,758	1,333	133	14	**1,660,985**
3,743	1,339	135	14	**1,661,410**
3,744	1,336	128	14	**1,661,637**
3,729	1,333	137	14	**1,664,284**
3,721	1,339	133	14	**1,665,429**
3,714	1,335	134	14	**1,666,712**
3,703	1,337	134	14	**1,669,415**
3,705	1,336	132	14	**1,670,341**
3,684	1,342	134	14	**1,670,744**
3,711	1,343	133	14	**1,673,669**
3,715	1,345	135	14	**1,675,434**
3,746	1,344	133	14	**1,675,503**
3,752	1,337	133	14	**1,675,521**
3,737	1,343	135	14	**1,675,827**
3,738	1,340	128	14	**1,675,947**

Industrial Rate M1	Industrial Rate M2	Industrial Rate 10	Industrial Rate 10 - CIA	**TOTAL CUSTOMERS**
3,723	1,337	137	14	**1,678,511**
3,715	1,344	133	14	**1,679,776**
3,708	1,340	134	14	**1,680,737**
3,696	1,342	134	14	**1,683,798**
3,698	1,341	132	14	**1,684,716**
3,679	1,346	134	14	**1,685,113**
3,704	1,348	133	14	**1,688,032**
3,709	1,349	135	14	**1,689,640**

EGI Forecast Volumes and DSM

Volumes (m^3; reduced by DSM savings)

	LUG_GS	LUG_C	LEG_GS	LEG_C	EGI_Total
2021	5,850,929,985	7,847,407,383	9,984,399,677	1,816,497,750	**25,499,234,795**
2022	5,845,906,643	8,074,240,856	10,049,038,702	1,806,108,508	**25,775,294,709**
2023	5,842,779,656	8,195,264,459	10,096,403,549	1,795,719,266	**25,930,166,930**
2024	5,874,413,144	8,127,062,367	10,153,746,704	1,785,330,024	**25,940,552,238**
2025	5,852,284,720	8,174,808,423	10,211,762,624	1,774,940,782	**26,013,796,549**
2026	5,856,822,652	8,222,967,640	10,269,316,126	1,764,551,540	**26,113,657,958**
2027	5,860,984,338	8,260,261,000	10,325,836,948	1,754,162,298	**26,201,244,584**
2028	5,891,243,270	8,220,717,949	10,379,987,323	1,743,773,056	**26,235,721,597**
2029	5,865,426,902	8,200,012,156	10,431,027,929	1,733,383,814	**26,229,850,800**
2030	5,867,637,246	8,314,145,979	10,480,119,073	1,722,994,572	**26,384,896,869**

DSM Savings (m^3; cumulative)

	LUG_GS	LUG_C	LEG_GS	LEG_C	EGI_Total	
2021	8,200,941	17,035,179	15,526,249	4,220,630	**44,982,999**	(0.2%)
2022	28,387,873	55,598,785	53,744,708	14,609,872	**152,341,238**	(0.6%)
2023	48,574,806	95,139,066	91,963,167	24,999,114	**260,676,152**	(1.0%)
2024	68,761,738	183,640,656	130,181,626	35,388,356	**417,972,375**	(1.6%)
2025	88,948,670	237,546,123	168,400,085	45,777,598	**540,672,476**	(2.0%)
2026	109,135,602	213,747,298	206,618,544	56,166,840	**585,668,284**	(2.2%)
2027	129,322,535	253,285,862	244,837,003	66,556,082	**694,001,481**	(2.6%)
2028	149,509,467	292,828,913	283,055,462	76,945,324	**802,339,165**	(3.0%)
2029	169,696,399	332,374,704	321,273,921	87,334,566	**910,679,589**	(3.4%)
2030	189,883,331	371,904,728	359,492,380	97,723,808	**1,019,004,247**	(3.7%)

EGI Forecast Volumes and DSM (Union Gas, General Service)

Volumes (m^3; reduced by DSM savings)

	Residential Rate M1	Residential Rate M2	Residential Rate 01	Commercial Rate M1	Commercial Rate M2	Tobacco Rate M1	Tobacco Rate M2	Commercial Rate 01	Commercial Rate 10	Industrial Rate M1	Industrial Rate M2	Industrial Rate 10	**Total**
2021	2,374,551,386	1,527,327	762,775,891	700,800,909	942,309,373	7,387,917	13,096,832	257,005,777	267,508,896	57,657,313	377,219,466	89,088,896	**5,850,929,985**
2022	2,378,709,731	1,517,339	765,535,728	696,762,924	936,012,644	7,323,842	13,040,290	259,242,540	269,665,265	57,087,070	372,226,306	88,782,963	**5,845,906,643**
2023	2,382,507,169	1,508,039	769,270,014	694,225,046	933,647,942	7,262,209	12,969,191	258,299,989	268,715,428	56,585,346	369,268,957	88,520,328	**5,842,779,656**
2024	2,399,626,307	1,507,036	778,185,070	696,037,029	936,560,355	7,185,581	12,877,243	259,199,046	269,756,428	56,532,485	368,389,793	88,556,772	**5,874,413,144**
2025	2,394,035,214	1,492,825	779,269,516	691,585,224	931,603,587	7,115,424	12,741,882	257,616,748	268,409,681	55,811,464	364,593,976	88,009,178	**5,852,284,720**
2026	2,399,892,679	1,485,983	784,379,601	690,185,372	930,215,719	7,027,012	12,705,665	257,289,840	268,216,585	55,431,425	362,233,782	87,758,990	**5,856,822,652**
2027	2,405,488,998	1,479,400	789,352,581	688,809,298	928,970,104	6,938,537	12,548,621	256,907,381	267,988,448	55,056,303	359,934,971	87,509,697	**5,860,984,338**
2028	2,422,372,112	1,479,857	798,000,302	690,432,206	931,393,992	6,839,900	12,475,181	257,755,237	268,926,399	55,022,236	358,992,510	87,553,338	**5,891,243,270**
2029	2,415,111,485	1,466,682	798,439,362	685,373,923	925,493,939	6,745,325	12,382,836	256,744,895	268,212,278	54,292,299	354,929,279	86,234,599	**5,865,426,902**
2030	2,419,265,766	1,460,577	802,682,150	683,342,129	923,237,108	6,652,113	12,221,623	257,395,881	268,958,555	53,885,486	352,259,745	86,276,114	**5,867,637,246**

DSM Savings (m^3; cumulative)

	Residential Rate M1	Residential Rate M2	Residential Rate 01	Commercial Rate M1	Commercial Rate M2	Tobacco Rate M1	Tobacco Rate M2	Commercial Rate 01	Commercial Rate 10	Industrial Rate M1	Industrial Rate M2	Industrial Rate 10	**Total**	
2021	3,125,093	-	535,218	1,101,204	1,434,081	-	-	298,751	226,245	154,063	1,224,252	102,034	**8,200,941**	(0.1%)
2022	10,817,629	-	1,852,677	3,811,861	4,964,128	-	-	1,034,137	783,156	533,296	4,237,794	353,195	**28,387,873**	(0.5%)
2023	18,510,165	-	3,170,137	6,522,518	8,494,175	-	-	1,769,523	1,340,067	912,528	7,251,336	604,356	**48,574,806**	(0.8%)
2024	26,202,702	-	4,487,596	9,233,175	12,024,222	-	-	2,504,910	1,896,978	1,291,760	10,264,879	855,517	**68,761,738**	(1.2%)
2025	33,895,238	-	5,805,056	11,943,832	15,554,268	-	-	3,240,296	2,453,889	1,670,993	13,278,421	1,106,678	**88,948,670**	(1.5%)
2026	41,587,774	-	7,122,515	14,654,489	19,084,315	-	-	3,975,682	3,010,799	2,050,225	16,291,964	1,357,838	**109,135,602**	(1.8%)
2027	49,280,311	-	8,439,975	17,365,146	22,614,362	-	-	4,711,069	3,567,710	2,429,457	19,305,506	1,608,999	**129,322,535**	(2.2%)
2028	56,972,847	-	9,757,434	20,075,803	26,144,408	-	-	5,446,455	4,124,621	2,808,690	22,319,048	1,860,160	**149,509,467**	(2.5%)
2029	64,665,383	-	11,074,893	22,786,460	29,674,455	-	-	6,181,842	4,681,532	3,187,922	25,332,591	2,111,321	**169,696,399**	(2.8%)
2030	72,357,920	-	12,392,353	25,497,117	33,204,502	-	-	6,917,228	5,238,443	3,567,154	28,346,133	2,362,482	**189,883,331**	(3.1%)

EGI Forecast Volumes and DSM- (Union Gas, Distribution Contract Market)

Volumes (m^3; **NOT** reduced by DSM savings)

	Chemical Refinery	Chemical Refinery	Chemical Refinery	Chemical Refinery	Steel	Steel	Steel	Steel	Power	Power	Power	Power
	Rate_100	Rate_M4	Rate_T1	Rate_T2	Rate_25	Rate_100	Rate_M4	Rate_T2	Rate_20	Rate_25	Rate_100	Rate_T2
2021	45,700,344	1,856,237	2,745,234	2,450,393,855	14,222,666	468,049,822	4,418,556	926,117,493	237,324,662	8,041,789	131,122,243	507,612,565
2022	45,700,344	1,856,237	2,745,234	2,404,253,090	14,222,666	468,049,822	4,418,556	926,117,493	237,324,662	8,041,789	131,122,243	507,612,565
2023	45,700,344	1,856,237	2,745,234	2,453,020,355	14,222,666	468,049,822	4,418,556	926,117,493	237,324,662	8,041,789	131,122,243	507,612,565
2024	45,700,344	1,856,237	2,745,234	2,453,020,355	14,222,666	468,049,822	4,418,556	926,117,493	237,324,662	8,041,789	131,122,243	507,612,565
2025	45,700,344	1,856,237	2,745,234	2,453,020,355	14,222,666	468,049,822	4,418,556	926,117,493	237,324,662	8,041,789	131,122,243	507,612,565
2026	45,700,344	1,856,237	2,745,234	2,453,020,355	14,222,666	468,049,822	4,418,556	926,117,493	237,324,662	8,041,789	131,122,243	507,612,565
2027	45,700,344	1,856,237	2,745,234	2,453,020,355	14,222,666	468,049,822	4,418,556	926,117,493	237,324,662	8,041,789	131,122,243	507,612,565
2028	45,700,344	1,856,237	2,745,234	2,453,020,355	14,222,666	468,049,822	4,418,556	926,117,493	237,324,662	8,041,789	131,122,243	507,612,565
2029	45,700,344	1,856,237	2,745,234	2,453,020,355	14,222,666	468,049,822	4,418,556	926,117,493	237,324,662	8,041,789	131,122,243	507,612,565
2030	45,700,344	1,856,237	2,745,234	2,453,020,355	14,222,666	468,049,822	4,418,556	926,117,493	237,324,662	8,041,789	131,122,243	507,612,565

DSM Savings (m^3; cumulative)

	Rate_20	Rate_100	Rate_M4	Rate_M5	Rate_M7	Rate_T1	Rate_T2	**Total**	
2021	854,609	443,858	5,839,886	290,218	5,430,110	288,697	3,887,802	**17,035,179**	(0.2%)
2022	2,953,564	1,536,430	20,214,989	1,004,600	18,796,534	999,336	10,093,332	**55,598,785**	(0.7%)
2023	5,057,243	2,629,003	34,590,092	1,718,982	32,162,958	1,709,975	17,270,812	**95,139,066**	(1.1%)
2024	7,157,037	3,721,576	97,930,389	2,433,364	45,529,383	2,420,614	24,448,293	**183,640,656**	(2.2%)
2025	9,250,800	4,814,149	126,680,595	3,147,747	58,895,807	3,131,253	31,625,773	**237,546,123**	(2.8%)
2026	11,355,671	5,906,721	77,715,400	3,862,129	72,262,231	3,841,892	38,803,254	**213,747,298**	(2.5%)
2027	13,457,633	6,999,294	92,090,503	4,576,511	85,628,655	4,552,531	45,980,734	**253,285,862**	(3.0%)
2028	15,564,082	8,091,867	106,465,606	5,290,893	98,995,080	5,263,170	53,158,214	**292,828,913**	(3.4%)
2029	17,673,272	9,184,440	120,840,709	6,005,275	112,361,504	5,973,809	60,335,695	**332,374,704**	(3.9%)
2030	19,766,694	10,277,012	135,215,812	6,719,658	125,727,928	6,684,448	67,513,175	**371,904,728**	(4.3%)

Wholesale Rate_M9	Wholesale Rate_M10	Wholesale Rate_T3	Large Comm/Indl Rate_20	Large Comm/Indl Rate_25	Large Comm/Indl Rate_100	Large Comm/Indl Rate_M4	Large Comm/Indl Rate_M5	Large Comm/Indl Rate_M7	Large Comm/Indl Rate_M9	Large Comm/Indl Rate_M10	Large Comm/Indl Rate_T1
103,989,608	391,185	283,373,809	426,502,542	47,048,132	365,053,150	370,982,987	47,708,050	377,023,997	(3,535,647)	(16,091)	204,189,056
103,989,608	391,185	283,373,809	449,836,981	47,048,132	400,583,562	391,739,742	49,943,741	411,385,315	-	-	369,368,276
103,989,608	391,185	283,373,809	449,836,981	47,048,132	468,083,562	394,692,511	49,943,741	416,290,915	-	-	369,368,276
103,989,608	391,185	283,373,809	449,836,981	47,048,132	481,583,562	391,136,498	49,943,741	416,290,915	-	-	369,368,276
103,989,608	391,185	283,373,809	449,836,981	47,048,132	481,583,562	391,136,498	49,943,741	416,290,915	-	-	369,368,276
103,989,608	391,185	283,373,809	449,836,981	47,048,132	468,083,562	391,136,498	48,343,741	416,228,310	-	-	369,368,276
103,989,608	391,185	283,373,809	449,836,981	47,048,132	468,083,562	391,136,498	48,343,741	416,228,310	-	-	369,368,276
103,989,608	391,185	283,373,809	449,836,981	47,048,132	468,083,562	391,136,498	48,343,741	416,228,310	-	-	369,368,276
103,989,608	391,185	283,373,809	449,836,981	47,048,132	468,083,562	391,136,498	48,343,741	416,228,310	-	-	369,368,276
103,989,608	391,185	283,373,809	449,836,981	47,048,132	468,083,562	391,136,498	48,343,741	416,228,310	-	-	369,368,276

Large Comm/Indl	Greenhouse	Greenhouse	Greenhouse	Greenhouse	CNG/LNG	lentified Market (M	lentified Market (MISC)	
Rate_T2	Rate_M4	Rate_M5	Rate_M7	Rate_T1	Rate_25	Rate_20	Rate_T2	**Total**
252,307,792	301,688,969	21,566,893	184,840,723	73,148,969	10,572,975	-	-	**7,864,442,562**
252,307,792	328,277,239	21,566,893	184,840,723	73,148,969	10,572,975	-	-	**8,129,839,640**
252,307,792	364,715,490	21,566,893	184,840,723	73,148,969	10,572,975	-	-	**8,290,403,525**
252,307,792	375,071,000	21,566,893	184,840,723	73,148,969	10,572,975	-	-	**8,310,703,022**
252,307,792	399,890,600	21,566,893	184,840,723	73,148,969	10,572,975	-	76,831,924	**8,412,354,546**
252,307,792	420,573,600	21,566,893	184,840,723	73,148,969	10,572,975	18,839,998	76,831,924	**8,436,714,938**
252,307,792	420,573,600	21,566,893	184,840,723	73,148,969	10,572,975	18,839,998	153,663,847	**8,513,546,862**
252,307,792	420,573,600	21,566,893	184,840,723	73,148,969	10,572,975	18,839,998	153,663,847	**8,513,546,862**
252,307,792	420,573,600	21,566,893	184,840,723	73,148,969	10,572,975	37,679,996	153,663,847	**8,532,386,860**
252,307,792	420,573,600	21,566,893	184,840,723	73,148,969	10,572,975	37,679,996	307,327,694	**8,686,050,707**

EGI Forecast Volumes and DSM (Enbridge Gas Distribution, General Service)

Volumes (m^3; reduced by DSM savings)

	Residential Rate 1	Apartment Rate 6	Commercial Rate 6	Industrial Rate 6	**Total**
2021	5,101,934,796	1,106,870,969	3,159,824,606	615,769,306	**9,984,399,677**
2022	5,128,314,421	1,115,032,644	3,191,182,160	614,509,477	**10,049,038,702**
2023	5,159,280,047	1,122,821,548	3,203,685,299	610,616,655	**10,096,403,549**
2024	5,198,946,102	1,131,221,214	3,215,745,427	607,833,960	**10,153,746,704**
2025	5,238,261,877	1,140,080,819	3,228,163,121	605,256,807	**10,211,762,624**
2026	5,276,341,088	1,149,358,920	3,240,641,893	602,974,224	**10,269,316,126**
2027	5,313,648,577	1,158,755,125	3,252,501,824	600,931,421	**10,325,836,948**
2028	5,349,318,937	1,168,260,240	3,263,422,937	598,985,209	**10,379,987,323**
2029	5,382,929,452	1,177,825,848	3,273,141,035	597,131,594	**10,431,027,929**
2030	5,414,951,148	1,187,426,808	3,282,372,390	595,368,727	**10,480,119,073**

DSM Savings (m^3; cumulative)

	Residential Rate 1	Apartment Rate 6	Commercial Rate 6	Industrial Rate 6	**Total**	
2021	4,770,886	3,405,398	4,225,611	3,124,354	**15,526,249**	(0.2%)
2022	16,514,606	11,787,914	14,627,116	10,815,072	**53,744,708**	(0.5%)
2023	28,258,325	20,170,431	25,028,620	18,505,791	**91,963,167**	(0.9%)
2024	40,002,045	28,552,948	35,430,124	26,196,509	**130,181,626**	(1.3%)
2025	51,745,764	36,935,465	45,831,629	33,887,227	**168,400,085**	(1.6%)
2026	63,489,484	45,317,982	56,233,133	41,577,945	**206,618,544**	(2.0%)
2027	75,233,203	53,700,499	66,634,637	49,268,663	**244,837,003**	(2.3%)
2028	86,976,923	62,083,016	77,036,142	56,959,381	**283,055,462**	(2.7%)
2029	98,720,642	70,465,533	87,437,646	64,650,099	**321,273,921**	(3.0%)
2030	110,464,361	78,848,050	97,839,150	72,340,818	**359,492,380**	(3.3%)

EGI Forecast Volumes and DSM (Enbridge Gas Distribution, Distribution Contract Market)

Volumes (m^3; reduced by DSM savings)

	Commercial Rate 100	Industrial Rate 100	Commercial Rate 110	Apartment Rate 110	Industrial Rate 110	Commercial Rate 115	Industrial Rate 115	Commercial Rate 135	Industrial Rate 135	Commercial Rate 145	Industrial Rate 145	Commercial Rate 170	Industrial Rate 170	**Total**
2021	15,665,178	17,765,481	394,069,061	13,032,195	549,917,648	8,867,643	461,051,577	9,538,725	52,103,986	13,909,814	13,247,083	49,690,660	217,638,699	**1,816,497,750**
2022	15,648,571	16,874,099	393,881,464	13,022,699	546,512,049	8,867,643	456,539,472	9,538,725	51,161,138	13,909,814	13,247,083	49,498,003	217,407,747	**1,806,108,508**
2023	15,631,965	15,982,718	393,693,867	13,013,202	543,106,450	8,867,643	452,027,367	9,538,725	50,218,291	13,909,814	13,247,083	49,305,347	217,176,795	**1,795,719,266**
2024	15,615,358	15,091,336	393,506,269	13,003,706	539,700,850	8,867,643	447,515,262	9,538,725	49,275,443	13,909,814	13,247,083	49,112,690	216,945,844	**1,785,330,024**
2025	15,598,752	14,199,954	393,318,672	12,994,210	536,295,251	8,867,643	443,003,157	9,538,725	48,332,595	13,909,814	13,247,083	48,920,033	216,714,892	**1,774,940,782**
2026	15,582,145	13,308,573	393,131,075	12,984,713	532,889,652	8,867,643	438,491,052	9,538,725	47,389,748	13,909,814	13,247,083	48,727,377	216,483,940	**1,764,551,540**
2027	15,565,539	12,417,191	392,943,478	12,975,217	529,484,053	8,867,643	433,978,947	9,538,725	46,446,900	13,909,814	13,247,083	48,534,720	216,252,988	**1,754,162,298**
2028	15,548,932	11,525,809	392,755,881	12,965,721	526,078,454	8,867,643	429,466,842	9,538,725	45,504,053	13,909,814	13,247,083	48,342,063	216,022,036	**1,743,773,056**
2029	15,532,326	10,634,428	392,568,284	12,956,224	522,672,854	8,867,643	424,954,737	9,538,725	44,561,205	13,909,814	13,247,083	48,149,407	215,791,085	**1,733,383,814**
2030	15,515,719	9,743,046	392,380,686	12,946,728	519,267,255	8,867,643	420,442,632	9,538,725	43,618,357	13,909,814	13,247,083	47,956,750	215,560,133	**1,722,994,572**

DSM Savings (m^3; cumulative)

	Commercial Rate 100	Industrial Rate 100	Commercial Rate 110	Apartment Rate 110	Industrial Rate 110	Commercial Rate 115	Industrial Rate 115	Commercial Rate 135	Industrial Rate 135	Commercial Rate 145	Industrial Rate 145	Commercial Rate 170	Industrial Rate 170	**Total**	
2021	6,746	362,124	76,211	3,858	1,383,525	-	1,833,043	-	383,032	-	-	78,267	93,824	**4,220,630**	(0.2%)
2022	23,353	1,253,505	263,809	13,354	4,789,124	-	6,345,148	-	1,325,879	-	-	270,923	324,776	**14,609,872**	(0.8%)
2023	39,960	2,144,887	451,406	22,851	8,194,723	-	10,857,253	-	2,268,727	-	-	463,580	555,728	**24,999,114**	(1.4%)
2024	56,566	3,036,269	639,003	32,347	11,600,322	-	15,369,358	-	3,211,575	-	-	656,237	786,680	**35,388,356**	(1.9%)
2025	73,173	3,927,650	826,600	41,843	15,005,922	-	19,881,463	-	4,154,422	-	-	848,893	1,017,631	**45,777,598**	(2.5%)
2026	89,779	4,819,032	1,014,197	51,339	18,411,521	-	24,393,568	-	5,097,270	-	-	1,041,550	1,248,583	**56,166,840**	(3.1%)
2027	106,386	5,710,414	1,201,794	60,836	21,817,120	-	28,905,673	-	6,040,118	-	-	1,234,207	1,479,535	**66,556,082**	(3.7%)
2028	122,992	6,601,795	1,389,392	70,332	25,222,719	-	33,417,778	-	6,982,965	-	-	1,426,863	1,710,487	**76,945,324**	(4.2%)
2029	139,599	7,493,177	1,576,989	79,828	28,628,318	-	37,929,883	-	7,925,813	-	-	1,619,520	1,941,439	**87,334,566**	(4.8%)
2030	156,205	8,384,559	1,764,586	89,325	32,033,918	-	42,441,988	-	8,868,661	-	-	1,812,177	2,172,390	**97,723,808**	(5.4%)

Residential: Single Family Natural Gas End Use Study

2019 Annual Results

Legacy Union Gas and Legacy Enbridge Gas Distribution

ENBRIDGE
Life Takes Energy

Market Research & Analysis
Reported Summer 2020

Objectives

- To measure the penetration of natural gas appliances in the single family residential customer market;
- To understand customer perceptions of the levels of insulation in their home;
- To determine awareness of company energy conservation programs, and understand where customers turn to for more information.

Methodology

- Sponsor-identified telephone interviews were completed by Leger (formally NRG Research Group), between November 26 and December 19, 2019 with quotas across regions, which are defined as follows:

Legacy Union Gas (LUG) Regions		Legacy Enbridge Gas (LEG) Regions	
Central	Hamilton/Halton, Waterloo/Brantford	Toronto	DMA 01
Eastern	Eastern	Central-West	DMA 21, DMA 53
Northern	Northeast, Northwest	Central-East	DMA 35, DMA 45, DMA 47
South/West	London/Sarnia, Windsor/Chatham	Eastern	DMA 65
		Niagara	DMA 76

- Survey screening requires that respondents reside in single family dwellings and are mainly responsible for making energy-related decisions for the home.
- The total number of completed interview is 2,400 with 1,200 for each of LUG and LEG in total, and final franchise-wide results are calculated based on true geographic proportions.
- Overall results yield a margin of error of +/-2.8% at the 95% confidence interval.
- All historical results in this report are based on LUG interviews conducted in previous years, and historical comparisons are only available for LUG customers.
- Unless otherwise noted, results in this report are based on all customers (EGI, comprised of LUG and LEG combined).

Executive Summary (1 of 2)

Natural Gas Penetration

- Natural gas remains the top choice for home heating and water heating.
- When asked to think about a new home, barring any other considerations, most customers continue to choose natural gas, though (like previous years) a small proportion would choose alternate sources, such as geothermal or solar for home and water heating, respectively.
- The prevalence of natural gas in secondary appliances is very consistent between 2018 and 2019 for LUG customers – penetration of natural gas dryers and natural gas fireplaces is significantly lower among LEG customers.
- The preference for natural gas continues to be stronger than current penetration across appliances, suggesting that penetration could increase over time.

Ownership

- Furnace ownership continues to be very high, especially for natural gas furnaces (90%), though in the case of future ownership, some customers show interest in renting (8%).
- Ownership of water heaters remains steady over the last several years for LUG customers and is similar among LEG customers. It continues to remain much lower than furnace ownership. Among those who are likely to replace their water heater in the next 2 years, interest in ownership is much stronger (64% LUG, 56% LEG) than current ownership (42%).

Furnace Efficiency

- The proportion of high efficiency furnaces has remained relatively stable over the last few years, with a slight uptick in 2019.
- Just over 1-in-6 customers do not know the efficiency level of their furnace (this has not changed much over the last decade) – customers who don't know are not likely to be aware of and act on the potential for upgrades.
- There is a continued, though small, increase incidence of Wi-Fi and Smart thermostats as customers upgrade their thermostats; about 3-in-4 customers with a programmable or Wi-Fi/Smart thermostat actively program it to reduce energy consumption.

Executive Summary (2 of 2)

Insulation

- About 2-in-5 customers (41%) deem their house to be “well insulated” while about 8% indicate it is “poorly insulated” or “not insulated,” which varies by age of home.
- Just over 2-in-3 customers have an attic, which is “well” (57%) or “adequately” (30%) insulated. More customers (92%) have a basement, which is only fully finished for 46% of them. Similar levels of insulation are indicated for basements as for attics. Household income does appear to be a factor and with more insulation needs, this group represents customers who might be eligible for HWP.

Windows

- Just over half of customers have vinyl windows (52%), and windows that are likely double paned (80%).
- Half of customers have replaced (some) windows since moving in, among which most were ENERGY STAR certified (72%).

Energy Efficiency (EE) and DSM offerings

- The proportion of customers planning to make energy efficiency updates sits at 25% at the end of 2019.
- Awareness that LUG offers energy conservation programs sits at 69% (slightly up compared to 2017 and 2018) and at 54% among LEG customers – this varies by customer age group and region.
- Overall customer awareness of the HWP and HER programs remains quite strong at 31% and 41%, respectively (and for LUG customers specifically is very similar to 2018). Among those aware of the respective programs, 11% have participated in HWP and 19% in HER.
- The internet continues to be the most important source of general energy efficiency information – highlighting the importance of digital marketing and strong website content.
- Most customers indicate that knowing the ENERGY STAR rating of a home is important (71%) as well as knowing the Home Energy Rating prior to purchase (79%).

Overview of Natural Gas (NG) Appliances

- Year over year, natural gas use for all major appliances is unchanged except for home heating and barbecues both of which are up relative to 2018 (for LUG customers). Importantly, natural gas continues to be the dominate fuel for home and water heating.
- Differences across legacy franchises:
  - Natural gas for home heating is higher in LEG compared to LUG.
  - Use of natural gas for clothes dryers is significantly higher in LUG where use ranges from a high of 50% in the South/West to 29% in the Eastern Region. Natural gas fireplaces are also more common in the LUG franchise area.

Natural Gas Appliance Penetration Rates

	2014	2015	2016	2017	2018	2019		
			LUG			EGI	LUG	LEG
Home Heating	96%	96%	95%	96%	94%	96%	95%	97%*
Water Heater	85%	86%	86%	83%	82%	82%	80%	83%
Fireplace	38%	41%	44%	36%	42%	35%	38%*	33%
Cooktop/Stove	29%	26%	31%	29%	31%	30%	29%	30%
Barbecue	27%	23%	26%	20%	24%	24%	23%	24%
Clothes Dryer	21%	20%	19%	17%	19%	16%	20%*	13%
Pool Heater	(--)	(--)	(--)	(--)	5%	6%	5%	6%

(--) = was not measured

* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers).

Residential: Single Family Natural Gas End Use Study

Penetration vs. Preference for NG Appliances

ENBRIDGE
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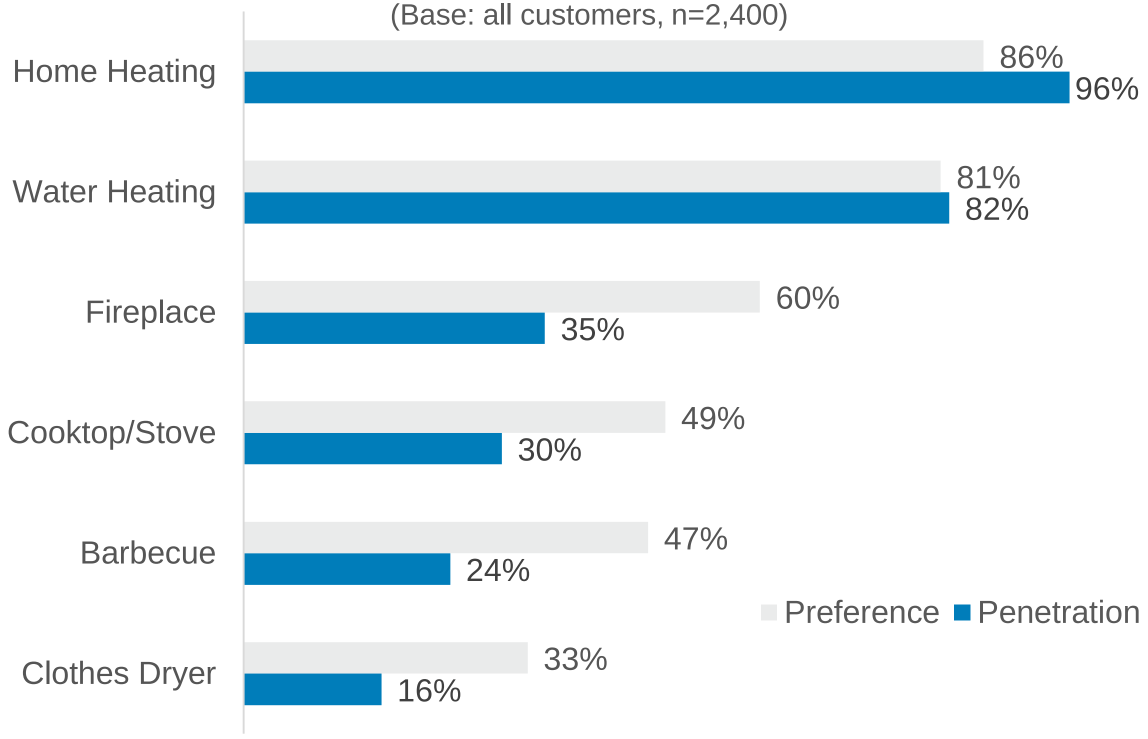
- Unlike home and water heating, preference for natural gas on secondary appliances (absent other barriers or considerations) remains stronger than current penetration levels.
- Legacy Union Gas customers have a markedly stronger preference for natural gas with water heating, fireplaces and especially clothes dryers.

Preference & Penetration

(Base: all customers, n=2,400)



Preferences by Legacy Utility

2019	LUG	LEG
Home Heating	86%	86%
Water Heating	84%*	80%
Fireplace	64%*	57%
Cooktop/Stove	51%	47%
Barbecue	48%	46%
Clothes Dryer	40%*	27%

* Indicates result is significantly higher at a 95% confidence level compared to the adjacent column

Residential: Single Family Natural Gas End Use Study

Home Heating: Preference

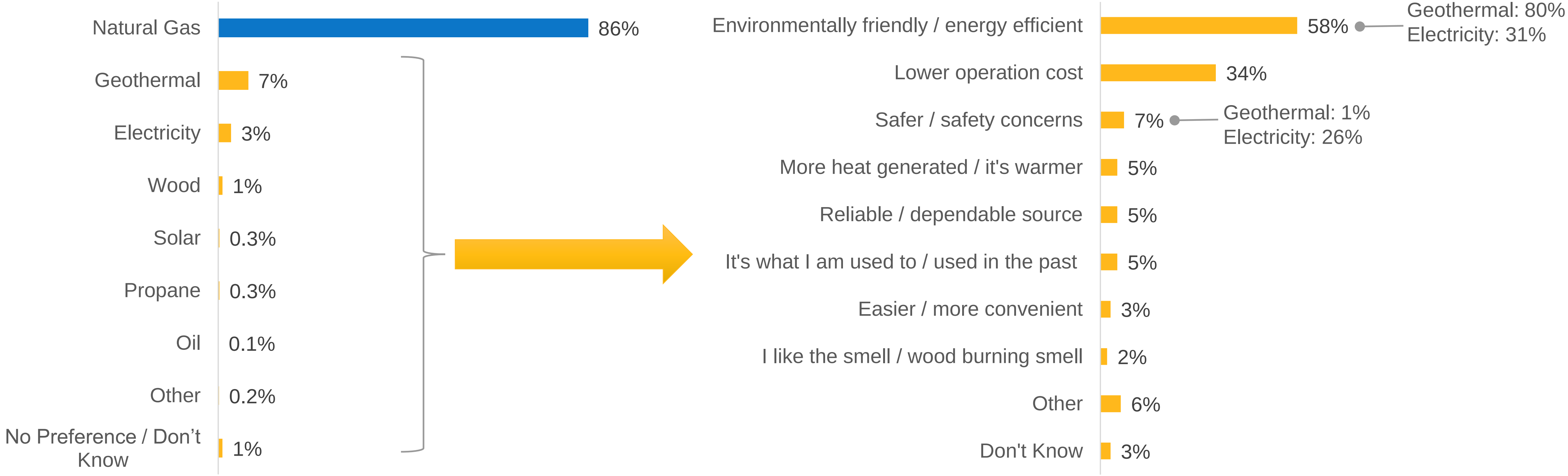
- Most customers (86%) would prefer natural gas for home heating in a new home, followed by geothermal (7%) and electricity (3%), which may include any number of systems.
- Key reasons for choosing an alternate fuel source include the perception that it is more environmentally friendly / energy efficient (especially for geothermal) and has lower operation costs. Also, electricity is considered to be safer by a number of customers.

Preferred Fuel Source for Home Heating

(Base: all customers, n=2,400)

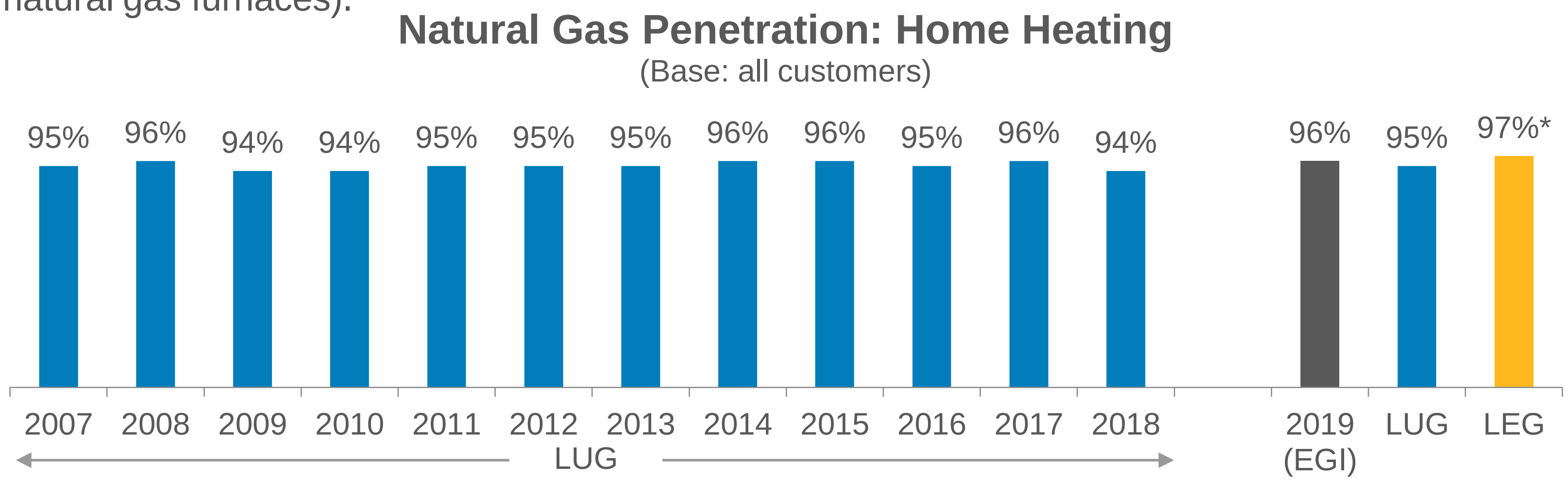
Reason for Preferred Fuel Source

(Base: all customers who did not choose natural gas, n=294)



Home Heating: NG Adoption & Equipment

- Natural gas forced air furnaces continue to be the most used heating equipment across the franchise.
- Few furnaces older than 20 years exist, and a significant group of customers state that they have replaced their furnace in the past two years (they are slowly replacing their oil and propane furnaces with natural gas furnaces).



Type of Natural Gas Heating Equipment	
Forced Air	83%
Hydronic	5%
Space Heaters	0%
Combination	4%
Don't Know	7%

Type of Electric Equipment (n=67)	
Forced Air	55%
Baseboard	20%
Air Source Heat Pumps	4%
Other	10%
Don't Know	10%

Age of Forced Air Furnace (all fuels)	
5 years or less	44%
6 to 10 years	29%
11 to 20 years	20%
More than 20 years	4%
Don't Know	3%

43% of those who currently have a furnace that is less than 5 years old, have replaced it in the last 2 years (or 19% of the total)

59% of customers who replaced their furnace in the past 2 years and also had an air conditioner also replaced it at the same time

Fuel Source for Original (replaced) Furnace	
Natural Gas	89%
Electricity	4%
Oil	3%
Propane	0.5%
Don't Know	4%

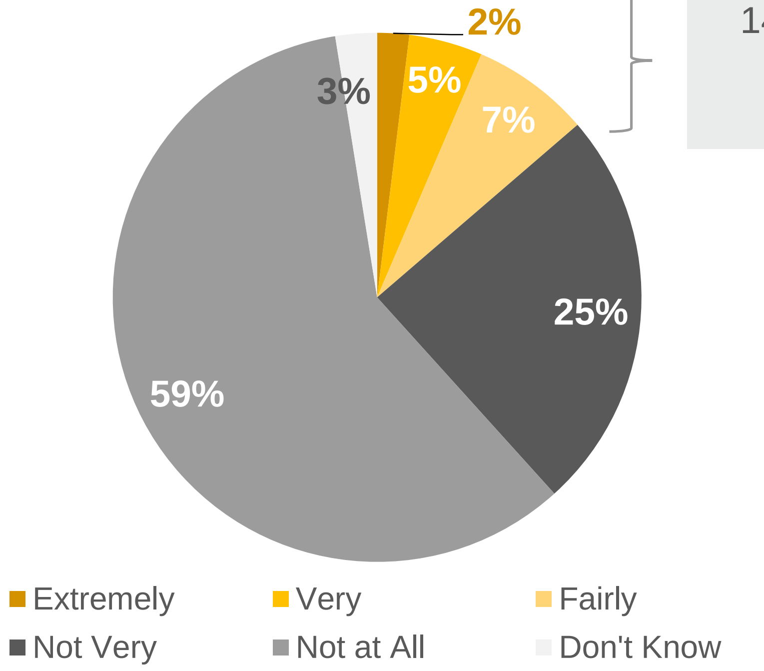
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers).

Home Heating: Furnace Replacement

- A small proportion of customers (14%) indicate that they are at least likely to replace their furnace in the next year because it is likely to break down or because they're looking to improve the efficiency level – most would get a natural gas furnace.

Likely to Replace Furnace in Next 2 Years

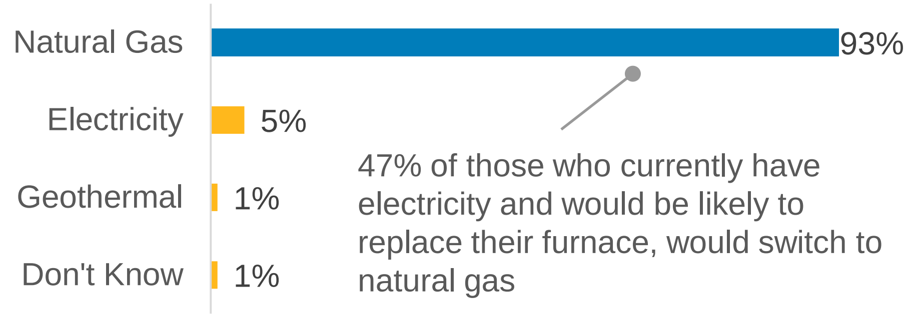
(Base: customers who have not replaced their furnace in the past 2 years, n=2,035)



14% at least fairly likely
LEG: 14%
LUG: 13%

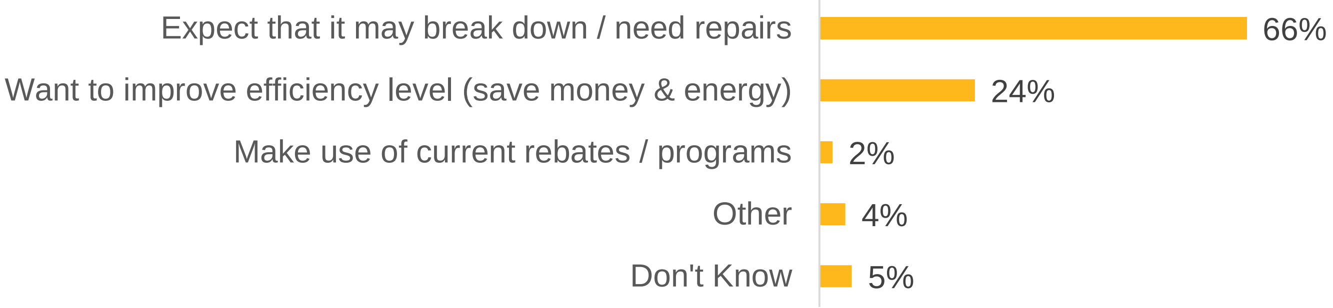
Fuel Source of New Furnace

(Base: customers who are at least fairly likely to replace their furnace n=279)



Reason For Replacing Furnace

(Base: customers who are at least fairly likely to replace their furnace n=279)



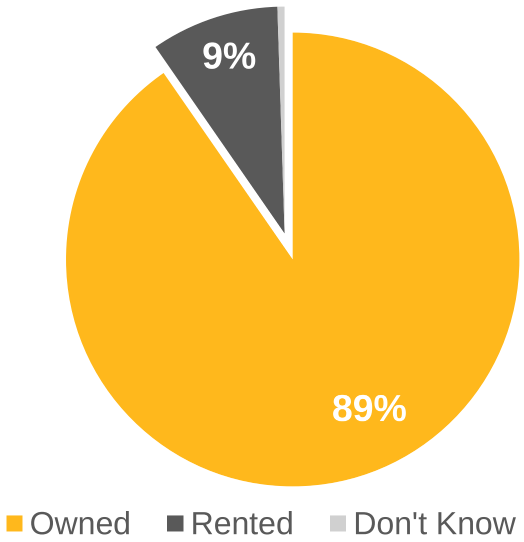
Residential: Single Family Natural Gas End Use Study

Home Heating: Furnace Ownership

- Most customers own their furnace (or heating system), and most customers who anticipate replacing their furnace or heating system in the future would continue to own it (rather than rent it).
- Rental rates are higher among those households that also rent the water heater (11%), in homes built since 1990 (11%), row/townhouses (26%), those with an income under $40K (13%), and younger (18-34) customers (13%).

Ownership of Current Furnace / Heating System

(Base: customers who use electricity, natural gas or oil for home heating, n=2,369)

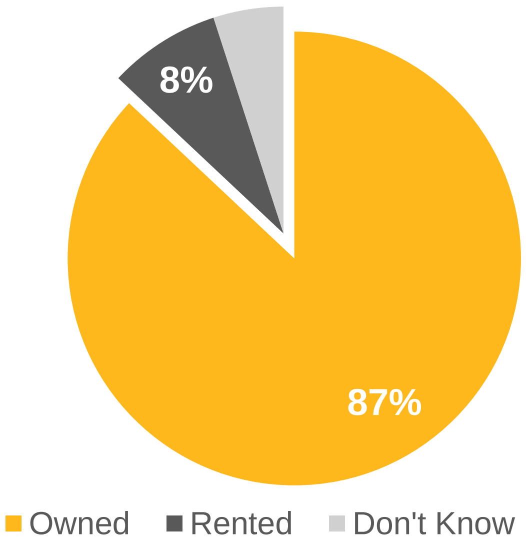


	Region	Owns (%)
LEG	Total LEG	**89%**
	Toronto	88%
	Central-West	89%
	Central-East	89%
	Eastern	92%
	Niagara	94%
LUG	Total LUG	**89%**
	Central	88%
	Eastern	93%
	Northern	86%
	South/West	92%

Among customers whose household income is $40K or less the ownership level is lower at 83% compared to their counterparts

Ownership of Replacement Furnace / Heating System

(Base: customers who are at least fairly likely to replace their furnace n=279)

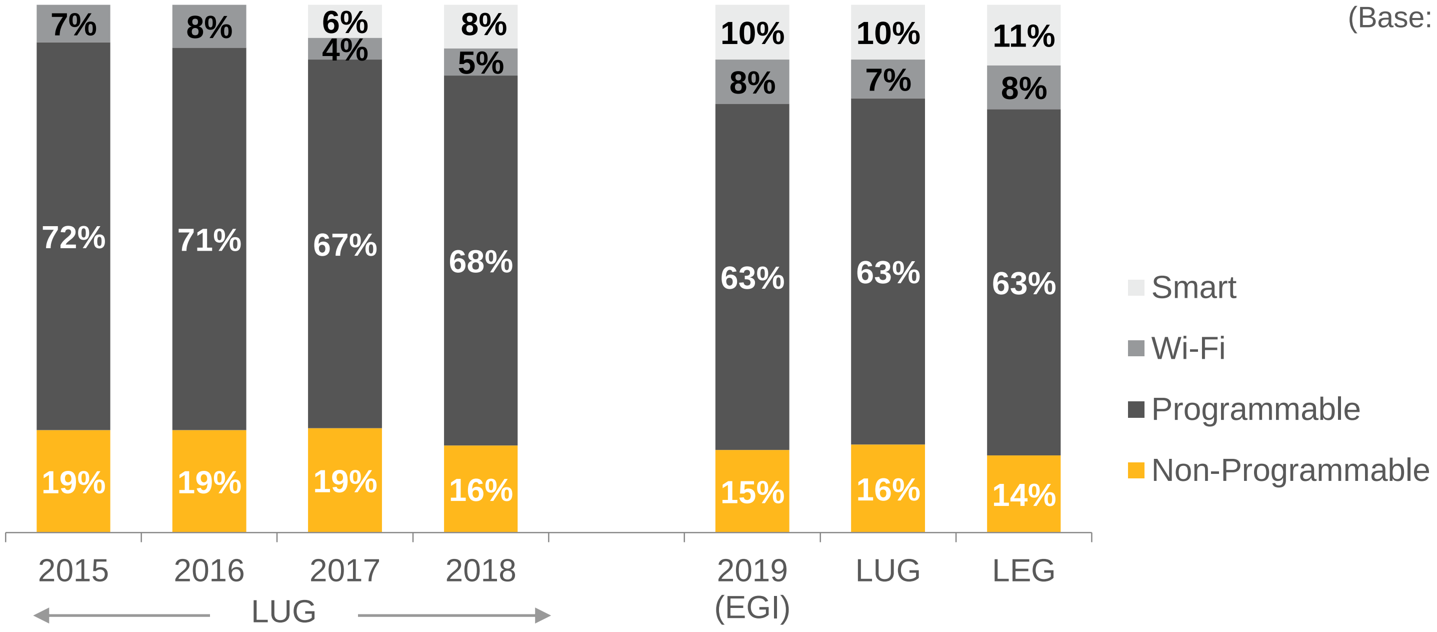


Home Heating: Thermostats

- Non-programmable thermostats occur disproportionately among customers in LUG's Northern Region (29%) and LEG's Toronto Region (21%), and in older (24%), smaller (20%), lower income (26%) senior (20%) occupied homes. Opportunities to upgrade thermostats continue to exist, especially for low-to-moderate income households.
- Wi-Fi and Smart thermostats continue to gain in popularity. They are more common in LUG's Central (19%) and LEG's Central-West Regions (23%), in newer homes (26%), and higher earning households (29%). They are also more common in households planning to make energy improvements 23% vs. 17%.

Type of Thermostat

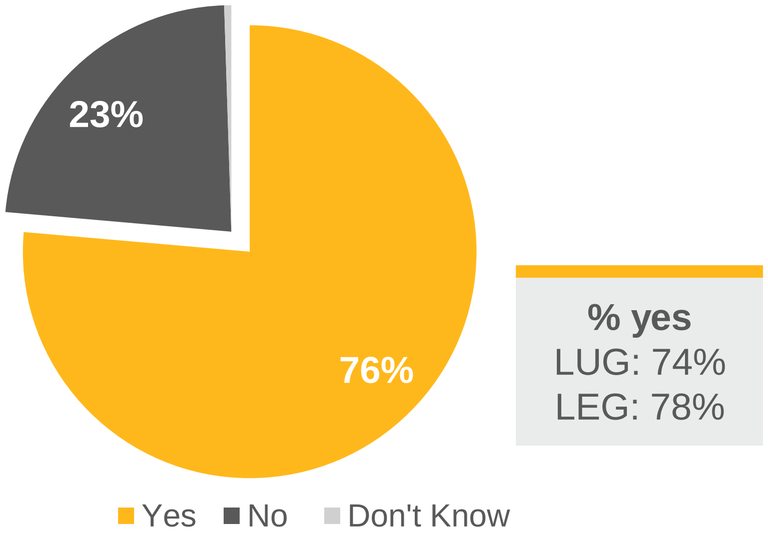
(Base: all customers, n=2,400)



Question changed in 2017 to distinguish between "Smart" and "Wi-Fi"

Actively program thermostat to help reduce energy use

(Base: all customers with Smart, Wi-Fi, or Programmable, n=1,954)

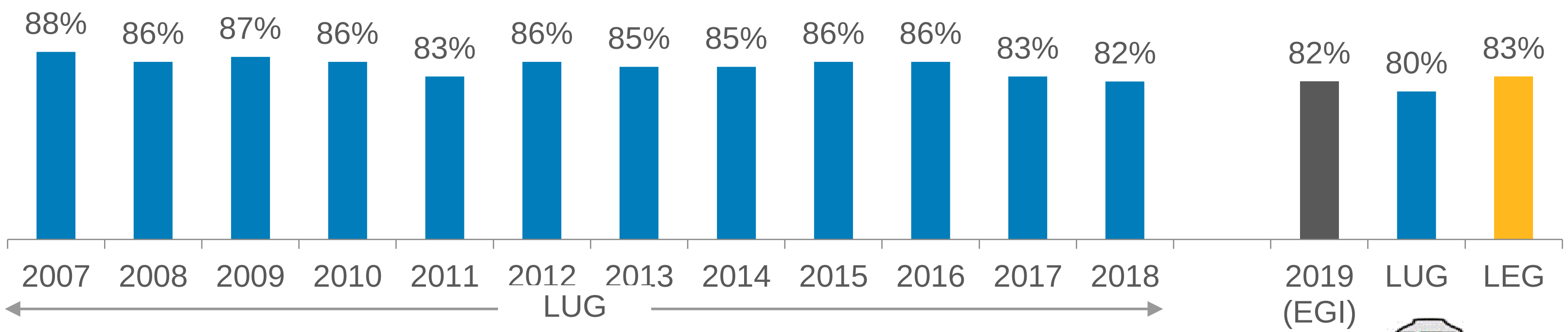


Water Heating: NG Adoption & Equipment

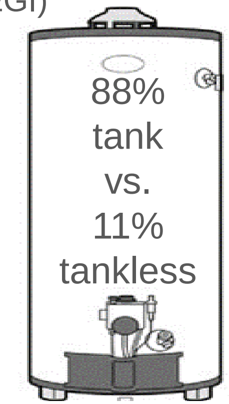
- Penetration of natural gas water heaters has dropped over the past decade among LUG customers. Natural gas use for water heating ranges from 69% LUG's Eastern Region to 83% in the Central Region (73%). There is less variability in LEG's franchise at 82% everywhere except for Niagara Region where it is 89%.
- The proportion of tankless water heaters continues to grow slowly up from 6% in 2017 to 11% in 2019.

Natural Gas Penetration: Water Heating

(Base: all customers)



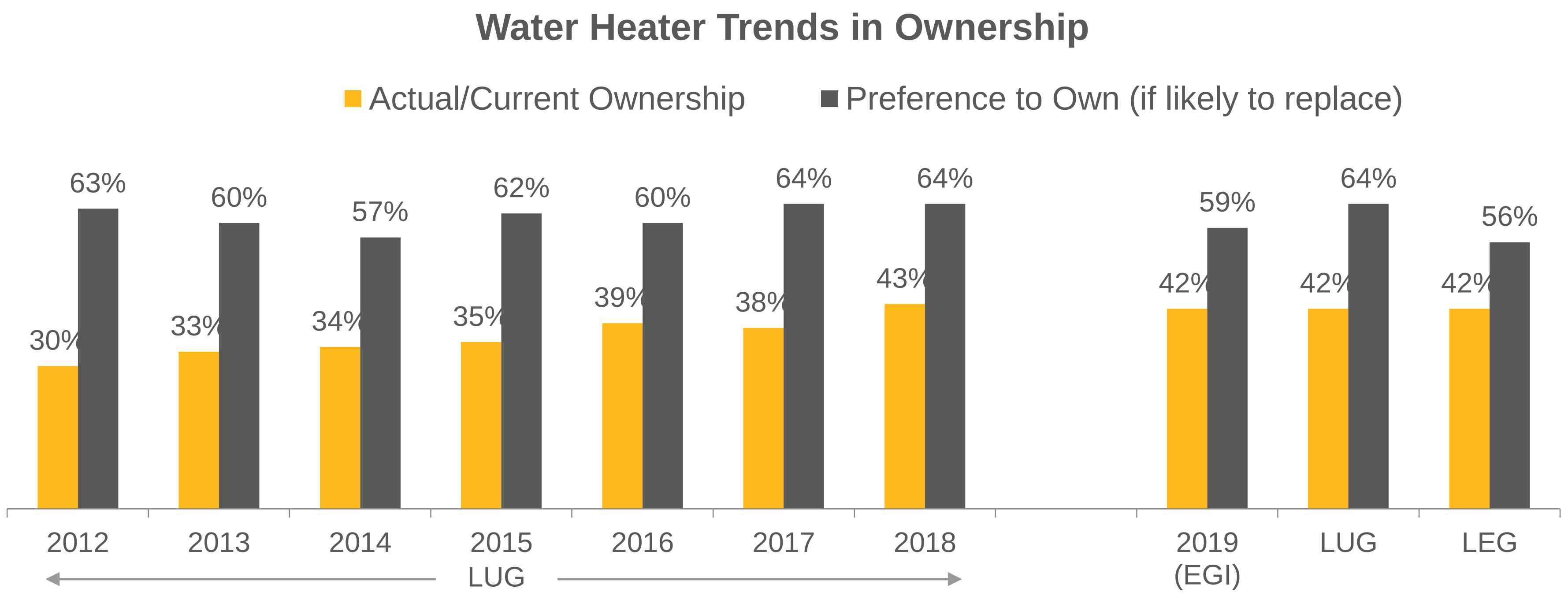
Age of Water Heater (all)	
5 years or less	49%
6 to 10 years	31%
11 to 15 years	10%
More than 15 years	5%
Don't Know	5%



	Region	Tankless (%)
LEG	**Total LEG**	**10%**
	Toronto	13%
	Central-West	8%
	Central-East	9%
	Eastern	9%
	Niagara	13%
LUG	**Total LUG**	**12%**
	Central	11%
	Eastern	13%
	Northern	15%
	South/West	11%

Water Heating: Ownership

- Current ownership is the same among LUG and LEG customers and is quite consistent for LUG over the last couple of years.
- Ownership tends be higher among customers who have an electric water heater compared to one that is fueled by natural gas.
- Future intentions continue to lean toward ownership - 59% plan to own. This ranges considerably across the franchise from 42% in LEG's Central-West region to 74% in LUG's Northern region.



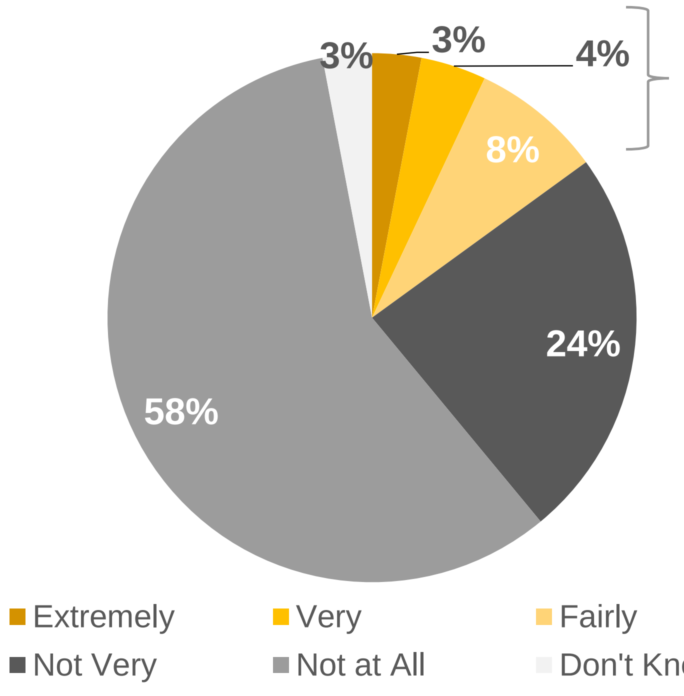
Owned % by type of water heater
Natural Gas: 39%
Electricity: 58%

Water Heating: Replacement

- Similar to furnaces, a small proportion of customers (15%) indicate that they are at least likely to replace their furnace in the next 2 years because it is likely to break down or because they're looking to improve the efficiency level – among them, most would get a natural gas water heater.

Likely to Replace Water Heater in Next 2 Years

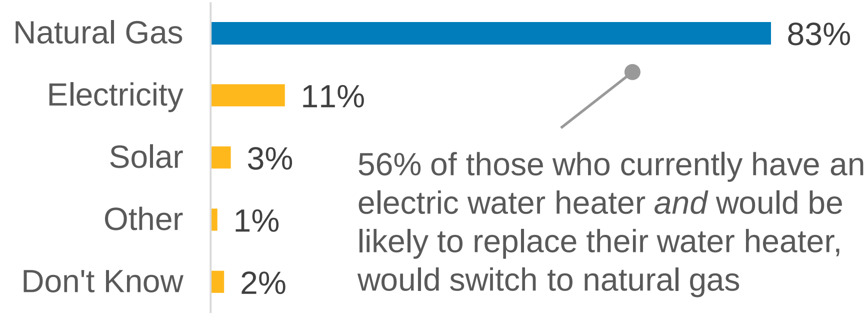
(Base: customers who have a water heater and own their home n=2,179)



15% at least fairly likely
LEG: 16%
LUG: 14%

Fuel Source of New Water Heater

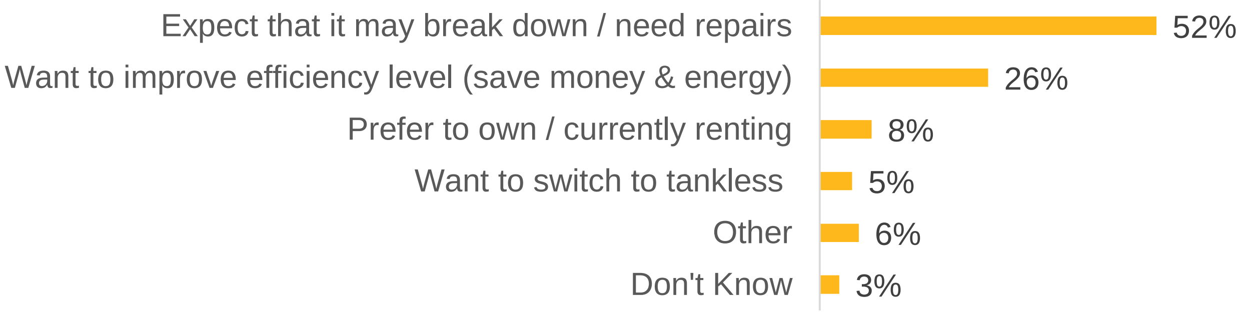
(Base: customers who are at least fairly likely to replace their water heater n=323)



56% of those who currently have an electric water heater *and* would be likely to replace their water heater, would switch to natural gas

Reason For Replacing Water Heater

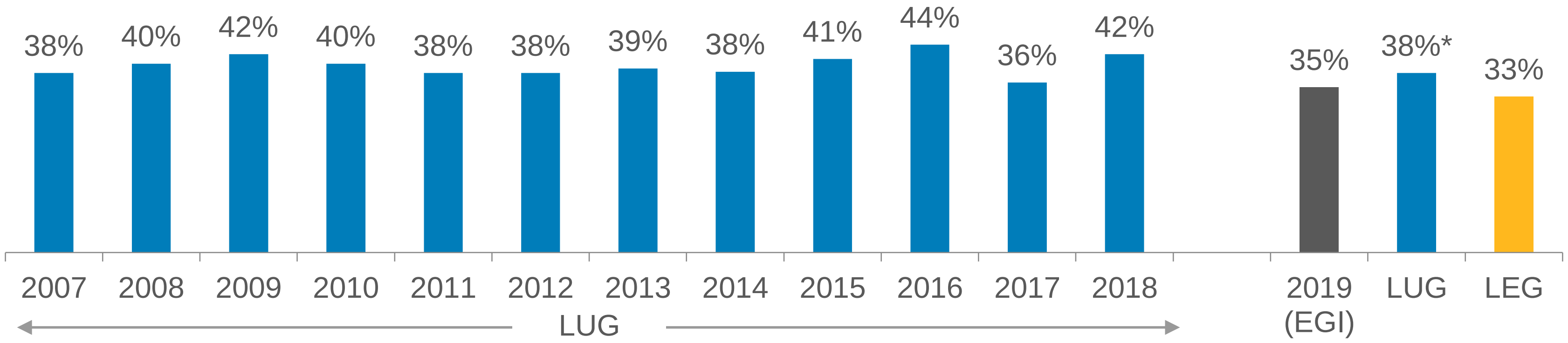
(Base: customers who are at least fairly likely to replace their water heater n=323)



Fireplaces: NG Adoption & Equipment

- Reported penetration of natural gas fireplaces is slightly down in 2019 for LUG customers, though higher than among LEG customers.
- Natural gas fireplaces continue to be popular among those who have a fireplace or would like to install one.

Natural Gas Penetration: Fireplaces
(Base: all customers)



8% are at least fairly likely to install a fireplace in the next 2 years

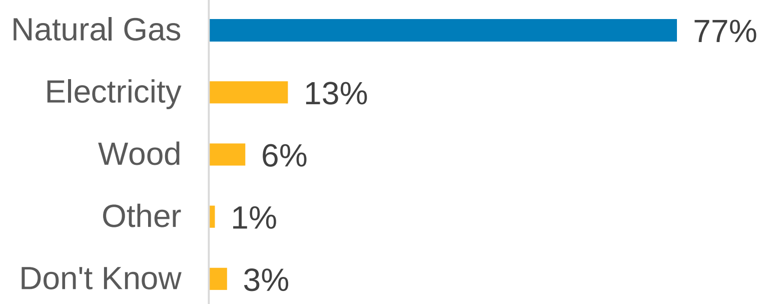
55% of households have a fireplace

- 78% have just one
- 22% have 2 or more

Fuel Type: 65% 32% 9%

Age of Fireplaces (all)
About 2-in-5 (40%) fireplaces are less than 10 years old

Fuel Source of New Fireplace
(Base: customers who are at least fairly likely to install a new fireplace, n=190)

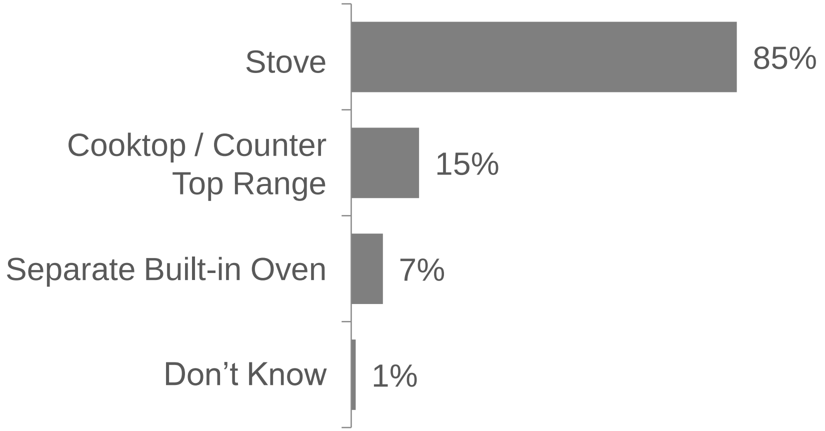


* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers).

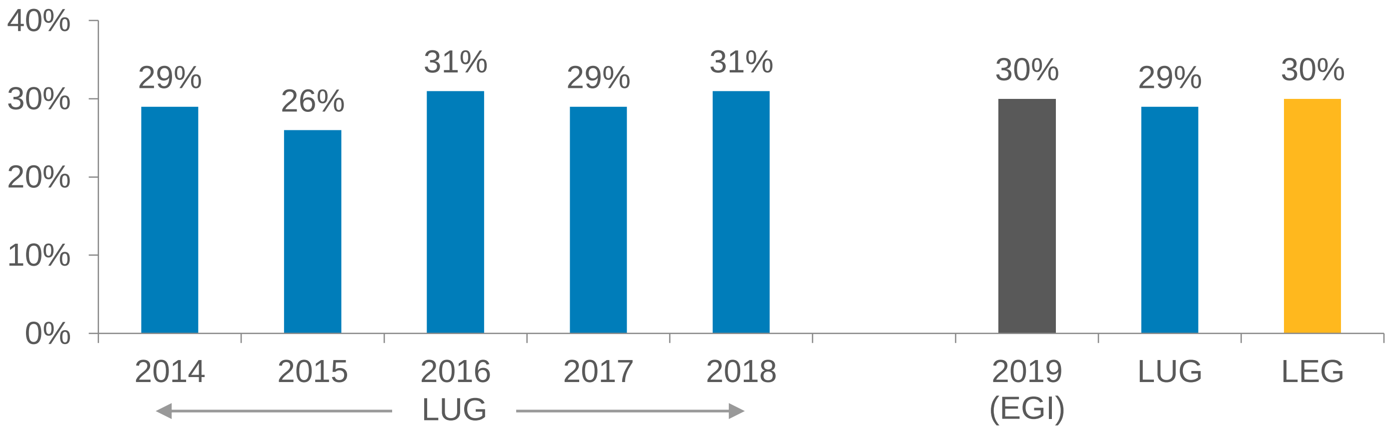
Cooking: NG Adoption & Equipment

- At 29%, penetration of natural gas for indoor cooking continues to be relatively stable.
- Both natural gas fuelled stoves and counter top ranges are the most prevalent in the highest earning (33%, 20%), largest (36%, 21%), newer homes (35%, 17%).
- Natural gas is perceived as a necessary component in high end kitchens. Emphasis on affordability in addition to quality may present an opportunity to broaden the appeal to a larger group.

Type of Cooking Equipment (more than one response allowed)
(Base: all customers, n=2,400)

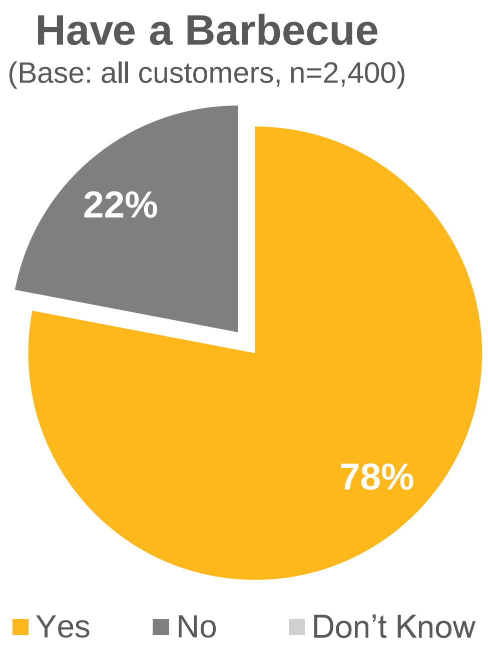


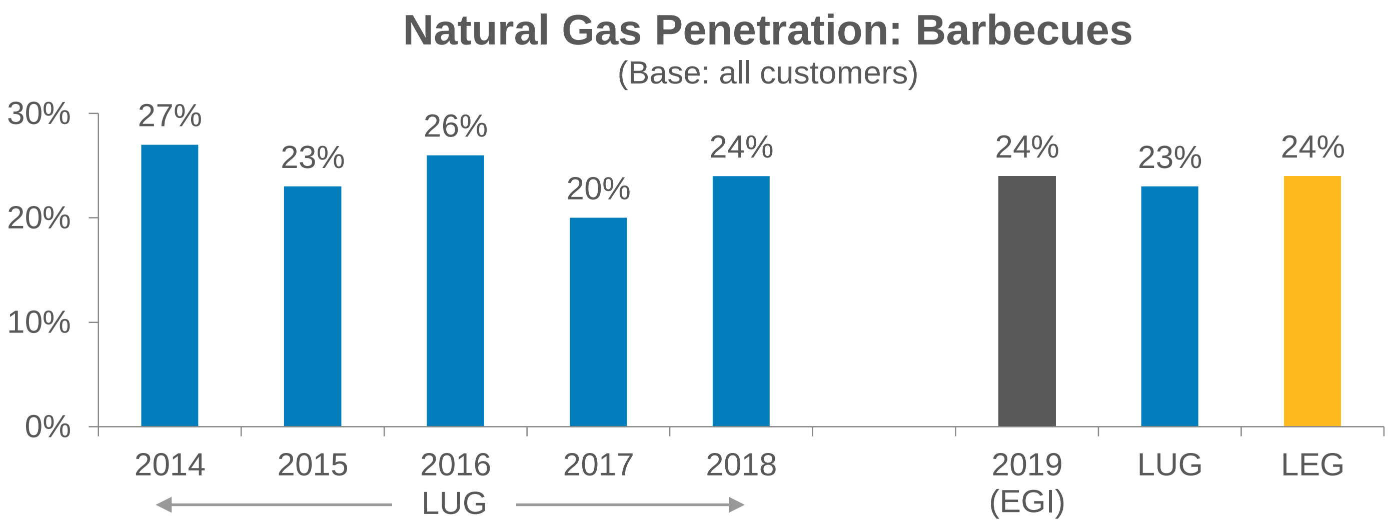
Natural Gas Penetration: Cooktop/Stove
(Base: all customers)



Barbecues: NG Adoption & Equipment

- The majority of single family homes have an outdoor barbecue (78%) – among them propane (64%) remains the most common fuel type, followed by natural gas (30%).
- Households with higher incomes ($100K+) are more likely to have a barbecue and to use natural gas to fuel it (90% ownership, among them 34% using natural gas), compared to lower income households. Just over 3-in-5 of those earning under $40K have a barbecue of which only 17% use natural gas.



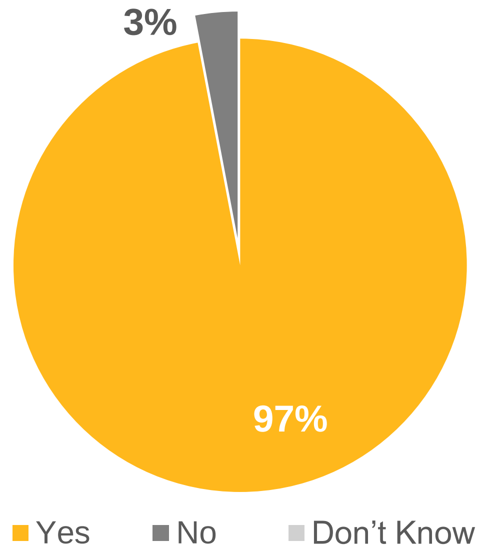


Clothes Dryer: NG Adoption & Equipment

- Almost all single family homes have a clothes dryer (97%) with electricity used most across the franchise (83%) followed by natural gas (17%), with significant differences between LUG and LEG.
- More dryers in LUG's South/West (27%) and Central (21%) and LEG's Niagara (23%) regions use natural gas.
- Households that own natural gas water heaters are more likely to have natural gas clothes dryers which suggests that for a sub-set of customers natural gas clothes dryers may be a desirable 'add on' tied more to psychographics than housing characteristics such as dwelling size or age.

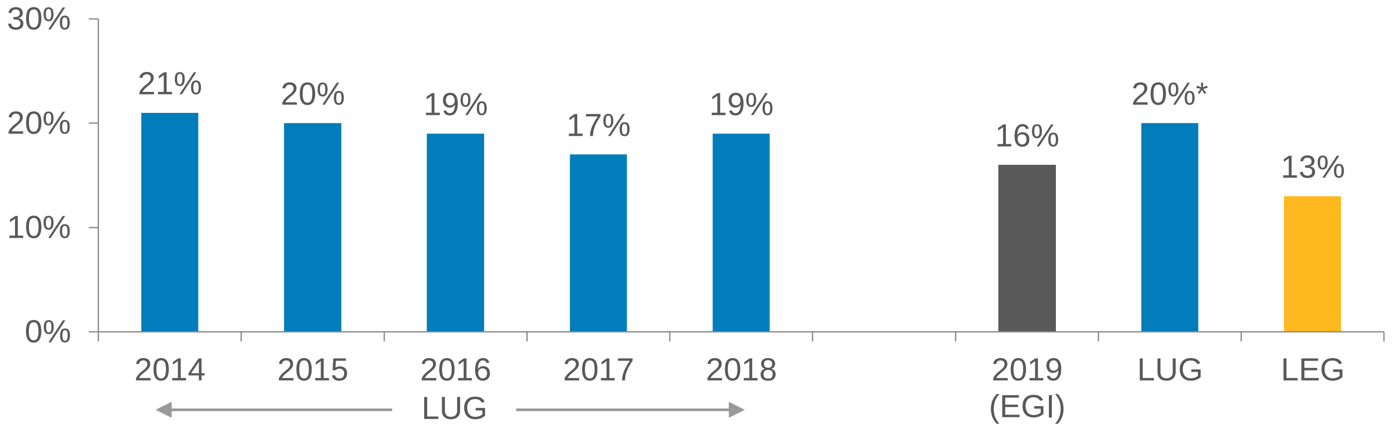
Have a Dryer

(Base: all customers, n=2,400)



Natural Gas Penetration: Clothes Dryers

(Base: all customers)



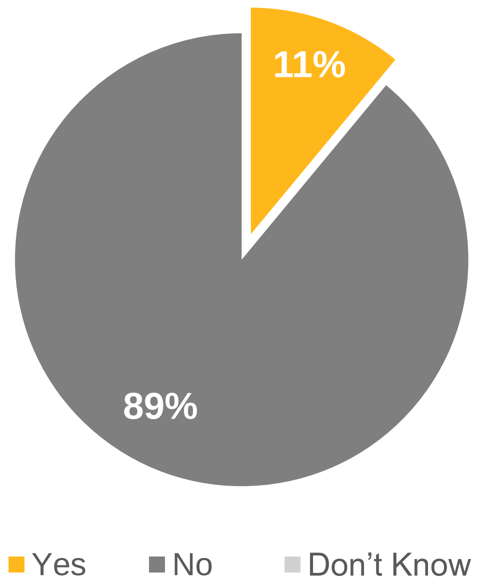
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers).

Pools

- Pools are not as common in Northern Ontario (7%), Toronto (4%) or in lower income households (8%).
- In terms of heating, pools located in LEG are more likely to be heated with than those in LUG with natural gas being the top fuel choice across the board.

Have a Pool

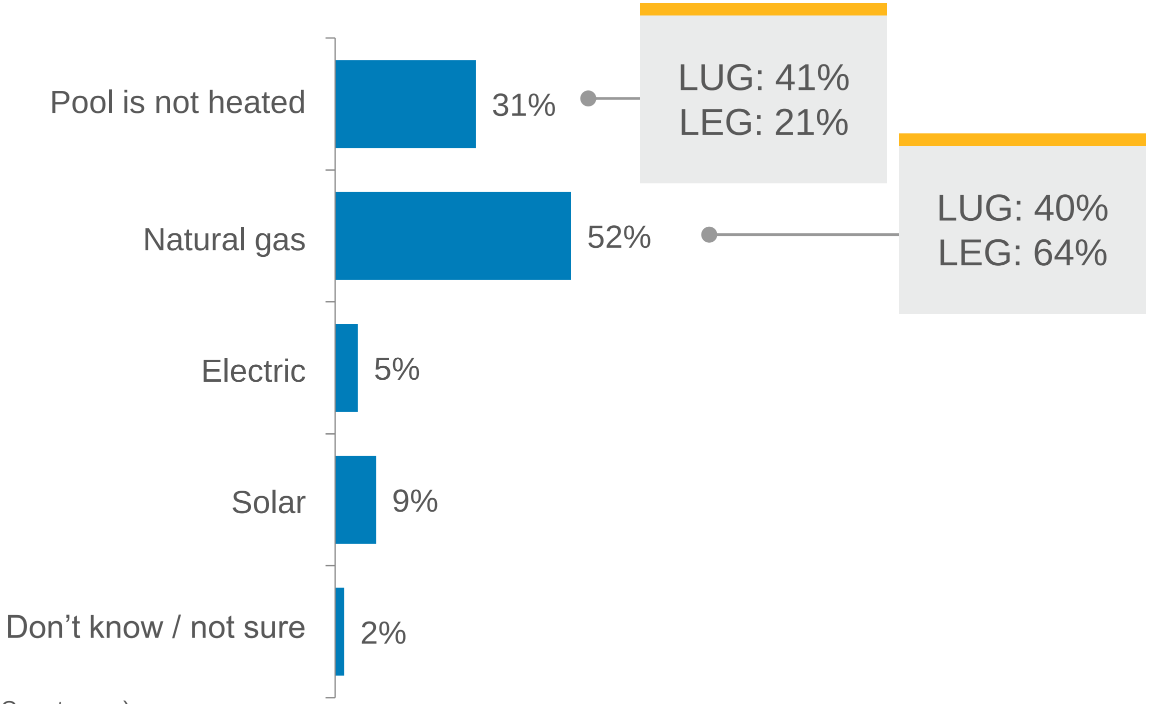
(Base: all customers, n=2,400)



	Region	Yes (%)
LEG	**Total LEG**	**9%**
	Toronto	4%
	Central-West	8%
	Central-East	15%
	Eastern	9%
	Niagara	16%
LUG	**Total LUG**	**13%***
	Central	12%
	Eastern	11%
	Northern	7%
	South/West	17%

Fuel Used to Heat Pool

(Base: customers who have a pool, n=261)

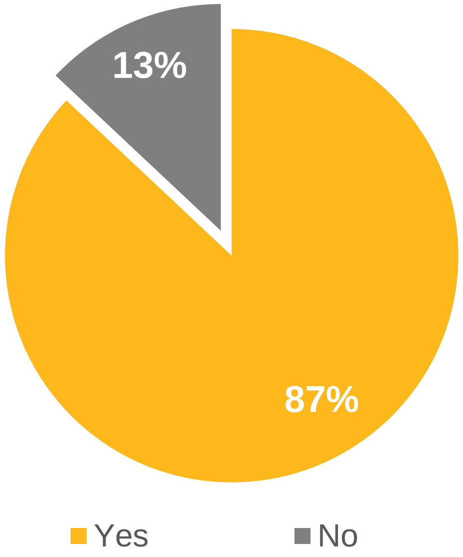


* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers).

Air Conditioning

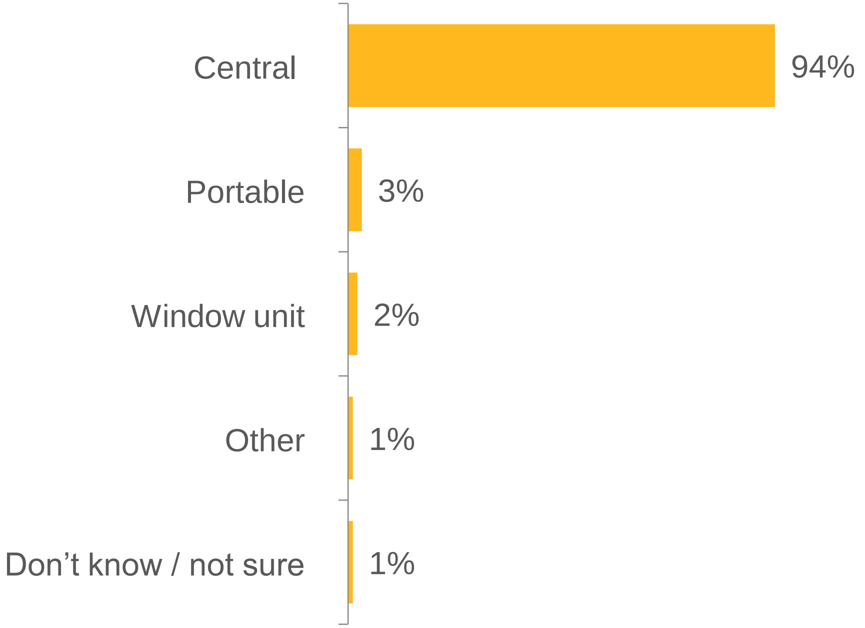
- There is considerable variation across the franchise ranging from 56% in LUG's Northern region to 93% in LEG's Central-West region in terms of whether a customer has air conditioning or not.
- Air conditioning is also significantly more common in newer houses with 96% of homes built since 1990 possessing air conditioning vs. only 71% of homes built before 1950. Proportions are similar by income with air conditioning in 92% of households earning at least $100K vs. 71% of households earning less than $40K.

Have Air Conditioning
(Base: all customers, n=2,400)



	Region	Yes (%)
LEG	Total LEG	**90%***
	Toronto	90%
	Central-West	93%
	Central-East	91%
	Eastern	90%
	Niagara	85%
LUG	Total LUG	**82%**
	Central	86%
	Eastern	78%
	Northern	56%
	South/West	90%

Type of Air Conditioning
(Base: customers who have air conditioning, n=2,082)



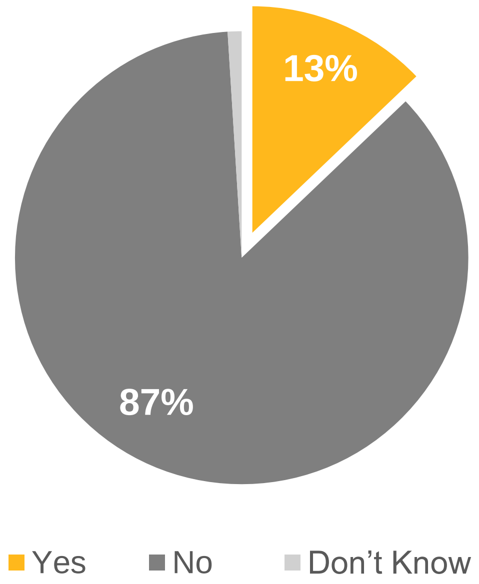
* Indicates result is significantly higher at a 95% confidence level for this customer group compared to the other (comparing LUG and LEG customers).

Backup Power

- More homes in Northern Ontario have backup power (19%) compared to all other regions, customers aged 55-64 are significantly more likely to have backup power relative to others (17%), as are those that use neither natural gas or electricity as their main home heating source (39%).

Have a Source of Backup Power

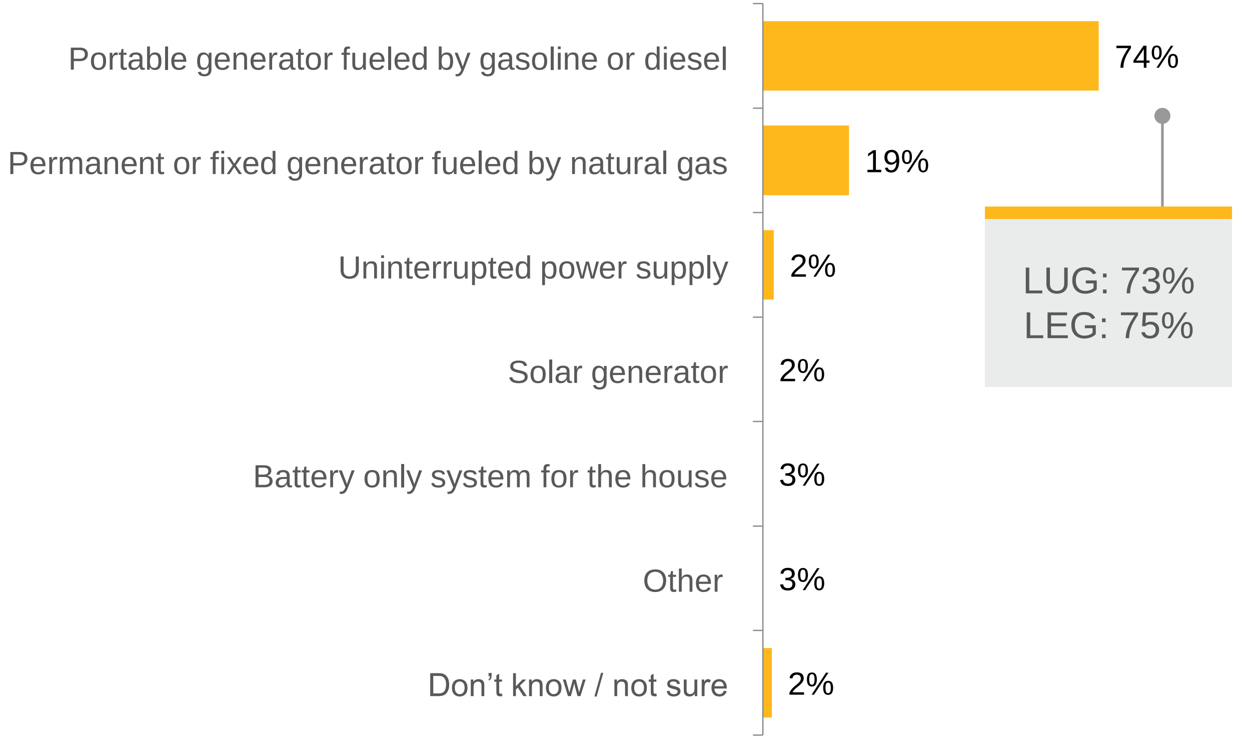
(Base: all customers, n=2,400)



	Region	Yes (%)
LEG	**Total LEG**	**12%**
	Toronto	11%
	Central-West	14%
	Central-East	10%
	Eastern	13%
	Niagara	11%
LUG	**Total LUG**	**14%**
	Central	11%
	Eastern	15%
	Northern	19%
	South/West	15%

Type of Backup Power

(Base: customers who have a source of backup power, n=306)

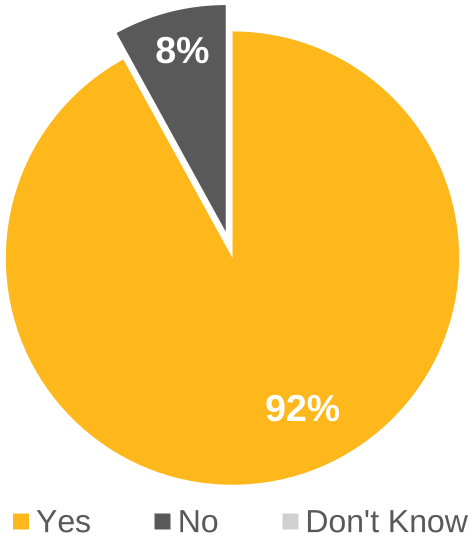


Insulation: Basement

- 92% of single family homes have a basement ranging from a low of 82% in LUG's South/West to a high of 97% in LEG's Toronto region. Across the franchise older homes are more likely to have poorly insulated or uninsulated basements (built before 1950: 13% poorly, 23% uninsulated, built after 1950: 5% poorly, 3% uninsulated).
- Household income also appears to be a factor – among low income customers 22% have poorly or uninsulated basements. This represents customers who may be eligible for the Home Winterproofing Program.

Have a Basement

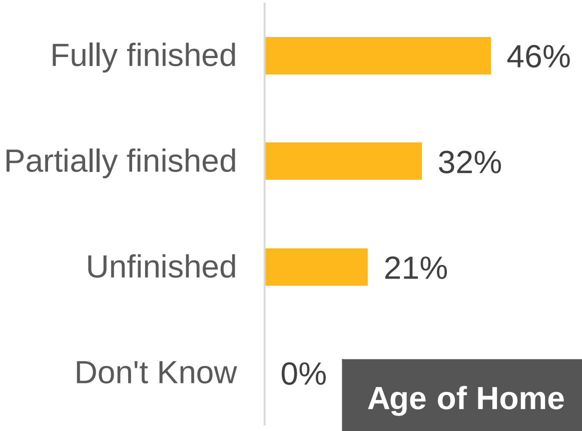
(Base: all customers, n=2,400)



% yes
LUG: 88%
LEG: 95%

Level of Finish

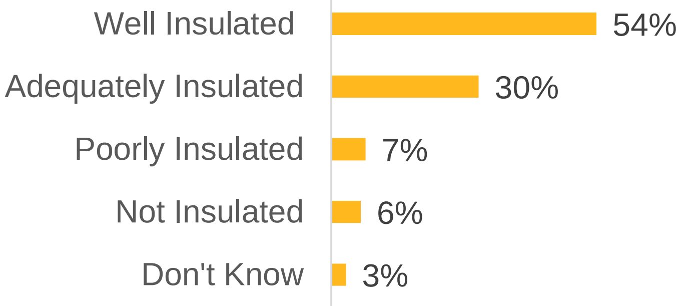
(Base: customers who have a basement, n=2,216)



Age of Home	Well (%)	Not (%)
Before 1950	35%	23%
1950-1969	49%	6%
1970-1989	59%	2%
1990-2019	64%	1%

Level of Insulation

(Base: customers who have a basement, n=2,216)



Household Income	Well (%)	Not (%)
Under $40K	43%	13%
$40K-$60K	49%	8%
$60K-$80K	55%	5%
$80K-$100K	53%	4%
$100K+	56%	6%

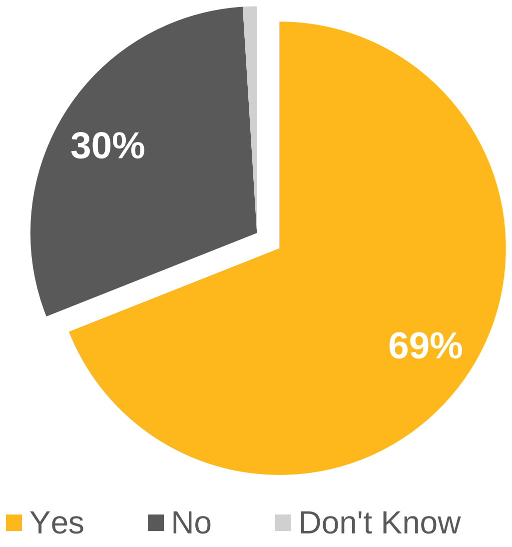
Q: Do you have a basement?; Q: Is your basement…?

Insulation: Attic

- Just over 2-in-3 single family homes have an attic ranging from a low of 61% in LEG's Toronto region to a high of 75% in LEG's Central-East region. Across the franchise, older homes are more likely to have poorly insulated or uninsulated attics.
- Household income also appears to be a factor – among low income customers more attics are poorly (7%) or not at all (3%) insulated, and a significant proportion don't know their insulation levels (as high as 12%), which represents customers who may be eligible for the Home Winterproofing Program.

Have an Attic

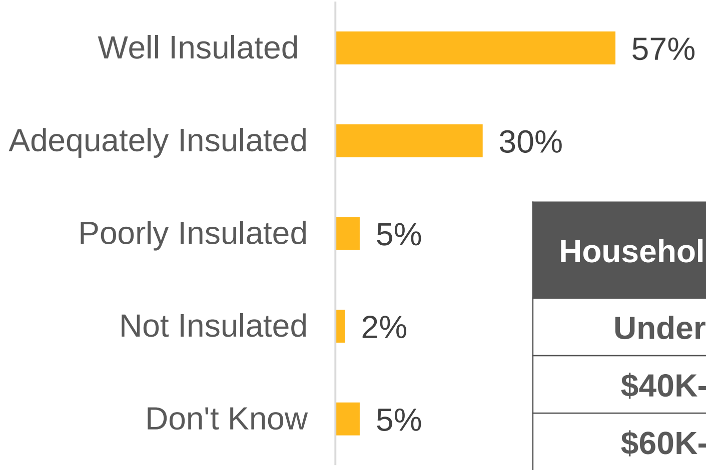
(Base: all customers, n=2,400)



% yes
LUG: 68%
LEG: 69%

Level of Insulation

(Base: customers who have an attic, n=1,646)



Age of Home	Well (%)	Not (%)
Before 1950	50%	6%
1950-1969	58%	1%
1970-1989	59%	1%
1990-2019	61%	1%

Household Income	Well (%)	Not (%)	Don't Know (%)
Under $40K	50%	3%	12%
$40K-$60K	54%	2%	5%
$60K-$80K	58%	2%	4%
$80K-$100K	61%	1%	6%
$100K+	56%	2%	3%

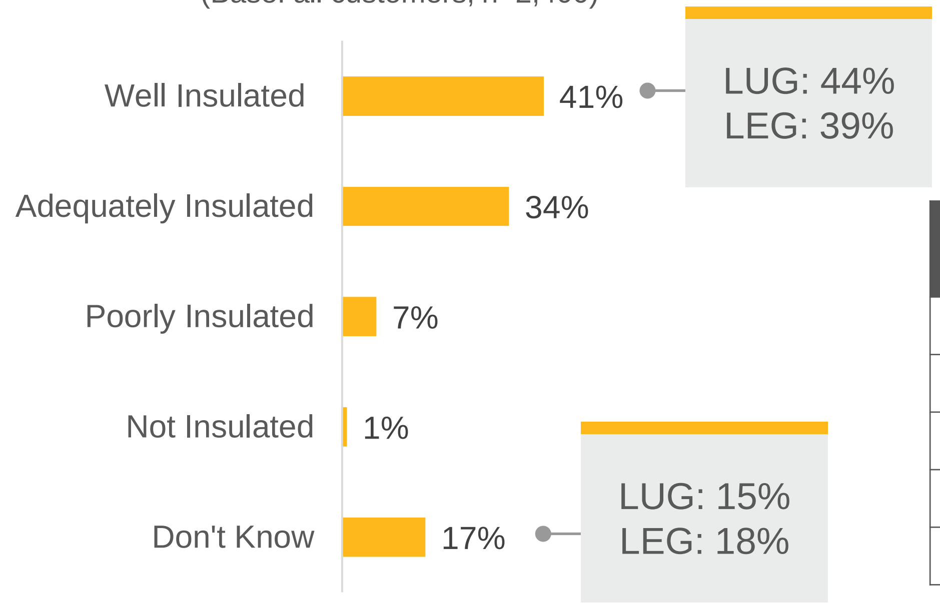
Q: Do you have an attic? Q: Is your attic …?

Insulation: Home and Exterior Wall

- Customers in LUG are significantly more likely to describe their home as being "well" insulated (44% vs. 39% LEG). Toronto customers are twice as likely as all others to say their home is 'poorly' insulated (15% vs. 7% total).
- Perceptions of insulation are polarized by the age of the house. Over half (55%) of homes built since 1990 are described as being 'well' insulated. Whereas "adequately" (35%), "poorly" (18%) or "not" (3%) are used with greater frequency to describe the insulation level in the oldest homes.
- Note, nearly 1-in-5 customers were unable to categorize the insulation level of their home.

Level of Home Insulation

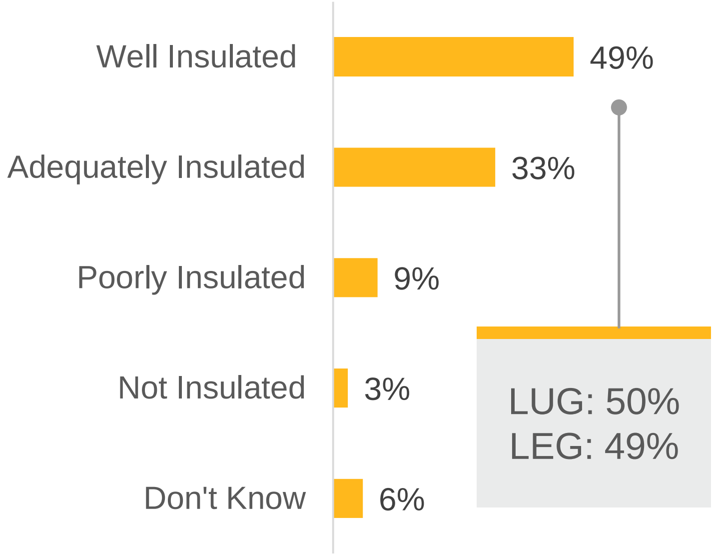
(Base: all customers, n=2,400)



Age of Home	Before 1950	1950-1969	1970-1989	1990-2019
Well	30%	29%	41%	55%
Adequate	35%	42%	39%	27%
Poor	18%	11%	6%	2%
Not	3%	1%	0%	0%
Don't Know	13%	16%	14%	17%

Level of Exterior Wall Insulation

(Base: all customers, n=2,400)



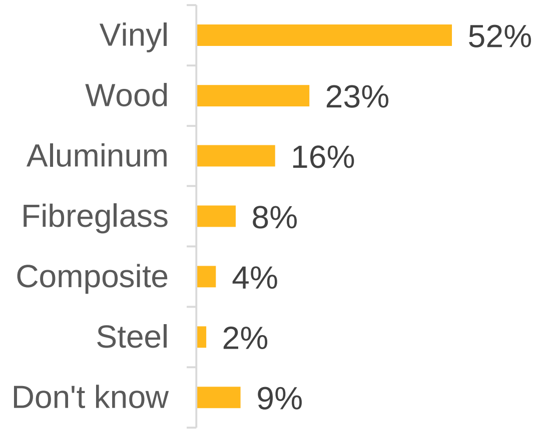
Q: How about your exterior, outside walls, are they…?; Q: Which best describes the insulation level of your home?

Windows

- Vinyl is the top window material across the franchise with notably higher use among LUG customers (LUG 55% vs. 50% LEG).
- Higher rates of aluminum (18%) and fibreglass (9%) in LEG are driven by the Toronto Region where use of these materials is much higher than the rest of the franchise.
- Customers in Toronto are more likely to have replaced windows since moving in than others (68% vs. 54% total).
- Note a significant number (19%) of customers were unable to answer if the replaced windows were Energy Star certified or not.

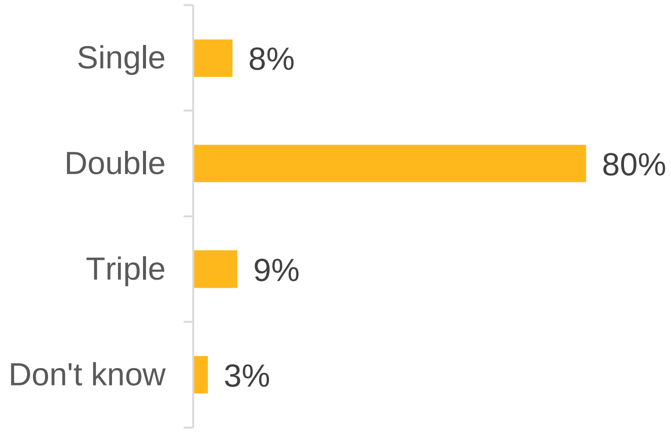
Window Material (multiple mentions)

(Base: all customers, n=2,400)



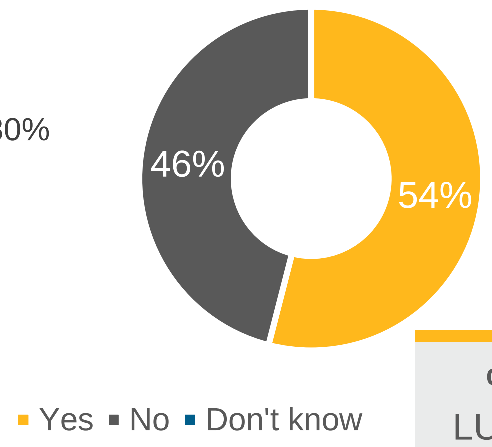
# of panes

(Base: all customers, n=2,400)



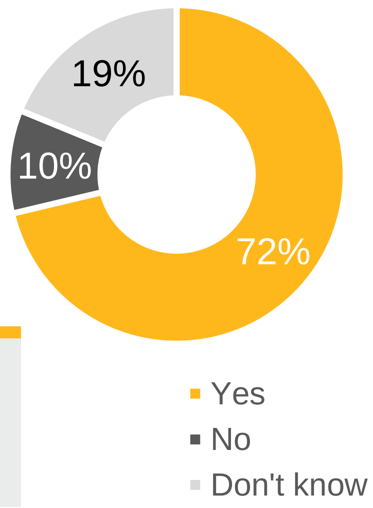
Replaced any Windows Since Moving in

(Base: all customers, n=2,400)



Were any Energy Star certified

(Base: all customers who replaced windows, n=1,293)



% yes
LUG: 47%
LEG: 59%

Q: What material are the window frames?; Q. How many panes of glass…?; Q. Since moving in have you replaced any windows?; Q. Are any Energy Star certified?

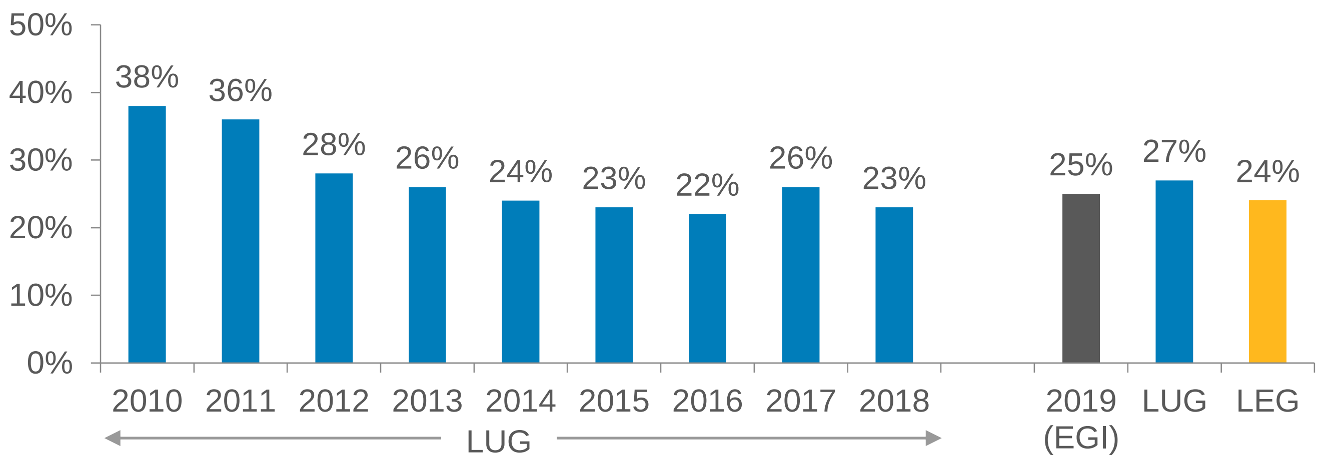
Energy Efficiency: Future Intentions

- One quarter (25%) of customers intend to make their home more energy efficient in the next 2 years.
- This intention is significantly higher among customers in LUG's Northern Region (38%) and among customers with homes built before 1950 (30%), though among customers with homes built between 1990-2019 just over 1-in-4 also indicate plans to make their home more energy efficient (26%).
- Younger, larger households are also significantly more likely to be planning energy efficiency upgrades.

Age of Home	Plans (% yes)
Before 1950	30%
1950-1969	23%
1970-1989	26%
1990-2019	26%

Plans to make home more energy efficient in next 2 years (% yes)

(Base: all customers, n=2,400)



Age Group	Plans (% yes)
18 – 34	43%
35 – 54	37%
55 – 64	22%
65+	13%

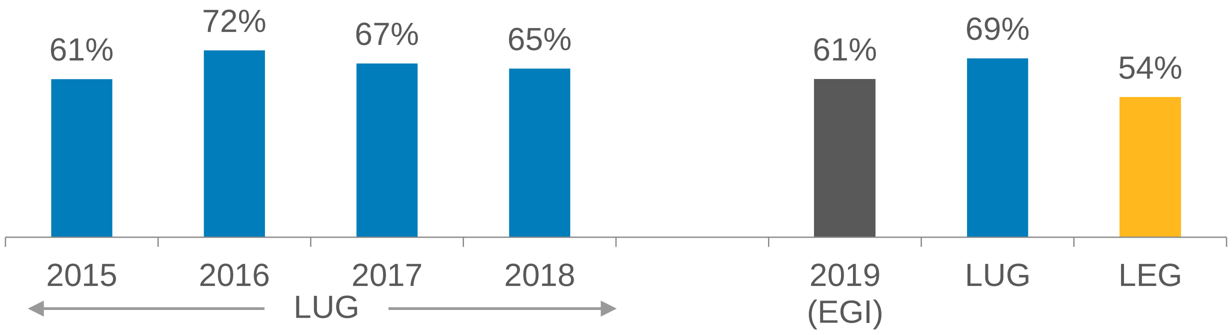
	Region	Plans (% yes)
LEG	**Toronto**	23%
	Central-West	26%
	Central-East	27%
	Eastern	18%
	Niagara	23%
LUG	**Central**	26%
	Eastern	27%
	Northern	38%
	South/West	24%

Q: Do you have any plans to make your home more energy efficient within the next two years?

Energy Efficiency: Awareness of Any Programs

- Awareness that LUG/LEG offers energy conservation and energy efficiency improvement programs and incentives is higher among those planning to make energy improvements than not (62% vs. 56%) and among those residing in LUG than LEG (69% vs. 54%).
- Awareness ranges from highest in LUG's South/West (72%) to lowest in LEG's Eastern Region (49%).
- Awareness is also strongest amongst older customers, though they're less likely to have plans to make their homes more energy efficient.

Aware that LUG/LEG offers Energy Conservation & Efficiency Programs
(Base: all customers, n=2,400)



Age Group	Aware (% yes)
18 – 34	57%
35 – 54	58%
55 – 64	60%
65+	66%

	Region	Aware (% yes)
LEG	Toronto	54%
	Central-West	53%
	Central-East	58%
	Eastern	49%
	Niagara	54%
LUG	Central	70%
	Eastern	66%
	Northern	62%
	South/West	72%

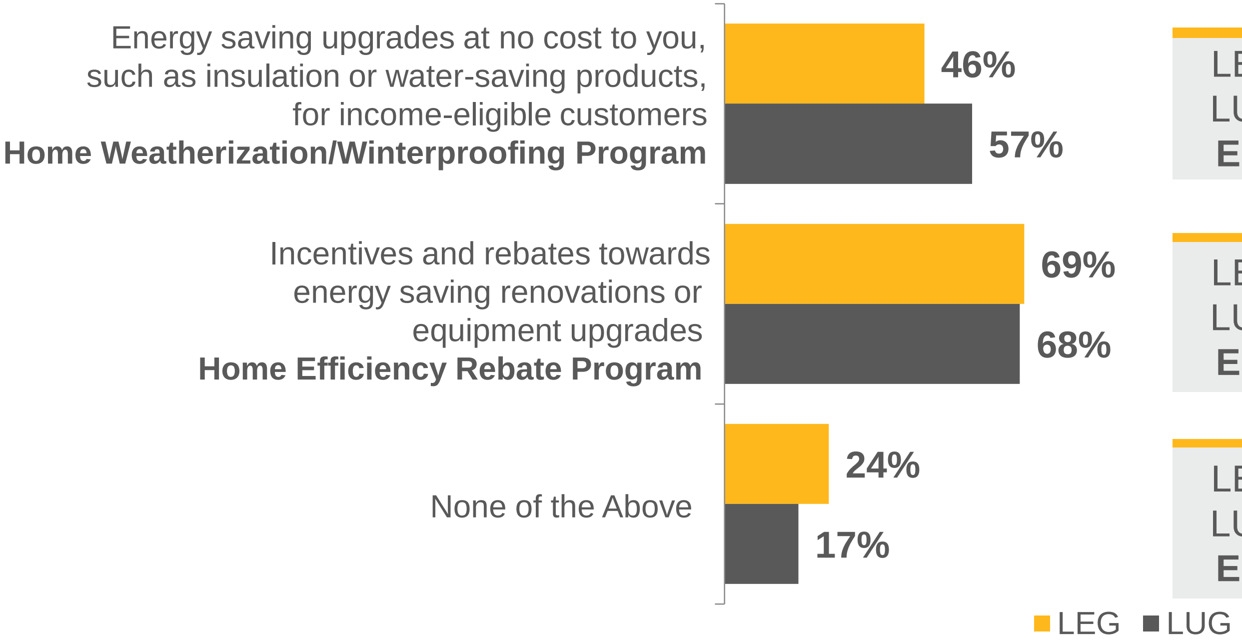
Q: Are you aware that Union Gas / Enbridge Gas offers energy conservation & energy efficiency improvement programs & incentives to help residential customers like you to save money on their energy bills?

Energy Efficiency: Awareness of Programs

- Awareness of the Home Winterproofing Program is at 31% across the franchise but is higher among LUG customers (39%) even though participation levels are about the same across legacy franchises.
- Overall Home Efficiency Rebate (HER) program awareness is 41%, and similar to HWP is significantly higher among LUG customers (as general awareness is higher), though reported uptake is slightly higher in LEG.

Offerings Aware of … *(aided awareness)*

Base: all customers aware that EGI offers programs

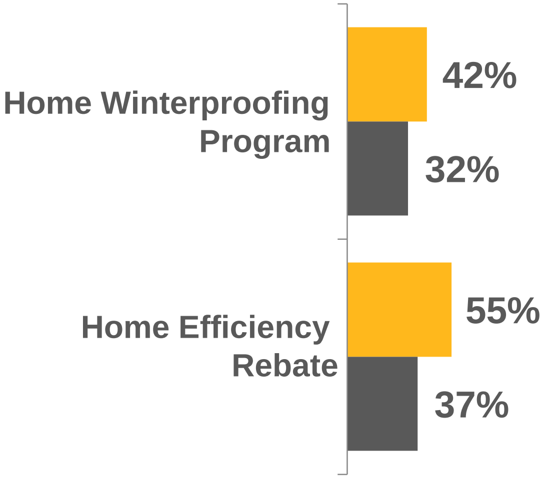


Base: all customers

Home Weatherization/Winterproofing Program	LEG: 25% LUG: 39% **EGI: 31%**
Home Efficiency Rebate Program	LEG: 37% LUG: 47% **EGI: 41%**
None of the Above	LEG: 13% LUG: 12% **EGI: 13%**

Previously Participated

Base: all customers aware of the specified program



Base: all customers

Home Winterproofing Program	LEG: 11% LUG: 12% **EGI: 11%**
Home Efficiency Rebate	LEG: 20% LUG: 17% **EGI: 19%**
HAP (Home Assistance Program offered by the IESO)	LEG: 3% LUG: 4% **EGI: 4%**

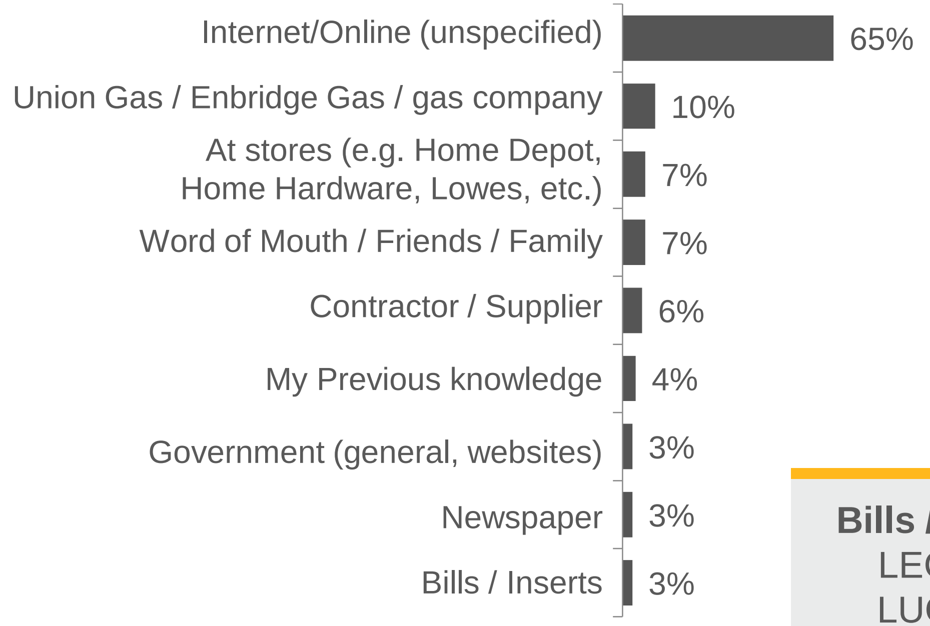
Q: Which of the following company energy conservation offerings are you aware of?; Q: Have you ever participated in the ...

Energy Efficiency: Sources of Information

- The majority of customers planning to make their home more energy efficient go online to look for information – senior-led households and lower income households do so at lower rates.
- Older customers are much more likely to look to the utility for information than their younger counterparts, while lower income households disproportionately look to friends, family and word of mouth recommendations.

Top Sources of Information (Unaided)

(Base: all customers who plan to make their home more energy efficient, n=607)



Bills / Inserts
LEG: 2%
LUG: 5%

Age Group	Internet / Online	From LEG/LUG
18 – 34	62%	12%
35 – 54	74%	10%
55 – 64	63%	8%
65+	50%	11%

Q: Where do you look for energy efficiency information? IF NECESSARY: What sources do you consider?

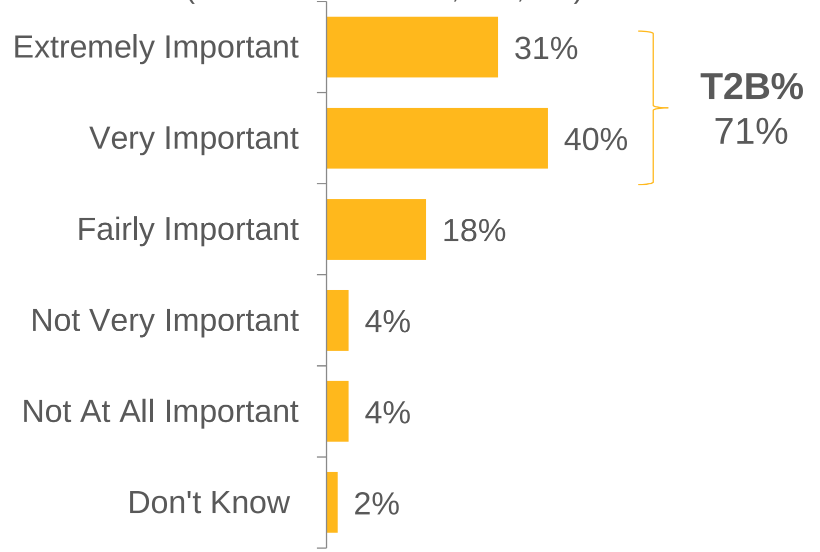
ENBRIDGE
Life Takes Energy

Energy Efficiency: Home Ratings

- Customers were asked to consider a scenario where they are looking to purchase a different home, and asked about home energy ratings:
  - Most customers (71%) indicate that the home being ENERGY STAR qualified is “very” or “extremely” important to them, and 79% indicate that they would like to know a home’s “Energy Rating” prior to purchase.
  - Results have been consistent for the past two years in interest in Energy Rating, but the importance of ENERGY STAR among LUG customers has increased a bit, in particular amongst the youngest age group.

Importance of a Home being ENERGY STAR qualified (if purchasing a new home)

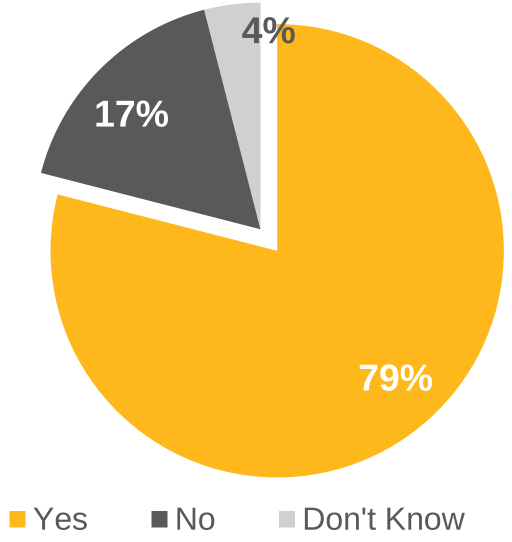
(Base: all customers, n=2,400)



Age Group	Importance Energy Star (T2B%)	Interest in Energy Rating
18 – 34	62%	81%
35 – 54	72%	84%
55 – 64	74%	82%
65+	72%	74%

Interest in knowing Home’s Energy Rating (if purchasing a new home)

(Base: all customers, n=2,400)

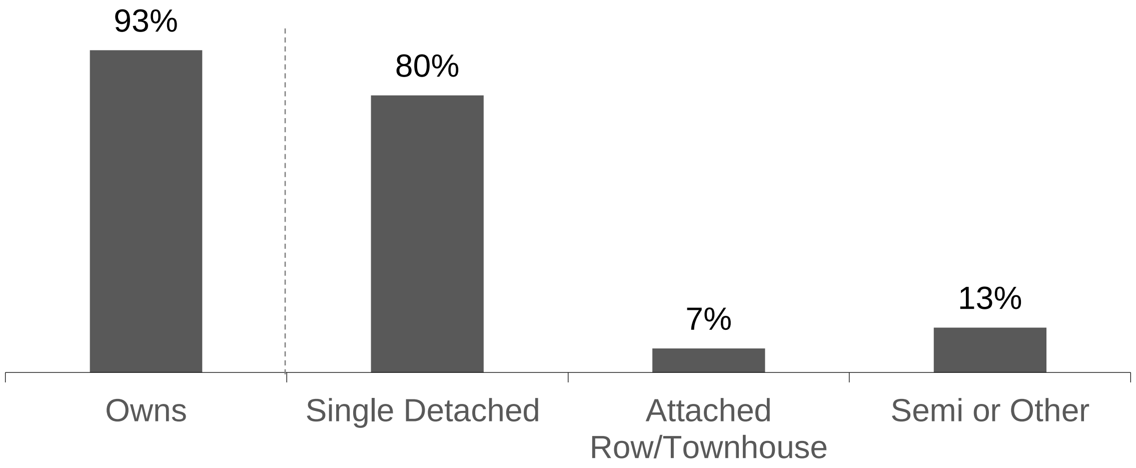


Q: In the event that you look to purchase a new home in the future, how important would it be that your new home is Energy Star qualified (or has an equivalent rating)? Q: In the event that you look to purchase a new home in the future, would you be interested in knowing the Energy Rating of a home, so you could compare homes prior to purchasing?

Demographics: House Characteristics (EGI)

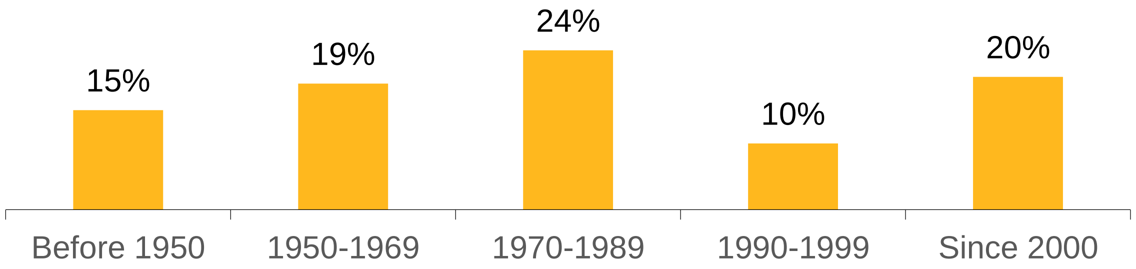
Home Ownership

Type of Home

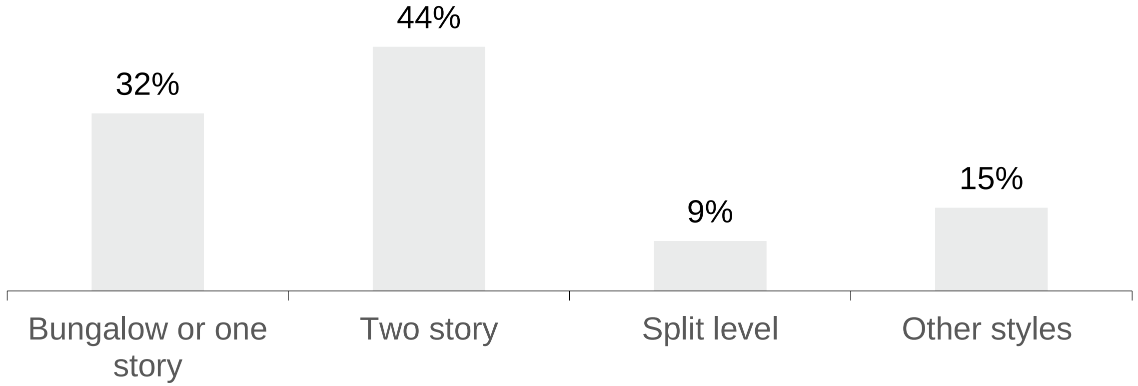


Age of Home

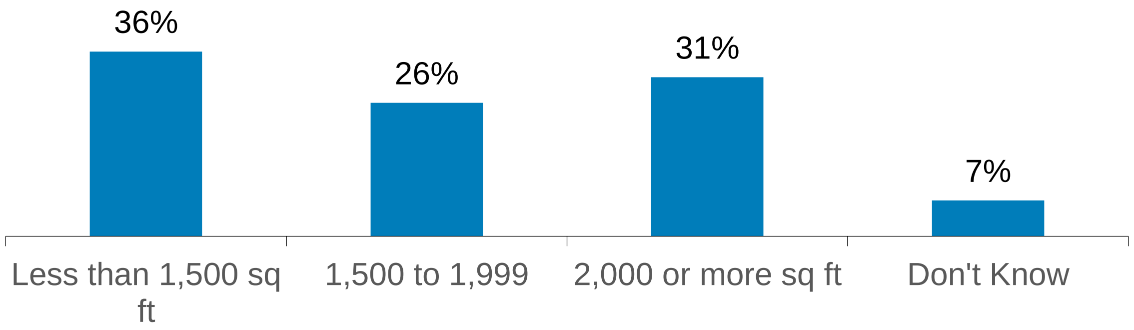
Average: 1972



Style of Home

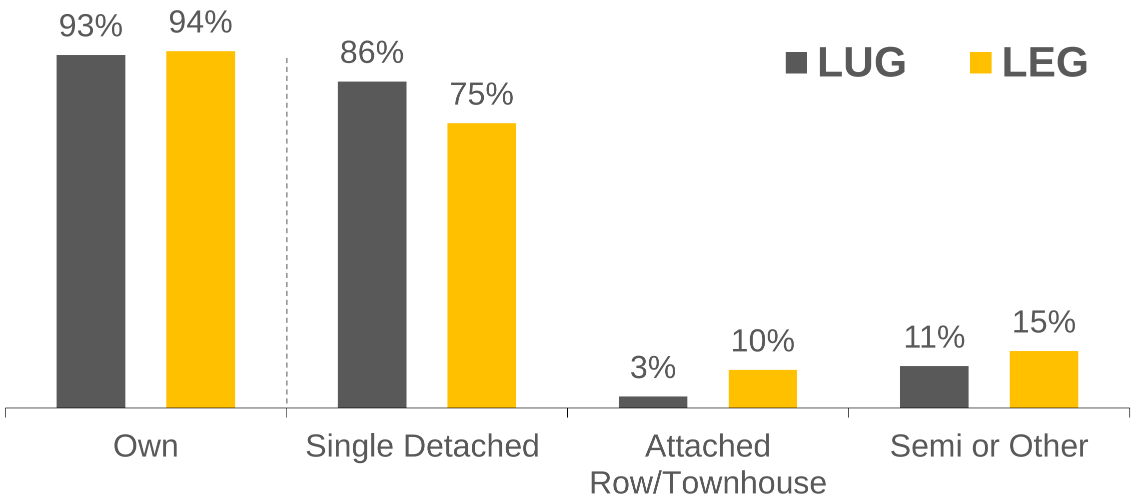


Size of Home

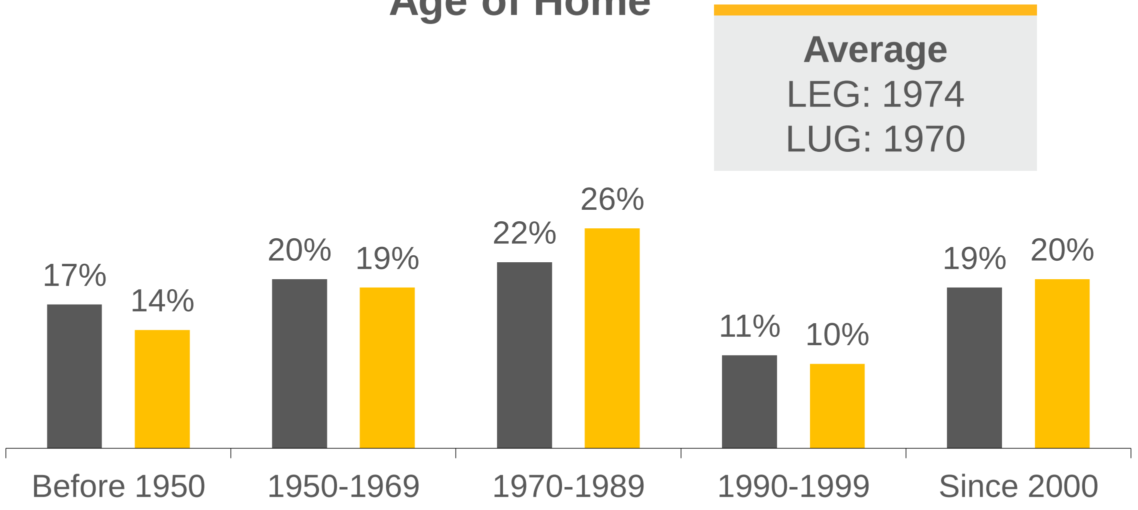


Demographics: House Characteristics (Legacy)

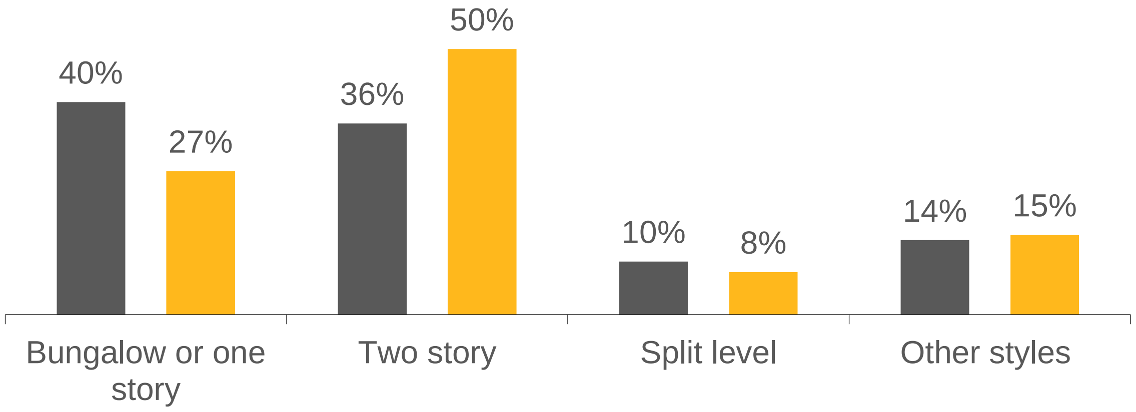
Home Ownership Type of Home



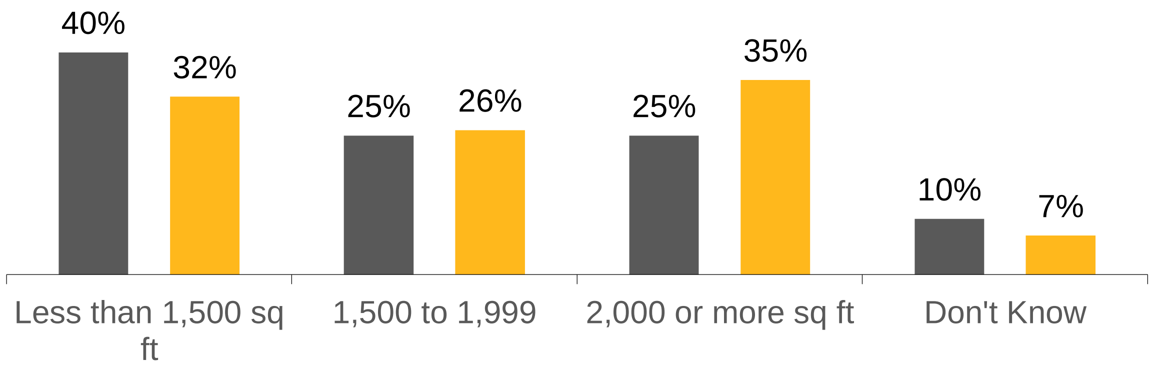
Age of Home



Style of Home



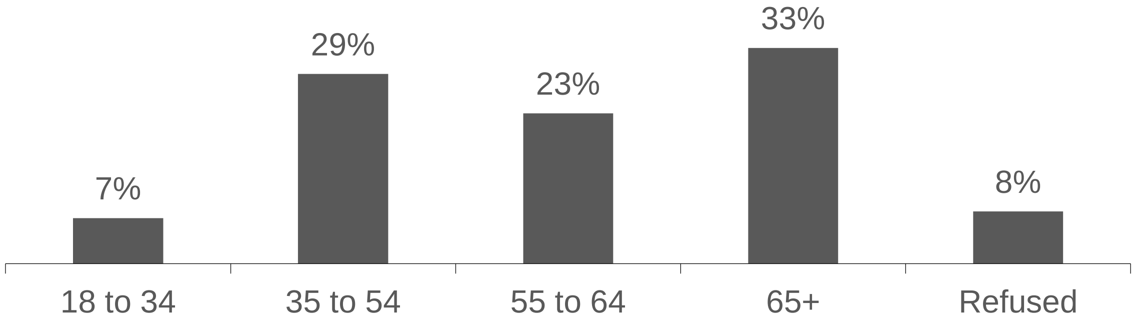
Size of Home



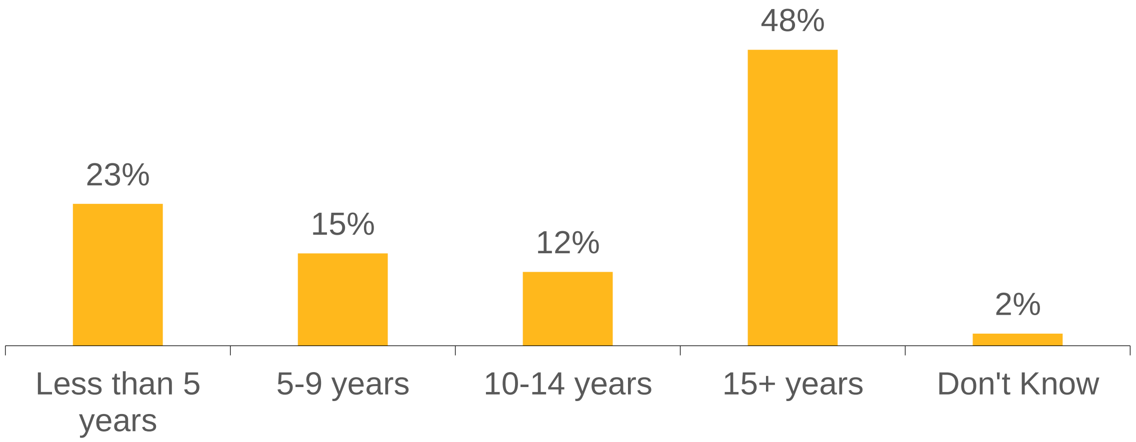
Demographics: Customer Characteristics (EGI)

ENBRIDGE
Life Takes Energy

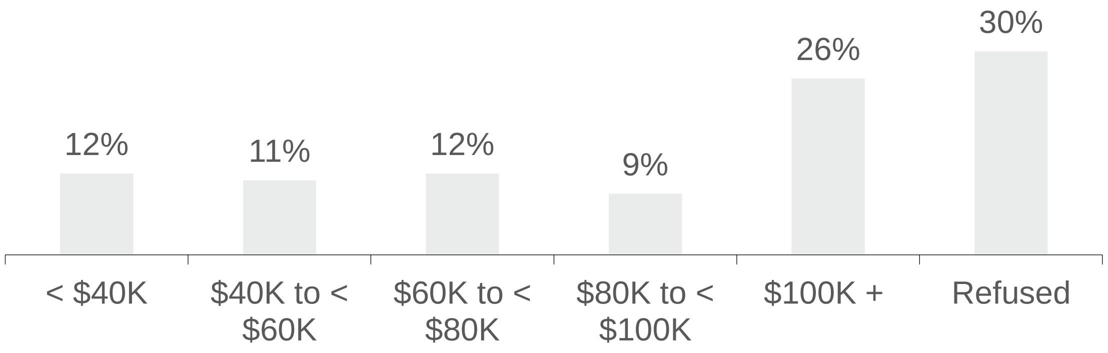
Age



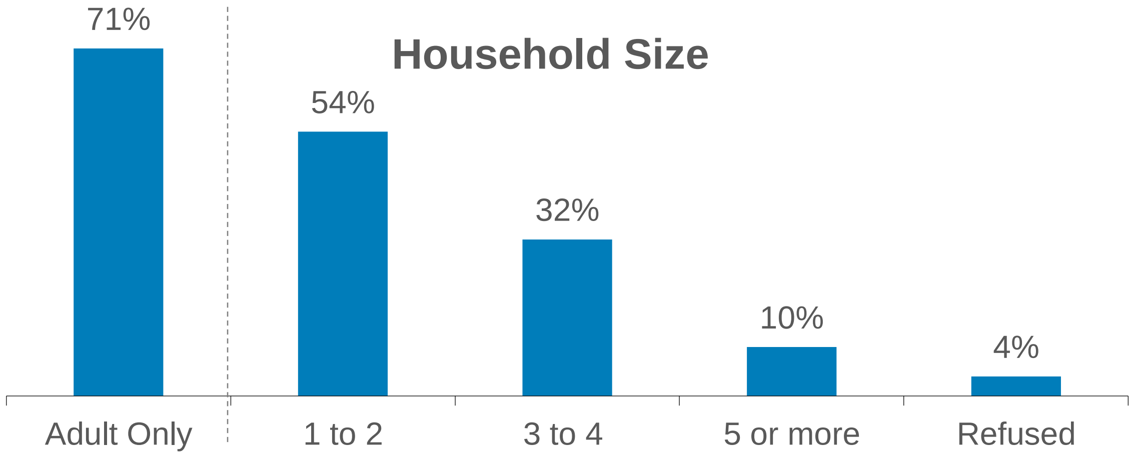
Length of Residence



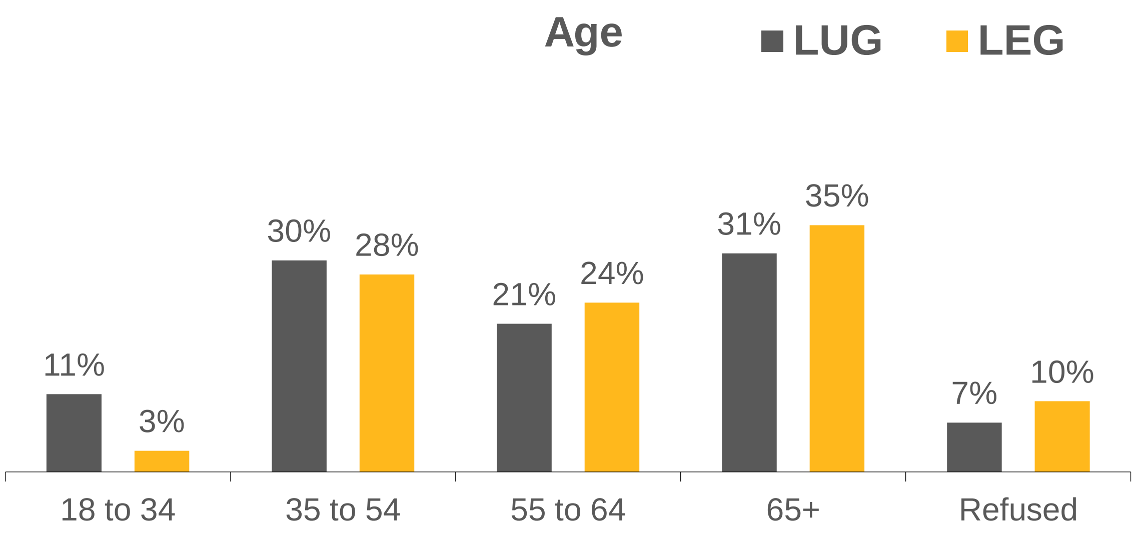
Household Income

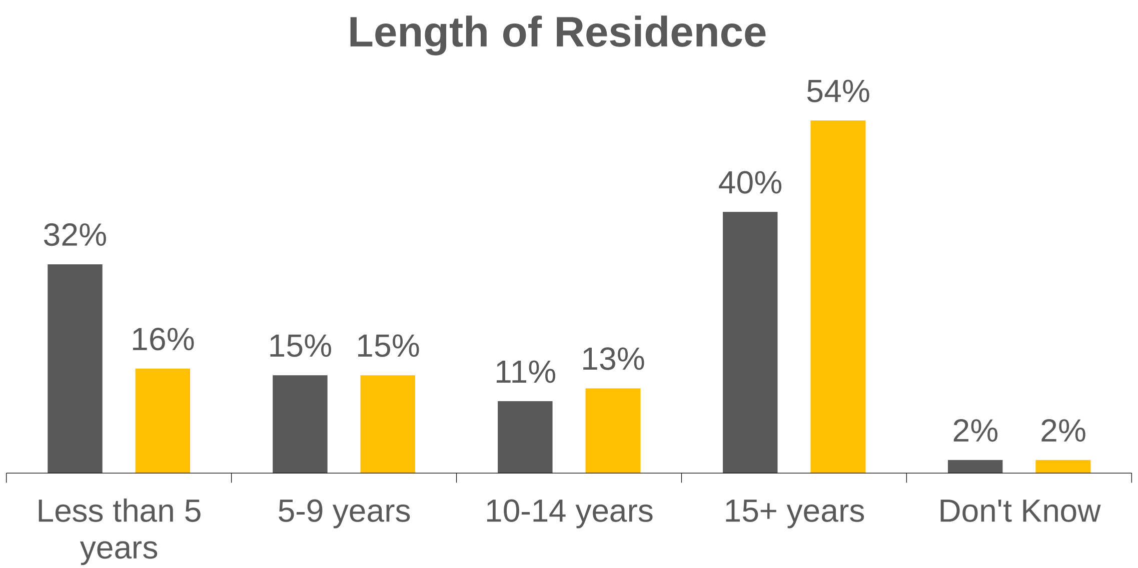


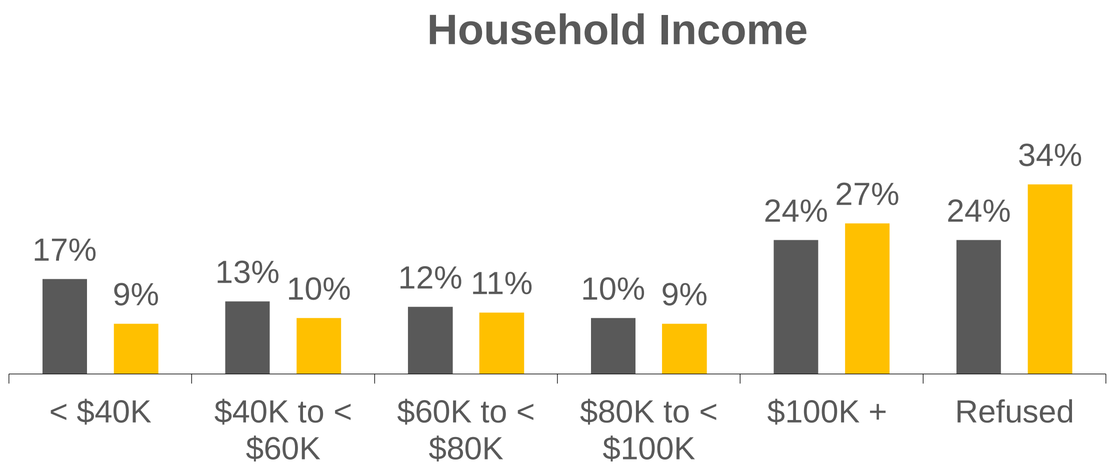
Household Size

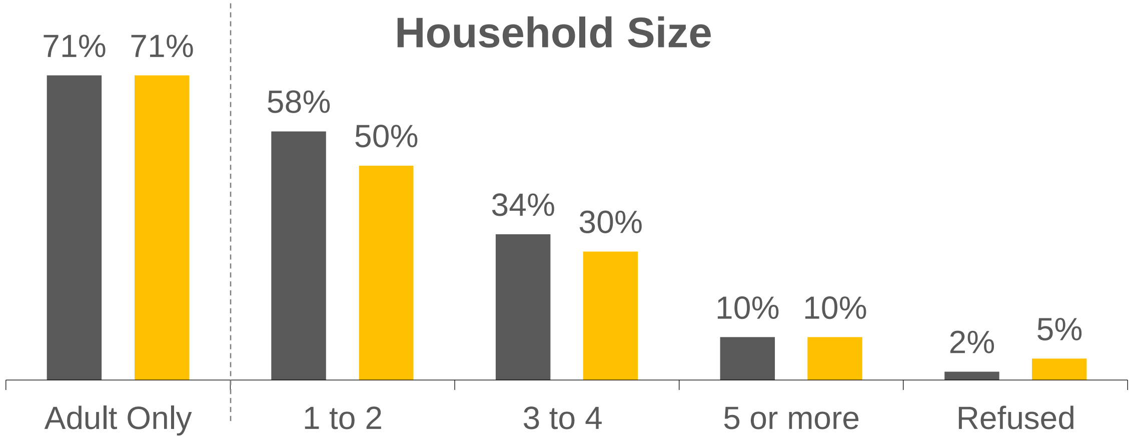


Demographics: Customer Characteristics (Legacy)





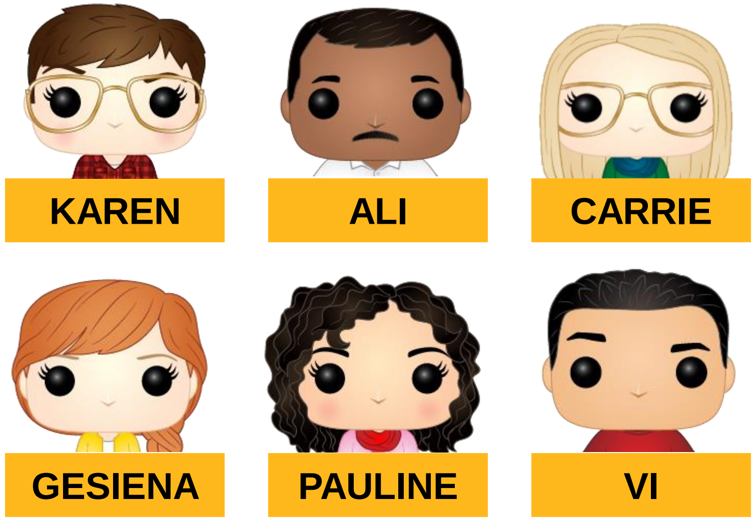




ENBRIDGE
Life Takes Energy

Enbridge Gas' Friendly

Market Research Team



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New Housing: Residential Natural Gas End Use

2019 Annual Results

Legacy Union Gas and Legacy Enbridge Gas Distribution

ENBRIDGE®

Market Research & Analysis

Background

Objectives

- Measure the penetration of natural gas appliances within the franchise “new build” customer base;
- Understand customer perceptions of the energy efficiency levels of their home and their familiarity with energy efficiency rating systems; and
- Determine key factors in the home purchase decision.

Methodology

- Respondents are customers who reside in single family dwellings built within the prior 18 months (built after May 2018) and are mainly responsible for making energy-related decisions for the home
- Sponsor identified telephone interviews were fielded by Leger, a Canadian market research vendor, over the period November 21 - December 19, 2019
- 800 interviews were completed across the total Enbridge Gas area, with 400 in the Legacy Enbridge Gas Distribution area (L-EGD) and 400 in the Legacy Union Gas area (L-UG)
- Overall results yield a margin of error of +/-3.4% at the 95% confidence interval

Executive Summary (1 of 2)

- Natural gas continues to be used for home heating and water heating by the large majority of customers in newly built homes (penetration levels are very similar to the single family market more generally) for both legacy utilities
- Penetration of natural gas is relatively stable among secondary appliances, with some differences across the legacy utilities:
  - Penetration of NG cooktop/stoves is back at 2017 levels and is somewhat higher in L-UG (50%) compared to L-EGD (40%)
  - Natural gas clothes dryers are more prevalent among L-UG customers (22%) compared to L-EGD customers (7%)
  - Natural gas tends to be more popular for appliances in new homes, compared to the average single family home
- While a new house is more likely to have a Smart or Wi-Fi Thermostat (compared to the average single family residential home), most new houses still have programmable thermostats installed (62% in L-UG and 57% in L-EGD)
- In 2019 we see the proportion of tankless water heaters continue to grow (to 48% in L-UG, which is slightly higher than in L-EGD) – ownership levels (rather than renting) stayed the same, while the proportion who said builders offered a choice for the fuel type increased from 24% to 35% in 2019 (L-UG)

Executive Summary (2 of 2)

ENBRIDGE

- Just over half of customers believe that their home is built to a higher level of energy efficiency (EE) compared to the standard new home, and a similar proportion discussed the home's EE with the builder prior to making the purchasing decision (down in L-UG from 2018) – most customers who discussed the home's EE with the builder expressed satisfaction with the usefulness and amount of information provided (satisfaction is lower among those who did not discuss EE with a builder)
- Among factors that influence the purchasing decision, EE was still in the top 5 of mentions, but its prevalence varies by region – few considered certification as a factor in the purchasing decision
- Familiarity with home EE rating systems has moved very little over the last several years, with the majority of customers being unfamiliar or never having heard of most rating/certification systems (with the exception of Energy Star) – 1-in-5 customers indicate seeing some Energy Star advertising during the process

Overview of Natural Gas Appliances

ENBRIDGE

- Natural gas continues to lead as the fuel of choice for home and water heating across the entire franchise area
- The prevalence of natural gas appliances in new homes is quite similar across the franchise area, with the exception of natural gas dryers, which are much more popular in the L-UG area

	2004	2005	2006	2007	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
							L-UG							L-UG	L-EGD
Home Heating	97%	93%	96%	94%	93%	95%	93%	97%	97%	96%	97%	95%	95%	95%	94%
Water Heating	88%	92%	92%	85%	85%	87%	87%	88%	85%	88%	85%	86%	83%	85%	83%
Stoves/Cook tops	23%	23%	23%	24%	34%	35%	36%	36%	39%	46%	48%	53%	41%	50%*	40%
Clothes Dryers	20%	17%	17%	9%	11%	13%	15%	(--)	10%	16%	20%	17%	15%	22%*	7%
Fireplaces	51%	63%	63%	58%	49%	54%	59%	48%	55%	57%	60%	56%	51%	53%	62%
Barbecues	19%	22%	22%	19%	27%	23%	(--)	(--)	31%	28%	30%	28%	26%	26%	23%

(--) indicates no measurement

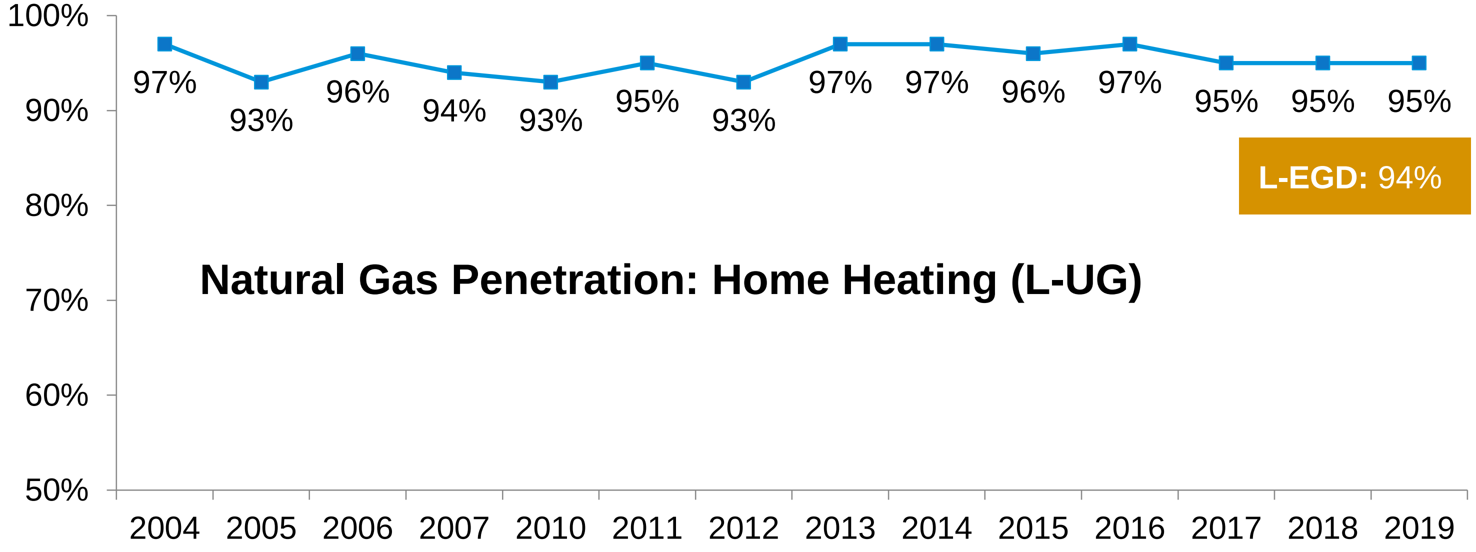
2011-2014 results for Outdoor BBQs restated on full population base size for consistent comparison.

*/*Indicates result is significantly higher/lower at a 95% confidence level compared to 2018 (for L-UG).

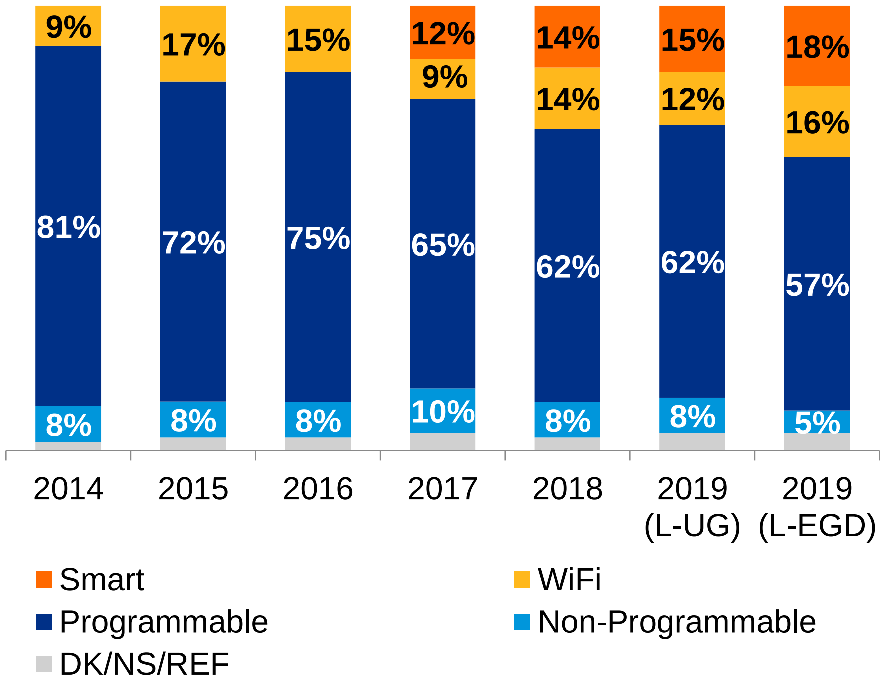
Home Heating: Gas Adoption & Equipment

ENBRIDGE

- Natural gas continues to be the choice for home heating – the remainder tend to heat with electricity (5%)
- Heating equipment continues to be predominately forced air (81% in L-UG and 79% in L-EGD) though it is noted that a sizable group of customers is not aware of the type of heating equipment in the home (11% in L-UG and 12% in L-EGD)
- Smart Thermostats are slightly more popular in the L-EGD franchise area (especially among younger and higher income customers)



Type of Thermostat



Q:What is the MAIN energy source for heating your home? Q: What type of natural gas furnace or heating system do you have? Is it a forced-air system, a hydronic system using a hot water radiator, a space heater, or a combination system where the water heater, rather than a furnace, heats your home? Q: Which of the following thermostats do you have?

Fireplace: Gas Adoption & Equipment

ENBRIDGE

- Just over 2-in-3 L-EGD customers have an indoor fireplace (69%), which is slightly more than L-UG (61%) – among them, the majority have just one – fireplaces are especially popular in Eastern L-EGD (77%) and South/West L-UG (67%)
- The majority have fireplaces that are natural gas (90% L-EGD, 86% L-UG), followed by electricity
- Almost 1-in-5 customers are likely (fairly/very/extremely) to install an indoor fireplace in the next 2 years (among them most would put in natural gas or electricity)

Do you have an indoor fireplace?	L-EGD	L-UG
Yes	69%	61%
… One	62%	51%
… Two or more	7%	10%
No	31%	39%

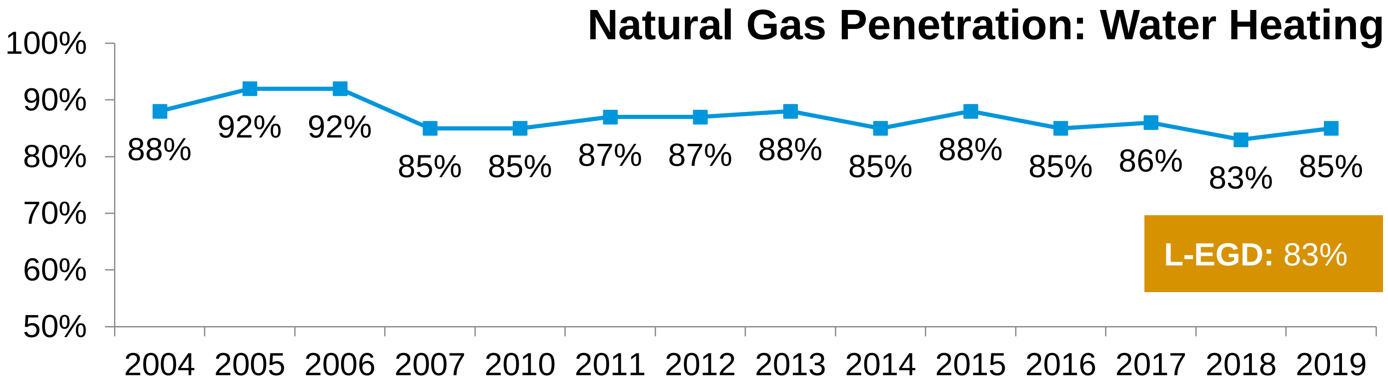
Any fueled by …	L-EGD	L-UG
Natural Gas	90%	86%
Electricity	10%	16%
Wood	1%	2%

Likely to install an indoor fireplace in the next 2 years (and what fuel)	L-EGD	L-UG
Extremely / Very / Fairly Likely	18%	17%
… Natural Gas	7%	11%
… Electric	10%	5%
… Other	1%	1%
Not very / Not at all Likely	82%	79%
Don’t Know	0%	3%

Q: Are there any indoor working fireplaces in your home? Q: How many indoor working fireplaces do you have in your home? Q: And which energy source does (FIREPLACE #) use? Q: How likely are you to install an indoor fireplace in your home in the next 2 years? Are you ... Q: And what type of fireplace are you most likely to install?

Water Heating: Gas Adoption & Equipment

- Natural gas continues to be popular for water heating – the remainder have electric water heaters (12% in L-UG and 14% in L-EGD) or something else – note that 8% (L-UG) and 6% (L-EGD) of all customers do not know the fuel type of their water heater
  - 35% of L-UG customers say that their builder offered them a choice of type of water heater (directionally up from 24% in 2018), while the same is only true for 14% of L-EGD customers
  - Proportion of tankless water heaters continues to grow to 48% among L-UG customers (up from 43% in 2018, 30% in 2017 and 15% in 2016) – the proportion is slightly lower among L-EGD customers at 41% - tankless water heaters are much more popular in Eastern Ontario
  - Ownership remains at 39% of L-UG customers (54% in Northern Ontario and 44% in South/West) and is much lower among L-EGD customers (21%)



Builder offered a choice between Natural Gas and Electricity …	L-EGD	L-UG
Yes	14%	35%
No	82%	60%
Don't Know	4%	5%
Type of Water Heater	**L-EGD**	**L-UG**
Tank	57%	50%
Tankless	41%	48%
Don't Know	1%	3%
Ownership of Water Heater	**L-EGD**	**L-UG**
Owned	21%	39%
Rented	77%	59%
Don't Know	3%	2%

Q: What type of water heater do you have? Is it ...? Q: Did the builder allow you to choose the fuel you would prefer your water heater to be powered by? Q: Does your water heater have a tank or is it tankless? Q: Is your water heater owned or rented?

Cooking: Gas Adoption & Equipment

ENBRIDGE

- The majority of customers have a stove, though some have cook top/counter ranges and separate built-in ovens (multiple combinations are possible) – most stoves are bought new by the customer (L-EGD and L-UG: 87%), while the remainder are included as part of the builder's incentives (L-EGD: 11% , L-UG: 6%)
- 64% of cooktops use natural gas, while 42% of stoves are fueled by natural gas (the remainder are fueled by electricity)
- Most customer purchased a new stove (L-EGD: 87%) – among those who had the stove included as part of the builder incentives just 9% paid extra for an upgrade

Do you have a …	L-EGD	L-UG
Stove	77%	80%
Cooktop / Counter top range	22%	19%
Separate built-in oven	11%	6%

Fueled by Natural Gas (%)	L-EGD	L-UG
Stove	38%	50%
Cooktop / Counter top range	48%	55%
Separate built-in oven	7%	4%

Stove was …	L-EGD	L-UG
Brought the OLD one	2%	6%
Purchased a NEW one	87%	87%
INCLUDED as part of the builder incentives	11%	6%

Q: Do you have a stove or do you have a cook top with a separate oven? Q: Is your stove / cooktop / counter range / separate built-in oven fueled by natural gas or electricity? Q: Did you bring your stove / cooktop / counter range / separate built-in oven from a previous home or did you purchase a new one when you moved? Q: Was the stove / cooktop / counter range / separate built-in oven included as part of the builder incentives or did you have to pay extra for an upgrade? Q: Assuming your stove / cooktop / counter range / separate built-in oven does not break down, how likely are you to replace it in the next 2 years? Are you...? Q: What type of stove / cooktop / counter range / separate built-in oven are you most likely to replace your current appliance with?

Dryer: Gas Adoption & Equipment

ENBRIDGE

- The majority of customers have a clothes dryer in their home (97%), which was most likely a newly purchased one (84%)
- Most are dryers are purchased new, and are fueled by electricity rather than natural gas, though natural gas dryers are much more prevalent in the legacy Union Gas franchise region (led by the South/West (28%) and Central (22%) region)

Do you have a clothes dryer?	L-EGD	L-UG
Yes	97%	97%
No	2%	3%
Don't Know	1%	0%

Fueled by …	L-EGD	L-UG
Natural Gas	7%	22%
Electricity	91%	77%
Don't Know	2%	1%

Dryer was …	L-EGD	L-UG
Brought the OLD one	7%	10%
Purchased a NEW one	84%	84%
INLCUDED as part of the builder incentives	8%	5%
Other	1%	1%

Q: Do you have a clothes dryer? Q: Is it a natural gas or an electric dryer? Q: Did you bring your dryer from a previous home or did you purchase a new one when you moved? Q: Was the **dryer** included as part of the builder incentives or did you have to pay extra for an upgrade? Q: Assuming your dryer does not break down, how likely are you to replace it in the next 2 years? Are you...? Q: What type of dryer are you most likely to replace your current dryer with?

Barbecue: Gas Adoption & Equipment

ENBRIDGE

- 3-in-5 customers have an outdoor barbeque (60%) in L-UG and slightly fewer in L-EGD – barbecues appear to be less popular in Central Ontario (L-UG: 49%), Central-East (L-EGD: 41%) and Toronto (L-EGD: 19%)
- The majority of barbeques use propane, followed by natural gas, and a distant third choice is charcoal

Do you have an outdoor barbecue?	L-EGD	L-UG
Yes	54%	60%
No	45%	40%
Don't Know	1%	0%

Fueled by …	L-EGD	L-UG
Propane	53%	52%
Natural Gas	42%	44%
Charcoal Briquettes	4%	3%
Electricity	0%	1%
Wood	0%	1%

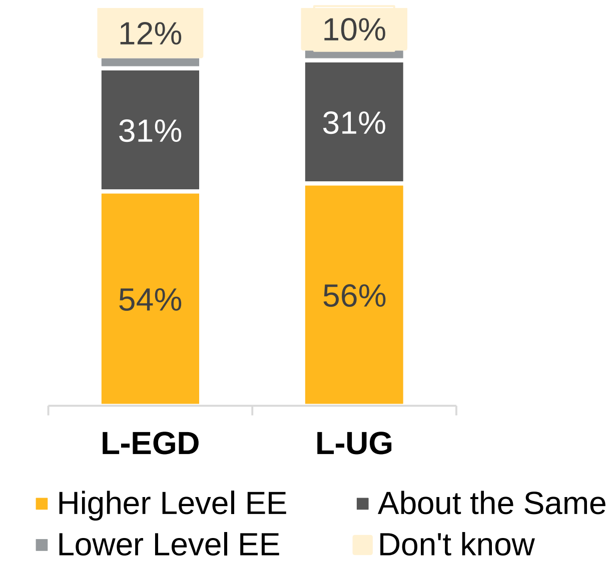
Q: Do you have an outdoor barbecue at your home? Please do not include barbecues at the cottage or those used only for camping. Q: And is this barbecue fueled by …?

Energy Efficiency (EE) of the New Home

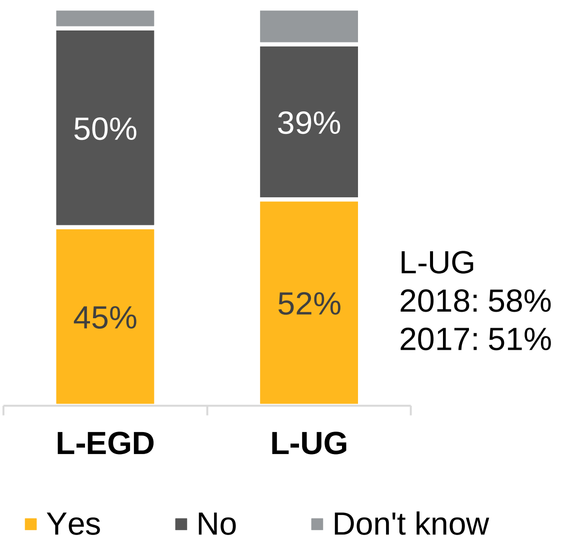
ENBRIDGE

- The majority of customers believe their new home is built at least to the same level of EE, if not higher, compared to a standard new home
- The belief that the home built to higher EE levels is significantly more prevalent among those who have a custom built home (68% say their house is built to a higher level of EE compared to just over half overall)
- Just over half of customers say that their builder discussed the home's EE prior to making the purchase decision – this continues to vary somewhat by region

Level of Home EE (compared to standard new house)

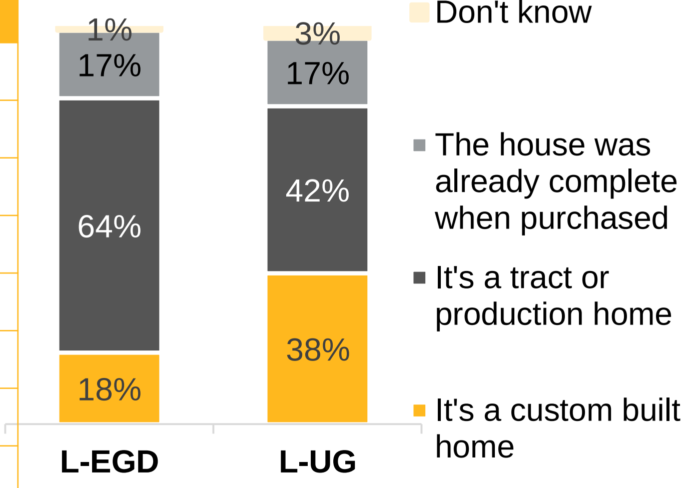


Builder discussed EE prior to making purchase decision



	Region	Yes (%)
L-EGD	Toronto	56%*
	Central-West	30%
	Central-East	39%
	Eastern	58%
	Niagara	32%
L-UG	Central	49%
	Eastern	59%
	Northern	58%*
	South/West	52%

Type of new built home



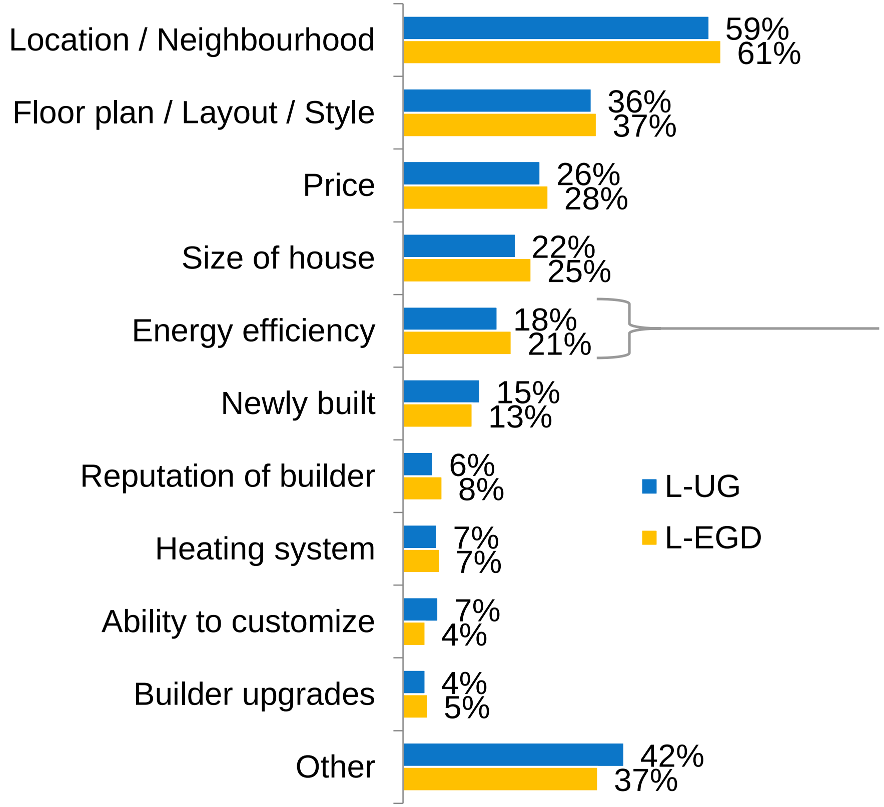
* indicates a low base size (n<30). Interpret results with caution.
Q: To the best of your knowledge is your new home built to a … ? Q: Prior to making your purchase decision, did the builder discuss the home´s energy efficiency with you? Q: Which of the following best describes your new home?

Factors in Home Purchase Decision

ENBRIDGE

- Location, floor plan (as well as size) and price continue to be top factors that influence the home purchase decision
- Just about 1-in-5 customers identified energy efficiency as one of the top factors in the purchase decision – similar to results in previous years (measured among L-UG customers)

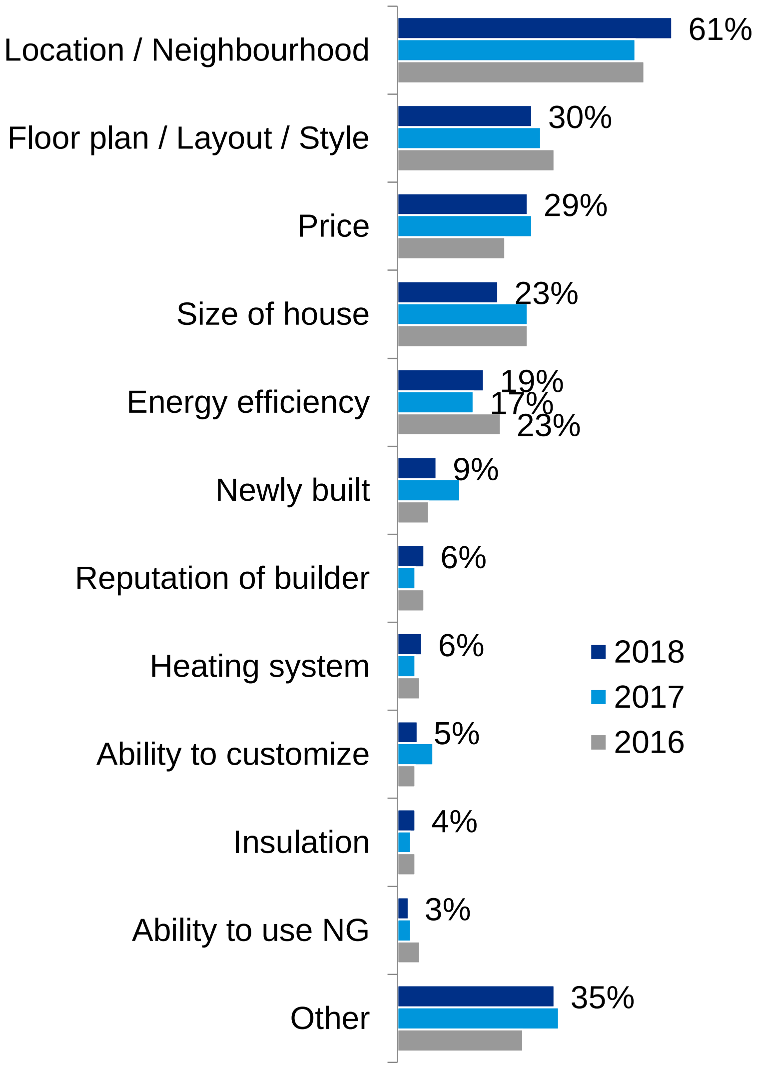
Factors Important in Choosing a New Home *(Unaided)*



	Region	Energy Efficiency
L-EGD	**Toronto**	19%*
	Central-West	19%
	Central-East	15%
	Eastern	23%
	Niagara	29%
L-UG	**Central**	15%
	Eastern	11%
	Northern	31%*
	South/West	21%

Certification by a designated program (ENERGY STAR, Built Green, Energuide)
L-UG: 2%
L-EGD: 3%

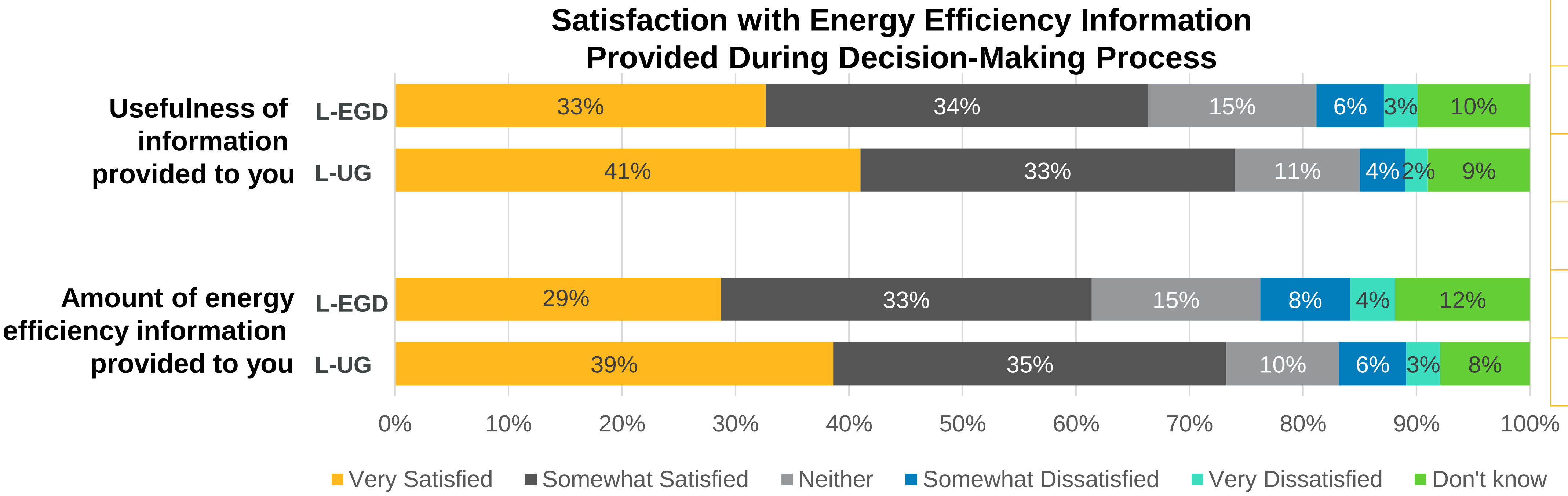
Historical L-UG results



* indicates a low base size (n<30). Interpret results with caution.
Q: Please tell me what factors were important when you chose your new home?

Home Energy Efficiency: Satisfaction with EE information provided

- Most customers indicate satisfaction with the usefulness and amount of energy efficiency provided during the decision-making process (though 1-in-10 indicate don't know)
- Satisfaction on these measures is stronger with L-UG customers, and also stronger among those who discussed energy efficiency with the builder



Total Satisfied (Top 2 Box %)	
Total	The builder discussed EE with you (Yes)
66%	85%
74%	92%
62%	82%
74%	92%

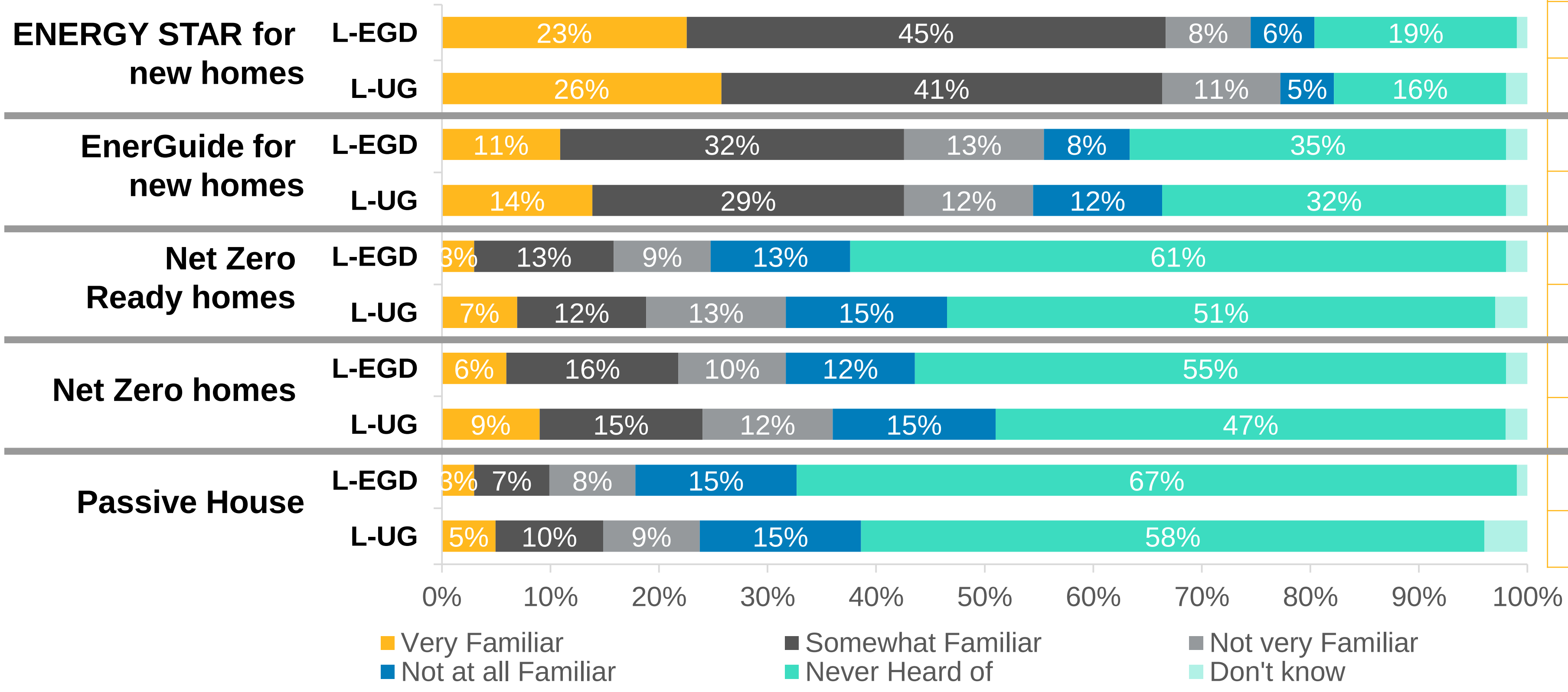
Q: Thinking about the energy efficiency information provided to you during the decision-making process, how satisfied were you with the following:

Familiarity with Energy Rating Systems

ENBRIDGE

- Customers tend to be aware of ENERGY STAR for new homes, but few are familiar, or even have heard of, other rating or certification systems
- More customers are aware of Net Zero Ready Homes in South/West Ontario (23% in L-UG) and Eastern (23% in L-EGD)

Familiarity with rating systems
(base: all new housing customers)



Top 2 box (Very + Somewhat)	Is your home certified? (base: all homes)
2019	2019
67%	33%
67% (72% in 2018)	32%
44%	20%
43% (46% in 2018)	17%
16%	2%
19%	4%
22%	2%
24% (23% in 2018)	5%
10%	2%
15%	4%

Q: How familiar would you say you are with the following … Q: Is your home certified or labelled by one the following …?

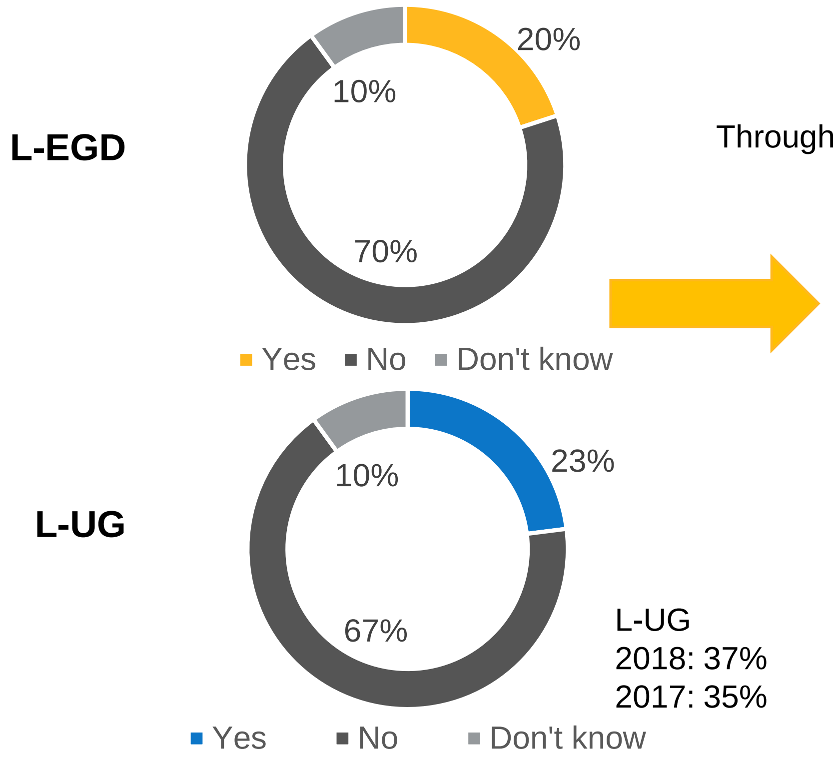
ENERGY STAR Advertising

ENBRIDGE

- About 1-in-5 New Housing customers saw some type of ENERGY STAR advertising during the home purchasing process although not necessarily about the whole home ENERGY STAR rating. Customers remember seeing information about appliances, windows and doors (through pamphlets and stickers), for example.
- L-EGD customers are much more likely to have seen advertising through the home builder / information at show / model home compared to L-UG customers

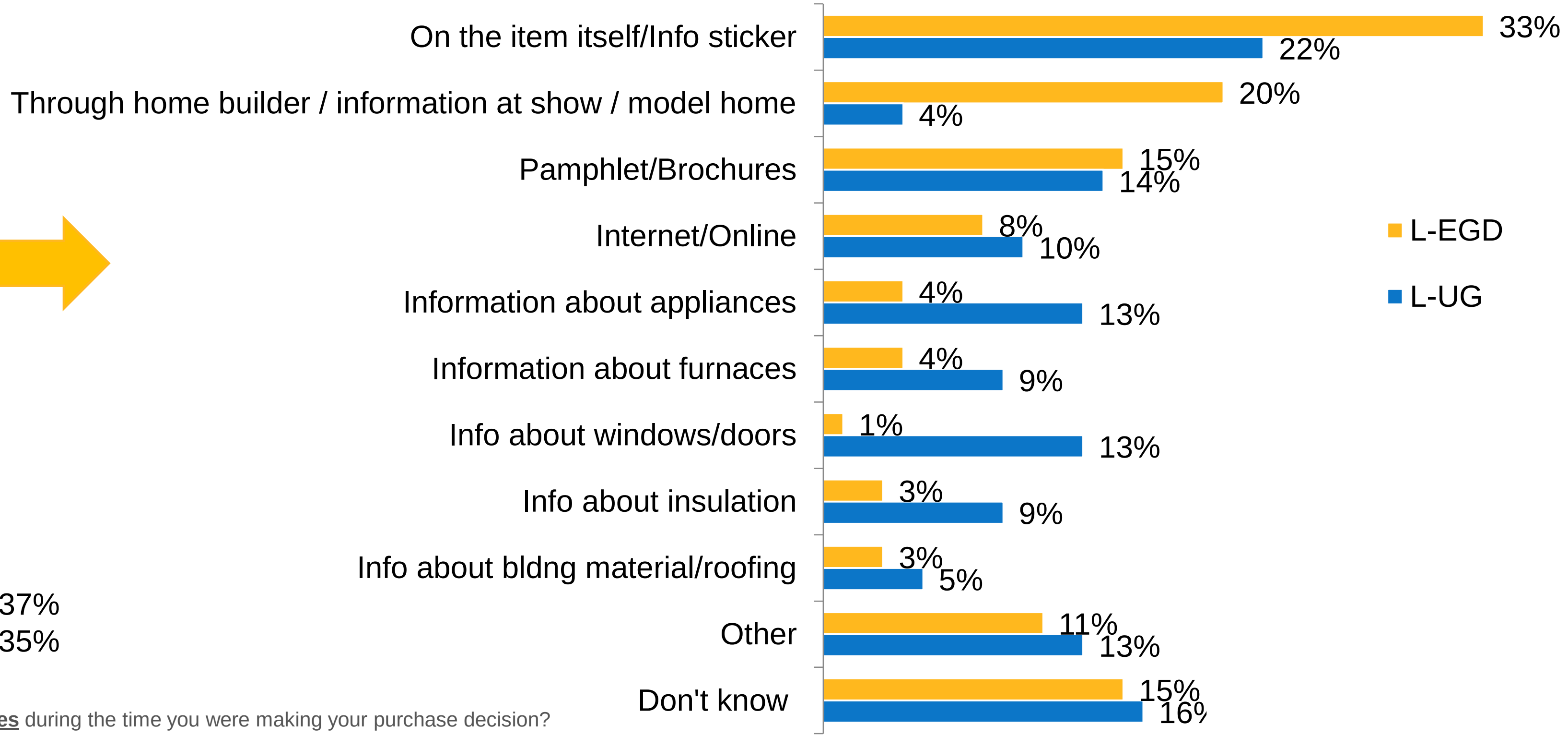
See any ENERGY STAR advertising for new homes

(base: all customers)



Recall of type of material

(base: all customers who saw advertising)



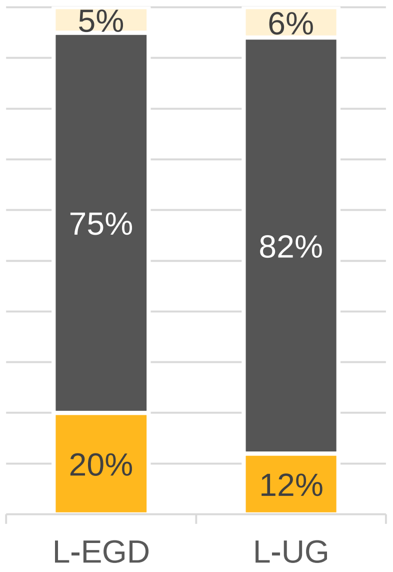
Q: Did you see any advertising material related to Energy Star **for new homes** during the time you were making your purchase decision?
Q: Can you recall what type of material you saw?

Home Energy Efficiency: Future Intentions

ENBRIDGE

- A proportion of customers (L-EGD: 20%, L-UG: 12%) intend to make their new home more energy efficient in the next 2 years
- This proportion is slightly higher among customers with homes that were already complete when purchased (27% in L-EGD and 13% in L-UG) and tract/production homes (20% in L-EGD and L-UG), which are more predominant in Central Ontario (where customers are also more likely to plan upgrades at 20% L-UG)
- Age is also an important factor – younger customers are more likely to plan to make their homes more energy efficient than older customers

Plans to make home more energy efficient in the next 2 years



L-UG
2018: 16%
2017: 14%

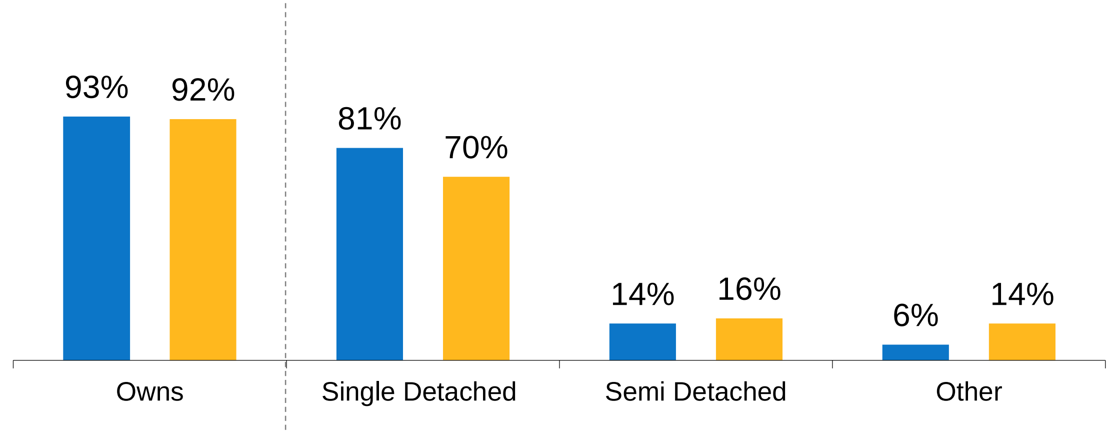
Age Group	L-EGD Yes %	L-UG Yes%
18 – 34	30%	19%
35 – 54	25%	20%
55 – 64	13%	1%
65+	4%	3%

	Region	Yes %
L-EGD	**Toronto**	50%*
	Central-West	22%
	Central-East	24%
	Eastern	16%
	Niagara	11%
L-UG	**Central**	20%
	Eastern	11%
	Northern	15%
	South/West	10%

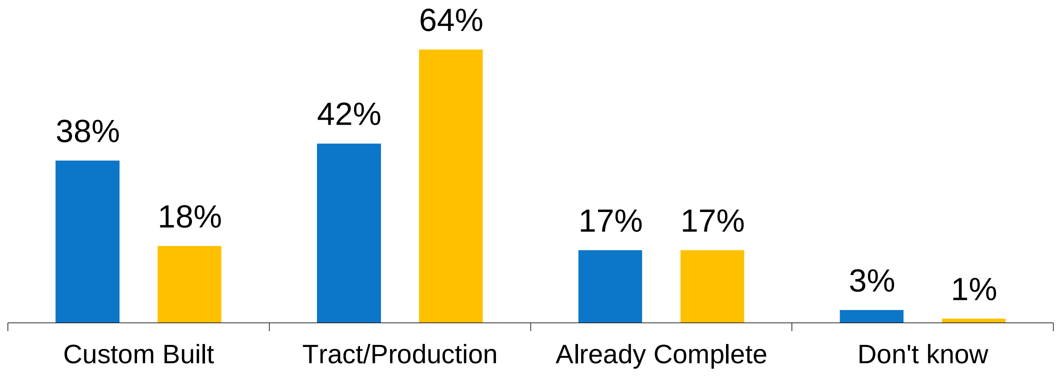
* indicates a low base size (n<30). Interpret results with caution.
Q: Do you have any plans to make your home more energy efficient within the next two years?

Demographics: House Characteristics

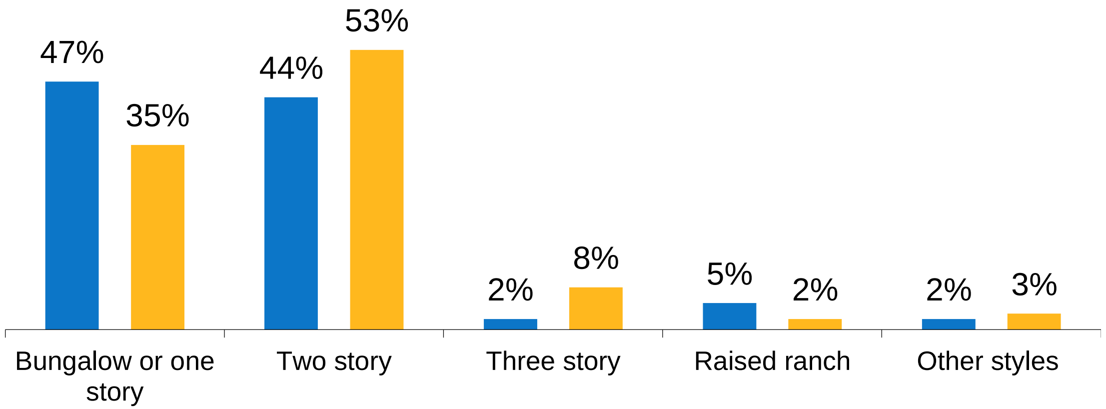
Home Ownership **Type of Home**



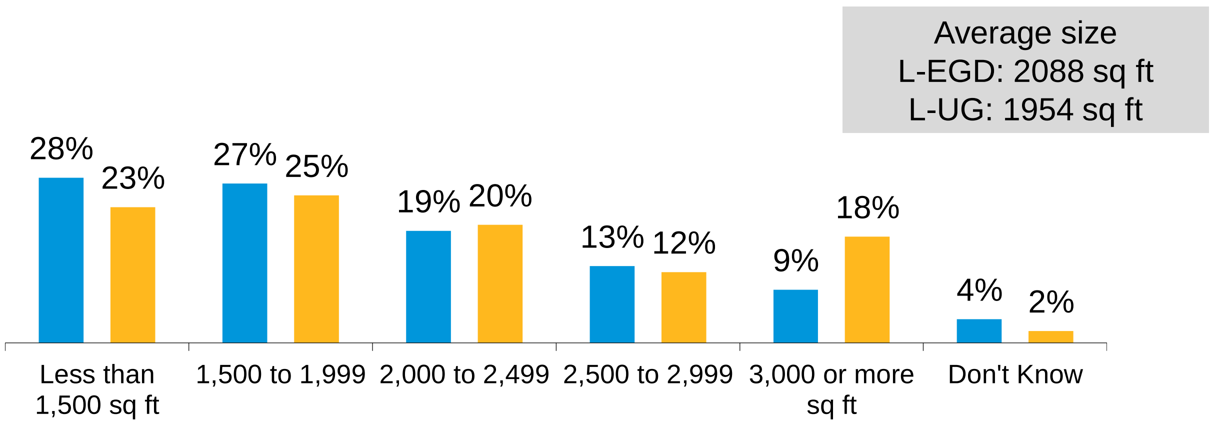
Type of Construction



Style of Home



Size of Home



L-UG L-EGD

Demographics: Customer Characteristics

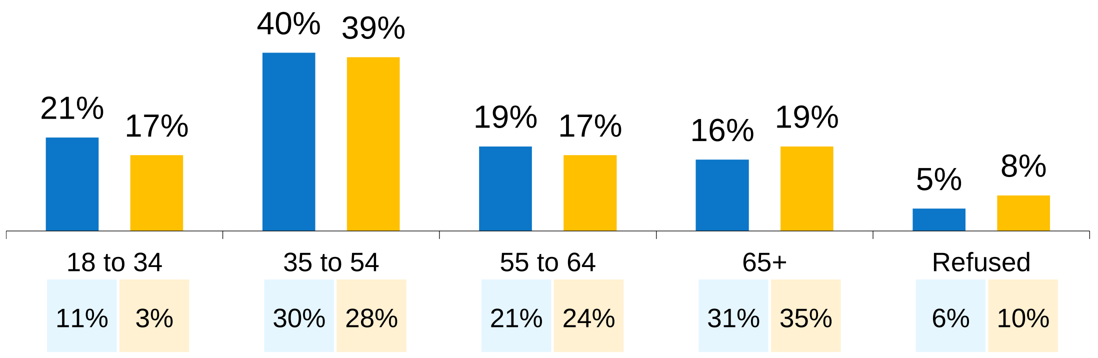
ENBRIDGE

■ L-UG ■ L-EGD

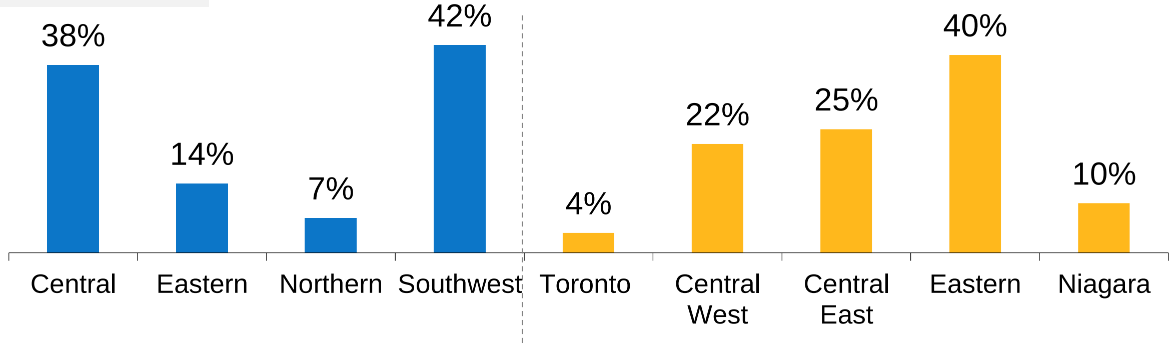
Compared to Single Family Population:

□ L-UG □ L-EGD

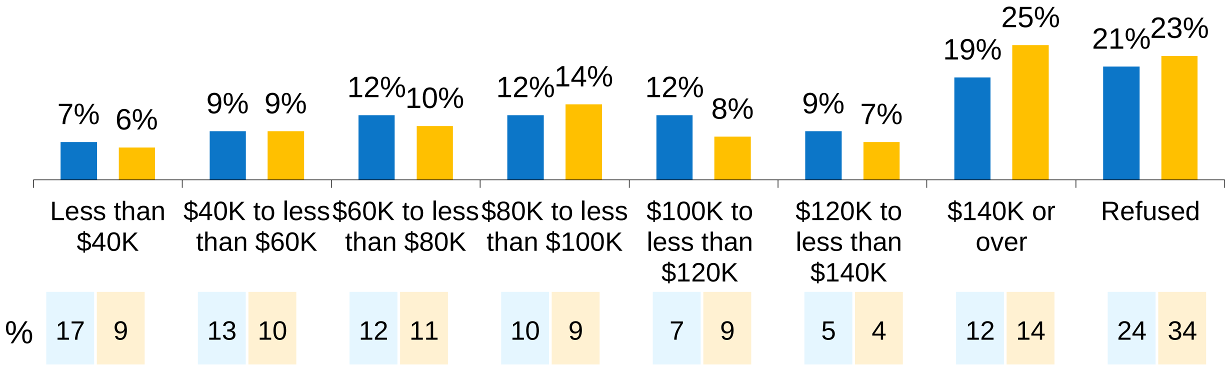
Age



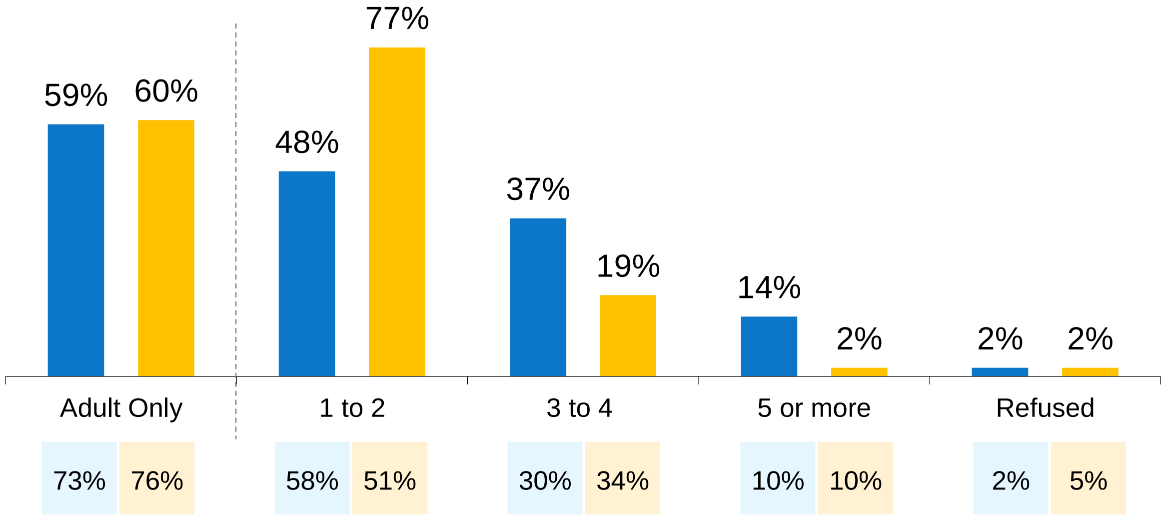
Region



Household Income



Household Size



ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 1, p.18

Question(s):

Please confirm that the study assumes no end of use equipment is replaced prior to the end of its expected useful life.

Response:

The following response was provided by Posterity Group:

The model includes assumptions for an "effective useful life" (EUL) for equipment serving each end-use and limits the rate of equipment replacement based on this effective useful life assumption. Effective useful life is an estimate for how long the equipment stays in place on average. For example, if EUL is 10 years, that means the model assumes 1/10 of the equipment turns over per year. In reality, for equipment with an EUL of 10 years, some equipment will turn over before 10 years, some after, but the average is 10 years.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 1, p.19

Question(s):

Please explain how fuel switching was modelled while assuming zero cross price elasticity.

Response:

The following response was provided by Posterity Group:

For the ETSA scenarios, “own-price” elasticity - how demand changes in response to changes in price of that good only - was used to model price-driven fuel switching.

In addition, policy-driven fuel switching was also modelled separately from price-driven fuel switching.

The following simplifying assumptions were made for the ETSA scenarios:

- Price elasticities will not vary by year; the same value will be used throughout the study period
- Price elasticities vary by sector, but not by region, segment, rate class, end use, etc.
- The same price elasticity value will be applied to changes in commodity price and carbon price.
- Cross-price elasticity was not considered.

Price elasticity is represented numerically and calculated as the percent change in quantity demand divided by the percent change in price. The following table provides price elasticity values used for each sector.

	Residential	Commercial	Industrial
Long Run Price Elasticity Value	-0.380	-0.350	-0.700

These values are from the long-run elasticity values for natural gas by sector provided by The State of Washington's Department of Commerce Carbon Tax Assessment Model.[1] The source notes that these values are "the product of an extensive literature search of fuel and sector specific price elasticity of demand values."

The model also constrains price-driven fuel switching to reflect several realities including:

- Equipment lifetimes, such that fuel switching only occurs when equipment reaches end of life
- Assumptions for which end uses can fuel switch, as some cannot for technical reasons
- End uses with very high or very low gas fuel shares are less sensitive to fuel switching than end-uses that have more equal gas and electricity fuel shares. The corresponding assumption is that end-uses that have more equal gas and electricity fuel shares have fewer technical barriers to additional fuel switching.

Posterity Group has not made an assumption for cross-price elasticity between gas and electricity. The estimation of a cross-price elasticity value at the sector level is not well-supported by the existing literature. Use of cross-price elasticity would also require additional assumptions for future marginal electricity prices for customers in various segments over the scenario period. In our view, incorporating these additional assumptions and adding consideration of cross-price elasticity between gas and electricity in the price-driven fuel switching modelling would increase the complexity of the modelling without meaningfully improving usefulness of the scenario results.

[1] Washington State Department of Commerce, "Carbon Tax Assessment Model," 2017. [Online]. Available: https://www.commerce.wa.gov/growing-the-economy/energy/washington-state-energy-office/carbon-tax/ [Last Accessed February, 2023]

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 1, p.22

Question(s):

Please provide a table that shows:

a) All critical drivers that were proposed by Enbridge but not ultimately accepted by Posterity Group;

b) All critical drivers that were proposed by Enbridge and ultimately tested in the model;

c) All critical drivers that were proposed by Posterity Group but not ultimately accepted by Enbridge; and

d) All critical drivers that were proposed by Posterity Group and ultimately tested in the model.

Response:

The following response was provided by Posterity Group:

a-d) Posterity Group and Enbridge Gas jointly reviewed a long list of critical drivers and worked together to agree on a short list based on the two criteria stated in Exhibit 1, Tab 10, Schedule 5, Attachment 1, page 22:

> The criteria for a variable to be included as a CD for the project were:
>
> A. It was thought the variable would have a material impact on Enbridge Gas annual volume, peak hour and day, and/or GHG emissions in the next 20 years.
>
> B. There was sufficient data available to predict what the variable could be in the next 20 years.

In addition to the final list of critical drivers presented in Exhibit 1, Tab 10, Schedule 5, Attachment 1, pages 22-26, we discussed and jointly agreed to exclude the following (please also see Exhibit 1, Tab 10, Schedule 5, Attachment 1, page 27):

- Changing Customer Behaviour (We agreed changing customer attitudes will be reflected via non-price driven fuel switching, as there is a link between people's attitudes and government policy)

- Gas Quality (This item was listed as a potential critical driver because different natural gas sources have different energy contents which can affect volume through Enbridge's system; impact was expected to be small on system-wide m^3 forecast)

- Clean Fuel Standards (We agreed impacts of the CFS would be captured within the Steady Progress and Electricity Centric Scenarios, where CFR credit prices would encourage Renewable Natural Gas (RNG) and hydrogen delivery. In the Diversified Scenario low-carbon fuel delivery is driven by policy)

- DSM Savings Potential (We determined this was not a CD, and instead defined DSM Budget as a CD. DSM Budget was specified in the scenarios and the associated energy savings potential was included in the scenario results)

- Delivery Charges (There was insufficient data available to develop a forecast range and we determined it was too difficult to estimate)

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 1, p.22

Question(s):

Please provide, for each critical driver, the input assumptions proposed by each of Enbridge and the Posterity Group, and the ultimate input assumption used.

Response:

The following response was provided by Posterity Group:

Posterity Group and Enbridge worked together to develop input assumptions for each of the critical drivers. Details on each input assumption, for each critical driver, for each scenario are presented on Exhibit 1, Tab 10, Schedule 5, Attachment 1, pages 42 to 45.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 1, p.23

Question(s):

Please provide the full email thread that contains the email “OBPS & EPS Stringency Factors” dated November 10, 2020.

Response:

The following response was provided by Posterity Group:

Please see the following document, provided as Attachment 1.

From:	Sophear Net
To:	Jennifer Murphy; Alexandra Burke; Cora Carriveau
Subject:	RE: OBPS & EPS Stringency Factors
Date:	Tuesday, November 10, 2020 10:03:00 AM
Attachments:	image001.jpg image003.jpg

OK thanks everyone, if I am understanding correctly, Jenn – you are saying we should apply these assumptions below on carbon pricing for the contract market:

1 – EPS to replace OBPS by 2021
2a – Apply 30% FCPP charges to majority of OBPS customers with 2 segment exceptions
2b – Apply 20% FCPP charges to Greenhouse contract customers
2c – Apply 10% FCPP charges to Power Producers

Thanks,

Sophear Net, P. Eng., MBA, CEM
Specialist BD Carbon
CELL: 519-350-6401
EMAIL: sophear.net@enbridge.com

From: Jennifer Murphy <Jennifer.Murphy@enbridge.com>
Sent: Tuesday, November 10, 2020 9:48 AM
To: Alexandra Burke <Alexandra.Burke@enbridge.com>; Sophear Net <Sophear.Net@enbridge.com>; Cora Carriveau <Cora.Carriveau@enbridge.com>
Subject: RE: OBPS & EPS Stringency Factors

Thanks Alex. This is helpful…and triggering my memory! For power generation it's a declining OBS, not the stringency factor I was thinking of!

For ETSA purposes, I think we should assume that EPS will be in place 2021 onwards. It's difficult to determine how much entities will pay under EPS, but it should be less than OBPS in theory. If we are applying a carbon price to these OBPS customers, I'd suggest 10% of the federal carbon charge.

From: Alexandra Burke <Alexandra.Burke@enbridge.com>
Sent: Monday, November 9, 2020 5:13 PM
To: Jennifer Murphy <Jennifer.Murphy@enbridge.com>; Sophear Net <Sophear.Net@enbridge.com>; Cora Carriveau <Cora.Carriveau@enbridge.com>
Subject: OBPS & EPS Stringency Factors

Hi team,

Here are my findings from the OBPS and EPS regulations on the stringency factors.

OBPS

The stringency factors do not decline over time and are set at 80% for transmission of natural gas and existing electricity generation using gaseous fuels. This 80% GHG emissions reduction factor is what was used to calculate the OBS for these industrial activities (0.393 tCO2e/MWh for transmission of natural gas and 370 tCO2e/GWh for electricity generation from gaseous fuels).

One caveat is if a covered facility begins generating electricity using gaseous fuel on or after January 1, 2021 and meets the following criteria (a) the electricity is generated from gaseous fuel by equipment that is designed to operate at a thermal energy to electricity ratio of less than 0.9; and (b) the covered facility has an electricity generation capacity equal to or greater than 50 MW from that equipment. The stringency factor for this type of industrial activity will decline, with the OBS starting at 370 tCO2e/unit of measurement for the 2021 compliance period, declining to **0 tCO2e/unit of measurement** for the 2030 compliance period and subsequent compliance periods.

New Electricity Generation using Gaseous Fuel – Decreasing OBS

Compliance Year	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
tCO2e/units of measurement	370	329	288	247	206	164	123	82	41	0

EPS

Under the EPS, the stringency factors are separated by fixed process emissions and non-fixed process emissions. As defined in the regulation, “Fixed process emissions are generally the result of chemical or physical reactions (that are not related to combustion). Non-fixed process emissions include combustion, fugitive and on-site mobile sources.”

For fixed process emissions, the stringency factors do not change over time.

For the non-fixed process emissions, the stringency factors do decline for most activities but not electricity generation. For electricity generation the performance standard is set at 470 tCO2e/GWh and does not change. There doesn’t seem to be anything further about declining stringency for new electricity generation facilities like under the OBPS.

Hopefully this helps. Let me know if you have any questions or need any other information.

Thanks,
Alex

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 1, p.26, 86

Question(s):

Please advise the basis of the 11% of reference case RNG assumption and the 14% of reference case hydrogen assumption.

Response:

The following response was provided by Posterity Group:

These upper bound assumptions for the RNG and Hydrogen critical drivers are expressed as a percentage of reference case demand. The pace and scale of RNG and hydrogen supply development and availability is assumed as a response to demand creation. These upper bound assumptions were provided by Enbridge Gas.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 1, p.42

Question(s):

Please explain why the reference case assumptions with respect to customer accounts were used in all scenarios. Please confirm that, in an electrification scenario, it is reasonable to assume that the number of customer accounts will go down over time.

Response:

The following response was provided by Posterity Group:

The customer accounts critical driver assumptions were only used as a starting point to determine scenario impacts on the number of customer accounts.

The Reference Case assumptions for customer accounts was held constant, as a starting point, across each scenario. Then, additional adjustments were made via the non-price driven fuel switching driver. For example, account connection assumptions for new construction were adjusted (and decoupling assumptions for existing buildings were applied) via the non-price driven fuel switching driver. Please see Exhibit 1, Tab 10, Schedule 5, Attachment 1, page 43 for non-price driven fuel switching assumptions that impact accounts for the Diversified Portfolio and Electricity Centric scenarios.

We confirm that, in an electrification scenario, it is reasonable to assume that the number of customer accounts will go down over time. Customer accounts decrease in the Electricity Centric scenario, as reflected in this scenario per details on Exhibit 1, Tab 10, Schedule 5, Attachment 1, page 43.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 1, p.44

Question(s):

Please describe the hydrogen equipment barriers referred to in detail.

Response:

The following response was provided by Posterity Group:

Details on these barriers were not defined in our research. The text included in the report is an acknowledgement that barriers (which could include technology, price, and other market barriers) would need to be overcome.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 1, p.63

Question(s):

Please confirm that, in the Diversified Scenario in 2038:

a) It is assumed that the 40% natural gas,39% hydrogen,10% RNG and 12% natural gas with CCS all use a common distribution infrastructure for delivery to customers. If not confirmed, please provide details of the incremental costs assumed for different distribution infrastructure.

b) It is assumed that end of use equipment does not have to be replaced to deal with the new fuel mix

Response:

The following response was provided by Posterity Group:

a) We confirm that the Diversified Scenario assumed the distribution of natural gas, hydrogen, RNG and natural gas with CCS using Enbridge Gas's infrastructure. Please see Exhibit 1, Tab 10, Schedule 5, Attachment 1, pages 113-114 for details on input assumptions for hydrogen demand across each sector, and what percentage of customers in each sector would receive higher hydrogen blends vs. lower blends. These assumptions were used to develop total hydrogen estimates for the residential, commercial, and industrial sectors. Determining system change requirements or developing cost of estimates for changes to distribution system infrastructure was not part of the study scope.

b) This scenario assumes customers install hydrogen-ready equipment when equipment reaches its effective useful life.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 1, p.81

Question(s):

Please explain in more detail the difference between the Enbridge forecasting system and the base year data, and the adjustment used in the Posterity Group model to fix it.

Response:

The following response was provided by Posterity Group:

Enbridge Gas's Business Intelligence (BI) group and Economic Evaluation and Forecast group segment customer data slightly differently. We calibrated base year data to match weather-normalized actuals at the same level of granularity (segment-rate class level) that the BI Group maps the utility's customers. We then applied growth rates from the Demand Forecasting group to the BI group's segment-rate class segmentation structure. This resulted in very minor differences in total system forecast compared to the Demand Forecasting group's total forecast.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 1, p.89, 93

Question(s):

Please explain the basis for the assumption that the contract classes of customers will have "relatively constant consumption 2021-2030", and will continue that constant consumption until 2038.

Response:

The following response was provided by Posterity Group:

This assumption is consistent with Enbridge Gas's forecasting assumptions (at the time we were completing our analysis).

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 1, p.94

Question(s):

Please confirm that the gas volume forecast in Exhibit 83 is the same as the forecast filed in the Application. If not confirmed, please identify and explain all differences.

Response:

The following response was provided by Posterity Group:

Exhibit 83 is not a gas volume forecast, rather they are input assumptions provided by Enbridge Gas to develop the volume forecast. The volume forecast developed using these input assumptions was Enbridge Gas's most current forecast at the time the Reference Case was developed (2020).

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 2, p.1

Question(s):

Please confirm that this study assumes no future technology innovations that will affect the pathways studied. If not confirmed, please provide details of which innovations were assumed, and how they were taken into account.

Response:

The following response was provided by Guidehouse Canada Ltd.:

The Pathways to Net Zero Emissions for Ontario Study considered two scenarios that can achieve net-zero emissions. Both of the scenarios assume that future technology innovations and commercialization will occur between now and 2050. The study assumes that the following technologies – several of which have been demonstrated in commercial applications – will be introduced in Ontario.

- **E-Kerosene for aviation**. E-kerosene, also referred to as synthetic kerosene, is a sustainable aviation fuel produced from carbon dioxide, water and renewable electricity. Both scenarios in the study assumed that the aviation sector will begin adoption of e-kerosene prior to 2030.

- **Ammonia used in shipping**. Specialized internal combustion engines that can be fueled by ammonia are currently being developed and are expected to come to market for marine shipping applications in 2024. The study assumed in the Diversified scenario that the marine shipping sector will begin shifting to ammonia fuels prior to 2030.

- **Hydrogen-powered trains**. The study assumed in the Diversified scenario that a portion of rail transport will be powered by hydrogen. Hydrogen-powered trains are currently operating in Germany, and the study assumed that hydrogen-powered trains will be introduced in Ontario prior to 2030.

- **Point-source carbon capture in industry.** The study assumed that a portion of industrial process heat will be fueled by natural gas paired with on-site carbon capture for sequestration. The study assumed that deployment of industrial carbon capture will begin after 2030 and will increase to encompass all remaining industrial natural gas combustion by 2050.

- **Hydrogen-powered gas heat pumps**. The study assumed that space heating and water heating service in a portion of buildings will be served by hydrogen-fired gas heat pumps consuming 100% hydrogen fuel. Several models of natural gas-fired gas heat pumps are available today, and gas heat pump manufacturers have indicated that hydrogen-ready models of gas heat pump are in development.

- **Hydrogen-fired furnaces and boilers in buildings.** The study assumed that a portion of buildings will be heated by 100% hydrogen consumed by hydrogen-fired boilers or furnaces. The study assumed that some buildings would begin accepting 100% hydrogen service before 2040. Hydrogen boilers are currently available for industrial applications, and commercial- and residential-scale hydrogen-fired boilers are currently in the commercialization stage.

- **Hydrogen fuel cells in transportation**. The study assumed that in the Diversified scenario, hydrogen fuel cells will be used to power a portion of energy demand for buses and trucking and some niche light-duty vehicle applications. Trucks and buses powered by fuel cells are available today, and the study assumed that Ontario will begin adopting hydrogen in transport applications prior to 2030.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 2, p.1

Question(s):

Please provide details of how, if at all, the cost of stranded assets was taken into account in this study.

Response:

The following response was provided by Guidehouse Canada Ltd.:

The *Pathways to Net Zero Emissions for Ontario* study does not account for the cost of stranded assets. As noted on page 44 of the study, the cost analysis in the study does not include the costs of decommissioning portions of the gas network. The study also did not include stranded asset costs that could result from early replacement of appliances, equipment, or vehicles.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 2, p.5

Question(s):

Please confirm that the total energy system cost in Figure ES-2 assumes that gas customers continue to bear the full cost of the natural gas distribution system in the electrification scenario. Please provide a full breakdown of the figures of $765 and $945 in that figure.

Response:

The following response was provided by Guidehouse Canada Ltd.:

The callout box on page 44 of the *Pathways to Net Zero Emissions for Ontario* Report describes the scope of energy system costs presented in Figure ES-2 of the report. The study describes total energy system costs and does not assign energy system costs to customer classes. Guidehouse does not take a position on how costs will be socialized across different customer classes.

Figure ES-2 scenario costs are broken down by cost category and by decade in Figure 18 of the *Pathways to Net Zero Emissions for Ontario* Report.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 2, p.21

Question(s):

Please provide a copy of the Low Carbon Pathways model and all explanatory guides or materials related to its use.

Response:

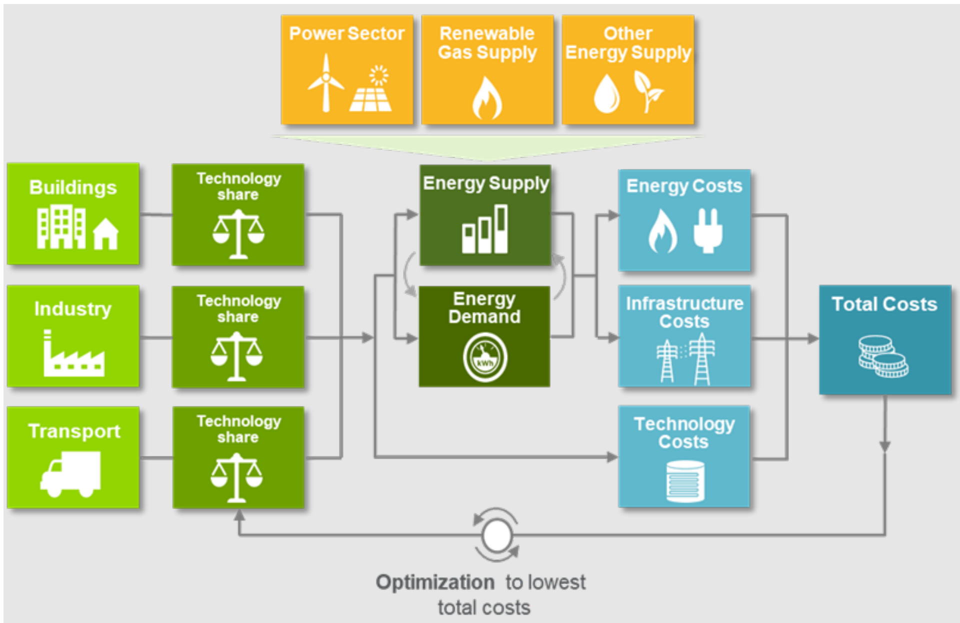
The following response was provided by Guidehouse Canada Ltd.:

The Low Carbon Pathways (LCP) model used in the *Pathways to Net Zero Emissions for Ontario* Study is a proprietary model developed by Guidehouse and is not available for commercial use. Therefore, Guidehouse declines to provide the model for review. The following information provides details on the structure and function of the LCP model.

Guidehouse's proprietary Low Carbon Pathways (LCP) model is an integrated capacity expansion and dispatch optimization model that allows users to identify the lowest cost, energy system pathway to a decarbonized future under different scenarios. The cost-optimization engine of the LCP model minimizes the net present value of the total system costs over the analyzed study time frame while considering various constraints at the energy system level (e.g., the buildout and availability of supply, the development of interconnections, etc.) as well operational constraints at the individual technology level (e.g., the operation of power generation plants, etc.)

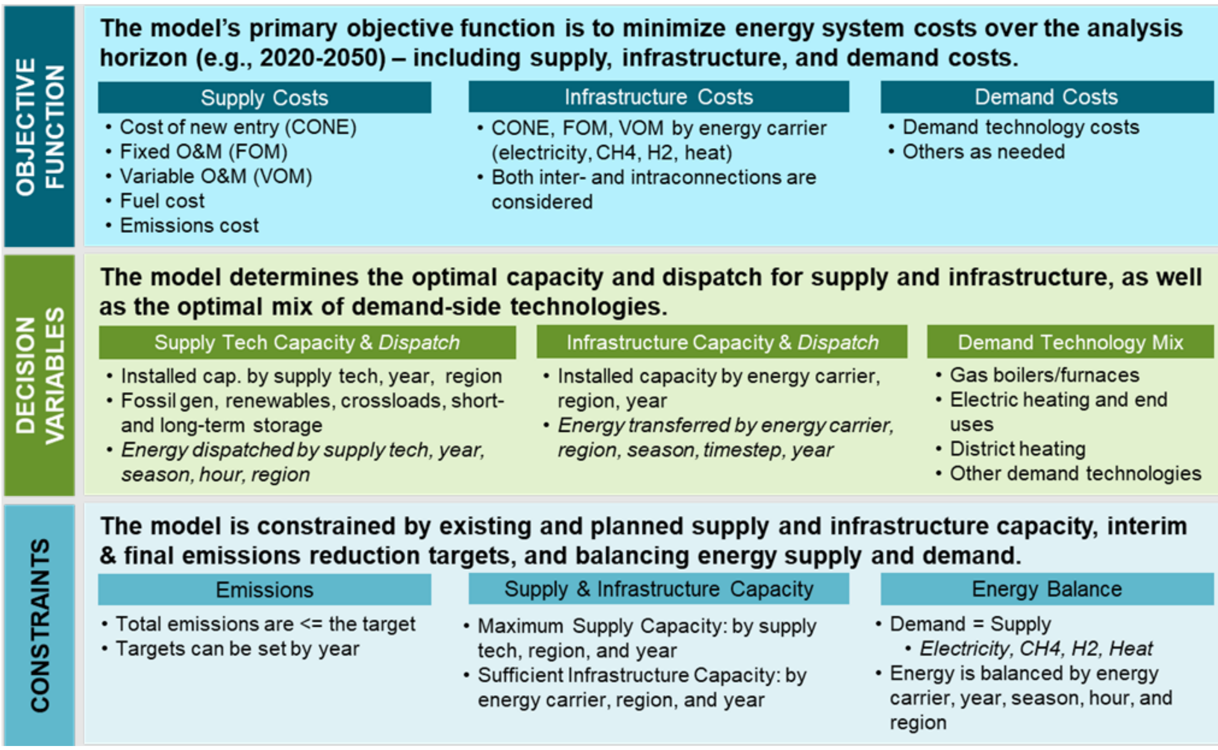
The LCP model uses optimization techniques to identify the technological and infrastructure changes needed to achieve carbon emissions reduction targets while balancing the entire energy system on an hourly basis across multiple geographies and energy carriers. LCP does this by making hundreds of thousands of decisions about how energy should be produced, transported, and stored while minimizing the total system cost. Figure 1 provides a schematic overview of the LCP model.

Figure 1 - Low Carbon Pathways Model Schematic



LCP stands out from similar models available in the energy industry due to several key features. First, LCP is able to choose both how much of a technology to deploy in a given year and how to dispatch that technology on an hourly basis within the same optimization. Second, LCP captures interactions between the energy sub-systems, such as interactions between the natural gas, electricity, and hydrogen systems. Third, LCP can be configured to make supply- and demand-side decisions in an integrated fashion within the same optimization. Figure 2 describes the objective function, decision variables, and constraints used in the model.

Figure 2 - LCP Model Objective Function, Decision Variables, and Constraints



Low Carbon Pathways Modeling Detail for the Pathways Study

In this *Pathways to Net Zero Emissions for Ontario* study, Guidehouse applied the LCP model to optimize the supply of electricity, hydrogen, and methane to meet demand in two net-zero 2050 scenarios. The following describe some of the major features of the LCP model as applied in this study:

- Capacity expansion and dispatch optimization: Optimization of generation, storage, and interconnections assets across the electricity and gas (methane and hydrogen) networks.
- Lowest-cost net zero pathway: Optimized pathways to achieve compliance with net-zero emissions targets.
- Intra-annual temporal resolution: Uses representative and peak days to reflect the seasonal variability of electricity and gas demand loads and supply resources.
- Geographical resolution: Simulates the Ontario energy system on a provincial scale and models energy import and export to neighbouring regions.

As an integrated energy system model, the cross-sector interactions between electricity, hydrogen, and methane are an integral part of the analysis (e.g., electrolyzers increase demand for electricity, hydrogen gas turbine usage increases hydrogen demand). The analysis also models the use of transmission interties between Ontario and neighbour regions (e.g., power lines and pipelines) and storage assets (e.g., gas and electricity storage) to balance supply and demand. The modeling methodology is based on a “copper plate” for the province, meaning the focus of the analysis is primarily on inter-connections (between the province and its neighbours) rather than intra-connections (i.e., network capacity within the province; although nominally allowed for in the energy system costs, it is not the focus of the modeling).

The LCP model uses a nodal network to model an interconnected energy system; each node has a unique energy supply and demand varying over time. All existing electricity and gas interties between regions are simulated in the model. The model allows for existing interties to be expanded or for new ones, where applicable, to be constructed and for the option to repurpose methane interties for hydrogen.

A description of the main configuration parameters of the LCP model and several other modeling considerations is presented in Figure C-1 of the *Pathways to Net Zero Emissions for Ontario* Report.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 2, p.30, 56

Question(s):

Please provide a comparison of the lifecycle cost of a geothermal heat pump system vs. a cold climate electric air source heat pump system plus the assumed deep energy efficiency retrofit. Please explain the assumptions used, and the reason that they were used in this study.

Response:

The following response was provided by Guidehouse Canada Ltd.:

The *Pathways to Net-Zero Emissions for Ontario* Study used a top-down approach and did not model the electric consumption or utility costs of individual buildings or individual heat pump systems. Instead, our approach estimated the total province-wide electric consumption of ASHPs and GSHPs that would result from the electrification of residential and commercial heating loads and from the adoption of heat pumps in new construction. A lifecycle cost calculation of individual heat pump systems would require an estimate of electric consumption for individual heat pump units and a forecast of future electric utility rates. This Study did not develop either of these forecasts, and a lifecycle cost calculation of geothermal and air-source heat pumps is not feasible using the assumptions and results developed in this Study.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 2, p.41-58

Question(s):

Please confirm that this study assumes that green hydrogen is used by the electricity system in the electrification scenario as a method of storage. Please provide details of how that use of hydrogen is modelled, including the calculations driven by that modelling.

Response:

The following response was provided by Guidehouse Canada Ltd.:

Guidehouse confirms that green hydrogen is used as an energy storage medium for the electricity system in both the Electrification scenario and the Diversified scenario. The analysis conducted for the *Pathways to Net Zero Emissions for Ontario* Study included forecasts of the expansion of electric generation capacity. These forecasts were developed to ensure that electric generation capacity is sufficient to meet demand during peak periods. During peak periods, electric demand will be met by a combination of intermittent generation resources (e.g., solar and wind power) and dispatchable resources (e.g., hydrogen-powered gas turbines). During peak periods, the available supply of hydrogen must be sufficient to power dispatchable generation resource and to meet other direct end use demand for hydrogen (e.g., from industrial and transportation uses). As illustrated in Figure 14 of the report, hydrogen-powered turbines account for a small amount of annual electricity production, but they play a crucial role in meeting electric demand in peak periods.

The amount of stored hydrogen was calculated and tracked as follows. The analysis assumed that, in periods when electricity demand is not peaking, the electricity generated in excess of end user electric demand would be used productively to charge battery storage and to generate hydrogen and store it for use during peak periods. The analysis calculated the difference between electric generation and electric demand on an hourly basis and assigned a portion of the excess electric generation to be used by electrolyzers for hydrogen production (taking electrolyzer efficiencies into account). The amount of stored hydrogen in a given hour is equal to the amount of stored hydrogen in the prior hour plus new hydrogen production in the given hour, minus hydrogen demand in the given hour.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 2, p.42

Question(s):

The Report states that: “CCS is fundamental in reducing GHG emissions from natural gas…The scale-up of CCS for blue hydrogen and natural gas use is required to reach net zero emissions in both scenarios.” Does Guidehouse agree that, without sufficient CCS capability, the Diversification Scenario that is not in this study demonstrated to be a preferred option?

Response:

The following response was provided by Guidehouse Canada Ltd.:

As quoted from the report, “The scale-up of CCS for blue hydrogen and natural gas use is required to reach net zero emissions in both scenarios.” In other words, neither the Electrification scenario nor the Diversified scenario can achieve a target of net-zero emissions by 2050 without the use of CCS. Without sufficient CCS capability, neither of the scenarios considered would be a viable option. Guidehouse does not take a position on which of the two scenarios would be closer to viability if CCS were not available.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 2, p.45-47

Question(s):

Please explain how customer costs to convert end of use equipment of all types from natural gas to new energy sources (e.g. hydrogen or electricity) are factored into these forecasts. Please provide the detailed calculations and underlying assumptions for this cost category.

Response:

The following response was provided by Guidehouse Canada Ltd.:

In the *Pathways to Net Zero Emissions for Ontario* Study, Guidehouse calculated the customer cost of converting residential space heating equipment based on a forecast of the installed heating system types per decade and estimates of the installation costs for different types of residential space heating equipment. Guidehouse did not model the costs of converting customer equipment for other end uses besides space heating (e.g., water heating, cooking, laundry, etc.).

The calculations of heating system conversion costs for both scenarios are detailed in Attachment 1. The following steps provide a narrative description of Guidehouse's estimate of space heating equipment conversion costs.

1) Forecast the count of existing and new-build households in Ontario through 2050.

- Reference the forecast number of households in Ontario through the year 2040 from IESO APO 2020 Figure 5.[1]
- Extrapolate the number of households through 2050 based on an observed linear trend in the IESO APO 2020 forecast.

[1] IESO APO 2020, Demand Forecast Module Data. Available at: https://www.ieso.ca/-/media/Files/IESO/Document-Library/planning-forecasts/apo/APO-Demand-Forecast-Module-Data.ashx.

- For each decade after 2020 (i.e., 2030, 2040, and 2050), determine the number of new build households in each decade by subtracting the prior decade's housing stock from the current housing stock.

2) Define changes in heating system saturation over time and define the assumed shares of heating system types in new construction households.

- As part of scenario definitions, define the share of households by heating system type in 2020, 2030, 2040, and 2050.
    - The system types defined in the analysis include: gas-fired furnaces, electric air-source heat pumps, electric ground-source heat pumps, a hybrid system that combines a gas furnace with an air-source heat pump, a gas-powered heat pump, or an "other" system (e.g., wood stove, propane furnace, or other type).
- As part of scenario definitions, estimate the portion of new construction dwellings that are built with different heating technologies.

3) Calculate the number of new-build heating systems and the number of heating system conversions for existing stock by decade.

- For each decade, multiply the forecast number of households by the defined heating system shares to determine the cumulative number of households by heating system type.
- For each heating system type in each decade after 2020 (i.e., 2030, 2040, 2050), calculate the number of new build households for each heating system type as the number of new build households multiplied by the assumed share of heating system types for new households.
- For each heating system type in each decade after 2020 (i.e., 2030, 2040, 2050), calculate the number of existing households converting to the heating system type as the number of households in the current decade minus the number of households in the prior decade, minus the number of new build households.

4) Estimate the per-unit cost of heating system installations over time.

- Heating system costs in 2020 are provided in Attachment 1 with citations to cost sources.
- Heat pump system costs are assumed to decline 5% by decade, due to technology improvement and an increase in installer familiarity with the equipment as system penetration increases

5) Calculate total installed cost of heating system installations. /u

- Multiply the total number of new systems and system conversions by the per-unit costs to estimate the total installation costs by heating system type for each scenario and decade. /u

6) Apply salvage factors to each decade's installed costs. /u

- The cost analysis in this study accounts for the portion of asset life that coincides with the study period (2020 to 2050). For assets with lifetimes that extend beyond the end of the study period, the installed cost of the asset is discounted according to the portion of the asset life that occurs before 2050. /u

- Individual salvage discount factors are calculated for each decade based on the assumed equipment lifetime, and the salvage factors are applied to the heating system cost in each decade. /u

Pathways to Net Zero Emissions for Ontario study
Estimate of end-user costs for residential heating system conversions and building envelope upgrades.
Diversified Scenario

Building stock changes over time, defined by scenario

Total Number of Households (IESO APO)	2020	2030	2040	2050
Households (#millions)	5.82	6.56	7.19	7.96
New Builds (#millions)	0.00	0.74	0.63	0.77

Space Heating	Percent of households per technology type 2020	2030	2040	2050
Gas HP (RNG or H2)	0%	6%	34%	55%
Electric ASHP	7%	13%	24%	30%
Electric GSHP	0%	4%	7%	10%
Hybrid	0%	0%	0%	0%
Other	11%	10%	7%	5%
Natural Gas Furnace	82%	68%	28%	0%
Total	100%	100%	100%	100%

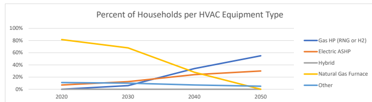
Percent of new builds per technology type	
Gas HP (RNG or H2)	40%
Electric ASHP	30%
Electric GSHP	30%
Hybrid	0%
Total	100%

Space Heating	Cumulative number of total households per technology type (millions) 2020	2030	2040	2050
Gas HP (RNG or H2)	0.00	0.39	2.44	4.38
Electric ASHP	0.41	0.82	1.73	2.39
Electric GSHP	0.00	0.23	0.50	0.80
Hybrid	0.00	0.00	0.00	0.00
Other	0.64	0.66	0.50	0.40
Natural Gas Furnace	4.75	4.46	2.01	0.00
Total	5.79	6.56	7.19	7.96

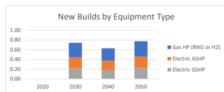
Space Heating	Incremental number of new households per technology type each year (millions) 2020	2030	2040	2050
Gas HP (RNG or H2)	0.00	0.30	0.25	0.31
Electric ASHP	0.00	0.22	0.19	0.23
Electric GSHP	0.00	0.22	0.19	0.23
Check	TRUE	TRUE	TRUE	TRUE

Equipment Conversion Pathways:
(Note that for Sensitivity 4, any starting category customer could get a hybrid HP)

NG Furnace (82%)	Get Electric HP
	Get Gas HP
Electric (7%)	No decarb action. About 1/3 of these homes have a heat pump, the remainder have baseboard heating or an electric furnace. These homes will have to upgrade their equipment to be consistent with >100% efficiency requiremnets, but that is outside the scope of this study.
Other (11%)	No decarb action - stay as other (5%)
	Get Electric HP
	Get Gas HP



New Home Assumptions:
80% of added GSHPs are installed in new construction homes, the rest are retrofitted into existing homes
Of the remaining new construction homes, 50% install an ASHP and 50% install a gas HP



Total cost of space heating technology

Space Heating	Incremental number of existing households switching to each technology type (million households) 2020	2030	2040	2050	Incremental number of new builds per technology type (million households) 2020	2030	2040	2050
Gas HP (RNG or H2)		0.09	1.80	1.62		0.30	0.25	0.31
Electric ASHP		0.19	0.72	0.43		0.22	0.19	0.23
Electric GSHP		0.01	0.09	0.06		0.22	0.19	0.23
Hybrid		0.00	0.00	0.00		0.00	0.00	0.00
Total		0.29	2.60	2.12		0.74	0.63	0.77

Costs (CAD$/unit)

	Existing Home	New Construction	Assumptions	Source
Cold Climate HP with electric resistance backup	$11,100	$11,100	Includes installatior	Pages 347-3
Hybrid Heating with Smart Controls	$11,350	$11,350	Includes installatior	Pages 347-3
Gas Heat Pump	$12,200	$12,200	Includes USD$8,0	Page 397, lin
Electric GSHP	$27,500	$24,655	3.4 ton heating cap	Dunsky report,

Year	Reduction in HP Cost
2030	5%
2040	10%
2050	15%

Assume the costs of all HPs come down 15% from 2020 to 2050 due to tech improvement over time and installer familiarity with the equipment as penetration increases.

Space Heating	Total cost (billion CAD$) 2020	2030	2040	2050
Gas HP (RNG or H2)		$4.56	$22.52	$20.08
Electric ASHP		$4.35	$9.05	$6.26
Electric GSHP		$5.40	$6.30	$6.30
Hybrid		$0.00	$0.00	$0.00
Total		$14.32	$37.86	$32.64

$USD	GSHP Cost (equip + install) [$/ton]	Source
New Construction	$ 9,521	*Massachusetts Clean Energy Center: Ground Source Heat*
Retrofit	$ 10,619	
Difference	112%	

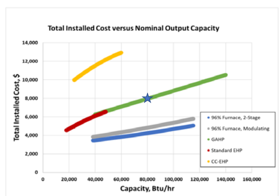
Real world installation cost data from MassCEC is used to estimate the proportional cost of installing GSHPs in existing vs. new construction.

Single Family Home

Table 4. Heat Pump Costs and Performance for Single Family Homes with Split-Central Forced Air Heating and Cooling Systems

Climate zone	Heat pump type	Nominal capacity (tons)	Upfront cost	Annual maintenance cost	Average seasonal COP	Minimum COP	Percentage of heating covered by the heat pump[15]
Toronto	ccASHP	2.3	11,500	91	2.8	1.3	92%
Toronto	GSHP	3.4	27,500	91	3.7	3.7	100%

Source: The Economic Value of Ground Source Heat Pumps for Building Sector Decarbonization (Dunsky, 2020)



Source: Page 397, link: https://www.rds.oeb.ca/CMWebDrawer/Record/732115/File/document

Retrofit Costs

Thousand CAD$	Building envelope upgrade cost per building (thousand CAD$) 2020	2030	2040	2050
Moderate Retrofit	13.3	12.1	11.1	10.1
Deep Retrofit	31.4	28.6	26.4	24.3

Source: ETM Model, Insulation, Table 11
(https://docs.energytransitionmodel.com/main/insulation)

	Existing Homes Retrofit Assumptions: Moderate Retrofit	Deep Retrofit
Electric ASHP	34%	66%
Electric GSHP	66%	0%

	Total cost (billion CAD$) 2020	2030	2040	2050
Moderate Retrofit		$0.84	$3.33	$1.91
Deep Retrofit		$3.56	$12.51	$6.91

Retrofit Assumptions
All existing homes switching to ASHPs receive a retrofit.
Homes built before 1995 require a deep retrofit
Homes built after 1995 require a moderate retrofit.
Older existing homes switching to GSHPs receive a retrofit
Homes built before 1995 switching to GSHPs receive a moderate retrofit
All other technologies do not require retrofits beyond current EE programs.
Assume no retrofits for new build households.

Shares (%)	2018
Before 1946	11.8
1946–1960	7.9
1961–1977	17.6
1978–1983	8.6
1984–1995	20.3
1996–2000	5.6
2001–2005	8.1
2006–2010	6.9
2011–2015	6.5
2016–2018	6.8

Source: Residential Sector Ontario Table 15: Housing Stock by Building Type and Vintage | Natural Resources Canada (rncan.gc.ca)

Total end user cost

	Total cost of Res. space heat conversion and retrofits (billion CAD$) 2020	2030	2040	2050
Equipment		$14.32	$37.86	$32.64
Retrofits		$4.40	$15.84	$8.82
Total		$18.72	$53.70	$41.45

	Lifetime	
Equipment	18	*Assumed t*
Retrofits	20	*Based on a*

SimYr	DiscountSalvage Equipment	Retrofits	
			/u
2020	1.00	1.00	/u
2030	1.00	1.00	/u
2040	0.61	0.55	/u
2050	0.06	0.05	/u

	Total cost of retrofits (billion CAD$) WITH SALVAGE 2020	2030	2040	2050	
					/u
Equipment		$14.32	$23.14	$1.81	/u
Retrofits		$4.40	$8.71	$0.44	/u
Total		$18.72	$31.85	$2.25	/u

Pathways to Net Zero Emissions for Ontario study
Estimate of end-user costs for residential heating system conversions and building envelope upgrades.
Electrification Scenario

Building stock changes over time, defined by scenario

Total Number of Households (IESO APO 2020, Figure 5 through 2040; extrapolated to 2050)	2020	2030	2040	2050
Households (#millions)	5.82	6.56	7.19	7.96
New Builds (#millions)	0.00	0.74	0.63	0.77

Space Heating	Percent of households per technology type 2020	2030	2040	2050
Gas HP (RNG or H2)	0%	4%	6%	10%
Electric ASHP	7%	14%	52%	75%
Electric GSHP	0%	4%	7%	10%
Hybrid	0%	0%	0%	0%
Other	11%	10%	8%	5%
Natural Gas Furnace	82%	68%	27%	0%
Total	100%	100%	100%	100%

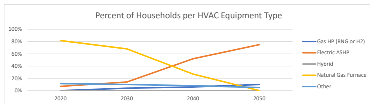
Percent of new builds per technology type	
Gas HP (RNG or H2)	10%
Electric ASHP	60%
Electric GSHP	30%
Hybrid	0%
Total	100%

Space Heating	Cumulative number of total households per technology type (millions) 2020	2030	2040	2050
Gas HP (RNG or H2)	0.00	0.26	0.43	0.80
Electric ASHP	0.40	0.92	3.74	5.97
Electric GSHP	0.00	0.23	0.50	0.80
Hybrid	0.00	0.00	0.00	0.00
Other	0.66	0.66	0.58	0.40
Natural Gas Furnace	4.75	4.46	1.94	0.00
Total	5.82	6.53	7.19	7.96

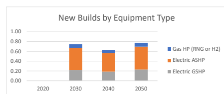
Space Heating	Incremental number of new households per technology type each year (millions) 2020	2030	2040	2050
Gas HP (RNG or H2)	0.00	0.08	0.06	0.08
Electric ASHP	0.00	0.45	0.38	0.47
Electric GSHP	0.00	0.22	0.19	0.23
Check	TRUE	TRUE	TRUE	TRUE

Equipment Conversion Pathways:
(Note that for Sensitivity 4, any starting category customer could get a hybrid HP)

NG Furnace (82%)	Get Electric HP
	Get Gas HP
Electric (7%)	No decarb action. About 1/3 of these homes have a heat pump, the remainder have baseboard heating or an electric furnace. These homes will have to upgrade their equipment to be consistent with >100% efficiency requiremnets, but that is outside the scope of this study.
Other (11%)	No decarb action - stay as other (5%)
	Get Electric HP
	Get Gas HP



New Home Assumptions:
80% of added GSHPs are installed in new construction homes, the rest are retrofitted into existing homes
Of the remaining new construction homes, most install an ASHP and the remainder install a gas HP



Total cost of space heating technology

Space Heating	Incremental number of existing households switching to each technology type (million households) 2020	2030	2040	2050	Incremental number of new builds per technology type (million households) 2020	2030	2040	2050
Gas HP (RNG or H2)		0.19	0.10	0.29		0.08	0.06	0.08
Electric ASHP		0.07	2.44	1.77		0.45	0.38	0.47
Electric GSHP		0.01	0.09	0.06		0.22	0.19	0.23
Hybrid		0.00	0.00	0.00		0.00	0.00	0.00
Total		0.26	2.63	2.12		0.74	0.63	0.77

Single Family Home

Table 4. Heat Pump Costs and Performance for Single Family Homes with Split-Central Forced Air Heating and Cooling Systems

Climate zone	Heat pump type	Nominal capacity (tons)	Upfront cost	Annual maintenance cost	Average seasonal COP	Minimum COP	Percentage of heating covered by the heat pump[h]
Toronto	ccASHP	2.3	11,500	91	2.8	1.3	92%
Toronto	GSHP	3.4	27,500	91	3.7	3.7	100%

Source: The Economic Value of Ground Source Heat Pumps for Building Sector Decarbonization (Dunsky, 2020)

Costs (CAD$/unit)

	Existing Home	New Construction	Assumptions	Source
Cold Climate HP with electric resistance backup	$11,100	$11,100	Includes installatior	Pages 347-3
Hybrid Heating with Smart Controls	$11,350	$11,350	Includes installatior	Pages 347-3
Gas Heat Pump	$12,200	$12,200	Includes USD$8,00	Page 397, lin
Electric GSHP	$27,500	$24,655	3.4 ton heating cap	Dunsky report, s

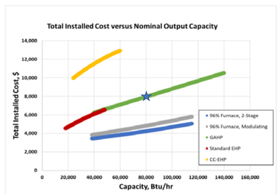
Year	Reduction in HP Cost
2030	5%
2040	10%
2050	15%

Assume the costs of all HPs come down 15% from 2020 to 2050 due to tech improvement over time and installer familiarity with the equipment as penetration increases.

Space Heating	Total cost (billion CAD$) 2020	2030	2040	2050
Gas HP (RNG or H2)		$3.04	$1.86	$3.79
Electric ASHP		$5.42	$28.18	$21.08
Electric GSHP		$5.40	$6.30	$6.30
Hybrid		$0.00	$0.00	$0.00
Total		$13.86	$36.33	$31.17

Year	GSHP Cost (equip + install) [$/ton]	Source
New Construction	$ 9,520.69	*Massachusetts Clean Energy Center: Ground Source Heat*
Retrofit	$ 10,619.16	
Difference	112%	

Real world installation cost data from MassCEC is used to estimate the proportional cost of installing GSHPs in existing vs. new construction.



Source: Page 397, link: https://www.rds.oeb.ca/CMWebDrawer/Record/732115/File/document

Retrofit Costs

	Building envelope upgrade cost per building (thousand CAD$) 2020	2030	2040	2050
Moderate Retrofit	13.3	12.1	11.1	10.1
Deep Retrofit	31.4	28.6	26.4	24.3

Source: ETM Model, Insulation, Table 11
(https://docs.energytransitionmodel.com/main/insulation)

Existing Homes Retrofit Assumptions	Moderate Retrofit	Deep Retrofit
Electric ASHP	34%	66%
Electric GSHP	66%	0%

Retrofit Assumptions
All existing homes switching to ASHPs receive a retrofit.
Homes built before 1995 require a deep retrofit
Homes built after 1995 require a moderate retrofit.
Older existing homes switching to GSHPs receive a retrofit
Homes built before 1995 switching to GSHPs receive a moderate retrofit
All other technologies do not require retrofits beyond current EE programs.
Assume no retrofits for new build households.

Shares (%)	2018
Before 1946	11.6
1946–1960	7.9
1961–1977	17.6
1978–1983	8.6
1984–1995	20.3
1996–2000	5.6
2001–2005	8.1
2006–2010	6.9
2011–2015	6.5
2016–2018	6.8

Source: Residential Sector Ontario Table 15: Housing Stock by Building Type and Vintage | Natural Resources Canada (nrcan.gc.ca)

	Total cost (billion CAD$) 2020	2030	2040	2050
Moderate Retrofit		$0.34	$9.82	$6.51
Deep Retrofit		$1.25	$42.69	$28.42

Total end user cost

	Total cost of Res. space heat conversion and retrofits (billion CAD$) 2020	2030	2040	2050
Equipment		$13.86	$36.33	$31.17
Retrofits		$1.59	$52.51	$34.93
Total		$15.45	$88.84	$66.10

	Lifetime	
Equipment	18	*Assumed t*
Retrofits	20	*Based on a*

DiscountSalvage SimYr	Equipment	Retrofits	
			/u
2020	1.00	1.00	/u
2030	1.00	1.00	/u
2040	0.61	0.55	/u
2050	0.06	0.05	/u

	Total cost of retrofits (billion CAD$) WITH SALVAGE 2020	2030	2040	2050	
					/u
Equipment		$13.86	$22.20	$1.73	/u
Retrofits		$1.59	$28.88	$1.75	/u
Total		$15.45	$51.08	$3.48	/u

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 2, p.58

Question(s):

Please confirm that the study assumes the Diversified Scenario does not require heating equipment upgrades. Please reconcile that assumption with the increased use of hydrogen instead of natural gas in heating.

Response:

The following response was provided by Guidehouse Canada Ltd.:

Guidehouse does not confirm this statement. In both scenarios, most customers will require heating equipment upgrades to comply with the Pan-Canadian Framework target of deploying heating systems with energy efficiency ratings above 100%. In the Diversified scenario, we assume that a greater proportion of heating systems would be replaced by gas heat pumps that are capable of operating with hydrogen as an input fuel.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 2, p.59, 73

Question(s):

Please provide a detailed forecast of the total cost to convert natural gas transmission and distribution infrastructure to hydrogen delivery.

Response:

The following response was provided by Guidehouse Canada Ltd.:

Guidehouse did not assume in either the Electrification or Diversified scenario that the entire natural gas transmission and distribution infrastructure would be converted to deliver hydrogen. Table A-14 and Table A-15 of the P2NZ Report describe Guidehouse's input assumptions regarding capital and O&M costs for gas pipelines. The estimated costs to convert natural gas transmission infrastructure to carry hydrogen are provided at Exhibit I.1.10-ED-66. The costs to convert natural gas distribution infrastructure for hydrogen delivery were considered out of scope. Please see the "Scope of Energy System Costs" insert on page 45 of the Pathways Report.

In both scenarios, 10 GW of existing methane pipeline capacity are repurposed to
supply hydrogen from Quebec by 2050. In the Electrification scenario, 45 GW of /u
methane pipeline capacity is repurposed to supply hydrogen from western Canada. In
the Diversified scenario, this capacity is only 19 GW from western Canada since a large /u
share of the hydrogen demand is produced in province via steam methane reforming
with carbon capture and electrolysis. The cost of these repurposed pipelines over the
entire 2020-2050 study period is $2.2 billion for the Electrification scenario and $0.3 /u
billion for the Diversified scenario (real 2020$). /u

There are no new hydrogen pipelines built to connect Ontario with other regions in either scenario, only the repurposed pipelines described above.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-5, Attach 2, p.66

Question(s):

Please recalculate the cost of each scenario on the basis that the carbon price is the same in both scenarios.

Response:

The following response was provided by Guidehouse Canada Ltd.:

The costs of emissions are an input to the Low Carbon Pathways optimization model that Guidehouse used to determine the least cost pathway to develop energy supply to meet the future demand projected for the two scenarios considered in the analysis. Amending the emissions cost assumption would require re-running the optimization model, which is a lengthy and time-consuming process, and is outside Guidehouse’s scope of work with Enbridge Gas. For this reason, Guidehouse declines to recalculate the scenario costs.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-6, p.3

Question(s):

Please confirm that Enbridge has assumed all new assets acquired or built in the Asset Management Plan will continue to be used and useful after 2030 and for their remaining physical lives, and the Application does not assume that any assets will have to be retired prior to the end of their physical lives because of the energy transition.

Response:

Enbridge Gas assumes all new gas carrying assets acquired or built in the Asset Management Plan will continue to be used or useful after 2030 and for their remaining useful lives; and has not assumed that any specific gas carrying assets will have to be retired prior to the end of their physical lives because of energy transition. Please see Exhibit 4, Tab 5, Schedule 1, Attachment 1, page 19 of 451 under Section 3.2.3: Economic Planning Horizon Recommendations, which states that “at this time the future impacts of the relevant climate change legislation have not been sufficiently studied, nor have specific programs been put into place that would provide indications of the changes in the utilization levels.”

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-6, p.5, fn 11

Question(s):

Please advise whether Enbridge agrees with the characterization of Geologic Carbon Storage, and its prospects in Ontario, as set out in the January 2022 Discussion Paper cited in footnote 11. If Enbridge does not agree, please identify and describe the areas of disagreement.

Response:

Enbridge Gas agrees with the characterization in general (I.e., areas of suitable geologic storage, enabling storage on crown land, adding certainty for a commercial framework). Enbridge Gas does not agree with the proposal to maintain a ban on sequestration in association with enhanced oil recovery as it unnecessarily restricts the potential reservoirs that may be considered and evaluated for carbon capture and storage (CCS).

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-6, p.5, fn 12; Ontario's Low-Carbon Hydrogen Strategy, p.6, 29

Question(s):

Ontario's *Low-Carbon Hydrogen Strategy*, referred to be Enbridge, states that "Ontario has existing and planned pipeline and storage infrastructure that can be used to store hydrogen and deliver it to homes and businesses. This included geological storage opportunities and an extensive natural gas distribution network." Please describe in detail the extent to which Enbridge believes this statement to be true and, if it should be qualified in any material way, how it should be qualified.

Response:

Please see response at Exhibit I.1.10-SEC-27.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-6, p.56, fn 12; p.20

Question(s):

Please provide a detailed list of the places in the world where, to Enbridge's knowledge, hydrogen is being blended into natural gas-fired electricity generation facilities.

Response:

Enbridge Gas is not aware of a worldwide database with a listing of all the places where hydrogen is specifically being blended into natural gas-fired electricity facilities. We therefore present those locations that we are knowledgeable of, plus links to the largest gas turbine manufacturers (GE[1], Mitsubishi[2] and Siemens[3]) involved in such projects, and the publicly available IEA database[4] of power projects which can be filtered for "H – Power", "H – Grids" and "H – CHP". The filtering in the IEA database may not signify power plants only; we do not have deeper insights into the database.

Existing or planned projects of which Enbridge Gas is aware are listed below.

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[1] GE Gas Power. Hydrogen fueled gas turbines. Future of Energy. https://www.ge.com/gas-power/future-of-energy/hydrogen-fueled-gas-turbines
[2] Mitsubishi Heavy Industries Group. Hydrogen Gas Turbine. https://solutions.mhi.com/power/decarbonization-technology/hydrogen-gas-turbine/
[3] Siemens Energy. Hydrogen Power Plants. Offerings. https://www.siemens-energy.com/global/en/offerings/power-generation/power-plants/hydrogen-power-plants.html
[4] International Energy Agency. (2019). IEA hydrogen project database. https://iea.blob.core.windows.net/assets/a02a0c80-77b2-462e-a9d5-1099e0e572ce/IEA-Hydrogen-Project-Database.xlsx

a) Canada

i. Eastern Power Inc.[5] has plans to build a 600 MW combined-cycle power plant in Courtright, Ontario that will run on 100% natural gas or up to 65% hydrogen blending in natural gas, with eventual plans to fully convert to 100% hydrogen.

ii. Atura Power[6] has plans to blend hydrogen into its combined-cycle gas turbine at the Halton Hills Energy Centre.

iii. Atura Power[7] is undertaking multiple feasibility studies to investigate hydrogen hubs in Nanticoke, Sarnia, Windsor and other locations across Ontario.

b) United States

i. Long Ridge Energy Generation Project[8,9] in Hannibal, Ohio has tested 5% hydrogen in its 485 MW combined-cycle power plant, is currently testing up to 20% hydrogen blends, and plans to convert to 100% carbon-free hydrogen. This was the first hydrogen-burning power plant in the U.S. and the first GE H-class plant worldwide to blend hydrogen in commercial operations.

ii. Brentwood Small Clean Power Plant[10] on Long Island, NY has been testing hydrogen blending from 5-44% since 2021.

iii. Florida Power & Light[11] in Okeechobee, Florida is piloting use of blended hydrogen with 5% to start in three natural gas combustion turbines. Its GE turbines are theoretically compatible with up to 50% H_2 with plans to eventually run on 100% hydrogen.

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[5] Government of Canada. (2022, 08,17). Hydrogen Ready Power Plant Project. https://iaac-aeic.gc.ca/050/evaluations/proj/83696
[6] Atura Power. Clean Hydrogen. https://aturapower.com/about-hydrogen/
[7] Ibid.
[8] Long Ridge Energy & Power. (2022, April 25). Utica Gas Power Plan on Ohio River Uses Hydrogen in World First. News. https://www.longridgeenergy.com/news/2022-04-25-utica-gas-power-plant-on-ohio-river-uses-hydrogen-in-world-first
[9] GE Gas Power. (2022, Apr 21) Hurray for Hydrogen: This New Ohio Power Plant Successfully Used Hydrogen to Generate Electricity. https://www.ge.com/news/reports/hurray-for-hydrogen-this-new-ohio-power-plant-successfully-used-hydrogen-to-generate
[10] Utility Drive. (2022, Sep 23). NYPA burns up to 44% free hydrogen in GE turbine in first such retrofit of a US natural gas plant.https://www.utilitydive.com/news/new-york-power-authority-burns-green-hydrogen-cuts-emissions-EPRI-GE-Airgas-NYPA/632527/
[11] Florida Weekly. (2023, Feb, 1). Florida Power & Light Company prepares to turn water into clean energy at afirst-of-its-kind plant. https://fortmyers.floridaweekly.com/articles/florida-power-light-company-prepares-to-turn-water-into-clean-energy-at-first-of-its-kind-plant/

iv. Georgia Power[12], a subsidiary of Southern Company, in Smyrna, Georgia has tested its 265 MW Mitsubishi DLN gas turbine with up to 20.9% hydrogen.

v. Michigan WEC Energy Group[13,14] in Pelkie, Michigan, has tested an 18 MW turbine with up to 25% hydrogen blended in natural gas.

c) Additional / planned projects in the U.S. can be found at the link below:

i. https://www.cleanegroup.org/ceg-projects/hydrogen/projects-in-the-us/

d) Australia[15]

i. EnergyAustralia's 316MW B Power Station in Tallawarra, New South Wales will be Australia's first power plant capable of operating with 5% up to 100% hydrogen, with an opening planned for summer 2023-2024.

ii. H2U's new 200 MW hydrogen-ready gas generator in Whyalla, South Australia is expected to be fueled by 100% hydrogen in 2025.[16]

iii. SnowyHydro's 660 MW open-cycle gas turbine in Kurri Kurri, New South Wales is planned to initially operate with 15% green hydrogen upon launching at the end of 2023, with incremental increases to 30%, and plans for 100% by 2030.

iv. Coregas' Port Kembla industrial plant in New South Wales includes a hydrogen gas generator and refueling station.

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[12] Power Engineering. (2022, Sep 26). Taking DLN gas turbine hydrogen blending to the next level. https://www.power-eng.com/hydrogen/taking-dln-gas-turbine-hydrogen-blending-to-the-next-level/#gref
[13] Energy Tech. (2022, Nov 9). Hydrogen blending test completed at Michigan Gas-Fired Power plan using Wärtsilä engine. Energy Efficiency. https://www.energytech.com/energy-efficiency/article/21254445/important-hydrogen-blending-test-completed-at-michigan-gasfired-power-plant-using-wrtsil-engine
[14] Cision PR Newswire. (2022, Nov 2). Certarus Supplies WEC Energy Group with Hydrogen for the Worlds Largest Hydrogen Test on Natural Gas Engine at Michigan Power Plant. https://www.prnewswire.com/news-releases/certarus-supplies-wec-energy-group-with-hydrogen-for-the-worlds-largest-hydrogen-test-on-natural-gas-engine-at-michigan-power-plant-301666072.html
[15] State of Hydrogen, 2021, https://www.dcceew.gov.au/sites/default/files/documents/state-of-hydrogen-2021.pdf
[16] Government of South Australia. Office of Hydrogen Power South Australia. About the project. https://www.ohpsa.sa.gov.au/about-the-project

e) Egypt

   i. The Sharm El Sheikh Power Plant[17] conducted a 5-month pilot operating with blends of 5% to 40% H_2 by volume and has plans to retrofit its turbines to eventually operate with 100% hydrogen.

f) Europe

   i. DOW Elsta's 123MW power generation facility[18] in Terneuzen, Netherlands was upgraded to operate on up to 25% hydrogen in natural gas, with plans to convert to 100% hydrogen by 2024/2025.

[17] GE Gas Power. A first for Africa: LM6000 runs on hydrogen fuel blend. https://www.ge.com/gas-power/resources/case-studies/eehc-lm6000
[18] Ansaldo Energie Group (2020). Low/Zero Carbon Solutions for Gas Turbine Power Generation (1MW to 500 MW). https://www.thomassen.energy/wp-content/uploads/2020/11/Low-Zero-Carbon-Solutions-for-GT-Power-Generation.pdf

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-6, p.7, fn 21; The Canada Green Building Strategy

Question(s):

Please describe in detail the extent, if any, to which each of the following statements in the Canada Green Buildings Strategy is true and, if it should be qualified in any material way, how it should be qualified:

a) [p.4] “Electrification of space and water heating will be an essential component of decarbonizing the buildings sector”.

b) [p.6] “All new buildings need to be net-zero ready as early as 2027 and no later than 2032 and confirm to the latest applicable codes, standards and guidelines for climate resilience as early as 2025 and no later than 2030”.

c) [p.6]: “The deep retrofit rate would need to reach 3% to 5% of buildings annually by 2025”, with the definition of “deep retrofit” being described in the footnote as “A deep retrofit usually includes reducing energy demand and switching from fossil fuels to electricity to space and water heating”.

d) [p.13] “In most buildings across Canada, electric heat pumps are the right solution. Not only is electricity cleaner than fossil fuels in most jurisdictions (and will continue to get cleaner via the Clean Electricity Standard), the technology to use them more efficiently than fossil fuels to heat our buildings is available.”

e) [p.14]: “The federal government will work with partners to, for example, set phased timelines for ending the installation of new oil or natural gas heating systems…”

For each of the above statements in the federal strategy, please describe how the current Application is consistent with it.

Response:

a-e) In July 2022, Natural Resources Canada released a discussion paper entitled "The Canada Green Buildings Strategy", which, as noted at Exhibit 1, Tab 10, Schedule 6 page 7, provides details on potential themes and actions for reducing GHG emissions from residential, commercial, and institutional buildings. The release of the actual Canada Green Buildings Strategy is anticipated in Spring 2023.[1]

As noted in the discussion paper, Canada has set ambitious objectives to reduce GHG emissions from the building sector, and the challenge of decarbonizing buildings is significant. These targets include a 53 Mt reduction from the residential, commercial and institutional building sector by 2030 (a 37% reduction from 2005 levels) and net-zero emissions economy wide by 2050.

Enbridge Gas acknowledges that to achieve these objectives, a shift away from fossil fuels is required. The Pathways to Net-Zero for Ontario (P2NZ) Study provided at Exhibit 1, Tab 10, Schedule 5, Attachment 2, confirms that net-zero can be achieved via a diversified path – one that balances targeted electrification with repurposing the current gas pipeline system to deliver low- or zero-carbon gases, including renewable natural gas (RNG), hydrogen, and natural gas with carbon capture. In the buildings sector, a diversified pathway includes increased electrification, adoption of hybrid heating, and greening the gas supply with RNG and hydrogen. Based on the results shown in the P2NZ Study, an electrification pathway, which includes shifting most of the building heating to electric heat pumps, is not the most cost-effective, reliable or resilient solution in Ontario.

At this point in time, uncertainty remains regarding what solutions the final Canada Green Buildings Strategy will include, or how the strategy will be implemented in Ontario. For example, it is unclear if a 37% reduction from 2005 levels will be required in each province, or if this target may vary from province to province. It is also unclear if provinces will be enabled to find the solutions that work best for their jurisdiction, based on unique circumstances such as climate and existing energy infrastructure.

As provided at Exhibit 1, Tab 10, Schedule 6, paragraph 38, Enbridge Gas's Energy Transition Plan (ETP) and associated rebasing application proposals support continued progress towards a net-zero future despite current policy uncertainty. In

[1] The Canada Green Buildings Strategy: Discussion Paper, 2022, pg. 8. https://www.nrcan.gc.ca/sites/nrcan/files/engagements/green-buildingstrategy/CGBS%20Discussion%20Paper%20-%20EN.pdf.

particular, four out of the five safe bet actions provided at Exhibit 1, Tab 10, Schedule 6, pages 19 to 36 are aligned with reducing GHG emissions in the building sector: maximizing energy efficiency, increasing the amount of RNG in the gas supply, integrating gas and electric system planning, and supporting consumer choice and the energy transition journey.

As a result of the above, this Application is consistent with the discussion paper on the Canada Green Buildings Strategy.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-6, p.14, 21

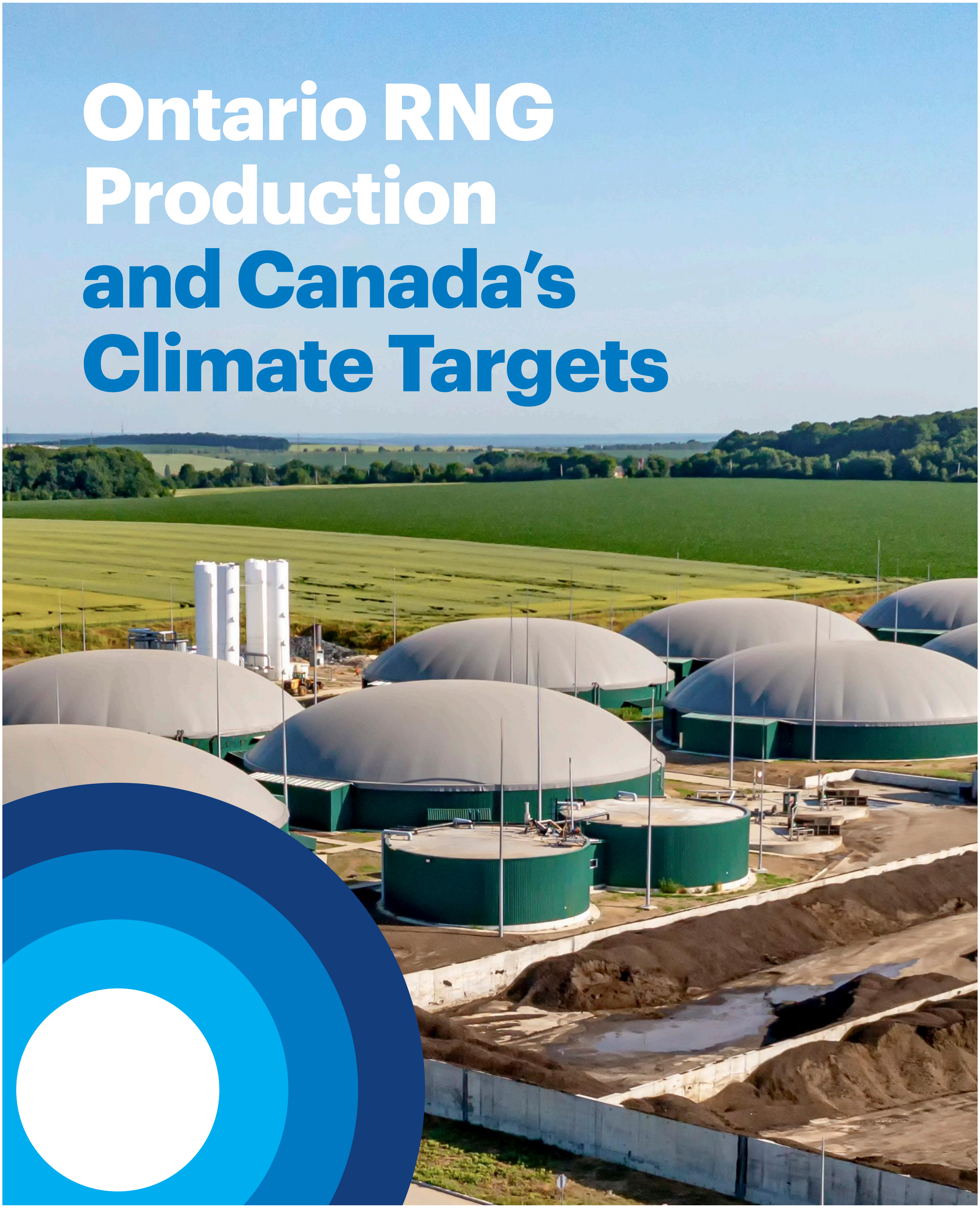
Question(s):

Please provide all studies, memoranda, presentations and other documents in the possession of Enbridge dealing with the amount and timing of increases in the amount of RNG in the gas supply.

Response:

As it relates to energy transition, RNG as part of Ontario's gas supply is discussed in detail in the Pathway to Net Zero (P2NZ) Study at Exhibit 1, Tab 10, Schedule 5, Attachment 2. The Canadian BioGas Association completed a publicly available study outlining potential RNG supply scenarios for Ontario and presented this to Enbridge Gas. This report is attached as Attachment 1.

Ontario RNG Production and Canada's Climate Targets



April 2022
biogasassociation.ca/climate

Canadian Biogas Association
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Section A:
Purpose

The Canadian Biogas Association retained Navius Research in early 2022 to forecast and analyze Biogas & RNG production and utilization in Canada under different policy scenarios. The purpose was to understand the extent to which different government policies are capable of unlocking Canada's unused Biogas & RNG feedstocks and to what degree these same actions would reduce greenhouse gas (GHG) emissions.

The broader results of this exercise are available in the report, "Hitting Canada's Climate Targets with Biogas & RNG", which is publicly available at www.biogasassociation.ca/climate.

The modelling also led to a number of insights that apply specifically to RNG production in Ontario. This report unpacks those insights.

The key focus of the Navius modelling was the impact of Biogas & RNG production on national climate goals, and specifically how different policies could induce more contributions from Biogas & RNG in achieving the Government of Canada's three major climate targets: (1) Reducing GHG emissions 40-45% by 2030, (2) Reducing methane emissions 30% by 2030, and (3) Achieving net zero emissions by 2050.

Through the supplementary analysis presented here, we have also been able to determine some important results for RNG in Ontario, including how much clean RNG energy could be produced in Ontario under different policy scenarios, and how this RNG helps contribute towards each of Canada's climate targets.

Section B:
Key Assumptions

In order to forecast Ontario RNG production under different policy scenarios, the model made a number of evidence-based assumptions.

1. Biogas & RNG Production Potential

The model assumes a maximum Biogas & RNG production potential in Ontario. This maximum potential is the upward limit of how much Biogas & RNG energy (PJ/yr) could be feasibly produced under any future scenario.

In order to ascertain the maximum Biogas & RNG production potential, the model draws on a range of literature and analysis, in particular the comprehensive RNG feedstock analysis conducted by TorchLight Bioresources in 2020[1], supplemented with the analysis compiled by Kelleher Environmental in 2013.[2] Ontario's maximum potential Biogas & RNG energy potential was determined for 2020 and then scaled over time to reflect population and sector growth. The numbers in Figure B-1 represent total Biogas & RNG potential in 2020, including heat, electricity and RNG. The maximum potential of just RNG is a subset of this total and is implied in the modelling.

Figure B-1:
Ontario Biogas & RNG Production Potential by Feedstock

	Maximum Biogas & RNG production potential (2020)
Landfills	11.1 PJ/yr
Livestock (manure co-digestion)	9.2 PJ/yr
Source separated organics	4.4 PJ/yr
Municipal wastewater treatment	4.3 PJ/yr
Pulp mill effluent	2.5 PJ/yr
Corn silage and crop residue	No fixed maximum, constrained only by physical and economic factors

2. RNG Demand Potential

The model assumes a maximum amount of potential RNG demand in Ontario. The absolute maximum is equivalent to the projected residential and commercial demand for all forms of natural gas in Ontario over time under current policies (see Figure B-2). In theory, the Ontario RNG production modelled in this study is not constrained by this limit since it can also be exported to other jurisdictions. However, no policy scenario modelled for this study sees demand for RNG rising close to the maximum level of Ontario demand.

Different policy scenarios unleash different amounts of RNG demand.

Figure B-2:
Ontario Natural Gas Demand (Residential and Commercial) Under Current Policies , 2025-2050

	2025	2030	2035	2040	2045	2050
Natural Gas Demand	529 PJ/yr	492 PJ/yr	470 PJ/yr	457 PJ/yr	450 PJ/yr	446 PJ/yr

3. RNG Production Costs

To determine RNG production costs, Navius Research consulted a wide range of literature and analysis, including but not limited to TorchLight Bioresources (2020)[3], Deloitte & WSP (2018)[4], International Energy Agency (2013 & 2020)[5,6], Hallbar Consulting (2017)[7], BiogasWorld (2022), IRENA (2013)[8], US Environmental Protection Agency (2021)[9], S&T Consultants (2021)[10], and Rajendran et al (2016)[11].

Navius evaluated the range of costs for two key sources: (i) landfill gas, and (ii) anaerobic digestion (AD), where the AD production costs are differentiated by feedstocks, including on-farm manure co-digestion versus digestion primarily of crop residues or silage, as well as AD of source-separated organics (SSO) and AD at wastewater treatment plants (WWT).

Figure B-3:
RNG Production Costs (2020 CAD)

	RNG ($/GJ)
AD on Farms	17.50 – 25.60
AD with SSO & WWT	19.80 – 28.00
Landfill Gas (Collection & Utilization)	12.00
Landfill Gas (Only utilization, LFG already collected)	6.70

4. Carbon Intensities

The carbon intensity of Biogas & RNG is important for measuring the impact on GHG reductions. Carbon intensities are used within the Navius model in two ways. First, they are used to define credit generation potential per unit of RNG supplied under policies such as clean fuel standards. Second, and more importantly, they define the parameterization of biogas production pathways in terms of how much energy those pathways consume and what methane (or other GHG) emissions they produce or emit per unit of energy produced.

The carbon intensity values presented in Figure B-4 exclude any credit given for methane abatement. While some policies are designed to recognize the methane abatement that is implicit in many forms of RNG production, and as such lead to even stronger lifecycle carbon assessments, other policies do not. This study models one policy scenario in which methane abatement is valued in addition to the inherent carbon intensity of RNG (see: “GHG offset system in which carbon credits are generated for methane utilization in landfills and agriculture”).

Figure B-4:
Carbon Intensities of RNG

Source	Carbon Intensity
Anaerobic Digestion	10-40 gCO_2e/MJRNG
Landfills	30-40 gCO_2e/MJRNG

Section C:
Modelling Results

This study modelled the impact of five different policy scenarios on Ontario RNG production. The policy scenarios were selected based on their immediate feasibility in the Canadian context. They are all policies that have Canadian precedent and that are generally consistent with federal and provincial policy directions.

They are examined here in the order of least impactful on Ontario RNG production to most impactful.

1. **Current policies**
2. **Clean fuel standard (as currently proposed by the federal government)**
3. **Carbon credits for methane utilization in landfills and agriculture**
4. **Renewable gas mandate**
5. **Combination: Renewable gas mandate + Carbon credits for methane utilization in landfills and agriculture**

For each policy scenario, this report is able to forecast the impact specifically on RNG production in Ontario. It is also able to forecast the ensuing GHG reductions. However, note than when it comes to GHG reductions, the model results are unable to separate the impact of RNG from other biogas energy outputs (ie. heat and electricity), and so the GHG reductions calculated here are for all these energy outputs from Ontario produced Biogas & RNG collectively.

1. Current policies

The Current Policies scenario modelled for this study includes both federal and provincial policies that are already implemented. The important policies influencing RNG production in Ontario include:

i. Carbon pricing, including the Output Based Pricing System, in which the price of carbon pollution rises incrementally according to the announced federal schedule, reaching \$170/tCO_2e in 2030. The Current Policies scenario assumes the carbon price remains at \$170/tCO_2e through to 2050.

ii. Renewable gas mandates in British Columbia (15 percent by 2030) and Québec (5 percent RNG by 2025-2026 and 10 percent by 2030), which can drive RNG production outside of those jurisdictions, including in Ontario.[12]

iii. Landfill gas regulations in Ontario, in which landfills larger than 1.5 million cubic metres are required to collect landfill gas and to flare it or utilize it.

Under the Current Policies scenario, Ontario RNG production increases only modestly in the medium term, growing 5 percent over 2020 levels by 2030, to 5.8 PJ/yr, before dropping off from 2035 to 2050. Figure C-1a shows the growth of Ontario RNG production under the Current Policies scenario, while Figure C-1b shows the contribution of different RNG sources to this total production.

Figure C-1a: Ontario RNG Production Under Current Policies

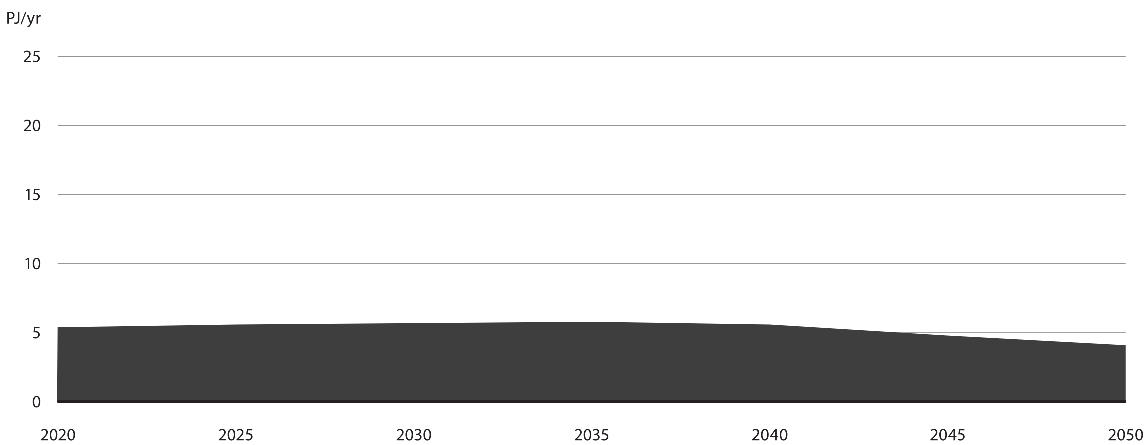
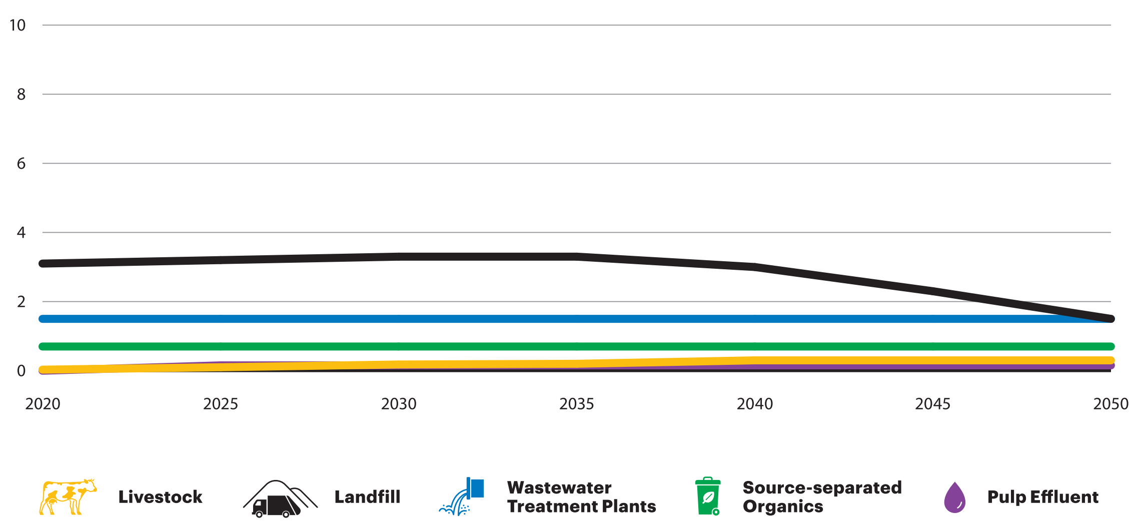


Figure C-1b: Ontario RNG Production by Source Under Current Policies



The modest growth in Ontario RNG production in the Current Policies scenario results in limited contributions to Canada's climate targets.

Figure C-1c:
Ontario Biogas & RNG Contribution to Canada's Climate Targets Under Current Policies*

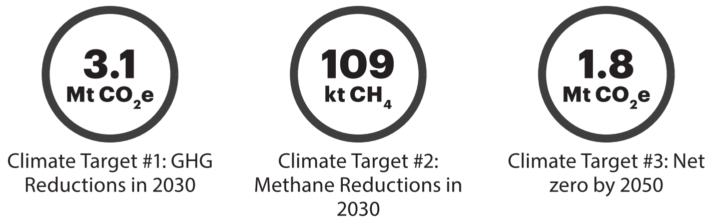
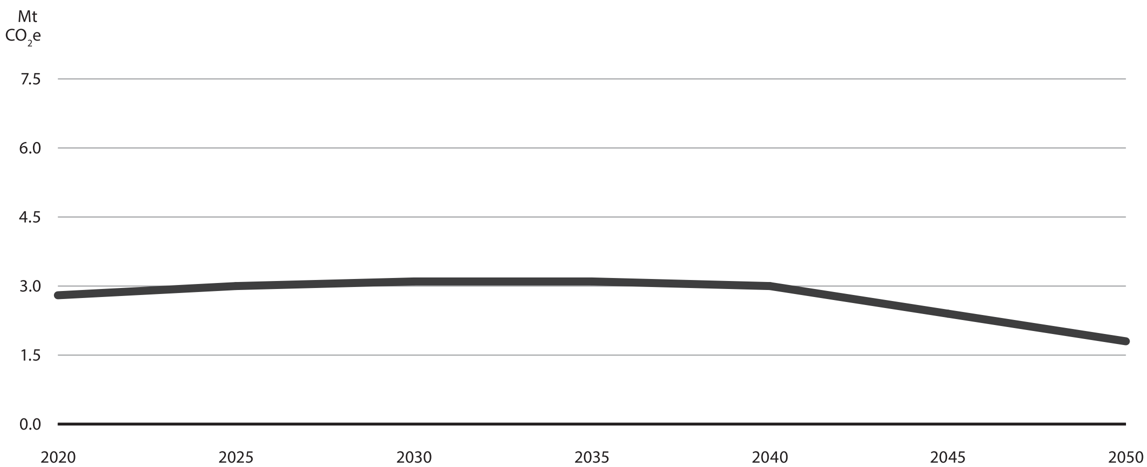


Figure C-1d:
GHG Reductions from Ontario Biogas & RNG Under Current Policies



2. Clean fuel standard

The second policy scenario modelled for this study is one in which a clean fuel standard is layered on to current policies. This scenario is expected to materialize shortly, with a federal government clean fuel standard coming into effect in 2022. The federal Clean Fuel Standard has undergone significant revisions since its initial design, including the elimination of a dedicated gaseous stream and the move to a primary focus on liquid fuels. However, the federal government's latest design does allow liquid fuel suppliers to meet up to 10 percent of their compliance needs through gaseous fuels. This is the policy scenario modelled here.

The modelling suggests that the federal Clean Fuel Standard will have almost zero effect on Ontario-produced RNG, resulting in changes of at most 10,000-40,000 GJ of Ontario RNG production compared with the Current Policies scenario over the long term.

* Note: The model does not separate the role of RNG from other Biogas & RNG energy outputs, so these are collective GHG reductions from RNG, biogas-to-electricity and biogas-to-heat

Figure C-2a:
Ontario RNG Production
Under Clean Fuel Standard

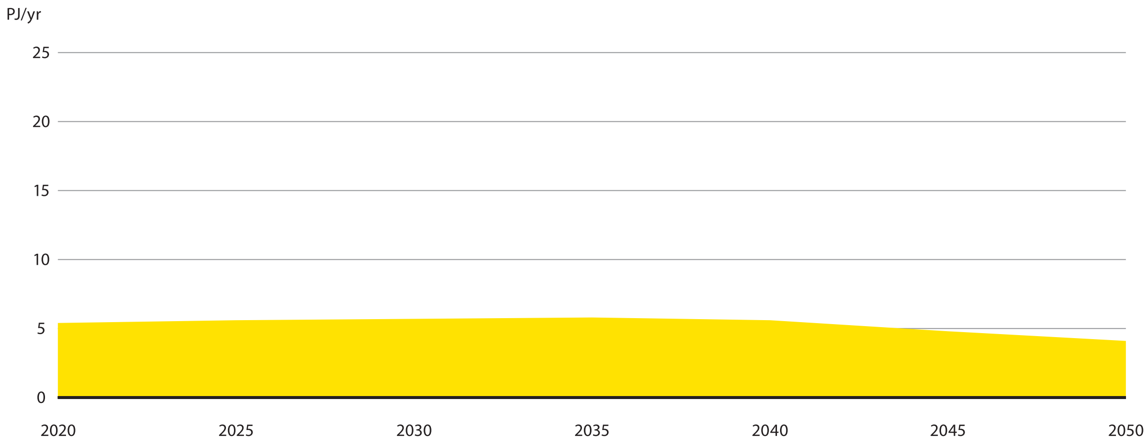
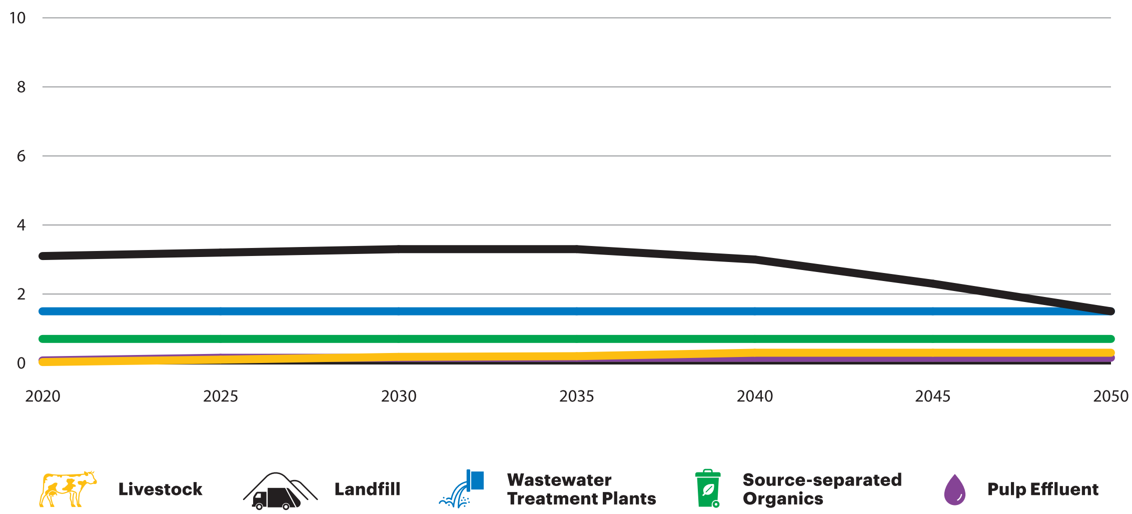


Figure C-2b:
Ontario RNG Production by Source
Under Clean Fuel Standard



As a result of the limited impact of the federal Clean Fuel Standard on RNG production and adoption, the contribution to Canada's climate targets remains unchanged under this policy scenario.

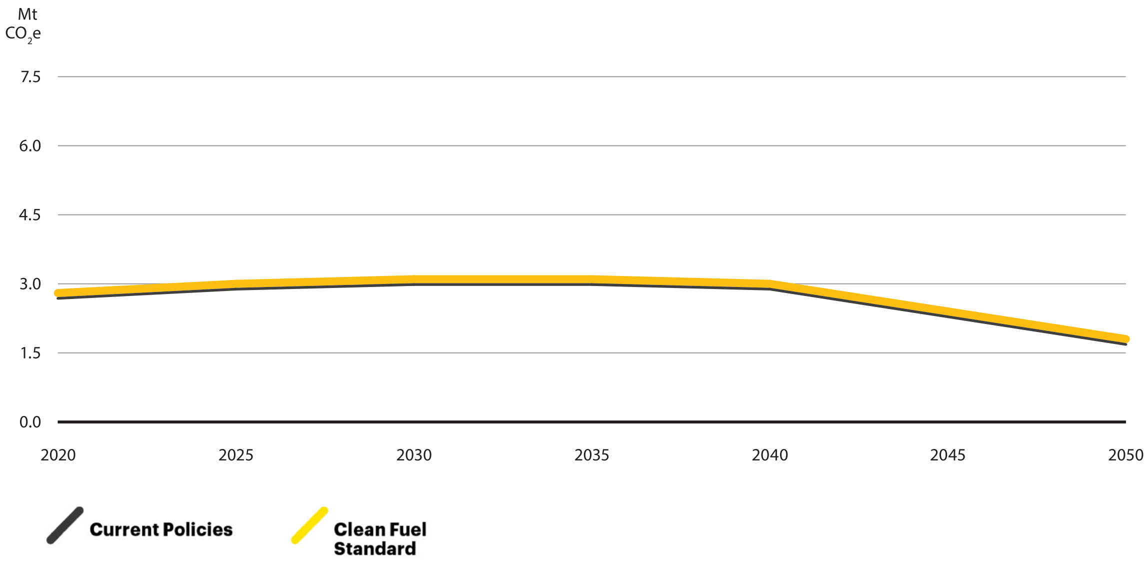
Figure C-2c:
Ontario Biogas & RNG Contribution to Canada's Climate Targets
Under Clean Fuel Standard

Climate Target #1: GHG Reductions in 2030

Climate Target #2: Methane Reductions in 2030

Climate Target #3: Net zero by 2050

Figure C-2d:
GHG Reductions from Ontario Biogas & RNG Under Clean Fuel Standard



3. Carbon credits for methane utilization in landfills and agriculture

The third policy scenario evaluated for this study is one in which there is a GHG offset system that allows carbon credits to be generated for methane utilization in landfills and agriculture.

The specific policy scenario modelled for this study is based on the emerging Federal GHG Offset System, which will allow offsets to be used by industrial firms regulated under the Output Based Pricing System in order to meet their compliance obligations. By allowing voluntary GHG reduction activities to generate carbon credits under this system, it effectively extends the price signal from the OBPS, which is set to rise incrementally to \$170/tCO_2e in 2030, to these activities.

The policy modelled here implies that RNG production using methane collected from both the landfill sector and the agriculture sector be eligible for generating credits. This is a policy which has important precedents at the provincial level in both Alberta[13] and Québec.[14]

A policy scenario in which carbon credits can be generated for methane utilization in landfills and agriculture drives significant growth in Ontario RNG production. Figure C-3a shows Ontario RNG production reaching 8.5 PJ/yr in 2030. That amounts to 57 percent more production than today's production and 50 percent more production than what current policies will achieve on their own. As noted in Figure C-3b, this growth is driven primarily by RNG production using methane from livestock manure and from landfills.

Figure C-3a:
Ontario RNG Production
Under Carbon Credits System

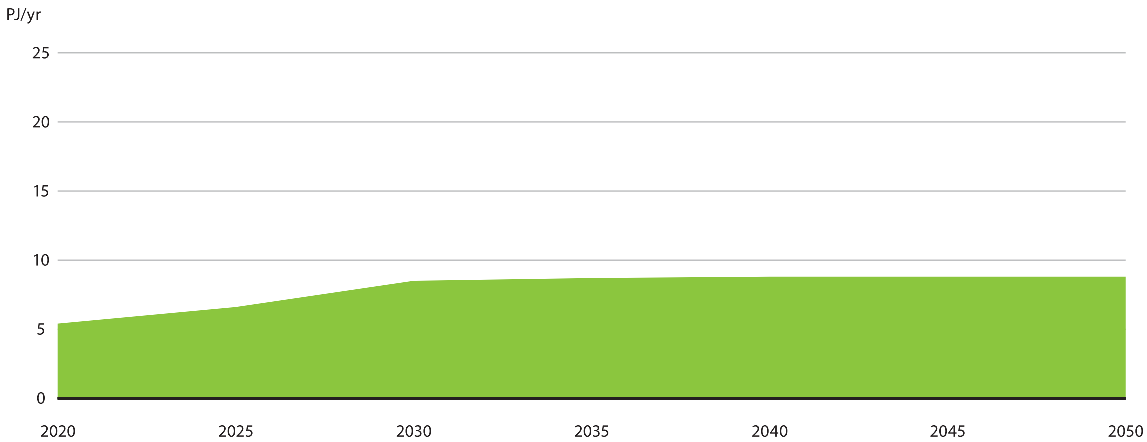
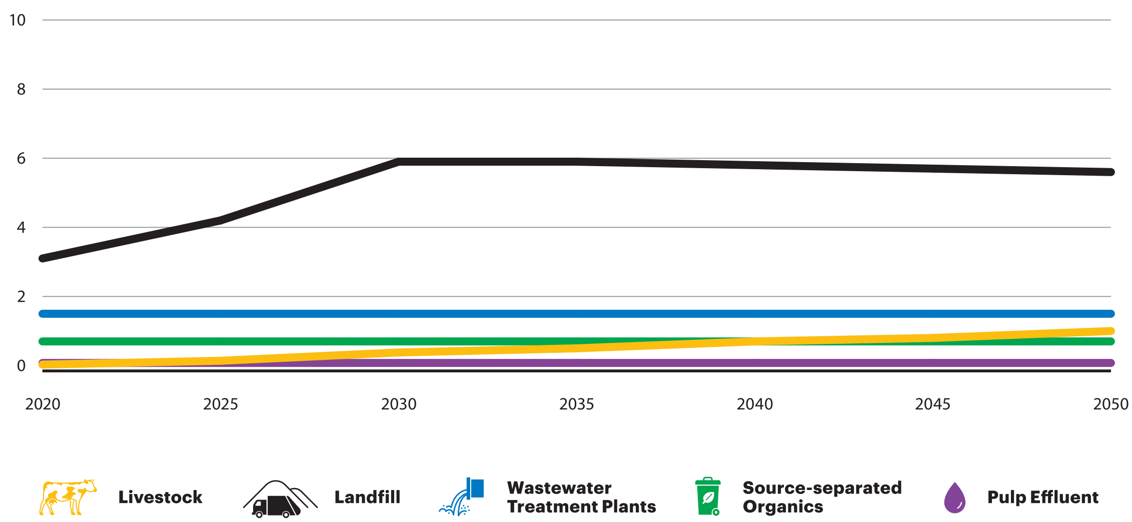


Figure C-3b:
Ontario RNG Production by Source
Under Carbon Credits System



The additional methane abatement that is triggered by a carbon credits system on top of the additional displacement of conventional natural gas with the resulting RNG leads to much bigger GHG reductions. GHG reductions in this policy scenario are nearly double today's GHG reductions by 2030. This effect tapers off after 2030 due to a plateauing of the price signal in the GHG Offsets System that was modelled.

Figure C-3c:
Ontario Biogas & RNG Contribution to Canada's Climate Targets Under Carbon Credits System

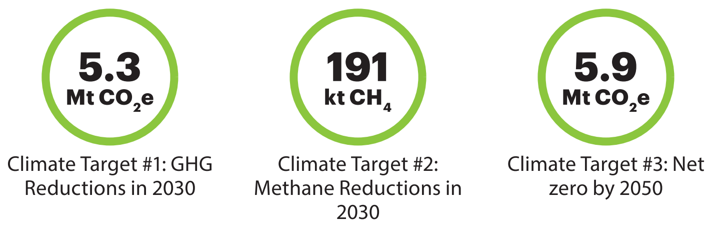
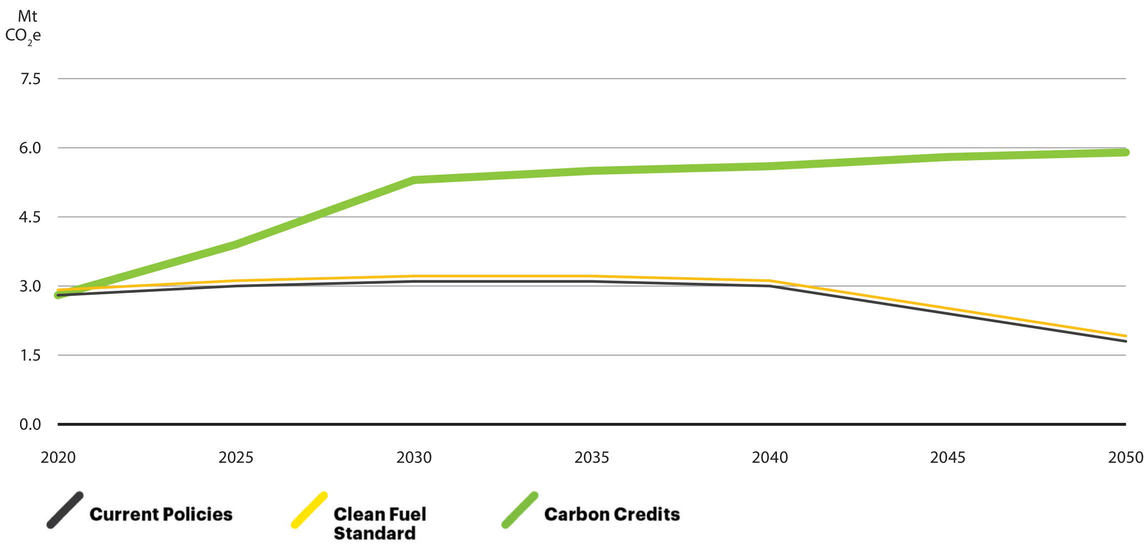


Figure C-3d:
GHG Reductions from Ontario Biogas & RNG Under Carbon Credits System



4. Renewable Gas Mandate

The fourth policy scenario modelled for this study is a renewable gas mandate. Renewable fuel mandates have important precedents in Canada. These include the federal mandate for renewable content in liquid fuels, which has been in place since 2011 and which requires a minimum 5-percent renewable blend in gasoline and 2-percent blend in diesel fuel.[15] Precedents also include provincial renewable gas mandates in Québec[16] and British Columbia[17].

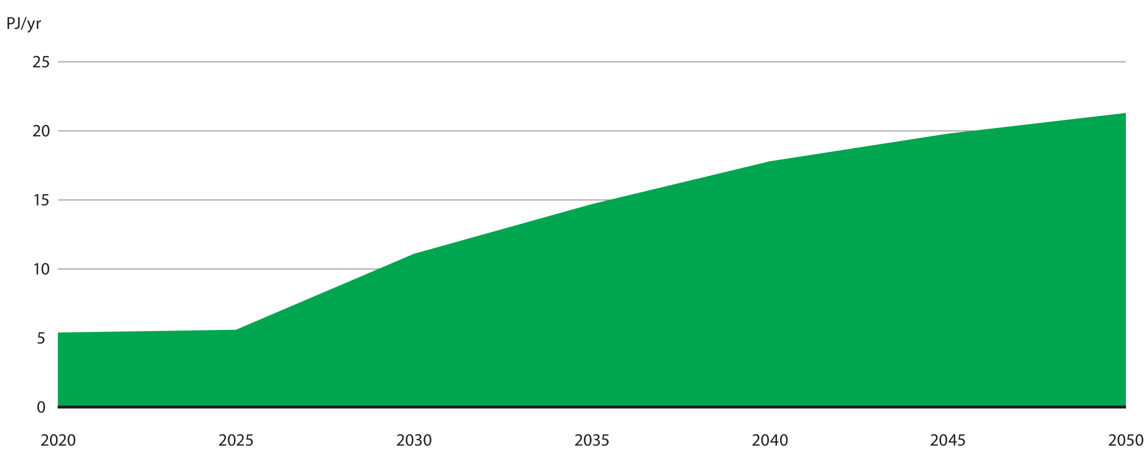
For this study we modelled a country-wide renewable gas mandate designed like British Columbia's policy, in which natural gas suppliers are required to achieve a minimum 15-percent renewable blend by 2030. The policy scenario then requires that the renewable blend be increased steadily to 30 percent by 2040. Similar to British Columbia, the policy scenario modelled here allows for a variety of renewable gases to contribute to that mandate, including biogas-based RNG, low-carbon hydrogen and synthetic natural gas.

The Renewable Gas Mandate policy scenario sees a different dynamic play out with respect to Ontario RNG when compared with the Carbon Credits System scenario described above.

First, the renewable gas mandate policy unlocks more Ontario RNG. Figure C-4a shows that annual RNG production in Ontario more than doubles in 2030 compared with today's levels, to 11.1 PJ/yr, and then almost doubles again by 2050, to 21.3 PJ/yr, as a result of a renewable gas mandate. This is a function of two things: on one hand, the Renewable Gas Mandate incentivizes the production exclusively of RNG with biogas feedstocks as opposed to other potential energy outputs. For example, landfill gas that might be more cost effectively utilized to generate electricity under a system of carbon credits, is being used for RNG under a renewable gas mandate. Meanwhile, the renewable gas mandate is also simply a more ambitious policy that increases in stringency from 2030 to 2040. As a result, Ontario RNG production is pushed to new levels in order to hit demand targets.

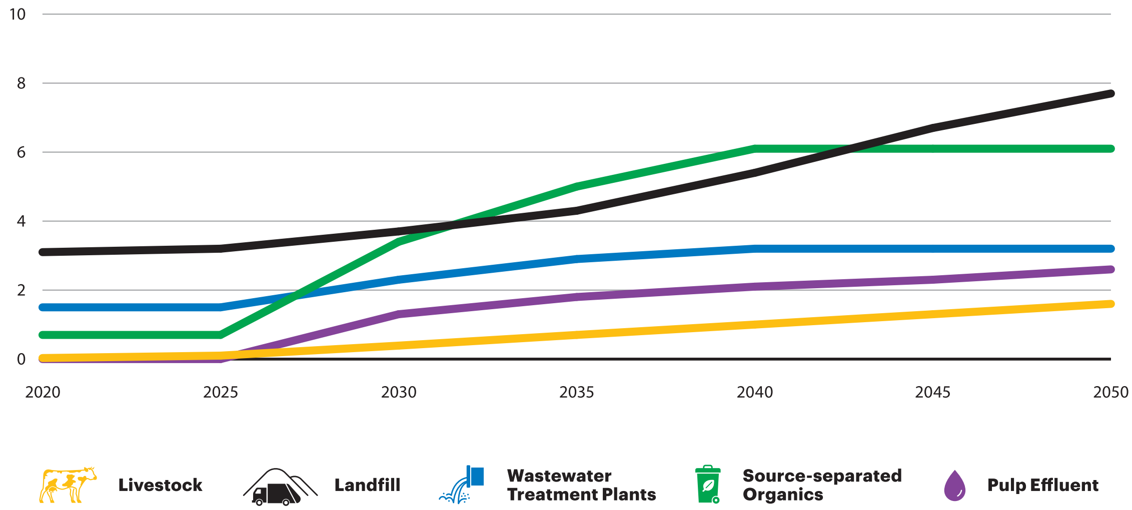
The second dynamic that changes under the Renewable Gas Mandate policy scenario, when compared with the Carbon Credits scenario, is that the renewable gas mandate activates a broader pool of RNG production sources in Ontario. Unlike the Carbon Credits scenario, which stimulates RNG production exclusively in the landfill and agriculture sectors, the renewable gas mandate unlocks underutilized RNG feedstocks in other sectors. Figure C-4b shows a renewable gas mandate driving a doubling of RNG production from wastewater treatment plants by 2050, more than eight times more RNG production from source-separated organics by 2050, and new opportunities from pulp effluent.

Figure C-4a:
Ontario RNG Production
Under Renewable Gas Mandate



While the Renewable Gas Mandate policy scenario results in more RNG production in Ontario compared with the Carbon Credits scenario, it does not achieve the same level of GHG reductions. Figure C-4c and Figure C-4d

Figure C-4b:
Ontario RNG Production by Source Under Renewable Gas Mandate



show that a renewable gas mandate can achieve important GHG reductions, including more than 2.5 times more than under current policies in 2050. However, it does not achieve as many GHG reductions as a carbon credits policy due to it stimulating less activity in the landfill sector, where methane destruction can result in powerful GHG reductions.

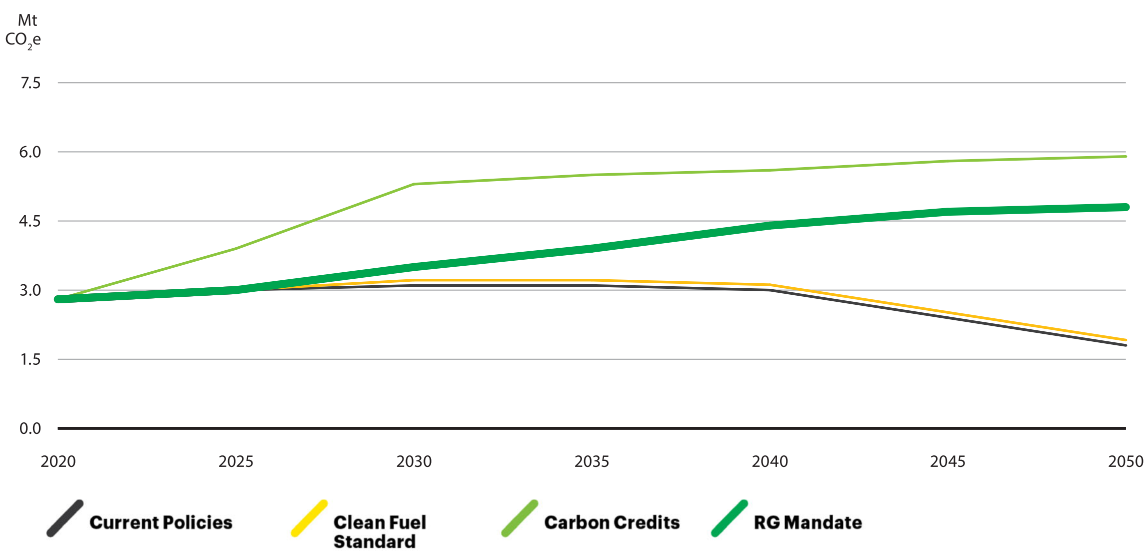
Figure C-4c:
Ontario Biogas & RNG Contribution to Canada's Climate Targets Under Renewable Gas Mandate

Climate Target #1: GHG Reductions in 2030

Climate Target #2: Methane Reductions in 2030

Climate Target #3: Net zero by 2050

Figure C-4d:
GHG Reductions from Ontario Biogas & RNG Under Renewable Gas Mandate

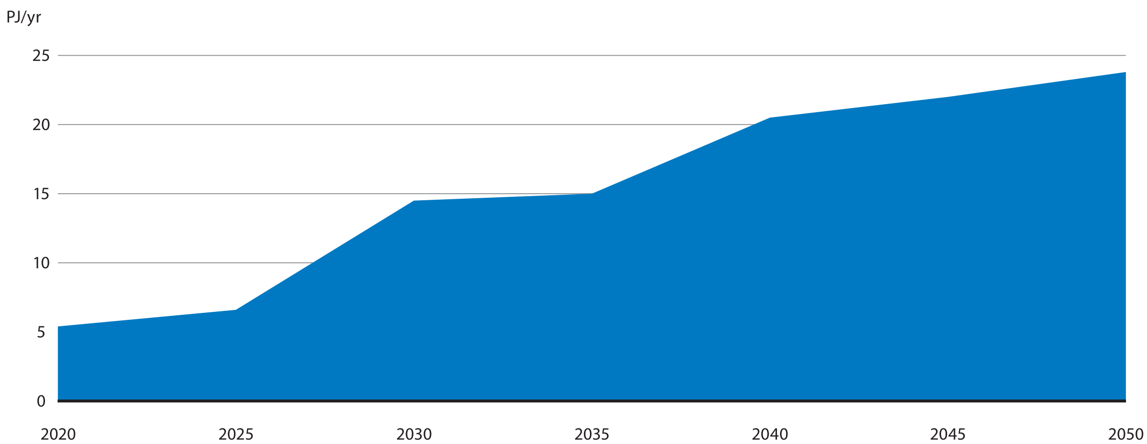


5. Renewable gas mandate + Carbon credits for methane utilization in landfills and agriculture

The final policy scenario evaluated for this study, and the policy scenario showing the greatest impact on RNG production in Ontario, is a combination of the previous two policy scenarios: a renewable gas mandate combined with a GHG offset system that allows credits to be generated for methane utilization in landfills and agriculture.

This policy scenario harnesses the strengths of both individual policies. It supercharges Ontario RNG production in the short term through a price signal for methane utilization, achieving 14.5 PJ/yr in 2030, while also sustaining growth in RNG production over the longer term through a renewable gas mandate, resulting in 23.8 PJ/yr in 2050. Under this policy scenario, the majority of Ontario's feasible RNG feedstocks from traditional sources is being harnessed.

Figure C-5a:
Ontario RNG Production
Under RG Mandate + Carbon Credits



The combination of a renewable gas mandate and a GHG offsets systems that allows credits to be generated for methane utilization in landfills and agriculture results in the biggest GHG reductions modelled in this study. These are shown below in Figure C-4c and Figure C-4d. Note again that these are national GHG reductions resulting from both RNG and other biogas energy outputs produced in Ontario.

Figure C-5b:
Ontario RNG Production by Source
Under RG Mandate + Carbon Credits

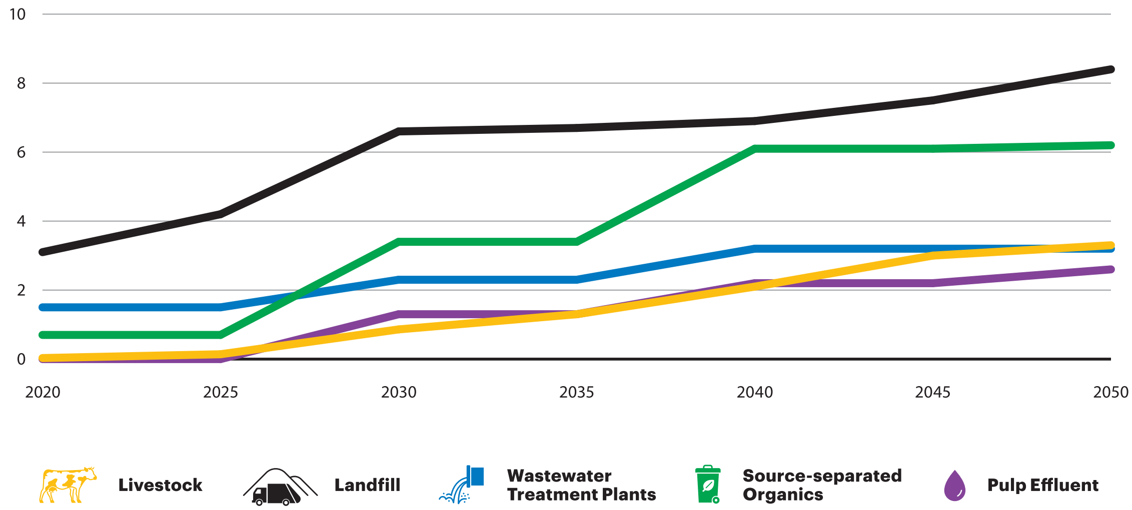


Figure C-5c:
Ontario Biogas & RNG Contribution to Canada's Climate Targets
Under RG Mandate + Carbon Credits

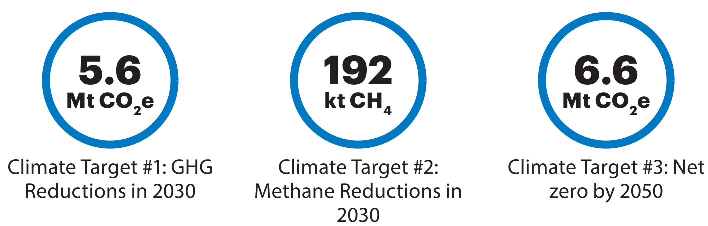
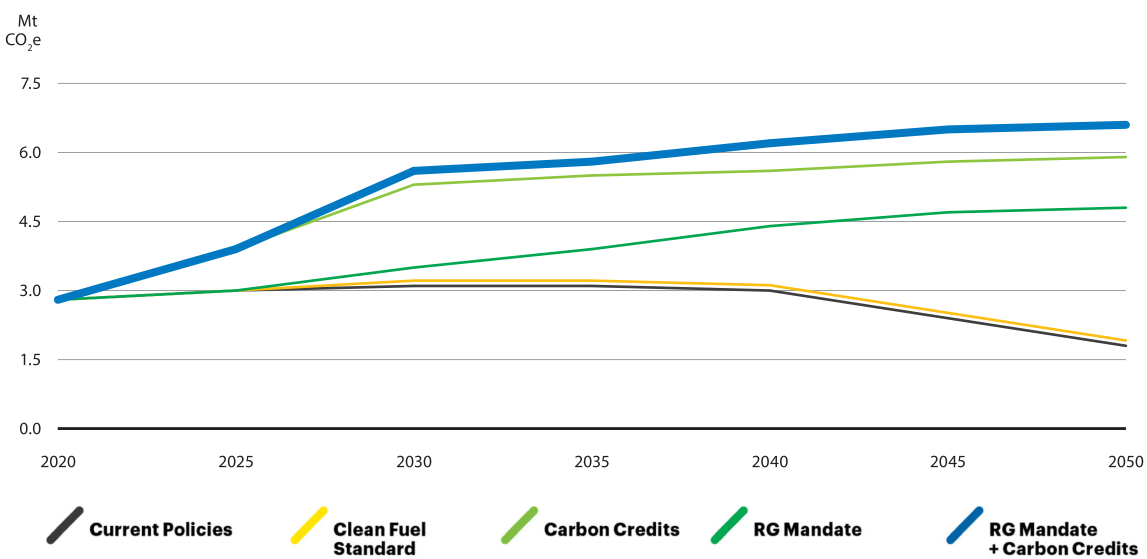


Figure C-5d:
GHG Reductions from Ontario Biogas & RNG
Under RG Mandate + Carbon Credits



Conclusion:

Three Takeaways for Enbridge

Three immediately pertinent takeaways stand out from this analysis for Enbridge.

1. Proven policies can unlock almost two thirds of Ontario's feasible RNG potential

The first takeaway is that the majority of Ontario's feasible RNG feedstocks can be unlocked through tested and proven policies. The combination of a renewable gas mandate and a GHG offset system that allows credits to be generated for methane utilization in landfills and agriculture, both of which have important precedents in other provinces, unlocks 14.5 PJ/yr of Ontario RNG production in 2030, 20.5 PJ/yr in 2040, and 23.8 PJ/yr in 2050. This amounts to harnessing roughly 56 percent of Ontario's feasible RNG feedstocks from traditional sources in 2030, 66 percent of feasible feedstocks from traditional sources in 2040, and 65 percent of feasible feedstocks from traditional sources in 2050.

Additional policies, or increased stringency of the proposed policies, would be needed to activate Ontario's remaining RNG feedstocks from traditional sources.

When it comes to Ontario's non-traditional RNG feedstocks, namely crop residues and purpose-grown energy crops, TorchLight Bioresources calculates an additional 183 PJ/yr of potential in Ontario in 2020. However, because of the competing demands for these feedstocks, including for food, the modelling in this study did not see this feedstock being harnessed for RNG through to 2050. However, it's a feedstock that other government policies might be capable of triggering for Ontario RNG production.

2. Ontario RNG can make a significant contribution to Canada's climate targets

The second takeaway is that Ontario-produced RNG can make a significant contribution to Canada's climate targets. Different government policies unlock this potential with varying degrees of success. The most impactful policy scenario looked at in this study, in which there is a renewable gas mandate in effect across Canada as well as a GHG offset system that allows credits to be generated for methane utilization in landfills and agriculture, results in 5.6 Mt CO_2e of GHG reductions in 2030 and 6.6 Mt CO_2e in 2050.

Because this analysis focused on Biogas & RNG production rather than consumption, the model can't confirm that all of those GHG reductions happen in Ontario. In theory, some of Ontario's RNG could be exported to other provinces, resulting in GHG reductions in those provinces. However, given the level of natural gas demand in Ontario, which outstrips other provinces, it's most likely that Ontario-produced RNG would be consumed in Ontario under the policy scenarios analyzed, and that the GHG reductions that have been calculated here would indeed factor into Ontario's GHG inventory.

3. Ontario-produced RNG can help satisfy renewable gas demand

The final key takeaway is that Ontario-produced RNG can help the province meet ambitious renewable gas demand goals.

According to the modelling, the optimal policy scenario, in which a renewable gas mandate is combined with a GHG offsets system that allows credits to be generated for methane utilization in landfills and agriculture, would unleash enough RNG production in Ontario to satisfy 2.9 percent of all Ontario's residential and commercial natural gas demand in 2030. This amount of RNG would meet almost 20 percent of renewable gas demand under a 15-percent renewable gas mandate. In 2040, Ontario-produced RNG is satisfying 4.3 percent of total Ontario residential and commercial natural gas demand, and meeting 14.5 percent of renewable gas demand under a 30-percent renewable gas mandate. And by 2050, Ontario-produced RNG is satisfying 5.3 percent of total Ontario residential and commercial natural gas demand, and meeting 17.8 percent of renewable gas demand under a 30-percent renewable gas mandate.

Meanwhile, the model shows that under the optimal policy scenario, there is surplus RNG being produced economically in other provinces, especially in Alberta and Saskatchewan, that could help fill the gap to meet Ontario's renewable gas demand. The model also sees emerging renewable gases, like synthetic natural gas and low-carbon hydrogen, playing an increasing role in meeting Ontario's renewable gas demand from 2030 to 2050, although RNG continues to be relied on for satisfying the majority of Ontario's demand.

Notes

1 Stephen et al, (2020). *Renewable Natural Gas (Biomethane) Feedstock Potential in Canada*. TorchLight Bioresources.

2 Kelleher M, (2013). *Canadian Biogas Study: Benefits to the Economy, Environment and Energy.* Canadian Biogas Association.

3 Stephen et al (2020)

4 Deloitte & WSP, (2018). *Renewable natural gas production in Québec: A key driver in the energy transition. Assessment of technical and economic potential in Québec (2018–2030).*

5 IEA - Energy Technology Systems Analysis Program, (2013). *Biogas and Bio-syngas Production*.

6 IEA, (2020). *Advanced Biofuels – Potential for Cost Reduction.*

7 Hallbar Consulting, (2017). *Resource Supply Potential for Renewable Natural Gas in B.C.*

8 IRENA - International Renewable Energy Agency, (2013). *Road transport: the cost of renewable solutions*.

9 US EPA, (2021). *Landfill Projects. Available from: https://www.epa.gov/lmop/landfill-technical-data - Landfill and Project level data*.

10 S&T Consultants, (2021). *GHGenius 5.01d model, RNG from landfill gas pathway default value*.

11 Rajendran K, Brian Ó Gallachóir BO, Murphy JD, (2016). *The role of incentivizing biomethane in Ireland using anaerobic digestion. Prepared for the Environmental Protection Agency, Ireland*.

12 See: Stanton Bros. Ltd project in Ilderton, ON, at: https://farmtario.com/news/stanton-bros-ltd-set-to-become-first-agricultural-supplier-into-ontario-grid/

13 Environment and Parks Alberta, (2020)

14 Gouvernement du Québec, (2011)

15 Environment and Climate Change Canada, (2019). *Federal Renewable Fuels Regulations Overview*. Government of Canada.

16 Government of Quebec, (2020). *2030 Plan for a Green Economy: Framework policy on electrification and the fight against climate change*.

17 Government of British Columbia, (2018). *CleanBC: Our nature, our power, our future*.

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ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-6, p.14, 21

Question(s):

Please explain why Enbridge has no proposal for the integration of gas and electricity planning.

Response:

Enbridge Gas believes that a collaborative approach is critical for energy planning in Ontario and that utilities should not plan or operate energy systems in silos. It is imperative to remove barriers to collaboration so that a holistic approach to optimizing energy systems can be achieved along a pathway toward Ontario's net-zero future. Planning energy systems collaboratively will achieve a safe, reliable, and resilient energy system at the least cost, while reducing GHG emissions and maintaining customer choice by leveraging the different benefits of each system. Further, collaboration can contribute to an open and solution-based environment for energy system planning and low emission energy development.

The outcomes and recommendations from the Electrification and Energy Transition Panel's work are needed to inform the approach for achieving more integrated or collaborative energy system planning. Enbridge Gas believes it is prudent to understand the Ontario government's and the OEB's perspective and to better understand the roles that the IESO as the electricity system planner, Enbridge Gas as the gas system planner, local distribution companies (LDCs) and the OEB will have and play through the energy transition, before a proposal can be made.

While Enbridge Gas has not made a specific proposal on integration of gas and electricity planning, the Company is committed to taking a collaborative approach. Enbridge Gas's participation in various working groups with LDCs, municipalities, indigenous groups, builder community, and industry groups demonstrates the Company's desire and on-going efforts to do so. For example, Enbridge Gas:

- Has presented the Pathways to Net Zero Emissions for Ontario (P2NZ) Report to municipalities, LDCs, IESO to prompt and facilitate discussions about the benefits of a diversified pathway and the need for collaborative and integrated gas and electricity system planning to realize a net-zero future in Ontario;

- Has initiated discussions with the IESO to understand each organizations' respective planning processes, i.e., RPPAG and IRP.

- Has begun working with the City of Ottawa regarding IRP and the City's energy planning, as described in the response at Exhibit I.1.10-PP-9 part e).

Ontarians expect – and deserve – access to reliable, resilient, and cost-effective energy systems. A collaborative and integrated approach to energy planning in Ontario can result in better investments in both the gas and electricity systems, and drive optimal solutions for individual communities, that have unique energy needs, requirements, and system constraints.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-6, p.19

Question(s):

Please recalculate the figure of 57.8 million tCO2e using the current version of the e-Tools model, and making the adjustments recommended by the Evaluation Contractor in their report on that model.

Response:

The referenced paragraph was provided in this Rebasing Application for context only. The historical audited results of Demand Side Management (DSM), up to and including the 2021 DSM program year reflected in the reference, are not an issue within this proceeding.

The Company also declines to perform the recalculation requested as the adjustment to the E-tools model recommended by the Evaluation Contractor would not apply to past years' audited results that have been subject to a clearance proceeding and approved by the OEB.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-6, p.27

Question(s):

Please file all studies evaluating subsurface CO_2 storage, when those studies are available.

Response:

The subsurface CO_2 storage studies are still in development.

These studies are being funded by Enbridge Inc. and the Company notes that the studies are considered proprietary as potential competitors in CO_2 storage do not release their reports assessing CO_2 storage capability. Enbridge Gas will not file these studies when they are completed.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-6, p.33

Question(s):

Please provide the full business case, in its current form and whether or not finally approved by Enbridge, for Phase 2 of LCEP.

Response:

Phase 2 of the LCEP was included and contemplated in Phase 1 of the LCEP1 Application as part of the full study area, the Blended Gas Distribution Area[1]. Phase 2 of the LCEP will, among other outcomes, provide a larger sample size and accelerate the decarbonization of the gas grid, as detailed in the evidence presented in Exhibit 4, Tab 2, Schedule 6, page 15. It is part of Enbridge Gas's growth asset class as set out in Exhibit 2, Tab 6, Schedule 2, page 72 of Enbridge Gas's Asset Management Plan 2023 to 2032 which describes Enbridge Gas's Hydrogen Strategy.

Phase 2 of the LCEP builds on the existing pilot of Phase 1, is consistent with the Pathways to Net Zero Emission for Ontario Study which details a major role for hydrogen in Ontario's decarbonization efforts (see Exhibit 1, Tab 10, Schedule 5, Attachment 2, page 57), and supports the evolving energy transition in Ontario.

A completed business case is not available at this time. Enbridge Gas will leverage on-going learnings from the LCEP Phase 1 pilot to complete a business case for Phase 2, which will be the subject of a future leave to construct application to the OEB.

[1] EB-2019-0294, Exhibit B, Tab 1, Schedule 1, Attachment 5, p.1.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-6, p.38

Question(s):

Please provide the numerical data behind Figure 1 in Excel format.

Response:

The following response was provided by Posterity Group:

Please see Attachment 1 for the Excel.

Figure 1: Annual GHG Emissions by Scenario (tCO2e)

Year	Steady Progress	Reference Case	Diversified Portfolio	Electricity Centric	Energy Transition Initiatives
2019	47,792,623	47,792,623	47,792,623	47,792,623	47,792,674
2020	47,703,971	48,168,064	47,972,269	47,972,404	47,972,266
2021	47,829,699	48,566,681	48,145,601	48,146,643	48,146,741
2022	47,974,647	48,965,153	48,377,703	48,337,413	48,308,525
2023	47,504,589	49,047,092	48,349,951	48,381,248	48,036,578
2024	47,108,530	49,132,452	48,205,988	48,090,963	47,488,976
2025	46,764,330	49,328,643	47,627,648	47,328,279	46,864,618
2026	46,352,931	49,252,651	46,513,628	45,323,835	46,043,793
2027	45,950,954	49,347,482	45,627,211	43,523,751	45,194,202
2028	45,674,430	49,390,278	43,335,103	41,621,902	44,179,948
2029	45,124,378	49,429,643	41,793,297	39,442,814	43,226,247
2030	44,643,236	49,871,931	40,048,224	37,325,231	42,812,482
2031	43,586,391	49,969,504	37,920,320	34,834,848	41,983,627
2032	42,322,295	50,078,133	35,463,997	30,867,723	41,293,781
2033	41,633,627	50,192,731	33,321,058	28,665,826	40,572,832
2034	40,855,458	50,312,113	30,730,464	26,548,746	39,835,086
2035	40,107,068	50,433,035	28,992,696	24,424,959	38,993,483
2036	39,331,603	50,553,627	26,817,726	22,743,077	38,268,559
2037	38,072,122	50,670,835	24,585,782	20,902,167	37,552,557
2038	36,961,293	50,783,032	22,424,218	19,072,959	36,837,418
2039					36,349,764
2040					35,891,271
2041					35,552,465
2042					35,227,689
2043					34,919,131
2044					34,647,400
2045					34,387,337
2046					34,137,131
2047					33,895,656
2048					33,661,910
2049					33,429,081
2050					33,218,837

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-6, Attach 1, p.12

Question(s):

Please provide the memo “Enbridge ETI Scenario – extending trends to 2050 – Guidehouse input”.

Response:

The following response was provided by Posterity Group:

Please see Attachment 1.

Filed: 2023-03-08, EB-2022-0200, Exhibit I.1.10-SEC-67, Attachment 1, Page 1 of 4

Extrapolating Trends from the Diversified Scenario for the Energy Transition Initiative Scenario

Project: Energy Transition Scenario Analysis (ETSA)
Re: Planning Scenario
Submitted to: Guidehouse
Submitted by: Posterity Group
Date: 8 December 2021

This template has been provided to Guidehouse from Posterity Group to fill in details of how Guidehouse extrapolated the Diversified Portfolio scenario from a 2020-2038 forecast period out to 2050. The tables below are provided as a starting point with a request for Guidehouse to fill in how demand was extrapolated out to 2050.

Guidehouse indicated trends were extended by fuel and by sector. For each sector, please indicate which output metrics were extended, what period of output data was used to develop the trendline (e.g., what years were used), and if there are any exceptions (e.g., the slope was too steep, so starting in 2041 the annual growth rate was reduced to X%). Feel free to add additional columns or reformat the tables to better fit the information being requested.

	Built Environment - Residential Sector		
	What Output Data Fields that were projected forward? (e.g., UEC and End Use Count)	What years were used to develop a trend?	Exceptions (e.g, segment differences)
Fossil-based natural gas	End Use Count, Consumption	2019-2038	None
Renewable natural gas	End Use Count, Consumption	2019-2038	None
Hydrogen	End Use Count, Consumption	2019-2038	None
Emission factors	Did not use emissions factors from ETSA		
….(anything else)			

	Built Environment - Commercial Sector		
	What Output Data Fields that were projected forward? (e.g., UEC and End Use Count)	What years were used to develop a trend?	Exceptions (e.g, segment differences)
Fossil-based natural gas Renewable natural gas Hydrogen	End Use Count (floorspace), Consumption	Floorspace (ETSA end use count) was extrapolated using the trend from 2034-2038. Total gas consumption per unit of floorspace was extrapolated based on 2019-2038.	
Emission factors	Did not use emissions factors from ETSA		
….(anything else)			

	Industry		
	What Output Data Fields that were projected forward? (e.g., UEC and End Use Count)	What years were used to develop a trend?	Exceptions (e.g, segment differences)
Fossil-based natural gas	Program Potential Consumption (column BJ)	The same approach described below was followed for the Diversified and Electric scenarios. **2040:** For each individual gas, we used trendline(..) over the last 5-year period, from 2034 to 2038. **2050:** <u>Step 1</u>: Trendline(..) over the last 5-year period, from 2034 to 2038, for total gas demand. Not for each individual gas. This "total gas demand" forecast will be used to determine the gas mix for all gases but RNG. RNG supply in 2050 is determined based on step 2. <u>Step 2</u>: For RNG supply, assume 2040/50 growth is equivalent to 2030/40 growth. See this formula: $=RNG_{2040}+ (RNG_{2040}- RNG_{2030})x\ 20\%$	**Electric scenario:** Exceptions in approach: • Steps 3.1, 3.2 and 3.3 were modified in the Electric scenario. The share of end use gas demand that is electrified is assumed to include 60% of the Process Heating (Direct) end use, in addition to HVAC, Other Process and Process Cooling. Exceptions by segment: • <u>Agriculture</u>: The 2050 extrapolation exercise in Step 1 yields a negative number (due to the steep decline in gas demand in the Elec scenario). In this case, we assumed 2050 gas
Fossil-based natural gas + CCS	Program Potential Consumption (column BJ)		
Renewable natural gas	Program Potential Consumption (column BJ)		
Hydrogen	Program Potential Consumption (column BJ)		

	Industry		
	What Output Data Fields that were projected forward? (e.g., UEC and End Use Count)	What years were used to develop a trend?	Exceptions (e.g, segment differences)
		<u>Step 3</u>: Determine the share of gas demand that can be decarbonized via electricity, hydrogen and NG+CCS. <u>Step 3.1 Electricity</u>. Assume the following end-uses are electrified: HVAC, Other Process, and Process Cooling. Determine the share of gas demand that can be electrified (e.g., x% of gas demand is electrified). This approach is consistent across all industrial segments. <u>Step 3.2 Hydrogen</u>. The share of gas demand that can be decarbonized via hydrogen is determined for industrial segments for which the ETSA report identified hydrogen potential (e.g., Agriculture, Fabricated Metals, etc. – Refer to table in ETSA report). The share of gas demand for hydrogen is determined based on the total end use mix from Process Heating (Direct) and Process Heating (Water and Steam). <u>Step 3.3 NG+CCS</u>: Follow the same process as in Step 3.2 but for NG+CCS instead of Hydrogen. As with Hydrogen, only a subset of all industrial segments are suitable / have potential for NG+CCS. Step 4: The %s determined in Step 3 will be applied to model the decarbonization of natural gas via electricity, hydrogen and NG+CCS. First, subtract 2050 RNG supply (Step 2) from 2050 total gas demand. Then apply the %s from Step 3 (3.1, 3.2 and 3.3) to the residual gas demand. Note: The % of gas demand decarbonized via electricity (Step 3.1) was used in our Pathways study to determine electricity demand. However, we assume it would not be used in updating the ETSA scenario since those focus purely on gas demand, not electricity demand.	demand from Agriculture was defined by RNG supply (Step 2), with no additional gas supply via hydrogen or NG+CCS.
Emission factors	Did not use emissions factors from ETSA		
….(anything else)			

	Transportation – Only Segments that are forecasted to use Fossil-based Natural Gas, Hydrogen or RNG delivered through Enbridge's System			
	Segment X	Segment Y	Segment Z	Etc.
Fossil-based natural gas	No inputs from the ETSA were used to model transportation			

	Transportation – Only Segments that are forecasted to use Fossil-based Natural Gas, Hydrogen or RNG delivered through Enbridge's System			
	Segment X	Segment Y	Segment Z	Etc.
Renewable natural gas				
Hydrogen				
Emission factors				
….(anything else)				

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-7, p.1-2, 4

Question(s):

Please provide a detailed description of Enbridge's expertise in evaluating, financing, and/or commercializing innovative technologies. Please provide examples of successful technology development initiatives the Applicant has managed, if available. Please also provide details of all low carbon technologies the gas company has developed in the past.

Response:

This evidence will be addressed in Phase 2 of the proceeding as noted in Enbridge Gas's February 1, 2023 letter.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-10-7, p.8

Question(s):

Please provide details of the use of hydrogen in space heating applications in other jurisdictions.

Response:

This evidence will be addressed in Phase 2 of the proceeding as noted in Enbridge Gas's February 1, 2023 letter.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Three Fires Group Inc. (Three Fires)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 3
Exhibit 1, Tab 10, Schedule 8

Preamble:

Enbridge provides an overview of the greenhouse gas ("**GHG**") emissions resulting both from Enbridge Gas's operations and from end-use customer combustion of natural gas, and a summary of current policies governing them. The overview includes reference to Enbridge's commitment to achieve net-zero emissions by 2050 and an interim target of a 35% reduction in GHG emission intensity by 2030 relative to a 2018 base year.

Question(s):

a) Please comment on whether Enbridge is currently on track to meet its interim target of a 35% reduction in GHG emission intensity by 2030 relative to a 2018 base year.

b) Please provide details as to how Enbridge will achieve its interim target for 2030, including any plans to offset emissions.

c) Please confirm whether Enbridge's emission reduction targets or pathways have been independently evaluated, verified or audited.

d) Please provide the anticipated costs to ratepayers for GHG reductions under Enbridge's anticipated reduction pathways. Please include anticipated costs by franchise area for 10 years going forward.

Response:

a) Enbridge Inc. is currently on track to meet its interim corporate ESG target of a 35% reduction in GHG emission intensity by 2030 relative to a 2018 base year[1].

[1] 2021 Sustainability Report, page 20. Enbridge 2021 Sustainability Report

b) The interim target of a 35% reduction in GHG emission intensity by 2030 relative to a 2018 baseline is an Enbridge Inc. target. To support the achievement of this ESG goal, Enbridge Gas has identified initiatives that it has included within its scope 1 and 2 emissions reduction plan, please see Exhibit 1, Tab 10, Schedule 8, Tables 1 & 2 for the opportunities included to date. In addition, Enbridge Gas, along with other business units, will continue to identify new emissions reduction opportunities and assess them for technical feasibility and cost-effectiveness, to support achievement of the target. Those that are technically feasible and cost-effective may be integrated into the AMP and managed through the approved capital envelope. Please note Enbridge Gas has identified an error in Table 1 of Exhibit 1, Tab 10, Schedule 8. The Forecasted Project Emissions Reductions for the Direct Inspection and Maintenance Program/Leak Detection and Repair (LDAR) project should be 8,200 tCO2e, not 118,200 tCO2e.With regards to offsetting emissions, please see response at Exhibit I.1.10-PP-10.

c) No, Enbridge's emission reduction targets or pathways have not been independently evaluated, verified or audited.

d) Additional costs, beyond what is included within the rebasing application, are not anticipated; however, consultations regarding amendments to the federal methane regulations are underway and there could be incremental costs if additional initiatives must be implemented to comply with new regulatory requirements.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Three Fires Group Inc. (Three Fires)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 4

Preamble:

Enbridge describes the energy transition assumptions that Enbridge Gas has incorporated into the Company's forecasting and planning processes, and the impacts on the Company's Asset Management Plan ("**AMP**"), finance and regulatory approaches. It states that the forecasts are important inputs into the Company's planning activities, such as the AMP development, gas supply planning, and rate setting. It further states that historically these Enbridge Gas forecasts only considered climate policies that had already been implemented.

Question(s):

a) Please explain the considerations that helped determine Enbridge's decision to begin to include in its forecasting policies that have not already been implemented.

b) Please explain Enbridge's reasoning in previously including only climate policies that had already been implemented.

c) Please describe any disadvantages to the new approach of including in Enbridge's forecasting policies that have not already been implemented.

d) Please describe the general composition of internal teams that Enbridge has used for the purposes of developing and applying its energy transition assumptions, and/or towards performing the reviews set out at paragraph 6 of Cara-Lynn Wade and Jennifer Murphy's evidence. In particular, please include details such as the number and seniority of personnel responsible, the approximate portion of their time devoted to analyzing energy transition issues, their general experience in the area, and any resources of significance that they have available to them in performing this aspect of their work.

e) With respect to Enbridge's statement at paragraph 11 that insufficient certainty exists concerning future requirements for new build and retrofit building codes, why does Enbridge not incorporate some form of scenario analysis as opposed to excluding the effects of new build and retrofit building codes?

f) Please describe the general thinking behind the forecasts set out in Table 2. In particular, please describe any scenario analysis that Enbridge has performed and why Enbridge has settled on the figures set out in the table.

g) Does the Customer Additions Forecast take into account any impact of increased cost to remaining consumers resulting from other customers transitioning away from use of natural gas?

h) What new or increased challenges will Enbridge face – for example with respect to increased costs or customer retention – in the event Ontario assumes a more status quo orientation to energy transition in the short-term, then pivots sharply to more drastic electrification scenarios in the medium term (i.e., over the next 3-6 years)?

i) What would the scenario referenced in question (h) immediately above mean for Enbridge customers in terms of new or increased challenges? Will these effects be uniform, or will they be felt disproportionately by certain individuals or groups?

<u>Response:</u>

a -c) Historically, Enbridge Gas only included the policies that were implemented because the impacts of future policies were not known and/or quantifiable. As provided at Exhibit 1, Tab 10, Schedule 6, paragraph 20, there has been significant development of climate and energy transition targets and plans in Canada at all levels of government in the last few years. While there remains a significant lack of details on how these targets will be met, and development of detailed policies is still in progress, Enbridge Gas believes it is prudent to incorporate energy transition assumptions into the Company forecasts where there is reasonable certainty based on policy signals, market trends and stakeholder feedback.

In the development of energy transition adjustments to the forecasts, Enbridge Gas took a conservative approach. Overestimating the impact of climate and energy transition policies could create a risk that Enbridge Gas does not have sufficient assets in the Company's Asset Management Plan (AMP) and/or Gas Supply Plan. Enbridge Gas has prudently incorporated energy transition related assumptions and, therefore, does not consider there to be disadvantages to the Energy Transition review and adjustment process that it has implemented.

As provided at Exhibit 1, Tab 10, Schedule 6, Section 4 and Exhibit 1, Tab 10, Schedule 4, paragraph 8, Enbridge Gas plans to continue evolving the Company's stakeholder engagement and evaluating the impacts of policies as certainty of implementation date and impact on the Company's forecasts is established.

d) The development of energy transition assumptions and the reviews set out at Exhibit 1, Tab 10, Section 4, paragraph 6 was led by the Carbon and Energy Transition Planning team. The Carbon and Energy Transition Planning team is led by Jennifer Murphy, Manager Carbon and Energy Transition Planning, and Cara-Lynne Wade, Director Energy Transition Planning, and their CVs are provided at Exhibit 1, Tab 1, Schedule 5 pages 61 and 89, respectively. Please see response at Exhibit I.1.6-CCC-22 for a description of the team composition. Additional departments that supported the development and application of energy transition assumptions include Finance, Customer Care, Engineering, Business Development and Regulatory, and Energy Services.

e) Enbridge Gas undertook the Energy Transition Scenario Analysis (ETSA) Project as provided in Exhibit 1, Tab 10, Schedule 5, Attachment 1 as a means of visualizing possible outcomes from various scenarios. As provided at Exhibit 1, Tab 10, Schedule 4, paragraphs 6 and 7, the ETSA project was used as one of several inputs to develop energy transition adjustments to the forecast. From a forecasting and planning perspective, it is not practical to undertake scenario analysis for the numerous possible individual future changes that could occur in the future. The level of effort to create multiple forecasts and plans is prohibitive.

f) Please see the response at Exhibit I.1.10-STAFF-27 part a), and Exhibit I.1.10-GEC-10 part c).

g) Enbridge Gas's Customer Additions Forecast does not take into account any impact of increased cost to remaining consumers resulting from other customers transitioning away from use of natural gas.

h - i) Please see response at Exhibit I.1.10-SEC-19. Enbridge Gas cannot determine if different customer types will be disproportionately impacted by other customers fuel-switching without undertaking further analysis which cannot be carried out at this time.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Three Fires Group Inc. (Three Fires)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 5
Exhibit 1, Tab 10, Schedule 5, Attachment 1

Preamble:

Enbridge retained Posterity Group Consulting ("**Posterity**" or "**PG**") to work on an Energy Transition Scenario Analysis ("**ETSA**") project. The ETSA project provides Enbridge Gas with theoretical scenarios of the future to help assess the potential impacts from climate policies and economic conditions that Enbridge's system could experience over the next 20 years. Four scenarios were modelled of future gas demand and greenhouse gas emissions over a twenty-year time horizon. Probabilities are not assigned to the scenarios and Enbridge does not endorse or oppose any of the scenarios presented in the report.

Question(s):

a) Why did the ETSA project not assign (or why did Enbridge not request or otherwise submit for the purposes of this Application) probabilities to the likelihood of each scenario occurring or include analysis of the cost implications of each scenario?
b) What are PG's views concerning the likelihood of each scenario occurring, as well as the cost implications of each scenario?
c) What are Enbridge's views concerning the likelihood of each scenario occurring, as well as the cost implications of each scenario?
d) Please produce the long list of critical drivers referenced at page 22 of the report.
e) Please confirm whether page 27 of the report sets out a full list of all variables considered by Enbridge and/or PG for the purposes of page 22 of the report that:
    i. Satisfied the criterion that it could have a material impact on Enbridge Gas annual volume, peak hour and day, and/or GHG emissions in the next 20 years;
    ii. But did not satisfy the criterion for sufficient available data to predict what the variable could be in the next 20 years

    If page 27 does not set out the full list of such variables, please provide a full list of variables that meet the above criteria.
f) Please explain the rationale for the maximum setting for each of the following variables set out in Exhibit 14, including any consideration given to drawing from international policy developments and thinking:

   i. Codes and standards: retrofit
   ii. Codes and standards: new construction

g) Please confirm whether PG and Enbridge considered any international examples or discussions for the purposes of its critical driver analysis for:
   1. Codes and standards, as discussed in Appendix C of the report
   2. Non-price driven fuel switching, as discussed in Appendix D of the report (in addition to the examples from the United States set out in Appendix D)

   If international sources were considered, please provide details. If they were not considered, please explain why.

Response:

a) As stated at Exhibit 1, Tab 10, Schedule 5, page. 3, Enbridge Gas undertook the Energy Transition Scenario Analysis (ETSA) project to understand the impact of climate policies on the gas distribution system under a range of possible scenarios. Assigning probabilities to the scenarios was considered speculative and highly subjective. Enbridge Gas considered assignment of probabilities to be of limited value for forecasting and planning purposes and therefore did not include it in the scope of the study.

   Based on the project's objective provided above, cost analysis of each scenario was not included in the scope of work for the ETSA project; however, the Pathway to Net-Zero Emissions in Ontario (P2NZ) Study, which is underpinned by the Diversified Portfolio and Electricity Centric scenarios developed in the ETSA project, provides a cost comparison under these two pathways, as provided in Exhibit 1, Tab 10, Schedule 5, Attachment 2.

   Enbridge Gas agrees with the findings of the P2NZ Study "which concluded that a diversified approach that included a targeted approach to electrification tied with deployment of low-or zero-carbon gases, including renewable natural gas (RNG), hydrogen, and natural gas with carbon capture, is the most cost-effective and resilient method to achieve net zero emissions in Ontario." Enbridge Gas is unable to comment on the likelihood of the diversified scenario or any other scenario occurring.

b) The following response was provided by Posterity Group:

   Please see response at Exhibit I.1.10-ED-19 part e). Assessing the cost implications of each scenario was not within the project scope.

c) Please see part a).

d-e) The following response was provided by Posterity Group:

Please see response at Exhibit I.1.10-SEC-35.

f) The following response was provided by Posterity Group:

Appendix C of the report provides detailed rationale for how we developed ‘high stringency’ and ‘medium stringency’ settings with respect to changes to new construction codes, retrofit codes and appliance standards. Please see Exhibit 1, Tab 10, Schedule 5, Attachment 1, pages 100 to 107. The maximum settings for the variables set out in Exhibit 14 are based on the ‘high stringency’ settings.

Exhibit 1, Tab 10, Schedule 5, Attachment 1, page 100 outlines our approach to selecting and modelling codes and standards. “We focused on C&S’s that were implemented, planned, or drafted. The goal was to capture the impacts of defined codes, and to avoid speculating on possible future codes that were not yet determined, with the exception of the potential retrofit codes for which the timing and impact were also estimated.”

Exhibit 1, Tab 10, Schedule 5, Attachment 1, pages 100 to 101 presents the list of codes included in the analysis and a discussion on codes that were excluded. While international policy developments and thinking were not explicitly considered, NECB 2020 Tiered Code (Part 3), NBC 2020 Tiered Code (Part 9), and Canada’s Energy Efficiency Regulations are all influenced by international policy developments, including the International Energy Conservation Code (IECC).

g) The following response was provided by Posterity Group:

1. Please refer to response at Exhibit 1.10-Three Fires-5 part f).

2. While no additional international examples were considered, beyond the examples from the United States, the non-price driven fuel switching input settings were not limited by the research. The research provided examples of what might cause switching from gas to electricity and what sectors and end-uses are being targeted by policies, codes, and programs. The maximum rate of change is determined by characteristics of the built environment, including new construction rates and the effective useful life of the underlying natural gas end-use equipment being replaced.

The Electricity Centric input settings for non-price driven fuel switching represent the maximum setting for this CD. They represent an upper bound for non-price fuel switching impacts. See Exhibit 1, Tab 10, Schedule 5, Attachment 1, page 43.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Three Fires Group Inc. (Three Fires)

Interrogatory

Reference:

Exhibit 1, Tab 10, Schedule 7

Preamble:

Enbridge seeks approval of an Energy Transition Technology Fund. It includes the company's history in technical innovation as part of its rationale. It states that the proposed funds will be used to accelerate technology development and deployment, drive market adoption and transformation, and drive economies of scale.

Question(s):

a) What opportunities, if any, will there be for Indigenous participation in the Fund, including with respect to development, piloting, or selection of projects.

b) What measures, if any, will be taken to ensure that the Fund produces benefits for Indigenous communities specifically or as part of any benefits that Enbridge customers more widely eventually enjoy?

c) Are there examples of Indigenous participation in any of the projects referenced at paragraph 11 that could provide helpful precedents for Indigenous participation relating to the proposed Fund? If not, are there examples from other Enbridge projects that could provide similar assistance in the current proceeding?

Response:

a-c) This evidence will be addressed in Phase 2 of the proceeding as noted in Enbridge Gas's February 1, 2023 letter.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence (ED)

Interrogatory

Reference:

Exhibit 1, Tab 11, Schedule 1

Question(s):

a) What relief is Enbridge seeking in relation to the evidence at Tab 11?

b) Is it within the OEB's jurisdiction in this proceeding to "extend the terms of existing transportation contracts and set a floor on the ex-franchise demand factors used for allocating Dawn to Parkway costs for a period of ten years"?

c) What is Enbridge's position on the relied set out in (b)?

d) Please provide a link to the CME, FRPO & OGVG evidence referred to on page 1.

e) Enbridge states on page 8: "The ICF analysis concludes that the Dawn Parkway System is highly likely to remain contracted through to 2034 at levels similar to today." Please explain the reference to 2034. The ICF report appears to relate only to 2022 to 2028. If ICF produced separate analysis up to 2034, please file that.

f) Please provide a table listing all the ex-franchise contracts on the Dawn-Parkway system, including the geographic location, expiry date, the contracted capacity (GJ/d), and the actual capacity utilized (GJ/d) under that contract on the peak summer day and peak winter day over the past 5 years.

Response:

a) Enbridge Gas is not requesting any relief in relation to the evidence provided at Exhibit 1, Tab 11, Schedule 1.

b-c) Enbridge Gas does not believe the OEB has the jurisdiction in this proceeding to extend the terms of existing transportation contracts. In any event, the context in the 2016 Dawn Parkway Expansion Project proceeding where the quoted proposal was made by intervenors was different. That case addressed a proposal to add facilities to increase Dawn Parkway System capacity, and the intervenor evidence proposed steps to be taken with existing and new customers to underpin the need for the new facilities and protect existing ratepayers from negative impacts in the future.

Similarly, the intervenor proposal to set a floor on the ex-franchise demand factors used for allocating Dawn Parkway System costs for a period of ten years in the 2016 Dawn Parkway Expansion Project proceeding was in the context of protecting ratepayers from negative consequences of a new facilities proposal. There is no such proposal for new facilities in this rebasing application.

d) https://www.rds.oeb.ca/CMWebDrawer/Record/461927/File/document

e) The reference in the evidence is incorrect. The study relates to 2024 to 2028.

f) Please see Attachment 1. The capacity used on a peak summer day and peak winter day is customer-specific information outside of STAR reporting requirements. As such, this information has been redacted from Attachment 1 and will be provided to the OEB under separate, confidential cover.

Customer Name	Agreement Name	Receipt Point	Delivery Point	Quantity (GJ)	Start Date	Expiry Date	Geographic Location	Maximum Daily Throughput Summer					Maximum Daily Throughput Winter				
								2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
York Energy Centre LP	C10102	Dawn	Parkway	11,654	Apr 1, 2012	Oct 31, 2023	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Repsol Energy North America Canada Partnership	C10128	Dawn	Parkway	5,275	Dec 1, 2022	Oct 31, 2023	Texas	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
1425445 Ontario Limited o/a Ut lities Kingston	M12077	Dawn	Parkway	6,322	Apr 1, 2004	Mar 31, 2025	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Energir, L.P. by its General Partner Energir Inc	M12109	Dawn	Parkway	65,000	Nov 1, 2007	Oct 31, 2027	Quebec	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Goreway Station Partnership	M12110	Dawn	Parkway	140,000	Nov 1, 2007	Oct 31, 2028	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Vermont Gas Systems, Inc.	M12119	Dawn	Parkway	20,000	Nov 1, 2007	Oct 31, 2025	Vermont	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Greater Toronto Airports Authority	M12120	Dawn	Parkway	7,500	Nov 1, 2007	Oct 31, 2024	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Liberty Utilities (St. Lawrence Gas) Corp.	M12126	Dawn	Parkway	10,785	Nov 1, 2008	Mar 31, 2025	New York	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Portlands Energy Centre L.P. by its General Partner, Portlands Energy Centre Inc.	M12130	Dawn	Parkway	100,000	Jan 13, 2009	Apr 21, 2029	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Energir, L.P. by its General Partner Energir Inc	M12132	Dawn	Parkway	52,343	Apr 1, 2009	Mar 31, 2025	Quebec	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
The Narragansett Electric Company d/b/a National Grid	M12164	Dawn	Parkway	1,081	Nov 1, 2011	Oct 31, 2025	Rhode Island	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Connecticut Natural Gas Corporation	M12166	Dawn	Parkway	6,410	Nov 1, 2011	Oct 31, 2025	Connecticut	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Consolidated Edison Company of New York, Inc. and Orange and Rockland Utilities, Inc.	M12171	Dawn	Parkway	21,825	Nov 1, 2011	Oct 31, 2025	New York	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Energir, L.P. by its General Partner Energir Inc	M12172	Dawn	Parkway	22,908	Apr 1, 2010	Mar 31, 2025	Quebec	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Central Hudson Gas & Electric Corporation (a subsidiary of CH Energy Group, Inc.)	M12182	Dawn	Parkway	5,467	Nov 1, 2011	Oct 31, 2025	New York	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
York Energy Centre LP	M12184	Dawn	Parkway	76,000	Apr 1, 2012	Oct 31, 2025	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Niagara Mohawk Power Corporation d/b/a National Grid	M12186	Dawn	Parkway	55,123	Nov 1, 2011	Oct 31, 2025	New York	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Vermont Gas Systems, Inc.	M12190	Dawn	Parkway	500	Nov 1, 2010	Oct 31, 2025	Vermont	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
The Brooklyn Union Gas Company d/b/a National Grid NY	M12193	Dawn	Parkway	43,170	Nov 1, 2010	Oct 31, 2025	New York	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
KeySpan Gas East Corporation d/b/a National Grid	M12194	Dawn	Parkway	39,934	Nov 1, 2010	Oct 31, 2025	New York	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Central Hudson Gas & Electric Corporation (a subsidiary of CH Energy Group, Inc.)	M12195	Dawn	Parkway	10,792	Nov 1, 2010	Oct 31, 2025	New York	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Boston Gas Company d/b/a National Grid	M12197	Dawn	Parkway	17,915	Nov 1, 2010	Oct 31, 2025	Massachusetts	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Liberty Utilities (EnergyNorth Natural Gas) Corp.	M12200	Dawn	Parkway	4,317	Nov 1, 2010	Oct 31, 2025	New Hampshire	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Connecticut Natural Gas Corporation	M12201	Dawn	Parkway	18,077	Nov 1, 2010	Oct 31, 2025	Connecticut	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
The Southern Connecticut Gas Company	M12202	Dawn	Parkway	34,950	Nov 1, 2010	Oct 31, 2025	Connecticut	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Yankee Gas Services Company dba Eversource Energy	M12203	Dawn	Parkway	43,116	Nov 1, 2010	Oct 31, 2025	Connecticut	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Eversource Gas Company of Massachusetts dba Eversource Energy	M12204	Dawn	Parkway	27,803	Nov 1, 2010	Oct 31, 2025	Massachusetts	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Connecticut Natural Gas Corporation	M12206	Dawn	Parkway	9,170	Nov 1, 2010	Oct 31, 2025	Connecticut	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
The Southern Connecticut Gas Company	M12207	Dawn	Parkway	13,970	Nov 1, 2010	Oct 31, 2025	Connecticut	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Yankee Gas Services Company dba Eversource Energy	M12210	Dawn	Parkway	20,560	Nov 1, 2010	Oct 31, 2025	Connecticut	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Yankee Gas Services Company dba Eversource Energy	M12212	Dawn	Parkway	5,380	Nov 1, 2010	Oct 31, 2025	Connecticut	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
The Southern Connecticut Gas Company	M12213	Dawn	Parkway	9,735	Nov 1, 2010	Oct 31, 2025	Connecticut	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Connecticut Natural Gas Corporation	M12214	Dawn	Parkway	6,489	Nov 1, 2010	Oct 31, 2025	Connecticut	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Energir, L.P. by its General Partner Energir Inc	M12222	Dawn	Parkway	257,784	Nov 1, 2015	Oct 31, 2025	Quebec	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Vermont Gas Systems, Inc.	M12224	Dawn	Parkway	8,100	Nov 1, 2014	Oct 31, 2025	Vermont	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Energir, L.P. by its General Partner Energir Inc	M12232	Dawn	Parkway	39,507	Nov 1, 2016	Oct 31, 2031	Quebec	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Energir, L.P. by its General Partner Energir Inc	M12233	Dawn	Parkway	19,754	Nov 1, 2016	Oct 31, 2031	Quebec	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Energir, L.P. by its General Partner Energir Inc	M12237	Dawn	Parkway	85,680	Nov 1, 2016	Oct 31, 2031	Quebec	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Energir, L.P. by its General Partner Energir Inc	M12244	Dawn	Parkway	36,670	Nov 1, 2017	Oct 31, 2032	Quebec	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Liberty Utilities (St. Lawrence Gas) Corp.	M12249	Dawn	Parkway	10,412	Nov 1, 2017	Oct 31, 2032	New York	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
1425445 Ontario Limited o/a Ut lities Kingston	M12251	Dawn	Parkway	5,000	Nov 1, 2017	Oct 31, 2032	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Northern Utilities, Inc.	M12256	Dawn	Parkway	42,962	Nov 1, 2017	Oct 31, 2033	New Hampshire	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Liberty Utilities (Gas New Brunswick) Corp.	M12270	Dawn	Parkway	2,650	Nov 1, 2018	Oct 31, 2040	New Brunswick	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Liberty Utilities (Gas New Brunswick) Corp.	M12271	Dawn	Parkway	4,831	Nov 1, 2019	Oct 31, 2040	New Brunswick	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Liberty Utilities (Gas New Brunswick) Corp.	M12272	Dawn	Parkway	959	Nov 1, 2020	Oct 31, 2040	New Brunswick	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Boston Gas Company d/b/a National Grid	M12273	Dawn	Parkway	60,328	Nov 1, 2018	Oct 31, 2040	Massachusetts	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
The Narragansett Electric Company d/b/a National Grid	M12274	Dawn	Parkway	30,656	Nov 1, 2018	Oct 31, 2040	Rhode Island	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Eastward Energy Incorporated	M12276	Dawn	Parkway	10,617	Nov 1, 2018	Oct 31, 2040	Nova Scotia	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Liberty Utilities (Gas New Brunswick) Corp.	M12277	Dawn	Parkway	112	Nov 1, 2018	Oct 31, 2040	New Brunswick	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Northern Utilities, Inc.	M12279	Dawn	Parkway	10,875	Nov 1, 2022	Oct 31, 2037	New Hampshire	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Bangor Natural Gas Company	M12283	Dawn	Parkway	8,796	Nov 1, 2022	Oct 31, 2037	Maine	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Liberty Utilities (EnergyNorth Natural Gas) Corp.	M12284	Dawn	Parkway	5,348	Apr 1, 2019	Oct 31, 2040	New Hampshire	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Eversource Gas Company of Massachusetts dba Eversource Energy	M12292	Dawn	Parkway	64,588	Nov 1, 2019	Oct 31, 2040	Massachusetts	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
The Berkshire Gas Company	M12293	Dawn	Parkway	4,239	Nov 1, 2019	Oct 31, 2040	Massachusetts	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Portlands Energy Centre L.P Napanee	M12294	Dawn	Parkway	143,775	Apr 29, 2020	Oct 31, 2032	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

Customer Name	Agreement Name	Receipt Point	Delivery Point	Quantity (GJ)	Start Date	Expiry Date	Geographic Location	Maximum Daily Throughput Summer					Maximum Daily Throughput Winter				
								2018	2019	2020	2021	2022	2018	2019	2020	2021	2022
Northern Utilities, Inc.	M12296	Dawn	Parkway	10,814	Nov 1, 2020	Oct 31, 2040	New Hampshire	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Connecticut Natural Gas Corporation	M12297	Dawn	Parkway	39,789	Nov 1, 2021	Oct 31, 2036	Connecticut	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
The Southern Connecticut Gas Company	M12299	Dawn	Parkway	23,743	Nov 1, 2021	Oct 31, 2036	Connecticut	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
1425445 Ontario Limited o/a Ut lities Kingston	M12X015	Dawn	Parkway	5,000	Apr 1, 2014	Mar 31, 2025	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Enbridge Gas Inc. (In-Franchise Customers - EGD Zone)	M12079	Dawn	Parkway	1,764,678	Apr 1, 2014	Oct 31, 2028	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Enbridge Gas Inc. (In-Franchise Customers - EGD Zone)	M12080	Dawn	Parkway	106,000	Nov 1, 2006	Oct 31, 2025	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Enbridge Gas Inc. (In-Franchise Customers - EGD Zone)	M12108	Dawn	Parkway	57,100	Nov 1, 2007	Oct 31, 2025	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Enbridge Gas Inc. (In-Franchise Customers - EGD Zone)	M12125	Dawn	Parkway	10,692	Nov 1, 2008	Oct 31, 2025	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Enbridge Gas Inc. (In-Franchise Customers - EGD Zone)	M12188	Dawn	Parkway	149,703	Nov 1, 2011	Oct 31, 2025	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Enbridge Gas Inc. (In-Franchise Customers - EGD Zone)	M12225	Dawn	Parkway	400,000	Nov 1, 2015	Oct 31, 2025	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Enbridge Gas Inc. (In-Franchise Customers - EGD Zone)	M12234	Dawn	Parkway	170,000	Nov 1, 2016	Oct 31, 2031	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Enbridge Gas Inc. (In-Franchise Customers - EGD Zone)	M12250	Dawn	Parkway	190,000	Nov 1, 2017	Oct 31, 2032	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Enbridge Gas Inc. (In-Franchise Customers - EGD Zone)	M12264	Dawn	Parkway	75,000	Nov 1, 2019	Oct 31, 2034	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Enbridge Gas Inc. (In-Franchise Customers - EGD Zone)	M12X006	Dawn	Parkway	200,000	Nov 1, 2012	Oct 31, 2025	Ontario	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence (ED)

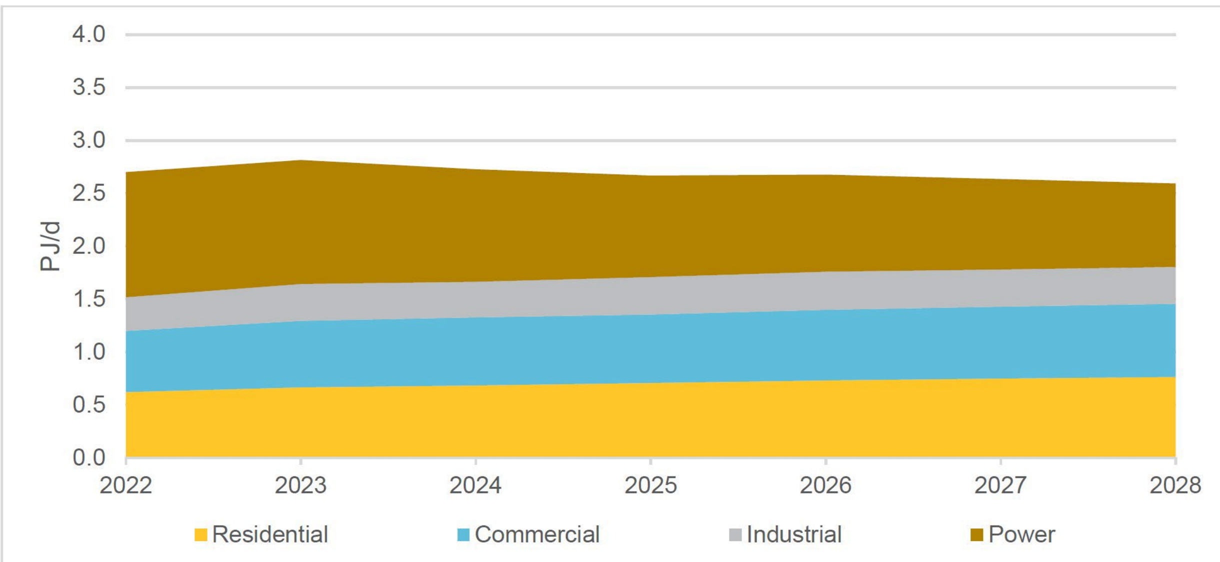
Interrogatory

Reference:

Exhibit 1, Tab 11, Schedule 1, Attachment 1, p. 11

Preamble:

Exhibit 3-5 New England Natural Gas Demand by Sector



Question(s):

These questions are for ICF:

a) In forecasting the contract demand on the Dawn Parkway system, did ICF consider the ISO New England Final 2022 Heating Electrification Forecast (link)? Did ICF consider Vermont's GHG emissions reductions legislation? Did ICF consider New York's decarbonization pathways study?

b) If not, please do so.

c) Please provide a breakdown of the forecast Ontario demand by summer and winter.

Response:

The following response was provided by ICF:

a) ICF's Q2 2022 Forecast for natural gas demand in New England and New York account for the latest policies that were available when the forecast used in the ICF Study (Q2 2022) was finalized. The ICF study projects demand for natural gas capacity on the Dawn to Parkway System through 2028. During this period, ICF expects the impact of decarbonization policies in New England and New York to have relatively small impacts on natural gas demand and natural gas demand for pipeline capacity.

   ICF's forecast for New England natural gas demand forecasts declining natural gas demand from the power generation sector in conjunction with expanding renewable power generation and it reflects the New England natural gas utilities' forecasts for natural gas demand in the residential, commercial, and industrial sector. The utilities' forecasts also account for the state and local emission reductions policies.

   The ICF Forecast did not take into account the ISO New England Final 2022 Heating Electrification Forecast, which was published two weeks before ICF finalized the Q2 2022 Forecast used in the Enbridge Gas analysis. Instead, ICF's forecast for New England accounts for the ISO New England Final 2021 Heating Electrification Forecast dated May 1, 2021. The 2021 Forecast projected higher amounts of heating would be electrified between 2022 and 2030; in 2028, for example, the 2021 Forecast projected that 1,581 GWh of new heating would be electric while the 2022 Forecast projected that 1,539 GWh of new heating would be electric. The two forecasts are similar, however, and the impact of updating the ICF Forecast to reflect the most recent ISO-NE Forecast would have been minimal. The updated 2022 Forecast value of 1,539 GWh of incremental new electric heating in 2028 would imply that a maximum 0.015 PJ/d (according to the U.S. Energy Information Administration conversion of 1 KWh to 3,412 Btu) of natural gas heating demand could be electric instead of 0.016 PJ/d in the 2021 Forecast. This also assumes that all the new electric heating was a result of conversions from current natural gas heating to electricity but the forecast notes that the projected new electric heating comes from all sources, including buildings that already use electricity and energy sources for heating.

   In ICF's Gas Market Model, natural gas demand from the six states in New England is aggregated and not calculated for each state. Vermont accounts for about 2% of New England's natural gas LDC demand, but the emissions reductions policy is accounted for in ICF's overall forecast of power generation and building demand to the best of our ability based on the emissions reductions targets. Renewable generation increases while Vermont Gas System's LDC demand increases at an annual average rate of about 1% between 2022 and 2028.

ICF did consider New York's Climate Leadership & Community Protection Act (CLCPA) and its decarbonization pathways study. ICF's Q2 2022 base case used existing New York State energy policies to set targets for each natural gas demand sector. The Q2 2022 Forecast accounts for the New York 70% renewable generation target by 2030, the New York utility energy efficiency targets based on Clean Energy Fund deployment targets, and utility forecasts like the May 2020 National Grid Downstate Natural Gas Long-Term Capacity Report.

Specific natural gas demand targets by sector were not incorporated into the New York CLCPA. However, based on the "Pathways to Deep Decarbonization in New York State" published on June 24, 2020, ICF's natural gas demand is roughly in line with the forecast for power generation natural gas demand (figure 18) and industrial demand (figure 15) in the High Technology Availability Pathway. The building demand (figure 13) in the High Technology Availability Pathway is about 650 TBtu in 2030 – the closest forecast year provided in the figure – which is 173 TBtu below ICF's forecast for 2028 New York State demand. It is important to note that these are annual demand totals which do not account for winter peak demand periods, which the "Pathways to Deep Decarbonization in New York State" acknowledges are the most difficult to reduce and which drive contracting on the Dawn to Parkway system.

In New York, for example, there has not yet been a discernable decrease in winter natural gas demand since the Climate Leadership & Community Protection Act was passed in 2019. During the 2018-19 winter, weather-normalized New York State natural gas demand was 158 BBtu per heating degree day (HDD) according to the U.S. EIA and NOAA population-weighted HDDs. During the 2020-21 winter, weather-normalized New York State natural gas demand was 162 BBtu/HDD and during the 2021-22 winter, it was 157 BBtu/HDD.

b) ICF has partially incorporated the referenced legislation based on information available at the time of the study (Q2 2022). Additional analysis would require significant additional effort and is not available.

c) Table 1 shows the Ontario winter and summer demand forecast by year. Winter includes December through February. Summer includes June through August.

Table 1
Ontario Winter and Summer Demand Forecast by Year

	Ontario Demand (PJ/d)
Winter 2022-23	4.47
Summer 2023	1.65
Winter 2023-24	4.48
Summer 2024	1.66
Winter 2024-25	4.68
Summer 2025	1.63
Winter 2025-26	4.81
Summer 2026	1.89
Winter 2026-27	4.86
Summer 2027	1.83
Winter 2027-28	4.83
Summer 2028	1.81
Winter 2028-29	4.79

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence (ED)

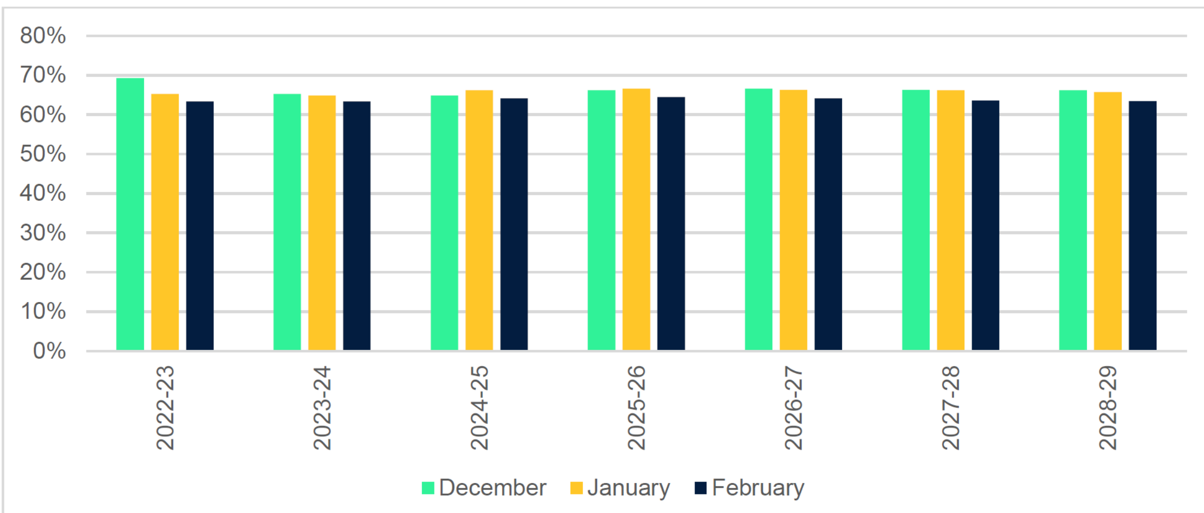
Interrogatory

Reference:

Exhibit 1, Tab 11, Schedule 1, Attachment 1, p. 16

Preamble:

Exhibit 3-13 ICF Q2 2022 Dawn Parkway Winter Utilization (%)



Question(s):

a) Please provide six versions of the above figure – one for each of the customer types listed in exhibit 2-2 on page 6. Alternatively, if it is easier, please provide the same information but in table format.

Response:

The following response was provided by ICF:

a) Please see Table 1.

Table 1
Exhibit 2-2 Capacity Contracts (PJ/d) by Customer Type[1]

Customer Type	2022	2023	2024-28
Enbridge Gas	5.54	0.00	0.00
LDCs, New York	0.20	0.20	0.05
LDCs, New England	0.55	0.53	0.33
LDCs, Ontario and Canadian Maritimes	0.62	0.62	0.38
Others (Marketers and Power Generators)	0.51	0.48	0.40
Pipeline (TransCanada Pipelines Limited)	0.19	0.06	0.01
TOTAL	7.61	1.89	1.17

ICF's Gas Market Model does not calculate utilization of a pipeline on a per-customer or customer-type basis. The model calculates the utilization of the pipeline by connecting the upstream supply to the downstream demand sources, but utilization of the pipeline corridors is based on the total natural gas flows. The contracts shown in Exhibit 2-2 show LDC demand, including Enbridge Gas, accounting for 91% of the demand in 2022. In ICF's forecast, residential, commercial, and industrial customers, the primary LDC customers, comprise more than 75% of the average winter demand between the winter 2022/2023 and the winter 2028/2029, which indicates that they will continue to be primary Dawn to Parkway customers.

[1] Enbridge Gas Inc. Transport Shippers as of February 1, 2022

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 11, Schedule 1

Question(s):

Please provide the Transportation and Storage index of customers reports for January 2014, January 2019 and January 2023.

Response:

Please see Attachment 1 for the Transportation and Storage index of customers reports for January 2014, January 2019 and January 2023.

January 2014

Customer Name	Contract Id	Max Store Amount(GJ)	Start Date	End Date	Withdraw Amount(GJ)	Injection Amount(GJ)	Receipt Point	Delivery Point	Affiliate
Thorold CoGen L.P. by its General Partner Northland Power Thorold Cogen GP Inc.	BHDS001	170,000	01-Nov-08	31-Mar-19	44,000	44,000	Dawn	Dawn	N
Goreway Station Partnership by its managing partner Goreway Power Station Holdings ULC	BHDS002	600,000	01-Jul-08	31-Oct-28	128,000	128,000	Dawn	Dawn	N
Greenfield Energy Centre LP	BHDS003	211,011	01-May-08	31-Oct-18	42,202	42,202	Dawn	Dawn	N
BP Canada Energy Group ULC	HDS003	1,055,056	01-Apr-08	31-Mar-14	52,753	26,376	Dawn	Dawn	N
Portlands Energy Centre L.P. ,by its General Partner, Portlands Energy Centre Inc.	HDS007	500,000	01-Jan-09	31-Mar-19	40,000	40,000	Dawn	Dawn	N
York Energy Centre LP	HDS008	175,000	01-Apr-12	31-Oct-22	87,654	87,654	Dawn	Dawn	N
AltaGas Ltd.	HUB179E02	1,055,056	16-Feb-13	31-Mar-14	12,661	0	Dawn	Dawn	N
Energy Source Canada Inc.	HUB337E12	21,101	16-Feb-13	31-Mar-14	253	0	Dawn	Dawn	N
Ag Energy Co-operative Ltd.	HUB351E01	200,000	01-Aug-13	31-Mar-14	2,400	6,452	Dawn	Dawn	N
Powerex Corp.	HUB463E22	1,055,056	01-Mar-12	31-Mar-14	12,661	0	Dawn	Dawn	N
Powerex Corp.	HUB463E24	1,055,056	16-Feb-13	31-Mar-14	12,661	0	Dawn	Dawn	N
Hess Energy Trading Company, LLC	HUB566E19	836,731	01-Oct-13	31-Jan-14	27,001	27,001	Dawn	Dawn	N
Repsol Energy Canada Ltd.	HUB567E01	1,055,056	01-Mar-12	28-Feb-14	12,661	0	Dawn	Dawn	N
Repsol Energy Canada Ltd.	HUB567E02	1,055,056	01-Mar-13	28-Feb-14	12,661	0	Dawn	Dawn	N
Freepoint Commodities LLC	HUB611E06	263,764	16-Feb-13	31-Mar-14	3,165	0	Dawn	Dawn	N
MIECO INC.	HUB615E05	654,135	07-Jun-13	31-Mar-14	7,850	0	Dawn	Dawn	N
Northland Power Inc.	HUB626E01	189,500	01-Sep-13	30-Apr-14	2,274	0	Dawn	Dawn	N
1425445 Ontario Limited o/a Utilities Kingston	LST037	943,500	01-Apr-04	31-Mar-14	11,322	7,076	Dawn	Dawn	N
Gaz Metro Limited Partnership	LST057	5,849,700	01-Apr-09	31-Mar-15	70,196	43,873	Dawn	Dawn	N
Enbridge Gas Distribution Inc.	LST059	5,260,000	01-Apr-10	31-Mar-15	63,120	39,450	Dawn	Dawn	N
Enbridge Gas Distribution Inc.	LST061	3,000,000	01-Apr-11	31-Mar-14	36,000	22,500	Dawn	Dawn	N
Gaz Metro Limited Partnership	LST064	2,974,880	31-Mar-11	31-Mar-15	35,699	22,312	Dawn	Dawn	N
Gaz Metro Limited Partnership	LST065	4,400,000	31-Mar-11	31-Mar-17	52,800	33,000	Dawn	Dawn	N
Enbridge Gas Distribution Inc.	LST066	5,055,056	01-Apr-12	31-Mar-17	60,661	37,913	Dawn	Dawn	N
Gaz Metro Limited Partnership	LST068	0	01-Apr-13	31-Mar-19	52,800	33,000	Dawn	Dawn	N
St. Lawrence Gas Company, Inc.	LST069	950,000	01-Apr-13	31-Mar-15	10,450	9,500	Dawn	Dawn	N
Merrill Lynch Commodities Canada, ULC	LTP024	1,582,584	01-Jul-09	30-Jun-14	18,991	18,991	Dawn	Dawn	N
AltaGas Ltd.	LTP035	2,800,000	01-Apr-09	31-Mar-29	33,600	21,000	Dawn	Dawn	N

January 2014

Customer Name	Contract Id	Max Store Amount(GJ)	Start Date	End Date	Withdraw Amount(GJ)	Injection Amount(GJ)	Receipt Point	Delivery Point	Affiliate
J. Aron & Company	LTP060	1,055,056	01-Apr-11	31-Mar-15	12,661	11,606	Dawn	Dawn	N
J. Aron & Company	LTP061	2,110,112	31-Mar-12	31-Mar-17	25,321	23,211	Dawn	Dawn	N
NJR Energy Services Company	LTP063	2,110,112	18-Mar-11	31-Mar-15	25,321	0	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP064	2,110,112	18-Mar-11	31-Mar-15	25,321	0	Dawn	Dawn	N
Exelon Generation Company, LLC	LTP065	1,055,056	01-May-11	30-Apr-14	49,588	36,927	Dawn	Dawn	N
Shell Energy North America (Canada) Inc.	LTP071	2,110,112	01-Dec-11	31-Mar-14	25,321	0	Dawn	Dawn	N
J.P. Morgan Commodities Canada	LTP072	2,110,112	01-Apr-12	31-Mar-14	25,321	69,634	Dawn	Dawn	N
Shell Energy North America (Canada) Inc.	LTP073	4,220,224	01-Feb-12	31-Mar-15	160,368	0	Dawn	Dawn	N
Cargill Limited	LTP075	1,055,056	01-Apr-12	31-Mar-14	12,661	0	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP077	1,582,584	09-May-12	31-May-14	18,991	0	Dawn	Dawn	N
Cargill Limited	LTP078	1,055,056	10-Jul-12	09-Jul-15	12,661	0	Dawn	Dawn	N
Shell Energy North America (Canada) Inc.	LTP079	1,055,056	01-Oct-12	31-Mar-16	12,661	35,133	Dawn	Dawn	N
Powerex Corp.	LTP080	527,528	20-Oct-12	31-Oct-14	6,330	105,506	Dawn	Dawn	N
United Energy Trading Canada, ULC	LTP081	263,764	20-Oct-12	31-Oct-14	3,165	87,921	Dawn	Dawn	N
Powerex Corp.	LTP082	2,110,112	31-Mar-13	31-Mar-15	25,321	0	Dawn	Dawn	N
Shell Energy North America (Canada) Inc.	LTP083	1,055,056	01-Feb-13	30-Jun-17	12,661	12,661	Dawn	Dawn	N
Shell Energy North America (Canada) Inc.	LTP084	1,055,056	01-Feb-13	30-Jun-17	12,661	12,661	Dawn	Dawn	N
Shell Energy North America (Canada) Inc.	LTP085	1,055,056	01-Feb-13	30-Jun-17	12,661	12,661	Dawn	Dawn	N
Suncor Energy Marketing Inc.	LTP086	1,055,056	13-Feb-13	31-Mar-16	12,661	0	Dawn	Dawn	N
Cargill Limited	LTP087	1,055,056	01-Mar-13	31-Mar-17	12,661	0	Dawn	Dawn	N
Cargill Limited	LTP088	2,110,112	15-Feb-13	31-Mar-17	25,321	0	Dawn	Dawn	N
Cargill Limited	LTP089	1,055,056	01-Mar-13	31-Mar-17	12,661	0	Dawn	Dawn	N
Koch Canada Energy Services, LP	LTP090	1,055,056	16-Feb-13	31-Mar-15	12,661	0	Dawn	Dawn	N
Powerex Corp.	LTP091	1,055,056	16-Feb-13	31-Mar-15	12,661	0	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP092	1,055,056	01-Apr-13	31-Mar-15	12,661	0	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP093	1,055,056	01-Apr-13	31-Mar-15	12,661	0	Dawn	Dawn	N

January 2014

Customer Name	Contract Id	Max Store Amount(GJ)	Start Date	End Date	Withdraw Amount(GJ)	Injection Amount(GJ)	Receipt Point	Delivery Point	Affiliate
J. Aron & Company	LTP094	1,055,056	01-Apr-13	31-Mar-17	12,661	11,606	Dawn	Dawn	N
J. Aron & Company	LTP095	1,055,056	01-Apr-13	31-Mar-17	12,661	11,606	Dawn	Dawn	N
J. Aron & Company	LTP096	1,055,056	01-Apr-13	31-Mar-17	12,661	11,606	Dawn	Dawn	N
J. Aron & Company	LTP097	1,055,056	01-Apr-13	31-Mar-17	12,661	11,606	Dawn	Dawn	N
Castleton Commodities Merchant Trading L.P.	LTP098	2,110,112	01-Apr-13	31-Jul-18	25,321	25,321	Dawn	Dawn	N
Castleton Commodities Merchant Trading L.P.	LTP099	3,165,168	01-Apr-13	31-Jul-18	37,982	37,982	Dawn	Dawn	N
Shell Energy North America (Canada) Inc.	LTP100	5,275,280	01-May-13	31-May-15	63,303	527,528	Dawn	Dawn	N
Suncor Energy Marketing Inc.	LTP101	1,055,056	01-May-13	30-Apr-15	12,661	0	Dawn	Dawn	N
Castleton Commodities Merchant Trading L.P.	LTP102	1,055,056	04-May-13	31-Jul-18	12,661	12,661	Dawn	Dawn	N
Castleton Commodities Merchant Trading L.P.	LTP103	1,055,056	04-May-13	31-Jul-18	12,661	12,661	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP104	1,055,056	11-May-13	30-Apr-16	12,661	0	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP105	1,055,056	11-May-13	30-Apr-16	12,661	0	Dawn	Dawn	N
EDF Trading North America, LLC	LTP106	1,055,056	24-May-13	31-May-16	41,147	0	Dawn	Dawn	N
EDF Trading North America, LLC	LTP107	527,528	24-May-13	31-May-16	20,574	0	Dawn	Dawn	N
Koch Canada Energy Services, LP	LTP108	1,055,056	07-Jun-13	30-Jun-15	41,147	0	Dawn	Dawn	N
PetroChina International (America), Inc.	LTP109	1,055,056	08-Jun-13	30-Jun-15	12,661	0	Dawn	Dawn	N
Suncor Energy Marketing Inc.	LTP110	1,055,056	07-Jun-13	30-Jun-16	41,147	0	Dawn	Dawn	N
Powerex Corp.	LTP111	1,055,056	01-Jul-13	30-Jun-15	12,661	0	Dawn	Dawn	N
Powerex Corp.	LTP112	1,055,056	01-Jul-13	30-Jun-16	12,661	0	Dawn	Dawn	N
Barclays Canadian Commodities Limited	LTP113	2,110,112	08-Jun-13	30-Jun-15	25,321	0	Dawn	Dawn	N
Exelon Generation Company, LLC	LTP114	1,055,056	01-Aug-13	30-Apr-17	25,321	36,927	Dawn	Dawn	N
St. Clair Power, L.P.	SA8349-1	0	01-Jan-13	31-Oct-27	28,380	28,380	Dawn	Dawn	N
TransCanada Power	SA9045-9	0	01-Jan-13	14-Jan-20	35,200	35,200	Dawn	Dawn	N
In-Franchise Customers		91,354,000	01-Oct-13	30-Sep-14	1,565,000	457,000	Dawn	Dawn	N

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Customer Name	Contract Identifier	Receipt Point	Delivery Point	Quantity (GJ)	Start Date	End Date	Negotiated Rate	Affiliate
Enbridge Gas Distribution Inc.	C10059	Parkway	Dawn	236,586	01-Apr-06	31-Mar-16	N	N
St. Lawrence Gas Company, Inc.	C10076	Parkway	Dawn	10,785	01-Apr-07	31-Mar-16	N	N
Greenfield Energy Centre LP	C10083	Dawn	Dawn-Vector	92,845	01-Mar-08	31-Oct-18	N	N
Dynegy Gas Imports, LLC	C10085	Ojibway	Dawn	38,533	01-Nov-08	31-Oct-15	N	N
Gaz Metro Limited Partnership	C10087	Parkway	Dawn	100,000	01-Apr-11	31-Mar-16	N	N
Direct Energy Marketing Limited	C10092	Ojibway	Dawn	10,000	01-Nov-10	31-Oct-15	Y	N
Direct Energy Marketing Limited	C10093	Ojibway	Dawn	10,000	01-Nov-10	31-Oct-15	Y	N
TransCanada PipeLines Limited	C10097	Dawn	Dawn (TCPL)	500,000	01-Nov-10	31-Oct-16	N	N
J. Aron & Company	C10098	Ojibway	Dawn	9,212	01-Oct-10	31-Jan-15	N	N
Direct Energy Marketing Limited	C10101	Ojibway	Dawn	20,000	01-Nov-11	31-Mar-16	Y	N
York Energy Centre LP	C10102	Dawn	Parkway	11,654	01-Apr-12	31-Mar-15	N	N
Bluewater Gas Storage, LLC	C10105	BLUE	Dawn	123,000	01-Nov-13	31-Oct-23	N	N
Direct Energy Marketing Limited	HUB030T084	Dawn	Parkway	7,500	01-Nov-13	31-Mar-14	Y	N
Direct Energy Marketing Limited	HUB030T085	Ojibway	Dawn	2,083	01-Nov-13	31-Mar-14	Y	N
Direct Energy Marketing Limited	HUB030T093	Dawn	Parkway	10,000	01-Jan-14	31-Jan-14	Y	N
Tenaska Marketing Canada - a division of TMV Corp.	HUB078T109	Ojibway	Dawn	10,551	01-Jan-14	31-Jan-14	Y	N
Tenaska Marketing Canada - a division of TMV Corp.	HUB078T110	Ojibway	Dawn	10,551	01-Jan-14	31-Jan-14	Y	N
Tenaska Marketing Canada - a division of TMV Corp.	HUB078T111	Dawn	Parkway	10,973	01-Jan-14	31-Jan-14	Y	N
Shell Energy North America (Canada) Inc.	HUB164E159	Dawn	Ojibway	20,000	01-Dec-13	31-Mar-14	Y	N
Shell Energy North America (Canada) Inc.	HUB164T081	St. Clair	Dawn	21,101	01-Jan-14	31-Mar-14	Y	N
AltaGas Ltd.	HUB179T006	Dawn	Parkway	271	01-Nov-13	31-Mar-14	Y	N
AltaGas Ltd.	HUB179T011	Dawn	Parkway	3,520	01-Nov-13	31-Mar-14	Y	N
Tidal Energy Marketing Inc.	HUB305T070	Dawn	Parkway	256	01-Jan-14	31-Jan-14	Y	N
NJR Energy Services Company	HUB317T140	St. Clair	Dawn	21,101	01-Jan-14	31-Jan-14	Y	N
Suncor Energy Marketing Inc.	HUB345T063	Dawn	Parkway	5,000	01-Nov-13	31-Mar-14	Y	N
Suncor Energy Marketing Inc.	HUB345T073	Dawn	Parkway	9,057	01-Jan-14	28-Feb-14	Y	N
J. Aron & Company	HUB369T103	Dawn	Parkway	16,000	01-Nov-13	31-Mar-14	Y	N
J. Aron & Company	HUB369T104	Dawn	Parkway	4,800	01-Nov-13	31-Mar-14	Y	N
J. Aron & Company	HUB369T107	St. Clair	Dawn	21,101	01-Jan-14	31-Mar-14	Y	N
J. Aron & Company	HUB369T108	St. Clair	Dawn	21,101	01-Jan-14	31-Jan-14	Y	N
J. Aron & Company	HUB369T109	Dawn	Parkway	1,399	01-Jan-14	31-Jan-14	Y	N
Cima Energy, Ltd.	HUB372T082	St. Clair	Dawn	21,101	01-Jan-14	31-Mar-14	Y	N
Blackstone Energy Services Inc.	HUB390T001	Dawn	Parkway	2,000	01-Nov-13	31-Mar-14	Y	N
Powerex Corp.	HUB463T195	St. Clair	Dawn	21,101	01-Jan-14	31-Mar-14	Y	N
Powerex Corp.	HUB463T196	St. Clair	Dawn	21,101	01-Jan-14	31-Mar-14	Y	N
Active Energy Corp.	HUB469T045	Dawn	Parkway	3	01-Jan-14	31-Jan-14	Y	N
Macquarie Energy Canada Ltd.	HUB510T028	St. Clair	Dawn	21,101	01-Jan-14	31-Jan-14	Y	N
Sequent Energy Canada Corp.	HUB521T185	St. Clair	Dawn	21,101	01-Nov-13	31-Mar-14	Y	N
Sequent Energy Canada Corp.	HUB521T203	St. Clair	Dawn	21,101	01-Jan-14	31-Jan-14	Y	N
Access Gas Services (Ontario) Inc.	HUB547T100	Dawn	Parkway	2,500	01-Nov-13	31-Mar-14	Y	N
EDF Trading North America, LLC	HUB561T124	Dawn	Parkway	15,826	01-Nov-13	31-Mar-14	Y	N
EDF Trading North America, LLC	HUB561T162	St. Clair	Dawn	21,101	01-Jan-14	31-Jan-14	Y	N
Hess Energy Trading Company, LLC	HUB566T021	St. Clair	Dawn	21,101	01-Nov-13	31-Mar-14	Y	N
Hess Energy Trading Company, LLC	HUB566T033	St. Clair	Dawn	21,101	01-Jan-14	31-Mar-14	Y	N
Freepoint Commodities LLC	HUB611T047	Dawn	Parkway	10,551	01-Nov-13	31-Mar-14	Y	N
Freepoint Commodities LLC	HUB611T049	Dawn	Parkway	9,496	01-Nov-13	31-Mar-14	Y	N
Freepoint Commodities LLC	HUB611T079	Dawn	Parkway	5,275	01-Jan-14	31-Jan-14	Y	N
Freepoint Commodities LLC	HUB611T080	Dawn	Parkway	10,551	01-Jan-14	31-Jan-14	Y	N
MIECO INC.	HUB615T082	St. Clair	Dawn	10,551	01-Nov-13	31-Mar-14	Y	N
MIECO INC.	HUB615T088	St. Clair	Dawn	21,101	01-Jan-14	31-Mar-14	Y	N
Twin Eagle Resource Management Canada, LLC	HUB618T049	St. Clair	Dawn	21,101	01-Jan-14	31-Jan-14	Y	N

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Customer Name	Contract Identifier	Receipt Point	Delivery Point	Quantity (GJ)	Start Date	End Date	Negotiated Rate	Affiliate
Iberdrola Energy Services, LLC	HUB625T001	St. Clair	Dawn	21,101	01-Nov-13	31-Mar-14	Y	N
Gaz Metro Limited Partnership	M12007D	Dawn	Parkway	21,021	01-Nov-91	31-Oct-16	N	N
TransCanada PipeLines Limited	M12012	Dawn	Kirkwall	62,602	01-Nov-94	31-Oct-15	N	N
1425445 Ontario Limited o/a Utilities Kingston	M12077	Dawn	Parkway	11,322	01-Apr-04	31-Mar-16	N	N
Enbridge Gas Distribution Inc.	M12079	Dawn	Kirkwall	32,123	01-Apr-04	31-Mar-14	N	N
Enbridge Gas Distribution Inc.	M12079A	Dawn	Kirkwall	32,123	01-Apr-14	31-Oct-16	N	N
Enbridge Gas Distribution Inc.	M12079	Dawn	Parkway	1,764,678	01-Apr-04	31-Mar-14	N	N
Enbridge Gas Distribution Inc.	M12079B	Dawn	Parkway	1,764,678	01-Apr-14	31-Oct-22	N	N
Enbridge Gas Distribution Inc.	M12080	Dawn	Parkway	106,000	01-Nov-06	31-Oct-18	N	N
TransAlta Cogeneration, L.P.	M12081	Dawn	Parkway	11,809	01-Nov-06	31-Oct-16	N	N
U.S. Steel Canada Inc.	M12085	Dawn	Parkway	17,351	01-Nov-06	31-Oct-18	N	N
TransCanada PipeLines Limited	M12086	Dawn	Parkway	119,787	01-Nov-06	31-Oct-16	N	N
BP Canada Energy Group ULC	M12087	Dawn	Parkway	20,000	01-Nov-06	31-Oct-22	N	N
The Corporation of the City of Kitchener	M12090	Dawn	Parkway	4,000	01-Nov-06	31-Oct-16	N	N
Gaz Metro Limited Partnership	M12092	Dawn	Parkway	35,000	01-Nov-06	31-Oct-16	N	N
Enbridge Gas Distribution Inc.	M12108	Dawn	Parkway	57,100	01-Nov-07	31-Oct-19	N	N
Gaz Metro Limited Partnership	M12109	Dawn	Parkway	65,000	01-Nov-07	31-Oct-27	N	N
Goreway Station Partnership by its managing partner Goreway Power Station Holdings ULC	M12110	Dawn	Parkway	140,000	01-Nov-07	31-Oct-28	N	N
KeySpan Gas East Corporation d/b/a National Grid	M12116	Dawn	Kirkwall	138,600	01-Nov-07	31-Oct-18	N	N
Vermont Gas Systems, Inc.	M12119	Dawn	Parkway	20,000	01-Nov-07	31-Oct-18	N	N
Greater Toronto Airports Authority	M12120	Dawn	Parkway	7,500	01-Nov-07	31-Oct-18	N	N
TransCanada PipeLines Limited	M12122	Dawn	Kirkwall	13,336	01-Nov-08	31-Oct-14	N	N
TransCanada PipeLines Limited	M12123	Dawn	Kirkwall	158,003	01-Nov-08	31-Oct-16	N	N
Enbridge Gas Distribution Inc.	M12125	Dawn	Parkway	10,692	01-Nov-08	31-Oct-16	N	N
St. Lawrence Gas Company, Inc.	M12126	Dawn	Parkway	10,785	01-Nov-08	31-Oct-16	N	N
1425445 Ontario Limited o/a Utilities Kingston	M12127	Dawn	Parkway	2,113	01-Nov-08	31-Oct-16	N	N
Thorold CoGen L.P. by its General Partner Northland	M12129	Dawn	Kirkwall	49,500	01-Sep-09	31-Aug-29	N	N
Portlands Energy Centre L.P. ,by its General Partner, Portlands Energy Centre Inc.	M12130	Dawn	Parkway	100,000	13-Jan-09	31-Oct-28	N	N
TransCanada Power, a Division of TransCanada Energy Ltd.	M12131	Dawn	Parkway	132,000	01-Nov-09	31-Oct-18	N	N
Gaz Metro Limited Partnership	M12132	Dawn	Parkway	52,343	01-Apr-09	31-Mar-16	N	N
Ag Energy Co-operative Ltd.	M12151	Dawn	Parkway	1,600	01-Nov-08	31-Oct-20	N	N
Greenfield Specialty Alcohols Inc.	M12156	Dawn	Parkway	3,000	01-Nov-08	31-Oct-19	N	N
Consolidated Edison Company of New York, Inc. and Orange and Rockland Utilities, Inc.	M12162	Dawn	Kirkwall	31,746	01-Nov-11	31-Oct-16	N	N
KeySpan Gas East Corporation d/b/a National Grid	M12163	Dawn	Parkway	43,837	01-Nov-11	31-Oct-16	N	N
The Narragansett Electric Company d/b/a National Grid	M12164	Dawn	Parkway	1,081	01-Nov-11	31-Oct-16	N	N
The Brooklyn Union Gas Company d/b/a National Grid NY	M12165	Dawn	Parkway	44,019	01-Nov-11	31-Oct-16	N	N
Connecticut Natural Gas Corporation	M12166	Dawn	Parkway	6,410	01-Nov-11	31-Oct-16	N	N
Ag Energy Co-operative Ltd.	M12167	Dawn	Parkway	1,900	01-Nov-11	31-Oct-21	N	N
Dynegy Gas Imports, LLC	M12170	Dawn	Kirkwall	38,306	01-Nov-08	31-Oct-15	N	N
Consolidated Edison Company of New York, Inc. and Orange and Rockland Utilities, Inc.	M12171	Dawn	Parkway	21,825	01-Nov-11	31-Oct-16	N	N
Gaz Metro Limited Partnership	M12172	Dawn	Parkway	22,908	01-Apr-10	31-Mar-16	N	N
Enbridge Gas Distribution Inc.	M12175	Dawn	Kirkwall	35,806	01-Nov-10	31-Oct-16	N	N
Gaz Metro Limited Partnership	M12176	Dawn	Parkway	88,728	01-Apr-11	31-Mar-16	N	N
Central Hudson Gas & Electric Corporation (a subsidiary of CH Energy Group, Inc.)	M12182	Dawn	Parkway	5,467	01-Nov-11	31-Oct-16	N	N

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Customer Name	Contract Identifier	Receipt Point	Delivery Point	Quantity (GJ)	Start Date	End Date	Negotiated Rate	Affiliate
York Energy Centre LP	M12184	Dawn	Parkway	76,000	01-Apr-12	31-Oct-22	N	N
Niagara Mohawk Power Corporation d/b/a National Grid	M12186	Dawn	Parkway	55,123	01-Nov-11	31-Oct-16	N	N
Enbridge Gas Distribution Inc.	M12188	Dawn	Parkway	18,703	01-Nov-11	31-Oct-16	N	N
Vermont Gas Systems, Inc.	M12190	Dawn	Parkway	500	01-Nov-10	31-Oct-20	N	N
The Brooklyn Union Gas Company d/b/a National Grid NY	M12193	Dawn	Parkway	12,953	01-Nov-10	31-Oct-17	N	N
KeySpan Gas East Corporation d/b/a National Grid	M12194	Dawn	Parkway	17,162	01-Nov-10	31-Oct-17	N	N
Central Hudson Gas & Electric Corporation (a subsidiary of CH Energy Group, Inc.)	M12195	Dawn	Parkway	10,792	01-Nov-10	31-Oct-17	N	N
National Fuel Gas Distribution Corporation	M12196	Dawn	Kirkwall	10,791	01-Nov-10	31-Oct-17	N	N
Boston Gas Company d/b/a National Grid	M12197	Dawn	Parkway	9,282	01-Nov-10	31-Oct-17	N	N
Colonial Gas Company d/b/a National Grid	M12198	Dawn	Parkway	6,475	01-Nov-10	31-Oct-17	N	N
Boston Gas Company d/b/a National Grid	M12199	Dawn	Parkway	2,158	01-Nov-10	31-Oct-17	N	N
EnergyNorth Natural Gas, Inc.	M12200	Dawn	Parkway	4,317	01-Nov-10	31-Oct-17	N	N
Connecticut Natural Gas Corporation	M12201	Dawn	Parkway	18,077	01-Nov-10	31-Oct-17	N	N
The Southern Connecticut Gas Company	M12202	Dawn	Parkway	34,950	01-Nov-10	31-Oct-17	N	N
Yankee Gas Services Company	M12203	Dawn	Parkway	43,116	01-Nov-10	31-Oct-17	N	N
Bay State Gas Company dba Columbia Gas of Massachusetts	M12204	Dawn	Parkway	27,803	01-Nov-10	31-Oct-17	N	N
Northern Utilities, Inc.	M12205	Dawn	Parkway	6,333	01-Nov-10	31-Oct-17	N	N
Connecticut Natural Gas Corporation	M12206	Dawn	Parkway	9,170	01-Nov-10	31-Oct-18	N	N
The Southern Connecticut Gas Company	M12207	Dawn	Parkway	13,970	01-Nov-10	31-Oct-18	N	N
The Brooklyn Union Gas Company d/b/a National Grid NY	M12208	Dawn	Parkway	30,217	01-Nov-10	31-Oct-18	N	N
KeySpan Gas East Corporation d/b/a National Grid	M12209	Dawn	Parkway	22,772	01-Nov-10	31-Oct-18	N	N
Yankee Gas Services Company	M12210	Dawn	Parkway	20,560	01-Nov-10	31-Oct-18	N	N
National Fuel Gas Distribution Corporation	M12211	Dawn	Kirkwall	15,904	01-Nov-10	31-Oct-20	N	N
Yankee Gas Services Company	M12212	Dawn	Parkway	5,380	01-Nov-10	31-Oct-19	N	N
The Southern Connecticut Gas Company	M12213	Dawn	Parkway	9,735	01-Nov-10	31-Oct-19	N	N
Connecticut Natural Gas Corporation	M12214	Dawn	Parkway	6,489	01-Nov-10	31-Oct-19	N	N
Suncor Energy Products Partnership Produits Suncor Energie, S.E.N.C.	M12217	Dawn	Parkway	15,000	01-Nov-11	31-Oct-16	N	N
TransCanada PipeLines Limited	M12219	Kirkwall	Parkway	88,497	01-Nov-12	31-Oct-22	N	N
TransCanada PipeLines Limited	M12220	Kirkwall	Parkway	174,752	01-Nov-13	31-Oct-23	N	N
Emera Energy Incorporated	M12221	Kirkwall	Parkway	36,751	01-Nov-12	31-Oct-22	N	N
TransCanada PipeLines Limited	M12X004	Dawn	Parkway	50,000	01-Sep-11	31-Aug-21	N	N
TransCanada PipeLines Limited	M12X005	Dawn	Parkway	78,316	01-Sep-11	31-Aug-21	N	N
Enbridge Gas Distribution Inc.	M12X006	Dawn	Parkway	200,000	01-Nov-12	31-Oct-22	N	N
TransCanada PipeLines Limited	M12X013	Dawn	Parkway	62,695	01-Nov-12	31-Oct-23	N	N
Huron Tipperary Limited Partnership I by its General partner Tipperary Gas Corp.	M16002	Dawn	North Tipperary	8,400	01-Apr-08	31-Mar-18	N	Y
Huron Tipperary Limited Partnership I by its General partner Tipperary Gas Corp.	M16002	North Tipperary	Dawn	10,000	01-Apr-08	31-Mar-18	N	Y
Market Hub Partners Canada L.P.	M16004	Dawn	Market Hub Partners - St. Clair Pool	9,000	01-Jun-07	31-May-16	N	Y
Market Hub Partners Canada L.P.	M16004	Market Hub Partners - St. Clair Pool	Dawn	5,000	01-Jun-07	31-May-16	N	Y

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Customer Name	Contract Identifier	Maximum Storage Quantity (GJ)	Start Date	End Date	Maximum Firm Daily Withdrawal Quantity (GJ)	Maximum Firm Daily Injection Quantity (GJ)	Receipt Point	Delivery Point	Affiliate
Thorold CoGen L.P. by its General Partner Northland Power Thorold Cogen GP Inc.	BHDS001	170,000	01-Nov-08	31-Mar-19	44,000	44,000	Dawn	Dawn	N
Goreway Station Partnership by its managing partner Goreway Power Station Holdings ULC	BHDS002	600,000	01-Jul-08	31-Oct-28	128,000	128,000	Dawn	Dawn	N
Portlands Energy Centre L.P. by its General Partner, Portlands Energy Centre Inc.	HDS007	500,000	01-Jan-09	31-Mar-19	40,000	40,000	Dawn	Dawn	N
York Energy Centre LP	HDS008	175,000	01-Apr-12	31-Oct-22	87,654	87,654	Dawn	Dawn	N
TransCanada Energy Ltd.	HDS010	500,000	01-Apr-18	31-Mar-33	126,000	126,000	Dawn	Dawn	N
Greenfield South Power Corporation	HDS012	162,400	01-Sep-17	28-Feb-37	16,248	16,248	Dawn	Dawn	N
Greenfield Energy Centre LP	HDS013	211,011	01-Nov-18	15-Oct-28	42,202	42,202	Dawn	Dawn	N
DTE Energy Trading, Inc.	HUB018E50	1,055,056	18-May-18	31-Mar-19	12,661	0	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	HUB078E125	2,110,112	21-Nov-18	30-Jun-19	35,872	0	Dawn	Dawn	N
Just Energy Ontario L.P.	HUB250E02	225,782	01-Apr-18	31-Mar-19	2,709	0	Dawn	Dawn	N
Suncor Energy Marketing Inc.	HUB345E228	1,055,056	18-May-18	31-Mar-19	12,661	0	Dawn	Dawn	N
Exelon Generation Company, LLC	HUB352E06	1,055,056	01-Apr-18	31-Mar-19	12,661	0	Dawn	Dawn	N
Macquarie Energy Canada Ltd.	HUB510E19	738,539	18-May-18	31-Mar-19	8,862	0	Dawn	Dawn	N
Repsol Energy Canada Ltd.	HUB567E06	1,055,056	31-Mar-18	31-Mar-19	12,661	0	Dawn	Dawn	N
Northland Power Inc.	HUB626E05	105,506	01-Apr-18	31-Mar-19	1,266	0	Dawn	Dawn	N
Uniper Global Commodities North America LLC	HUB727E03	1,055,056	01-Apr-18	31-Mar-19	12,661	0	Dawn	Dawn	N
BioUrja Trading, LLC	HUB760E02	1,055,056	31-Mar-18	31-Mar-19	12,661	0	Dawn	Dawn	N
Energir, L.P. by its General Partner Energir Inc	LST067	4,400,000	01-Apr-17	31-Mar-19	52,800	33,000	Dawn	Dawn	N
Energir, L.P. by its General Partner Energir Inc	LST068	0	01-Apr-13	31-Mar-19	52,800	33,000	Dawn	Dawn	N
Connecticut Natural Gas Corporation	LST078	980,000	01-Apr-17	31-Mar-21	11,760	7,350	Dawn	Dawn	N
The Southern Connecticut Gas Company	LST079	1,820,000	01-Apr-17	31-Mar-21	21,840	13,650	Dawn	Dawn	N
Yankee Gas Services Company dba Eversource Energy	LST084	4,500,000	01-Apr-16	31-Mar-19	54,000	33,750	Dawn	Dawn	N
Northern Utilities, Inc.	LST086	4,220,224	01-Apr-18	31-Mar-23	43,468	31,652	Dawn	Dawn	N
Energir, L.P. by its General Partner Energir Inc	LST088	2,125,000	01-Apr-17	31-Mar-20	25,500	31,875	Dawn	Dawn	N
Bay State Gas Company dba Columbia Gas of Massachusetts	LST089	1,920,202	01-Sep-17	31-Mar-22	27,959	10,551	Dawn	Dawn	N
Bay State Gas Company dba Columbia Gas of Massachusetts	LST090	1,688,090	01-Apr-18	31-Mar-22	16,881	8,440	Dawn	Dawn	N
St. Lawrence Gas Company, Inc.	LST091	950,000	01-Sep-17	31-Mar-19	10,450	9,500	Dawn	Dawn	Y
1425445 Ontario Limited o/a Utilities Kingston	LST092	150,000	01-Sep-17	31-Mar-19	2,400	1,790	Dawn	Dawn	N
1425445 Ontario Limited o/a Utilities Kingston	LST093	100,000	01-Sep-17	30-Apr-19	1,400	1,200	Dawn	Dawn	N
Castleton Commodities Merchant Trading L.P.	LST094	527,528	01-Sep-17	30-Apr-21	15,826	10,551	Dawn	Dawn	N
J. Aron & Company	LST098	1,582,584	01-Sep-17	31-Mar-19	31,652	21,101	Dawn	Dawn	N
J. Aron & Company	LST099	1,055,056	01-Sep-17	31-Mar-23	18,991	15,826	Dawn	Dawn	N
Repsol Energy Canada Ltd.	LST100	2,110,112	01-Sep-17	31-Mar-20	42,202	42,202	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LST101	317,382	01-Sep-17	31-Mar-19	15,869	7,935	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LST102	391,864	01-Sep-17	31-Mar-21	11,755	7,837	Dawn	Dawn	N
Tidal Energy Marketing Inc.	LST103	263,764	01-Sep-17	31-Mar-19	10,551	7,385	Dawn	Dawn	Y
Tidal Energy Marketing Inc.	LST104	844,045	01-Sep-17	31-Mar-22	10,129	6,330	Dawn	Dawn	Y
1425445 Ontario Limited o/a Utilities Kingston	LST105	150,000	01-Apr-18	31-Mar-21	2,250	1,125	Dawn	Dawn	N
The Southern Connecticut Gas Company	LST107	1,700,000	01-Apr-18	31-Mar-22	20,400	12,750	Dawn	Dawn	N
Connecticut Natural Gas Corporation	LST108	1,300,000	01-Apr-18	31-Mar-22	15,600	9,750	Dawn	Dawn	N
Energir, L.P. by its General Partner Energir Inc	LST109	2,200,000	01-Apr-18	31-Mar-21	26,400	33,000	Dawn	Dawn	N
AltaGas Ltd.	LTP035	2,844,465	01-Apr-09	31-Mar-29	34,134	21,333	Dawn	Dawn	N
Powerex Corp.	LTP151	1,055,056	01-Apr-16	31-Mar-19	12,661	0	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP152	3,165,168	01-Apr-16	31-Mar-19	69,634	0	Dawn	Dawn	N

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Customer Name	Contract Identifier	Maximum Storage Quantity (GJ)	Start Date	End Date	Maximum Firm Daily Withdrawal Quantity (GJ)	Maximum Firm Daily Injection Quantity (GJ)	Receipt Point	Delivery Point	Affiliate
Powerex Corp.	LTP155	1,055,056	01-Apr-16	31-Mar-19	12,661	0	Dawn	Dawn	N
NJR Energy Services Company	LTP161	2,110,112	31-Mar-17	31-Mar-23	25,321	0	Dawn	Dawn	N
NextEra Energy Marketing, LLC	LTP162	149,818	04-Jun-16	31-Mar-19	1,798	0	Dawn	Dawn	N
Twin Eagle Resource Management Canada, LLC	LTP164	1,055,056	31-Mar-17	30-Apr-19	12,661	0	Dawn	Dawn	N
Uniper Global Commodities North America LLC	LTP165	527,528	31-Mar-17	30-Apr-19	6,330	0	Dawn	Dawn	N
J. Aron & Company	LTP166	1,055,056	31-Mar-17	30-Apr-19	12,661	0	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP167	527,528	01-Jul-16	30-Apr-19	6,330	17,017	Dawn	Dawn	N
Powerex Corp.	LTP168	527,528	01-Sep-16	31-Mar-19	6,330	0	Dawn	Dawn	N
J. Aron & Company	LTP169	527,528	30-Jul-16	31-Mar-19	6,330	6,330	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP172	1,688,090	01-Apr-17	31-Mar-22	20,257	12,661	Dawn	Dawn	N
MIECO INC.	LTP173	527,528	01-Apr-17	31-Mar-20	10,832	0	Dawn	Dawn	N
Koch Canada Energy Services, LP	LTP174	2,110,112	31-Mar-17	31-Mar-20	25,321	10,551	Dawn	Dawn	N
Tidal Energy Marketing Inc.	LTP175	2,110,112	01-Apr-17	31-Mar-20	46,422	0	Dawn	Dawn	Y
United Energy Trading Canada, ULC	LTP178	263,764	01-Apr-18	31-Mar-20	3,165	0	Dawn	Dawn	N
Powerex Corp.	LTP180	1,055,056	01-Apr-17	31-Mar-20	12,661	0	Dawn	Dawn	N
Repsol Energy Canada Ltd.	LTP181	2,110,112	31-Mar-17	31-Mar-19	25,321	0	Dawn	Dawn	N
1425445 Ontario Limited o/a Utilities Kingston	LTP182	250,000	31-Mar-17	31-Mar-20	9,750	3,750	Dawn	Dawn	N
Shell Energy North America (Canada) Inc.	LTP183	6,330,336	01-Apr-17	31-Mar-22	75,964	40,112	Dawn	Dawn	N
Powerex Corp.	LTP184	1,055,056	31-Mar-17	31-Mar-20	12,661	0	Dawn	Dawn	N
NJR Energy Services Company	LTP186	1,055,056	01-Apr-18	31-Mar-23	12,661	0	Dawn	Dawn	N
Powerex Corp.	LTP187	1,055,056	31-Mar-17	31-Mar-19	12,661	0	Dawn	Dawn	N
Energy Source Natural Gas Inc.	LTP188	26,376	31-Mar-17	31-Mar-19	317	0	Dawn	Dawn	N
Tidal Energy Marketing Inc.	LTP189	1,055,056	01-Apr-17	31-Aug-19	12,661	0	Dawn	Dawn	Y
Uniper Global Commodities North America LLC	LTP191	1,055,056	06-Apr-17	05-Apr-19	12,661	0	Dawn	Dawn	N
Morgan Stanley Capital Group Inc.	LTP192	1,055,056	12-Apr-17	11-Apr-19	12,790	0	Dawn	Dawn	N
Sequent Energy Canada Corp.	LTP194	1,055,056	13-Apr-17	12-Apr-19	12,691	0	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP195	1,055,056	04-May-17	03-Oct-19	12,661	0	Dawn	Dawn	N
Morgan Stanley Capital Group Inc.	LTP196	1,582,584	10-May-17	09-May-19	18,991	0	Dawn	Dawn	N
Shell Energy North America (Canada) Inc.	LTP197	2,110,112	12-May-17	31-Mar-19	25,321	0	Dawn	Dawn	N
Freepoint Commodities LLC	LTP198	1,055,056	01-Apr-18	31-Mar-20	12,661	0	Dawn	Dawn	N
Castleton Commodities Merchant Trading L.P.	LTP199	1,055,056	01-Sep-17	31-Mar-20	12,661	35,133	Dawn	Dawn	N
Macquarie Energy Canada Ltd.	LTP201	1,055,056	01-Oct-17	30-Apr-19	12,661	0	Dawn	Dawn	N
Macquarie Energy Canada Ltd.	LTP202	2,110,112	01-Oct-17	31-Mar-19	25,321	0	Dawn	Dawn	N
Macquarie Energy Canada Ltd.	LTP203	2,110,112	01-Oct-17	31-Mar-20	25,321	0	Dawn	Dawn	N
Macquarie Energy Canada Ltd.	LTP204	2,110,112	01-Oct-17	31-Mar-21	25,321	0	Dawn	Dawn	N
Macquarie Energy Canada Ltd.	LTP205	1,055,056	01-Oct-17	31-Aug-19	12,661	0	Dawn	Dawn	N
Macquarie Energy Canada Ltd.	LTP206	1,055,056	01-Oct-17	31-Aug-19	12,661	0	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP207	1,055,056	01-Sep-17	31-Mar-20	12,661	35,133	Dawn	Dawn	N
Suncor Energy Marketing Inc.	LTP208	1,055,056	01-Apr-18	31-Mar-20	12,661	0	Dawn	Dawn	N
Emera Energy Limited Partnership	LTP209	1,055,056	01-Apr-18	31-Mar-20	12,661	0	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP210	2,110,112	01-Apr-18	31-Mar-21	25,321	0	Dawn	Dawn	N
Powerex Corp.	LTP211	1,055,056	01-Apr-18	31-Mar-21	12,661	0	Dawn	Dawn	N
J. Aron & Company	LTP212	1,055,056	01-Apr-18	31-Mar-22	12,661	0	Dawn	Dawn	N
Koch Canada Energy Services, LP	LTP213	1,055,056	01-Apr-18	31-Mar-21	12,661	0	Dawn	Dawn	N

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EDF Trading North America, LLC	LTP214	1,055,056	01-Apr-18	31-Mar-20	12,661	0	Dawn	Dawn	N
BP Canada Energy Group ULC	LTP215	527,528	31-Mar-18	31-Mar-20	6,330	0	Dawn	Dawn	N
Tidal Energy Marketing Inc.	LTP216	527,528	31-Mar-18	31-Oct-21	6,330	0	Dawn	Dawn	Y
Tourmaline Oil Corp.	LTP217	1,055,056	01-Apr-18	31-Mar-20	12,661	0	Dawn	Dawn	N
Powerex Corp.	LTP218	1,055,056	01-Apr-18	31-Mar-21	12,661	0	Dawn	Dawn	N
Suncor Energy Marketing Inc.	LTP219	1,055,056	01-Apr-18	31-Mar-20	12,661	0	Dawn	Dawn	N
Macquarie Energy Canada Ltd.	LTP220	1,055,056	01-Mar-18	31-Mar-21	12,661	0	Dawn	Dawn	N
Morgan Stanley Capital Group Inc.	LTP221	1,055,056	01-Mar-18	31-Mar-21	12,661	0	Dawn	Dawn	N
J. Aron & Company	LTP222	1,055,056	01-Apr-18	31-Mar-21	12,661	0	Dawn	Dawn	N
Powerex Corp.	LTP223	1,055,056	01-Apr-18	31-Mar-21	12,661	0	Dawn	Dawn	N
Castleton Commodities Merchant Trading L.P.	LTP224	1,055,056	01-Apr-18	31-Mar-21	12,661	10,551	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP225	1,055,056	01-Apr-18	31-Mar-21	12,661	0	Dawn	Dawn	N
Castleton Commodities Merchant Trading L.P.	LTP226	1,055,056	24-Apr-18	30-Apr-21	12,661	10,551	Dawn	Dawn	N
Tidal Energy Marketing Inc.	LTP227	1,055,056	16-May-18	01-Apr-20	12,661	21,101	Dawn	Dawn	Y
PetroChina International (Canada) Trading Ltd.	LTP231	1,055,056	01-Oct-18	31-Mar-21	12,661	31,652	Dawn	Dawn	N
Citadel Energy Marketing LLC	LTP236	1,055,056	01-Nov-18	31-Mar-21	12,661	34,817	Dawn	Dawn	N
Koch Canada Energy Services, LP	LTP240	2,110,112	01-Jan-19	31-Mar-22	25,321	0	Dawn	Dawn	N
TransAlta (SC) L.P. by its general partner, TransAlta (SC) Inc.	SA6233-19	261,746	01-Nov-18	31-Oct-19	12,901	12,901	Dawn	Dawn	N
St. Clair Power, L.P.	SA8349-2	0	01-Jan-13	31-Oct-27	28,380	28,380	Dawn	Dawn	N
TransCanada Power	SA9045-13	0	01-Nov-17	14-Jan-20	35,200	35,200	Dawn	Dawn	N
In-Franchise Customers - Union South and North Zones		92,446,000	01-Oct-18	30-Sep-19	1,981,420	398,420	Dawn	Dawn	N
Enbridge Gas Inc. (In-Franchise Customers - EGD Zone) *		19,500,000	01-Jan-19	31-Mar-19	315,000	182,250	Dawn	Dawn	N

* - comprised of former contract #'s: LST070, LST076, LST085, LST087, LST106 & LTP127

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Customer Name	Contract Identifier	Receipt Point	Delivery Point	Quantity (GJ)	Start Date	End Date	Negotiated Rate	Affiliate
St. Lawrence Gas Company, Inc.	C10076	Parkway	Dawn	10,785	01-Apr-07	31-Mar-21	N	Y
Greenfield Energy Centre LP	C10083	Dawn	Dawn-Vector	92,845	01-Mar-08	31-Oct-21	N	N
Energir, L.P. by its General Partner Energir Inc	C10087	Parkway	Dawn	100,000	01-Apr-11	31-Mar-19	N	N
TransCanada PipeLines Limited	C10097	Dawn	Dawn (TCPL)	500,000	01-Nov-10	31-Oct-21	N	N
York Energy Centre LP	C10102	Dawn	Parkway	11,654	01-Apr-12	31-Oct-22	N	N
Bluewater Gas Storage, LLC	C10105	Bluewater	Dawn	123,000	01-Nov-13	31-Oct-23	N	N
Emera Energy Limited Partnership	C10106	Ojibway	Dawn	21,016	01-Nov-15	31-Oct-20	N	N
Emera Energy Limited Partnership	C10107	Kirkwall	Dawn	73,745	01-Nov-15	31-Oct-21	N	N
Emera Energy Limited Partnership	C10108	Kirkwall	Dawn	26,335	01-Apr-15	31-Mar-21	N	N
Seneca Resources Company, LLC	C10109	Kirkwall	Dawn	388,261	01-Nov-16	31-Mar-23	Y	N
Rover Pipeline LLC	C10113	Ojibway	Dawn	36,927	01-Nov-17	31-Oct-25	N	N
TransCanada PipeLines Limited	C10114	Parkway	Dawn	516,787	01-Nov-17	31-Oct-20	N	N
TransCanada PipeLines Limited	C10115	Parkway	Dawn	42,202	01-Nov-17	31-Oct-22	N	N
Husky Oil Operations Limited	HUB002T0343	Dawn	Parkway	1,200	01-Dec-18	28-Feb-19	Y	N
BP Canada Energy Group ULC	HUB040E60	Dawn	Parkway	1,277	01-Nov-18	31-Oct-19	N	N
BP Canada Energy Group ULC	HUB040E61	Dawn	Parkway	3,053	01-Nov-18	31-Oct-19	N	N
BP Canada Energy Group ULC	HUB040E62	Dawn	Parkway	10,789	01-Nov-18	31-Oct-19	N	N
Vermont Gas Systems, Inc.	HUB100T0047	Dawn	Parkway	10,551	01-Nov-18	31-Mar-19	Y	N
Vermont Gas Systems, Inc.	HUB100T0048	Dawn	Parkway	5,275	01-Nov-18	31-Mar-19	Y	N
Shell Energy North America (Canada) Inc.	HUB164T0122	Dawn	Ojibway	20,000	01-Dec-18	31-Mar-19	Y	N
Just Energy Ontario L.P.	HUB250T004	Dawn	Parkway	5,275	01-Nov-18	31-Mar-19	Y	N
Just Energy Ontario L.P.	HUB250T005	Dawn	Parkway	1,055	01-Nov-18	31-Mar-19	Y	N
Tidal Energy Marketing Inc.	HUB305T168	Ojibway	Dawn	10,551	01-Nov-18	31-Mar-19	Y	Y
Ontario Power Generation Inc.	HUB335T0015	Parkway	Dawn	2,650	06-Nov-18	31-Oct-19	Y	N
Suncor Energy Marketing Inc.	HUB345T0418	Dawn	Parkway	3,587	01-Nov-18	31-Mar-19	Y	N
Suncor Energy Marketing Inc.	HUB345T0419	Dawn	Parkway	2,638	01-Nov-18	31-Mar-19	Y	N
Suncor Energy Marketing Inc.	HUB345T0423	Dawn	Parkway	10,551	01-Dec-18	31-Mar-19	Y	N
Emera Energy Limited Partnership	HUB380T0263	Ojibway	Dawn	13,188	01-Jan-19	31-Mar-19	Y	N
Bluewater Gas Storage, LLC	HUB507T133	Dawn	Dawn-Vector	123,001	01-Nov-18	31-Mar-19	Y	N
NextEra Energy Marketing, LLC	HUB526T0005	Dawn	Parkway	2,639	01-Nov-18	31-Mar-19	Y	N
NextEra Energy Marketing, LLC	HUB526T0006	Dawn	Parkway	5,275	01-Nov-18	31-Mar-19	Y	N
EDF Trading North America, LLC	HUB561T0951	Dawn	Parkway	31,652	01-Nov-18	31-Mar-19	Y	N
EDF Trading North America, LLC	HUB561T0990	Dawn	Parkway	15,826	01-Nov-18	31-Mar-19	Y	N
Hartree Partners, LP	HUB566T0301	St. Clair	Dawn	10,551	01-Nov-18	31-Mar-19	Y	N
MIECO INC.	HUB615T0144	St. Clair	Dawn	10,551	01-Nov-18	31-Mar-19	Y	N
Twin Eagle Resource Management Canada, LLC	HUB618T0083	Dawn	Parkway	3,000	01-Nov-18	31-Mar-19	Y	N
Castleton Commodities Merchant Trading L.P.	HUB623T0120	Dawn	Parkway	2,638	01-Nov-18	31-Mar-19	Y	N
Castleton Commodities Merchant Trading L.P.	HUB623T0123	Dawn	Parkway	5,275	01-Nov-18	31-Mar-19	Y	N
Castleton Commodities Merchant Trading L.P.	HUB623T0124	Dawn	Parkway	5,275	01-Nov-18	31-Mar-19	Y	N
Castleton Commodities Merchant Trading L.P.	HUB623T0125	Dawn	Parkway	5,275	01-Nov-18	31-Mar-19	Y	N
Castleton Commodities Merchant Trading L.P.	HUB623T0126	Dawn	Parkway	5,275	01-Nov-18	31-Mar-19	Y	N
Castleton Commodities Merchant Trading L.P.	HUB623T0130	Dawn	Parkway	5,275	01-Jan-19	31-Jan-19	Y	N
Castleton Commodities Merchant Trading L.P.	HUB623T0131	Dawn	Parkway	21,101	01-Jan-19	31-Jan-19	Y	N
Basic Energy Inc.	HUB750T001	Dawn	Parkway	180	01-Nov-18	31-Mar-19	Y	N
Energir, L.P. by its General Partner Energir Inc	M12007D	Dawn	Parkway	21,021	01-Nov-91	31-Oct-19	N	N
1425445 Ontario Limited o/a Utilities Kingston	M12077	Dawn	Parkway	6,322	01-Apr-04	31-Mar-21	N	N
Stelco Inc.	M12085	Dawn	Parkway	11,087	16-Sep-14	31-Oct-20	N	N
Energir, L.P. by its General Partner Energir Inc	M12092	Dawn	Parkway	35,000	01-Nov-06	31-Oct-19	N	N
Energir, L.P. by its General Partner Energir Inc	M12109	Dawn	Parkway	65,000	01-Nov-07	31-Oct-27	N	N
Goreway Station Partnership by its managing partner Goreway Power Station Holdings ULC	M12110	Dawn	Parkway	140,000	01-Nov-07	31-Oct-28	N	N
Vermont Gas Systems, Inc.	M12119	Dawn	Parkway	20,000	01-Nov-07	31-Oct-21	N	N
Greater Toronto Airports Authority	M12120	Dawn	Parkway	7,500	01-Nov-07	31-Oct-21	N	N
St. Lawrence Gas Company, Inc.	M12126	Dawn	Parkway	10,785	01-Nov-08	31-Oct-21	N	Y

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Thorold CoGen L.P. by its General Partner Northland Power Thorold Cogen GP Inc.	M12129	Dawn	Kirkwall	49,500	01-Sep-09	31-Aug-29	N	N
Portlands Energy Centre L.P. by its General Partner, Portlands Energy Centre Inc.	M12130	Dawn	Parkway	100,000	13-Jan-09	31-Oct-28	N	N
Energir, L.P. by its General Partner Energir Inc	M12132	Dawn	Parkway	52,343	01-Apr-09	31-Mar-21	N	N
Ag Energy Co-operative Ltd.	M12151	Dawn	Parkway	1,247	01-Nov-08	31-Oct-20	N	N
The Narragansett Electric Company d/b/a National Grid	M12164	Dawn	Parkway	1,081	01-Nov-11	31-Oct-21	N	N
Connecticut Natural Gas Corporation	M12166	Dawn	Parkway	6,410	01-Nov-11	31-Oct-21	N	N
Ag Energy Co-operative Ltd.	M12167	Dawn	Parkway	1,900	01-Nov-11	31-Oct-21	N	N
Consolidated Edison Company of New York, Inc. and Orange and Rockland Utilities, Inc.	M12171	Dawn	Parkway	21,825	01-Nov-11	31-Oct-21	N	N
Energir, L.P. by its General Partner Energir Inc	M12172	Dawn	Parkway	22,908	01-Apr-10	31-Mar-21	N	N
Energir, L.P. by its General Partner Energir Inc	M12176	Dawn	Parkway	88,728	01-Apr-11	31-Mar-21	N	N
Central Hudson Gas & Electric Corporation (a subsidiary of CH Energy Group, Inc.)	M12182	Dawn	Parkway	5,467	01-Nov-11	31-Oct-21	N	N
York Energy Centre LP	M12184	Dawn	Parkway	76,000	01-Apr-12	31-Oct-22	N	N
Niagara Mohawk Power Corporation d/b/a National Grid	M12186	Dawn	Parkway	55,123	01-Nov-11	31-Oct-21	N	N
Vermont Gas Systems, Inc.	M12190	Dawn	Parkway	500	01-Nov-10	31-Oct-21	N	N
The Brooklyn Union Gas Company d/b/a National Grid NY	M12193	Dawn	Parkway	12,953	01-Nov-10	31-Oct-21	N	N
KeySpan Gas East Corporation d/b/a National Grid	M12194	Dawn	Parkway	17,162	01-Nov-10	31-Oct-20	N	N
Central Hudson Gas & Electric Corporation (a subsidiary of CH Energy Group, Inc.)	M12195	Dawn	Parkway	10,792	01-Nov-10	31-Oct-21	N	N
Boston Gas Company d/b/a National Grid	M12197	Dawn	Parkway	9,282	01-Nov-10	31-Oct-21	N	N
Colonial Gas Company d/b/a National Grid	M12198	Dawn	Parkway	6,475	01-Nov-10	31-Oct-21	N	N
Boston Gas Company d/b/a National Grid	M12199	Dawn	Parkway	2,158	01-Nov-10	31-Oct-21	N	N
Liberty Utilities (EnergyNorth Natural Gas) Corp.	M12200	Dawn	Parkway	4,317	01-Nov-10	31-Oct-22	N	N
Connecticut Natural Gas Corporation	M12201	Dawn	Parkway	18,077	01-Nov-10	31-Oct-21	N	N
The Southern Connecticut Gas Company	M12202	Dawn	Parkway	34,950	01-Nov-10	31-Oct-21	N	N
Yankee Gas Services Company dba Eversource Energy	M12203	Dawn	Parkway	43,116	01-Nov-10	31-Oct-21	N	N
Bay State Gas Company dba Columbia Gas of Massachusetts	M12204	Dawn	Parkway	27,803	01-Nov-10	31-Oct-22	N	N
Connecticut Natural Gas Corporation	M12206	Dawn	Parkway	9,170	01-Nov-10	31-Oct-21	N	N
The Southern Connecticut Gas Company	M12207	Dawn	Parkway	13,970	01-Nov-10	31-Oct-21	N	N
The Brooklyn Union Gas Company d/b/a National Grid NY	M12208	Dawn	Parkway	30,217	01-Nov-10	31-Oct-21	N	N
KeySpan Gas East Corporation d/b/a National Grid	M12209	Dawn	Parkway	22,772	01-Nov-10	31-Oct-21	N	N
Yankee Gas Services Company dba Eversource Energy	M12210	Dawn	Parkway	20,560	01-Nov-10	31-Oct-21	N	N
Yankee Gas Services Company dba Eversource Energy	M12212	Dawn	Parkway	5,380	01-Nov-10	31-Oct-21	N	N
The Southern Connecticut Gas Company	M12213	Dawn	Parkway	9,735	01-Nov-10	31-Oct-21	N	N
Connecticut Natural Gas Corporation	M12214	Dawn	Parkway	6,489	01-Nov-10	31-Oct-21	N	N
Suncor Energy Products Partnership Produits Suncor Energie, S.E.N.C.	M12217	Dawn	Parkway	9,585	01-Nov-11	31-Oct-21	N	N
TransCanada PipeLines Limited	M12219	Kirkwall	Parkway	88,497	01-Nov-12	31-Oct-22	N	N
TransCanada PipeLines Limited	M12220	Kirkwall	Parkway	174,752	01-Nov-13	31-Oct-23	N	N
Emera Energy Limited Partnership	M12221	Kirkwall	Parkway	36,751	01-Nov-12	31-Oct-22	N	N
Energir, L.P. by its General Partner Energir Inc	M12222	Dawn	Parkway	257,784	01-Nov-15	31-Oct-25	N	N
Vermont Gas Systems, Inc.	M12224	Dawn	Parkway	8,100	01-Nov-14	31-Oct-24	N	N
TransCanada PipeLines Limited	M12230	Kirkwall	Parkway	36,301	01-Nov-16	31-Oct-31	N	N
Energir, L.P. by its General Partner Energir Inc	M12232	Dawn	Parkway	39,507	01-Nov-16	31-Oct-31	N	N
Energir, L.P. by its General Partner Energir Inc	M12233	Dawn	Parkway	19,754	01-Nov-16	31-Oct-31	N	N
Energir, L.P. by its General Partner Energir Inc	M12237	Dawn	Parkway	85,680	01-Nov-16	31-Oct-31	N	N
Energir, L.P. by its General Partner Energir Inc	M12244	Dawn	Parkway	36,670	01-Nov-17	31-Oct-32	N	N
TransCanada Energy Ltd.	M12246	Dawn	Parkway	143,775	01-Nov-17	31-Oct-32	N	N
St. Lawrence Gas Company, Inc.	M12249	Dawn	Parkway	10,412	01-Nov-17	31-Oct-32	N	Y
1425445 Ontario Limited o/a Utilities Kingston	M12251	Dawn	Parkway	5,000	01-Nov-17	31-Oct-32	N	N
1425445 Ontario Limited o/a Utilities Kingston	M12252	Kirkwall	Parkway	1,000	01-Nov-17	31-Oct-32	N	N

January 2019

Customer Name	Contract Identifier	Receipt Point	Delivery Point	Quantity (GJ)	Start Date	End Date	Negotiated Rate	Affiliate
The Corporation of the City of Kitchener	M12253	Kirkwall	Parkway	10,000	01-Nov-17	31-Oct-32	N	N
DTE Energy Trading, Inc.	M12255	Kirkwall	Parkway	73,854	01-Nov-17	31-Oct-31	N	N
Northern Utilities, Inc.	M12256	Dawn	Parkway	42,962	01-Nov-17	31-Oct-33	N	N
Portland Natural Gas Transmission System	M12266-AS1	Dawn	Parkway	1,957	01-Nov-18	31-Oct-40	N	N
Enbridge Gas New Brunswick Limited Partnership by its General Partner, Enbridge Gas New Brunswick Inc.	M12270	Dawn	Parkway	2,650	01-Nov-18	31-Oct-40	N	Y
Boston Gas Company d/b/a National Grid	M12273	Dawn	Parkway	22,332	01-Nov-18	31-Oct-40	N	N
The Narragansett Electric Company d/b/a National Grid	M12274	Dawn	Parkway	11,349	01-Nov-18	31-Oct-40	N	N
Heritage Gas Limited	M12276	Dawn	Parkway	3,978	01-Nov-18	31-Oct-40	N	N
Enbridge Gas New Brunswick Limited Partnership by its General Partner, Enbridge Gas New Brunswick Inc.	M12277	Dawn	Parkway	112	01-Nov-18	31-Oct-40	N	Y
TransCanada PipeLines Limited	M12X004	Dawn	Parkway	50,000	01-Sep-11	31-Aug-21	N	N
TransCanada PipeLines Limited	M12X005	Dawn	Parkway	78,316	01-Sep-11	31-Aug-21	N	N
TransCanada PipeLines Limited	M12X013	Dawn	Parkway	62,695	01-Nov-12	31-Oct-23	N	N
1425445 Ontario Limited o/a Utilities Kingston	M12X015	Dawn	Parkway	5,000	01-Apr-14	31-Mar-24	N	N
Market Hub Partners Canada L.P.	M16004	Dawn	Market Hub Partners - St. Clair Pool	9,000	01-Jun-07	31-May-21	N	Y
Market Hub Partners Canada L.P.	M16004	Market Hub Partners - St. Clair Pool	Dawn	5,000	01-Jun-07	31-May-21	N	Y
Enbridge Gas Inc. (In-Franchise Customers - EGD Zone) *		Dawn	Parkway	2,917,173	01-Jan-19	31-Oct-19	N	Y
Enbridge Gas Inc. (In-Franchise Customers - EGD Zone) **		Dawn	Kirkwall	67,929	01-Jan-19	31-Oct-19	N	Y
Enbridge Gas Inc. (In-Franchise Customers - EGD Zone) ***		Parkway	Dawn	236,586	01-Jan-19	31-Mar-19	N	Y
In-Franchise Customers - Union South and North Zones		Dawn	Parkway	2,333,248	01-Nov-18	31-Oct-19	N	Y

* - comprised of former contract #'s: M12079B, M12080, M12108, M12125, M12188, M12225, M12234, M12250 & M12X006

** - comprised of former contract #'s: M12079A & M12175

*** - comprised of former contract #: C10009

ENBRIDGE
Life Takes Energy

Enbridge Gas Inc. Storage Customers as of January 1, 2023

Customer Name	Contract Identifier	Maximum Storage Quantity(GJ)	Start Date	Expiry Date	Maximum Firm Daily Withdrawal Quantity(GJ)	Maximum Firm Daily Injection Quantity(GJ)	Receipt Point	Delivery Point	Affiliate
Goreway Station Partnership	BHDS002	600,000	Jul 1, 2008	Oct 31, 2028	128,000	128,000	Dawn	Dawn	N
Enbridge Gas Inc formerly known as Enbridge Gas Distribution	Formerly LST106	3,000,000	Apr 1, 2018	Mar 31, 2023	36,000	22,500	Dawn	Dawn	Y
Enbridge Gas Inc formerly known as Enbridge Gas Distribution	Formerly LST111	3,000,000	Apr 1, 2019	Mar 31, 2024	36,000	22,500	Dawn	Dawn	Y
Enbridge Gas Inc formerly known as Enbridge Gas Distribution	Formerly LST117	4,000,000	Apr 1, 2020	Mar 31, 2025	48,000	30,000	Dawn	Dawn	Y
Enbridge Gas Inc formerly known as Enbridge Gas Distribution	Formerly LST118	1,000,000	Apr 1, 2020	Mar 31, 2024	12,000	7,500	Dawn	Dawn	Y
Enbridge Gas Inc formerly known as Enbridge Gas Distribution	Formerly LST132	1,500,000	Apr 1, 2021	Mar 31, 2026	18,000	11,250	Dawn	Dawn	Y
Greenfield South Power Corporation	HDS012	162,400	Sep 1, 2017	Feb 28, 2037	16,248	16,248	Dawn	Dawn	N
Greenfield Energy Centre LP	HDS013	211,011	Nov 1, 2018	Oct 15, 2028	42,202	42,202	Dawn	Dawn	N
Thorold CoGen L.P. by its General Partner Northland Power Thorold Cogen GP Inc.	HDS014	170,000	Apr 1, 2019	Mar 31, 2030	44,000	44,000	Dawn	Dawn	N
DTE Electric Company	HDS015	1,582,584	Sep 1, 2021	May 31, 2027	21,101	58,208	Dawn	Dawn	N
Portlands Energy Centre L.P. by its General Partner, Portlands Energy Centre Inc.	HDS016	500,000	Apr 1, 2019	Apr 21, 2029	40,000	40,000	Dawn	Dawn	N
Portlands Energy Centre L.P Napanee	HDS017	500,000	Apr 29, 2020	Mar 31, 2033	126,000	126,000	Dawn	Dawn	N
York Energy Centre LP	HDS018	175,000	Nov 1, 2022	May 8, 2032	87,654	87,654	Dawn	Dawn	N
Mercuria Commodities Canada Corporation	HUB336PS0002	211,011	Apr 1, 2022	Mar 31, 2023	2,532	-	Dawn	Dawn	N
Mercuria Commodities Canada Corporation	HUB336PS0003	105,506	Apr 1, 2022	Mar 31, 2023	1,266	-	Dawn	Dawn	N
Emera Energy Limited Partnership	HUB380PS0001	633,034	Jun 10, 2022	Jun 9, 2023	7,596	-	Dawn	Dawn	N
Active Energy Inc.	HUB469PS0002	105,506	May 23, 2022	May 22, 2023	1,266	-	Dawn	Dawn	N
Spotlight Energy, LLC	HUB793PS0002	527,528	Apr 1, 2022	Mar 31, 2023	6,330	-	Dawn	Dawn	N
Spire Marketing Inc.	HUB874PS0001	263,764	Apr 1, 2022	Mar 31, 2023	3,165	-	Dawn	Dawn	N
TrailStone Energy Marketing, LLC	HUB883PS0001	527,528	Jul 1, 2022	Mar 31, 2023	6,330	-	Dawn	Dawn	N
Northern Utilities, Inc.	LST086	4,220,224	Apr 1, 2018	Mar 31, 2023	43,468	31,652	Dawn	Dawn	N
J. Aron & Company	LST099	1,055,056	Sep 1, 2017	Mar 31, 2023	18,991	15,826	Dawn	Dawn	N
EPCOR Natural Gas Limited Partnership	LST115	100,000	May 15, 2020	Mar 31, 2030	1,200	750	Dawn	Dawn	N
Energir, L.P. by its General Partner Energir Inc	LST116	2,125,000	Apr 1, 2020	Mar 31, 2023	25,500	31,875	Dawn	Dawn	N
1425445 Ontario Limited o/a Utilities Kingston	LST129	50,000	May 1, 2021	Apr 30, 2024	700	375	Dawn	Dawn	N
Liberty Utilities (St. Lawrence Gas) Corp.	LST131	950,000	Apr 1, 2021	Mar 31, 2024	11,400	9,500	Dawn	Dawn	N
Energir, L.P. by its General Partner Energir Inc	LST133	1,681,500	Apr 1, 2021	Mar 31, 2024	20,178	25,223	Dawn	Dawn	N
The Southern Connecticut Gas Company	LST134	1,820,000	Apr 1, 2021	Mar 31, 2026	21,840	13,650	Dawn	Dawn	N
The Southern Connecticut Gas Company	LST135	1,700,000	Apr 1, 2022	Mar 31, 2025	20,400	12,750	Dawn	Dawn	N
Connecticut Natural Gas Corporation	LST136	980,000	Apr 1, 2021	Mar 31, 2026	11,760	7,350	Dawn	Dawn	N
Connecticut Natural Gas Corporation	LST137	1,300,000	Apr 1, 2022	Mar 31, 2025	15,600	9,750	Dawn	Dawn	N
Eversource Gas Company of Massachusetts dba Eversource Energy	LST143	1,688,090	Apr 1, 2022	Mar 31, 2024	16,881	12,661	Dawn	Dawn	N
Eversource Gas Company of Massachusetts dba Eversource Energy	LST144	1,920,202	Apr 1, 2022	Mar 31, 2024	27,958	14,402	Dawn	Dawn	N
1425445 Ontario Limited o/a Utilities Kingston	LST145	150,000	Apr 1, 2022	Mar 31, 2024	2,100	1,125	Dawn	Dawn	N
Yankee Gas Services Company dba Eversource Energy	LST147	3,165,168	Apr 1, 2022	Mar 31, 2024	52,753	26,271	Dawn	Dawn	N
Enbridge Gas Inc formerly known as Enbridge Gas Distribution	LST148	2,000,000	Apr 1, 2022	Mar 31, 2024	24,000	15,000	Dawn	Dawn	Y
Energir, L.P. by its General Partner Energir Inc	LST151	7,620,625	Apr 1, 2022	Mar 31, 2025	91,448	114,309	Dawn	Dawn	N
Enbridge Gas Inc formerly known as Enbridge Gas Distribution	LST152	3,000,000	Apr 1, 2022	Mar 31, 2025	36,000	22,500	Dawn	Dawn	Y
Vermont Gas Systems, Inc.	LST154	263,764	Apr 1, 2022	Mar 31, 2024	3,165	3,165	Dawn	Dawn	N
AltaGas Ltd.	LTP035	2,844,465	Apr 1, 2009	Mar 31, 2029	34,134	21,333	Dawn	Dawn	N

Enbridge Gas Inc. Storage Customers as of January 1, 2023

Customer Name	Contract Identifier	Maximum Storage Quantity(GJ)	Start Date	Expiry Date	Maximum Firm Daily Withdrawal Quantity(GJ)	Maximum Firm Daily Injection Quantity(GJ)	Receipt Point	Delivery Point	Affiliate
NJR Energy Services Company	LTP161	2,110,112	Mar 31, 2017	Mar 31, 2023	25,321	-	Dawn	Dawn	N
NJR Energy Services Company	LTP186	1,055,056	Apr 1, 2018	Mar 31, 2023	12,661	-	Dawn	Dawn	N
J. Aron & Company	LTP238	1,582,584	Apr 1, 2019	Mar 31, 2023	18,991	-	Dawn	Dawn	N
J. Aron & Company	LTP249	2,110,112	May 8, 2019	Mar 31, 2023	25,321	-	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP255	3,165,168	Apr 1, 2020	Mar 31, 2023	37,982	-	Dawn	Dawn	N
Powerex Corp.	LTP260	1,055,056	Apr 1, 2020	Mar 31, 2023	12,661	-	Dawn	Dawn	N
BP Canada Energy Group ULC	LTP262	1,055,056	Apr 1, 2020	Mar 31, 2025	12,661	-	Dawn	Dawn	N
1425445 Ontario Limited o/a Utilities Kingston	LTP265	250,000	Apr 1, 2020	Mar 31, 2023	-	3,750	Dawn	Dawn	N
BP Canada Energy Group ULC	LTP275	2,110,112	Apr 1, 2020	Mar 31, 2025	25,321	-	Dawn	Dawn	N
Powerex Corp.	LTP279	1,055,056	Apr 1, 2020	Mar 31, 2023	12,661	-	Dawn	Dawn	N
Constellation Energy Generation, LLC	LTP289	1,055,056	Apr 1, 2021	Mar 31, 2023	12,661	-	Dawn	Dawn	N
Emera Energy Limited Partnership	LTP290	2,110,112	Apr 1, 2021	Mar 31, 2024	25,321	-	Dawn	Dawn	N
PetroChina International (Canada) Trading Ltd.	LTP291	1,055,056	Apr 1, 2021	Mar 31, 2024	12,661	-	Dawn	Dawn	N
Hartree Partners, LP	LTP294	3,165,168	Apr 1, 2021	Mar 31, 2024	37,982	-	Dawn	Dawn	N
Macquarie Energy Canada Ltd.	LTP295	2,110,112	Mar 31, 2021	Mar 31, 2023	25,321	-	Dawn	Dawn	N
J. Aron & Company	LTP297	1,055,056	Mar 31, 2021	Mar 31, 2024	12,661	-	Dawn	Dawn	N
Morgan Stanley Capital Group Inc.	LTP298	1,055,056	Apr 1, 2021	Mar 31, 2023	12,661	-	Dawn	Dawn	N
Castleton Commodities Merchant Trading L.P.	LTP299	1,582,584	Apr 1, 2021	Mar 31, 2024	18,991	10,551	Dawn	Dawn	N
Macquarie Energy Canada Ltd.	LTP300	2,110,112	Apr 1, 2021	Mar 31, 2024	25,321	-	Dawn	Dawn	N
Canadian RiteRate Energy Corporation	LTP301	33,762	Apr 1, 2021	Mar 31, 2023	405	-	Dawn	Dawn	N
BP Canada Energy Group ULC	LTP302	1,055,056	Apr 1, 2021	Mar 31, 2026	12,661	-	Dawn	Dawn	N
Powerex Corp.	LTP303	1,055,056	Apr 1, 2021	Mar 31, 2024	12,661	-	Dawn	Dawn	N
J. Aron & Company	LTP304	1,055,056	Apr 1, 2021	Mar 31, 2024	12,661	-	Dawn	Dawn	N
Vitol Inc.	LTP306	2,110,112	Apr 1, 2021	Mar 31, 2024	25,321	-	Dawn	Dawn	N
Koch Canada Energy Services, LP	LTP308	2,110,112	Apr 1, 2021	Mar 31, 2024	25,321	-	Dawn	Dawn	N
Castleton Commodities Merchant Trading L.P.	LTP310	2,110,112	Apr 1, 2021	Mar 31, 2024	25,321	-	Dawn	Dawn	N
Powerex Corp.	LTP311	2,110,112	Apr 1, 2021	Mar 31, 2024	25,321	-	Dawn	Dawn	N
Citadel Energy Marketing LLC	LTP312	1,055,056	Mar 31, 2021	Mar 31, 2024	12,661	-	Dawn	Dawn	N
Spotlight Energy, LLC	LTP314	527,528	Mar 31, 2021	Mar 31, 2024	6,331	-	Dawn	Dawn	N
Sequent Energy Canada LLC	LTP315	3,165,168	Apr 1, 2021	Mar 31, 2024	37,982	-	Dawn	Dawn	N
DTE Energy Trading, Inc.	LTP316	1,055,056	Apr 1, 2021	Mar 31, 2024	12,661	-	Dawn	Dawn	N
Macquarie Energy Canada Ltd.	LTP318	2,110,112	Mar 31, 2021	Mar 31, 2024	25,321	-	Dawn	Dawn	N
MIECO LLC	LTP319	527,528	Apr 1, 2021	Mar 31, 2023	6,330	-	Dawn	Dawn	N
EDF Trading North America, LLC	LTP320	1,055,056	Apr 10, 2021	Mar 31, 2024	12,661	-	Dawn	Dawn	N
EDF Trading North America, LLC	LTP321	1,055,056	May 1, 2021	Mar 31, 2024	12,661	-	Dawn	Dawn	N
Castleton Commodities Merchant Trading L.P.	LTP322	1,055,056	May 7, 2021	Mar 31, 2024	12,661	-	Dawn	Dawn	N
Tidal Energy Marketing Inc.	LTP323	1,055,056	Apr 1, 2022	Mar 31, 2024	12,661	-	Dawn	Dawn	Y
BP Canada Energy Group ULC	LTP324	1,055,056	Apr 1, 2022	Mar 31, 2027	12,661	-	Dawn	Dawn	N
EDF Trading North America, LLC	LTP329	1,055,056	Apr 1, 2022	Mar 31, 2025	12,661	-	Dawn	Dawn	N
EDF Trading North America, LLC	LTP330	2,110,112	Apr 1, 2022	Mar 31, 2025	25,321	-	Dawn	Dawn	N
Macquarie Energy Canada Ltd.	LTP331	3,165,168	Apr 1, 2022	Mar 31, 2025	37,982	-	Dawn	Dawn	N
Castleton Commodities Merchant Trading L.P.	LTP333	1,055,056	Apr 1, 2022	Mar 31, 2025	12,661	-	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP334	3,165,168	Apr 1, 2022	Mar 31, 2025	37,982	-	Dawn	Dawn	N
EDF Trading North America, LLC	LTP335	1,055,056	Apr 1, 2022	Mar 31, 2025	12,661	-	Dawn	Dawn	N
EDF Trading North America, LLC	LTP336	4,220,224	Apr 1, 2022	Mar 31, 2025	50,643	-	Dawn	Dawn	N

Enbridge Gas Inc. Storage Customers as of January 1, 2023

Customer Name	Contract Identifier	Maximum Storage Quantity(GJ)	Start Date	Expiry Date	Maximum Firm Daily Withdrawal Quantity(GJ)	Maximum Firm Daily Injection Quantity(GJ)	Receipt Point	Delivery Point	Affiliate
Tourmaline Oil Corp.	LTP337	1,055,056	Apr 1, 2022	Mar 31, 2024	12,661	-	Dawn	Dawn	N
Shell Energy North America (Canada) Inc.	LTP339	4,220,224	Apr 1, 2022	Mar 31, 2025	50,643	-	Dawn	Dawn	N
Castleton Commodities Merchant Trading L.P.	LTP340	2,110,112	Apr 1, 2022	Mar 31, 2025	25,321	-	Dawn	Dawn	N
1425445 Ontario Limited o/a Utilities Kingston	LTP341	150,000	May 1, 2022	Apr 30, 2025	5,850	2,925	Dawn	Dawn	N
Constellation Energy Generation, LLC	LTP343	2,110,112	Apr 1, 2022	Mar 31, 2024	25,321	44,312	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP344	1,318,820	Apr 1, 2022	Mar 31, 2024	15,826	9,891	Dawn	Dawn	N
Twin Eagle Resource Management Canada, LLC	LTP348	1,055,056	May 1, 2022	Apr 30, 2025	12,661	-	Dawn	Dawn	N
Powerex Corp.	LTP349	2,110,112	Apr 1, 2022	Mar 31, 2025	25,321	-	Dawn	Dawn	N
Macquarie Energy Canada Ltd.	LTP350	2,110,112	Apr 1, 2022	Mar 31, 2025	25,321	-	Dawn	Dawn	N
EDF Trading North America, LLC	LTP353	2,110,112	Apr 1, 2022	Mar 31, 2027	25,321	-	Dawn	Dawn	N
Uniper Trading Canada Ltd.	LTP354	1,055,056	Apr 1, 2022	Mar 31, 2025	12,661	-	Dawn	Dawn	N
Castleton Commodities Merchant Trading L.P.	LTP355	2,110,112	Apr 1, 2022	Mar 31, 2025	25,321	-	Dawn	Dawn	N
Emera Energy Limited Partnership	LTP357	2,110,112	Apr 1, 2022	Mar 31, 2025	25,321	-	Dawn	Dawn	N
ENGIE Energy Marketing NA, Inc.	LTP359	105,506	Apr 1, 2022	Mar 31, 2024	1,266	-	Dawn	Dawn	N
Tenaska Marketing Canada - a division of TMV Corp.	LTP360	2,110,112	Apr 1, 2022	Mar 31, 2024	25,321	-	Dawn	Dawn	N
Koch Canada Energy Services, LP	LTP361	1,055,056	Apr 1, 2022	Mar 31, 2025	12,661	-	Dawn	Dawn	N
Koch Canada Energy Services, LP	LTP362	1,055,056	Apr 1, 2022	Mar 31, 2025	12,661	-	Dawn	Dawn	N
Freepoint Commodities LLC	LTP363	1,055,056	Apr 1, 2022	Mar 31, 2024	12,661	-	Dawn	Dawn	N
Colonial Energy, Inc.	LTP364	263,764	Apr 1, 2022	Mar 31, 2024	3,165	-	Dawn	Dawn	N
BP Canada Energy Group ULC	LTP365	1,055,056	Apr 1, 2022	Mar 31, 2027	12,661	-	Dawn	Dawn	N
Constellation Energy Generation, LLC	LTP366	1,055,056	Apr 1, 2022	Mar 31, 2024	12,661	-	Dawn	Dawn	N
EDF Trading North America, LLC	LTP367	1,055,056	Apr 1, 2022	Mar 31, 2026	12,661	-	Dawn	Dawn	N
Koch Canada Energy Services, LP	LTP368	1,055,056	Apr 1, 2022	Mar 31, 2027	12,661	-	Dawn	Dawn	N
Modern Niagara Capital Inc.	LTP369 - RNG	25,000	Mar 1, 2022	Feb 28, 2027	250	250	Dawn	Dawn	N
Freepoint Commodities LLC	LTP372	2,110,112	Oct 1, 2022	Mar 31, 2025	25,321	-	Dawn	Dawn	N
Access Gas Services (Ontario) Inc.	LTP373 - RNG	1,500	Nov 1, 2022	Oct 31, 2027	15	15	Dawn	Dawn	N
Repsol Energy North America Canada Partnership	LTP380	1,055,056	Dec 1, 2022	Mar 31, 2023	12,661	-	Dawn	Dawn	N
Repsol Energy North America Canada Partnership	LTP381	2,110,112	Dec 1, 2022	Mar 31, 2023	25,321	-	Dawn	Dawn	N
Repsol Energy North America Canada Partnership	LTP382	2,110,112	Dec 1, 2022	Mar 31, 2024	25,321	-	Dawn	Dawn	N

ENBRIDGE
Life Takes Energy

Enbridge Gas Inc. Transport Shippers as of January 1, 2023

Customer Name	Agreement Name	Receipt Point	Delivery Point	Quantity (GJ)	Start Date	Expiry Date	Negotiated Rate	Affiliate
Liberty Utilities (St. Lawrence Gas) Corp.	C10076	Parkway	Dawn	10,785	Apr 1, 2007	Mar 31, 2025	N	N
Greenfield Energy Centre LP	C10083	Dawn	Dawn Vector	92,845	Mar 1, 2008	Oct 31, 2025	N	N
TransCanada PipeLines Limited	C10097	Dawn	Dawn TCPL	500,000	Nov 1, 2010	Oct 31, 2025	N	N
York Energy Centre LP	C10102	Dawn	Parkway	11,654	Apr 1, 2012	Oct 31, 2023	N	N
Bluewater Gas Storage, LLC	C10105	Bluewater	Dawn	123,000	Nov 1, 2013	Oct 31, 2023	N	N
Emera Energy Limited Partnership	C10107	Kirkwall	Dawn	73,745	Nov 1, 2015	Oct 31, 2025	N	N
Seneca Resources Company, LLC	C10109	Kirkwall	Dawn	388,261	Nov 1, 2016	Mar 31, 2023	Y	N
Rover Pipeline LLC	C10113	Ojibway	Dawn	36,927	Nov 1, 2017	Oct 31, 2025	N	N
TransCanada PipeLines Limited	C10115	Parkway	Dawn	42,202	Nov 1, 2017	Oct 31, 2025	N	N
DTE Electric Company	C10116	Dawn	Dawn Vector	110,781	Oct 29, 2021	May 31, 2027	N	N
TransCanada PipeLines Limited	C10118	Parkway	Dawn	200,000	Nov 1, 2020	Oct 31, 2025	N	N
TransCanada PipeLines Limited	C10119	Parkway	Dawn	200,000	Nov 1, 2020	Oct 31, 2023	N	N
TransCanada PipeLines Limited	C10122	Parkway	Dawn	105,937	Nov 1, 2021	Oct 31, 2024	N	N
TransCanada PipeLines Limited	C10123	Parkway	Dawn	128,316	Sep 1, 2022	Oct 31, 2024	N	N
TransCanada PipeLines Limited	C10124	Parkway	Dawn	359,951	Nov 1, 2022	Oct 31, 2027	N	N
Emera Energy Limited Partnership	C10125	Kirkwall	Parkway	42,202	Nov 1, 2022	Oct 31, 2024	N	N
Repsol Energy North America Canada Partnership	C10128	Dawn	Parkway	5,275	Dec 1, 2022	Oct 31, 2023	N	N
BP Canada Energy Group ULC	HUB040T0334	Dawn	Parkway	1,275	Nov 1, 2022	Oct 31, 2023	N	N
BP Canada Energy Group ULC	HUB040T0335	Dawn	Parkway	3,038	Nov 1, 2022	Oct 31, 2023	N	N
BP Canada Energy Group ULC	HUB040T0336	Dawn	Parkway	10,735	Nov 1, 2022	Oct 31, 2023	N	N
Vermont Gas Systems, Inc.	HUB100T0073	Dawn	Parkway	15,826	Nov 1, 2022	Mar 31, 2023	Y	N
Vermont Gas Systems, Inc.	HUB100T0074	Dawn	Parkway	5,275	Nov 1, 2022	Mar 31, 2023	Y	N
Tidal Energy Marketing Inc.	HUB305T0326	Dawn	Parkway	79,129	Nov 1, 2022	Mar 31, 2023	Y	Y
Tidal Energy Marketing Inc.	HUB305T0327	Dawn	Parkway	26,376	Nov 1, 2022	Mar 31, 2023	Y	Y
Ontario Power Generation Inc.	HUB335T0025	Parkway	Dawn	2,650	Nov 1, 2022	Oct 31, 2023	Y	N
Cima Energy, Ltd.	HUB372T0206	St. Clair MC	Dawn	21,101	Jan 1, 2023	Jan 31, 2023	Y	N
Koch Canada Energy Services, LP	HUB584T0489	Dawn	Parkway	5,091	Nov 1, 2022	Mar 31, 2023	Y	N
Castleton Commodities Merchant Trading L.P.	HUB623T0432	Dawn	Parkway	10,551	Nov 1, 2022	Mar 31, 2023	Y	N
Citadel Energy Marketing LLC	HUB729T0091	Ojibway	Dawn	31,652	Nov 1, 2022	Mar 31, 2023	Y	N
Citadel Energy Marketing LLC	HUB729T0092	Ojibway	Dawn	1,283	Nov 1, 2022	Mar 31, 2023	Y	N
1425445 Ontario Limited o/a Utilities Kingston	M12077	Dawn	Parkway	6,322	Apr 1, 2004	Mar 31, 2025	N	N
Energir, L.P. by its General Partner Energir Inc	M12109	Dawn	Parkway	65,000	Nov 1, 2007	Oct 31, 2027	N	N
Goreway Station Partnership	M12110	Dawn	Parkway	140,000	Nov 1, 2007	Oct 31, 2028	N	N
Vermont Gas Systems, Inc.	M12119	Dawn	Parkway	20,000	Nov 1, 2007	Oct 31, 2025	N	N

Enbridge Gas Inc. Transport Shippers as of January 1, 2023

Customer Name	Agreement Name	Receipt Point	Delivery Point	Quantity (GJ)	Start Date	Expiry Date	Negotiated Rate	Affiliate
Greater Toronto Airports Authority	M12120	Dawn	Parkway	7,500	Nov 1, 2007	Oct 31, 2024	N	N
Liberty Utilities (St. Lawrence Gas) Corp.	M12126	Dawn	Parkway	10,785	Nov 1, 2008	Mar 31, 2025	N	N
Thorold CoGen L.P. by its General Partner Northland Power Thorold Cogen GP Inc.	M12129	Dawn	Kirkwall	49,500	Sep 1, 2009	Aug 31, 2029	N	N
Portlands Energy Centre L.P. by its General Partner, Portlands Energy Centre Inc.	M12130	Dawn	Parkway	100,000	Jan 13, 2009	Apr 21, 2029	N	N
Energir, L.P. by its General Partner Energir Inc	M12132	Dawn	Parkway	52,343	Apr 1, 2009	Mar 31, 2025	N	N
The Narragansett Electric Company d/b/a National Grid	M12164	Dawn	Parkway	1,081	Nov 1, 2011	Oct 31, 2025	N	N
Connecticut Natural Gas Corporation	M12166	Dawn	Parkway	6,410	Nov 1, 2011	Oct 31, 2025	N	N
Consolidated Edison Company of New York, Inc. and Orange and Rockland Utilities, Inc.	M12171	Dawn	Parkway	21,825	Nov 1, 2011	Oct 31, 2025	N	N
Energir, L.P. by its General Partner Energir Inc	M12172	Dawn	Parkway	22,908	Apr 1, 2010	Mar 31, 2025	N	N
Central Hudson Gas & Electric Corporation (a subsidiary of CH Energy Group, Inc.)	M12182	Dawn	Parkway	5,467	Nov 1, 2011	Oct 31, 2025	N	N
York Energy Centre LP	M12184	Dawn	Parkway	76,000	Apr 1, 2012	Oct 31, 2025	N	N
Niagara Mohawk Power Corporation d/b/a National Grid	M12186	Dawn	Parkway	55,123	Nov 1, 2011	Oct 31, 2025	N	N
Vermont Gas Systems, Inc.	M12190	Dawn	Parkway	500	Nov 1, 2010	Oct 31, 2025	N	N
The Brooklyn Union Gas Company d/b/a National Grid NY	M12193	Dawn	Parkway	43,170	Nov 1, 2010	Oct 31, 2025	N	N
KeySpan Gas East Corporation d/b/a National Grid	M12194	Dawn	Parkway	39,934	Nov 1, 2010	Oct 31, 2025	N	N
Central Hudson Gas & Electric Corporation (a subsidiary of CH Energy Group, Inc.)	M12195	Dawn	Parkway	10,792	Nov 1, 2010	Oct 31, 2025	N	N
Boston Gas Company d/b/a National Grid	M12197	Dawn	Parkway	17,915	Nov 1, 2010	Oct 31, 2025	N	N
Liberty Utilities (EnergyNorth Natural Gas) Corp.	M12200	Dawn	Parkway	4,317	Nov 1, 2010	Oct 31, 2025	N	N
Connecticut Natural Gas Corporation	M12201	Dawn	Parkway	18,077	Nov 1, 2010	Oct 31, 2025	N	N
The Southern Connecticut Gas Company	M12202	Dawn	Parkway	34,950	Nov 1, 2010	Oct 31, 2025	N	N
Yankee Gas Services Company dba Eversource Energy	M12203	Dawn	Parkway	43,116	Nov 1, 2010	Oct 31, 2025	N	N
Eversource Gas Company of Massachusetts dba Eversource Energy	M12204	Dawn	Parkway	27,803	Nov 1, 2010	Oct 31, 2025	N	N
Connecticut Natural Gas Corporation	M12206	Dawn	Parkway	9,170	Nov 1, 2010	Oct 31, 2025	N	N
The Southern Connecticut Gas Company	M12207	Dawn	Parkway	13,970	Nov 1, 2010	Oct 31, 2025	N	N
Yankee Gas Services Company dba Eversource Energy	M12210	Dawn	Parkway	20,560	Nov 1, 2010	Oct 31, 2025	N	N
Yankee Gas Services Company dba Eversource Energy	M12212	Dawn	Parkway	5,380	Nov 1, 2010	Oct 31, 2025	N	N
The Southern Connecticut Gas Company	M12213	Dawn	Parkway	9,735	Nov 1, 2010	Oct 31, 2025	N	N
Connecticut Natural Gas Corporation	M12214	Dawn	Parkway	6,489	Nov 1, 2010	Oct 31, 2025	N	N
TransCanada PipeLines Limited	M12219	Kirkwall	Parkway	88,497	Nov 1, 2012	Oct 31, 2025	N	N
TransCanada PipeLines Limited	M12220	Kirkwall	Parkway	174,752	Nov 1, 2013	Oct 31, 2025	N	N
Emera Energy Limited Partnership	M12221	Kirkwall	Parkway	36,751	Nov 1, 2012	Oct 31, 2025	N	N
Energir, L.P. by its General Partner Energir Inc	M12222	Dawn	Parkway	257,784	Nov 1, 2015	Oct 31, 2025	N	N
Vermont Gas Systems, Inc.	M12224	Dawn	Parkway	8,100	Nov 1, 2014	Oct 31, 2025	N	N
TransCanada PipeLines Limited	M12230	Kirkwall	Parkway	36,301	Nov 1, 2016	Oct 31, 2031	N	N
Energir, L.P. by its General Partner Energir Inc	M12232	Dawn	Parkway	39,507	Nov 1, 2016	Oct 31, 2031	N	N
Energir, L.P. by its General Partner Energir Inc	M12233	Dawn	Parkway	19,754	Nov 1, 2016	Oct 31, 2031	N	N

Enbridge Gas Inc. Transport Shippers as of January 1, 2023

Customer Name	Agreement Name	Receipt Point	Delivery Point	Quantity (GJ)	Start Date	Expiry Date	Negotiated Rate	Affiliate
Energir, L.P. by its General Partner Energir Inc	M12237	Dawn	Parkway	85,680	Nov 1, 2016	Oct 31, 2031	N	N
Energir, L.P. by its General Partner Energir Inc	M12244	Dawn	Parkway	36,670	Nov 1, 2017	Oct 31, 2032	N	N
Liberty Utilities (St. Lawrence Gas) Corp.	M12249	Dawn	Parkway	10,412	Nov 1, 2017	Oct 31, 2032	N	N
1425445 Ontario Limited o/a Utilities Kingston	M12251	Dawn	Parkway	5,000	Nov 1, 2017	Oct 31, 2032	N	N
1425445 Ontario Limited o/a Utilities Kingston	M12252	Kirkwall	Parkway	1,000	Nov 1, 2017	Oct 31, 2032	N	N
The Corporation of the City of Kitchener	M12253	Kirkwall	Parkway	10,000	Nov 1, 2017	Oct 31, 2032	N	N
DTE Energy Trading, Inc.	M12255	Kirkwall	Parkway	73,854	Nov 1, 2017	Oct 31, 2031	N	N
Northern Utilities, Inc.	M12256	Dawn	Parkway	42,962	Nov 1, 2017	Oct 31, 2033	N	N
Liberty Utilities (Gas New Brunswick) Corp.	M12270	Dawn	Parkway	2,650	Nov 1, 2018	Oct 31, 2040	N	N
Liberty Utilities (Gas New Brunswick) Corp.	M12271	Dawn	Parkway	4,831	Nov 1, 2019	Oct 31, 2040	N	N
Liberty Utilities (Gas New Brunswick) Corp.	M12272	Dawn	Parkway	959	Nov 1, 2020	Oct 31, 2040	N	N
Boston Gas Company d/b/a National Grid	M12273	Dawn	Parkway	60,328	Nov 1, 2018	Oct 31, 2040	N	N
The Narragansett Electric Company d/b/a National Grid	M12274	Dawn	Parkway	30,656	Nov 1, 2018	Oct 31, 2040	N	N
Eastward Energy Incorporated	M12276	Dawn	Parkway	10,617	Nov 1, 2018	Oct 31, 2040	N	N
Liberty Utilities (Gas New Brunswick) Corp.	M12277	Dawn	Parkway	112	Nov 1, 2018	Oct 31, 2040	N	N
Northern Utilities, Inc.	M12279	Dawn	Parkway	10,875	Nov 1, 2022	Oct 31, 2037	N	N
Bangor Natural Gas Company	M12283	Dawn	Parkway	8,796	Nov 1, 2022	Oct 31, 2037	N	N
Liberty Utilities (EnergyNorth Natural Gas) Corp.	M12284	Dawn	Parkway	5,348	Apr 1, 2019	Oct 31, 2040	N	N
Eversource Gas Company of Massachusetts dba Eversource Energy	M12292	Dawn	Parkway	64,588	Nov 1, 2019	Oct 31, 2040	N	N
The Berkshire Gas Company	M12293	Dawn	Parkway	4,239	Nov 1, 2019	Oct 31, 2040	N	N
Portlands Energy Centre L.P Napanee	M12294	Dawn	Parkway	143,775	Apr 29, 2020	Oct 31, 2032	N	N
Northern Utilities, Inc.	M12296	Dawn	Parkway	10,814	Nov 1, 2020	Oct 31, 2040	N	N
Connecticut Natural Gas Corporation	M12297	Dawn	Parkway	39,789	Nov 1, 2021	Oct 31, 2036	N	N
The Southern Connecticut Gas Company	M12299	Dawn	Parkway	23,743	Nov 1, 2021	Oct 31, 2036	N	N
TransCanada PipeLines Limited	M12X013	Dawn	Parkway	62,695	Nov 1, 2012	Oct 31, 2025	N	N
1425445 Ontario Limited o/a Utilities Kingston	M12X015	Dawn	Parkway	5,000	Apr 1, 2014	Mar 31, 2025	N	N
Market Hub Partners Canada L.P.	M16004	Dawn	Market Hub Partners - St. Clair Pool	5,000	Jun 1, 2007	May 31, 2025	N	Y

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 11, Schedule 1

Question(s):

Please provide the contract details for all new Transportation and Storage service agreements that EGI expects to go into effect between January 2023 and December 2028.

Response:

Exhibit 1, Tab 11, Schedule 1, paragraphs 10 to 15 set out Enbridge Gas's high-level expectations regarding potential turnback and re-contracting during the referenced period. Enbridge Gas does not currently have details, but as required by STAR[1] any new contract details will be posted as they come into effect.

[1] EB-2008-0052, Issuance of new Rule – Storage and Transportation Access Rule (STAR)

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 11, Schedule 1

Question(s):

Please provide the contract details for all existing Transportation and Storage service agreements that EGI expects will terminate, or be modified, between January 2023 and December 2028.

Response:

Enbridge Gas does not expect any contracts to be modified or terminated between January 2023 and December 2028.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Consumers Council of Canada (CCC)

Interrogatory

Reference:

Ex. 1/T12/S1

Question(s):

Please provide the forecast in-service dates and the actual in-service dates for the projects included in Attachment 1 and Attachment 2

Response:

Please see Table 1 for projects in Attachment 1:

Table 1

Project	Forecasted In-Service Date	Actual In-Service Date
Burlington Oakville Pipeline Project (EB-2014-0182)	November 2016	November 2016
Panhandle 2015 Replacement Project (EB-2015-0041)	November 2015	November 2015
Sudbury Expansion Project (EB-2015-0120)	December 2015	December 2015
Kettle Point & Lambton Shores Community Expansion (EB-2015-0179)	September 2016	December 2017
Milverton, Rostock, Wartburg Community Expansion (EB-2015-0179)	September 2016	December 2017
Moraviantown Island Community Expansion (EB-2015-0179)	July 2016	July 2018
Prince Township Community Expansion (EB-2015-0179)	September 2016	September 2018
Canadian Nuclear Laboratories (EB-2015-0194)	October 2016	January 2017
Leamington Pipeline Expansion Project (EB-2016-0013)	November 2016	October 2016
Seaton Land Development Project (EB-2016-0054)	May 2017	December 2016
Sudbury Replacement Project (EB-2016-0122)	September 2016	October 2016
Panhandle Reinforcement Project (EB-2016-0186)	November 2017	November 2017
Sudbury Maley Replacement Project (EB-2016-0222)	October 2017	December 2017

Project	Forecasted In-Service Date	Actual In-Service Date
2017 Panhandle Replacement Project (EB-2017-0118)	November 2018	June 2018
Fenelon Falls Community Expansion Project (EB-2017-0147)	April 2018	November 2020
Terminus Well and Pipe Project (EB-2017-0162)	November 2017	August 2018
2018 Sudbury Replacement Project (EB-2017-0180)	November 2018	October 2018
Saugeen First Nation Community Expansion (EB-2019-0187)	November 2020	August 2020
North Bay Community Expansion Project (EB-2019-0188)	November 2020	December 2021
Low Carbon Energy Project (EB-2019-0294)	January 2021	October 2021

Please see Table 2 for projects in Attachment 2:

Table 2

Project	Forecasted In-Service Date	Actual In-Service Date
Scugog Island Community Expansion Project (EB-2017-0261)	Fall/Winter 2019	May 2020
Dow Moore Storage Pool Drilling (EB-2017-0354)	Summer 2018	October 2019
2018 Oxford Reinforcement Project (EB-2018-0003)	November 2018	October 2018
Kingsville Transmission Reinforcement Project (EB-2018-0013)	November 2019	October 2019
Liberty Village Project (EB-2018-0096)	February 2019	March 2019
Bathurst Reinforcement Project (EB-2018-0097)	December 2019	December 2019
Don River 30" Pipeline Project (EB-2018-0108)	October 2019	April 2020
Chatham-Kent Rural Project (EB-2018-0188)	November 2019	August 2019
Georgian Sands Pipeline Project (EB-2018-0226)	December 2019	June 2020
Stratford Reinforcement Project (EB-2018-0306)	November 2019	September 2019
St Laurent Pipeline Project (EB-2019-0006)	January 2020	September 2020
Windsor Line Replacement Project (EB-2019-0172)	November 2020	September 2021
Owen Sound Reinforcement Project (EB-2019-0183)	November 2020	October 2020
Sarnia Reinforcement Project (EB-2019-0218)	November 2021	November 2021

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 12, Schedule 1, Attachment 1, pg. 4

Preamble:

In the EB-2015-0179: Community Expansion Proposal - Post Construction Financial Report, the evidence shows a 65% contractor cost overage variance for the Milverton project. The variance explanation states: *Contract Costs were higher than estimated due to challenges with hydrostatic testing, dewatering and odourization of the steel main as well as challenges with the running line. The Milverton portion of the Project also required additional contracted resources to accomodate a compressed timeline.*

We would like to understand more about this project and the cost consequences.

Question(s):

Who bears the cost of this project overage?

a) What was driving the compressed timeline?
    i. What was the original commitment to be completed? To whom was this commitment made?
    ii. When was the project completed?

b) Please confirm that the hydrostatic testing, dewatering and odourization of the steel main was part of the final stages of the project.
    i. In the pre-construction estimate from the contractor, what was the expected cost of these components of completion?
    ii. What was the final original invoiced amount from the contractor prior to financial approval?
    iii. What amount was paid by Union to the contractor?
    iv. Please file all emails and other correspondence associated with this part of the project, its challenges and its eventual costs.

Response:

Enbridge Gas has not proposed to recover the cost overage's for the project referenced in the interrogatory as part of the current Application. The Company expects to request to recover such costs, as appropriate, through future rebasing applications that follow the completion of the 10-year rate stabilization period(s) and attachment forecast term(s) associated with each community expansion-related project. As part of its review of those future applications, the Company expects that the OEB will make determinations regarding the prudence of community expansion-related project costs incurred with the benefit of a more detailed evidentiary record that will include project-specific cost detail, and actual customer attachment results.

a- i.ii) Within its Community Expansion Application[1], Enbridge Gas (Union Gas Limited at that time) sought an order of the OEB granting leave to construct (in addition to other relief) the Milverton project by the end of 2016 (construction to commence in spring and to continue into the fall). The Company subsequently filed an UPDATED Community Expansion Application on March 31, 2017. Within that application, Enbridge Gas set out its commitment to provide natural gas distribution services to the communities of Milverton, Rostock and Wartburg by 2018 (in-service dates differed for facilities serving each community). The OEB subsequently granted leave to construct the project (Milverton) on August 10, 2017, including condition of approval 2a), which stated that "Authorization for leave to construct shall terminate 12 months after the decision is issued…."

Accordingly, project construction was initiated on August 21, 2017, and the Milverton-specific portion of the project was placed into-service on December 20, 2017, consistent with the Company's UPDATED Community Expansion Project Application.[2].

b) Confirmed.

In the pre-construction estimate from the contractor, unit rate pricing was utilized and assumed pneumatic pressure testing and odorization associated with the installation of steel pipe and anticipated those activities to occur as part of the final stages of project construction. Hydrostatic pressure testing and its associated dewatering activities was not part of the original project plan.

i-iii. $2,439,376 was invoiced and paid to the contractor for all works associated with the installation of NPS 4 steel pipe (including those in question). The construction contractor did not invoice Enbridge Gas specifically for each of hydrostatic

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[1] EB-2015-0179, July 23, 2015.
[2] EB-2015-0179, Exhibit A, Tab 2, Section B, Schedule 10 UPDATED (March 31, 2017).

testing, dewatering and odorization and the Company is unable to break out these components as requested.

iv. Enbridge Gas completed a search of its records of correspondence associated with the project and was not able find any email or correspondence dealing with the construction activities in question.

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ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 12, Schedule 1, Attachment 1, pg. 4

Preamble:

In the EB-2015-0179: Community Expansion Proposal - Post Construction Financial Report, the evidence shows a 65% contractor cost overage variance for the Milverton project. The variance explanation states: *Contract Costs were higher than estimated due to challenges with hydrostatic testing, dewatering and odourization of the steel main as well as challenges with the running line. The Milverton portion of the Project also required additional contracted resources to accomodate a compressed timeline.*

We would like to understand more about this project and the cost consequences.

Question(s):

For each of the projects identified in this Post Construction Report, please provide:

a) The long term forecast of the number of customers, filed with the Board as part of the application(s), to be added by year and customer type (i.e., residential, commercial, industrial).

b) The actual number of customers added and customer type from year of installation until 2022.

Response:

a) Please See Table 1[1].

[1] EB-2015-0179, March 31st, 2017, Exhibit A, Tab 2, Schedule B-2, p.84.

Table 1

Milverton Rostock Wartburg Attachment Forecast

Classification	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total	Ultimate Potential	Total Attachments % Potential
Residential Conversion	141	126	47	34	27	33	28	33	29	27	525	710	74%
Residential New	10	10	10	10	10	10	10	10	10	10	100	100	100%
Residential Multi Family	10	10	4	3	2	3	2	3	2	2	41	55	75%
Small Commercial	13	12	4	3	2	3	3	3	3	2	48	65	74%
Medium Commercial	5	4	2	1	1	1	1	1	1	1	18	24	75%
Large Commercial	5	1	0	0	0	0	0	0	0	0	6	6	100%
Seasonal (Grain Dryer)	1	0	0	0	0	0	0	0	0	0	1	1	100%
Total	185	163	67	51	42	50	44	50	45	42	739	961	77%

b) Please see response at Exhibit I.1.12-FRPO-21.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 12, Schedule 1, Attachment 1, pg. 15

Preamble:

In the EB-2017-0180: 2018 Sudbury Replacement Project - Post Construction Financial Report, the evidence shows an $18.2M or 31% overage variance. The variance explanation states: *Construction and Labour costs were higher than estimated due to permit conditions and challenges during pipeline installation. Environmental permitting was required (in several areas along the right of way) to be completed earlier than planned, requiring additional resources and overtime to meet permit conditions. Environmentally sensitive areas along the right of way were larger than expected resulting in the use of several thousand additional access mats. Construction and Installation costs also exceeded the Project Estimate due to unexpected rocky conditions. Further, safety processes and procedures required to work within Vale property were more costly than anticipated.*

We would like to understand more about this project and the cost consequences.

Question(s):

Please provide the original estimate of construction and labour costs filed with the application.

a) In the pre-construction estimate from the contractor, what was the expected cost of contractor costs and days to complete?

b) What was the final original invoiced amount from the contractor prior to financial approval?

c) What amount was paid by Union to the contractor?

d) Please file all emails and other correspondence associated with this part of the project, its challenges and its eventual costs.

Response:

Please see the 2018 Sudbury Replacement Project Leave-to-Construct Application, Schedule 3 (which is publicly available on the OEB website[1]) for the original estimate of construction and labour costs.

a) According to an estimate provided to Union by the project contractor in May 2017, the cost estimate was $45,603,494, and the estimated days to complete was 138 days. This contractor cost estimate formed part of the Construction and Labour amount that was filed in the 2018 Sudbury Replacement Project Application.[2] Prior to the start of construction, through negotiations, the contractor's updated cost estimate was $44,406,983 (contract Target Price, as further described in part d) and the days to complete was 181 days.

b) The final weekly invoiced amount by the contractor was $154,916.00. Contractor invoicing is completed weekly and does not contain a running aggregate total.

c) The final total amount paid to the contractor by Union was $62,550,452.

d) Please see Attachment 1 for a list of all change order submissions by the contractor and the decision for each change order by project management. For context, the Sudbury Replacement project was a Target Price Contract, with a Target Price for the scope of work that was set before commencement of construction at $44,406,983 and that was subsequently adjusted under the contract based on approved change orders. The final Target Price was $54,334,028.44 and the actual cost at completion when the new asset was placed in-service was $57,463,779.93, resulting in the contractor paying back to Union a share of the overage under the contract. Please see Attachment 2 for the detailed calculations leading to the final invoice amount. Note that certain commercially sensitive information within the attachments have been redacted, and the rationale is described in the confidentiality request accompanying the Company's interrogatory responses.

   Enbridge Gas does not believe that finding and producing voluminous communications related to the project would add value to the information that is provided in Attachments 1 and 2 in response to this question.

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[1] EB-2017-0180, Schedule 3, https://www.rds.oeb.ca/CMWebDrawer/Record/570568/File/document
[2] EB-2017-0180.

2018 SUDBURY PROJECT - CHANGE ORDER / TARGET PRICE / ECAC / FINAL PROJECT COST

Original Target	$	44 406 983 00	T
ECAC (Aecon Bi-Weekly Finan[redacted]rd dated No 18 '18)	$	[redacted]	ECAC
[redacted]rofit Margin In ECAC	$		PM = ECAC - [redacted]
[redacted]ark Up In ECAC	$		MU = ECAC -
Total Current APPROVED Change Orders	$	9 927 045 44	CO
Re ised Target	$	[redacted]	RT = T CO
O erage Difference	$		[redacted] - RT
	$		[redacted] 2
Sinc[redacted]	$		TS
Final Project Cost to Union / Re enue to Aecon	$		FPC = ECAC - TS
Net Profit Margin	$		PMnet = MU - TS
Net PM %			PMnet / FPC

(1) Excerpt from [redacted] Prior[redacted] Project

Proposed Target Freeze		
Proposed Section 2 and 3 ECAC:	$	[redacted]
Anticipated Target Payback Amount*	$	
Maximum Section 2 and 3 Cost Limit	$	

*Anticipated Target Payback Amount is the forecasted payback to Union Gas under the Target Price Contract Model based on the approved and pending change orders as of October 1, 2018.

O er ( ) / Under (-) Proposed Target Freez[redacted] $ [redacted]

Notes (*)
Ha e not seen SB CO's on any pre ious projects
These are all part of the normal course of construction

CN #	Description	Type (LS Target T&M)	Date	Requested $ Amt	Status	Agreed By: Aecon Bourne	Union Tricker or Adams	Approvals: Day	Moneme	< $50k weather Tricker	< $250k Adams	< $1MM Piett	< $5 MM Lamoureux	< $25 MM Shannon	$ Amounts: Appro ed	Rejected	Pending	Voided / Cancelled	Notes / Issue / Comment	Work Completed Tricker
																			(*) per Aecon CN Rpt Dec 6 '18 no change from prior Aecon Rpt No 14 '18 Aecon's CN Report alues are used as they include all third party costs	
1 0	WWSD Apr 4	T&M		4 892 26		✓	✓	✓		✓					4 892 26				(*)	
1 1	WWSD Apr 16	T&M		32 586 85		✓	✓	✓		✓					32 586 85				(*)	
1 2	WWSD Apr 25	T&M		9 937 30		✓	✓	✓		✓					9 937 30				decreased from $10 110 29 per Aecon's CN Rpt Dec 6 '18	
1 3	WWSD May 2	T&M		3 195 72		✓	✓	✓		✓					3 195 72				(*)	
1 4	WWSD May 4	T&M		9 684 89		✓	✓	✓		✓					9 684 89				(*)	
1 5	WWSD May 10	T&M		21 905 45		✓	✓	✓		✓					21 905 45				(*)	
1 6	WWSD May 19	T&M		23 864 43		✓	✓	✓		✓					23 864 43				(*)	
1 7	WWSD May 31	T&M		6 779 45		✓	✓	✓		✓					6 779 45				(*)	
1 8	WWSD Jun 4	T&M		8 950 69		✓	✓	✓		✓					8 950 69				(*)	
1 9	WWSD Jun 13	T&M		24 385 20		✓	✓	✓		✓					24 385 20				(*)	
1 10	WWSD Jun 30	T&M		84 223 56		✓	✓	✓		✓					84 223 56				(*)	
1 11	Heat Jul 3	T&M		98 371 52		✓	✓	✓		✓					98 371 52				(*)	
1 12	Heat Jul 4	T&M		102 686 66		✓	✓	✓		✓					102 686 66				(*)	
1 13	Heat Jul 5	T&M		131 031 52		✓	✓	✓		✓					131 031 52				(*)	
1 14	Heat Jul 10	T&M		9 089 59		✓	✓	✓		✓					9 089 59				(*)	
1 15	Heat Jul 16	T&M		81 251 29		✓	✓	✓		✓					81 251 29				(*)	
1 16	WWSD Jul 24	T&M		60 635 37		✓	✓	✓		✓					60 635 37				(*)	
1 17	WWSD Jul 25	T&M		16 237 58		✓	✓	✓		✓					16 237 58				(*)	
1 18	WWSD Aug 6	T&M		12 037 94		✓	✓	✓		✓					12 037 94				(*)	
1 19	WWSD Aug 7	T&M		58 068 82		✓	✓	✓		✓					58 068 82				(*)	
1 20	WWSD Aug 8	T&M		14 745 58		✓	✓	✓		✓					14 745 58				increased from $11 508 40 per Aecon's CN Rpt Dec 6 '18	
1 21	WWSD Aug 9	T&M		15 579 35		✓	✓	✓		✓					15 579 35				increased from $12 342 17 per Aecon's CN Rpt Dec 6 '18	
1 22	WWSD Aug 12	T&M		10 893 46		✓	✓	✓		✓					10 893 46				increased from $3 810 78 per Aecon's CN Rpt Dec 6 '18	
1 23	WWSD Aug 25	T&M		76 648 75		✓	✓	✓		✓					76 648 75				increased from $75 484 86 per Aecon's CN Rpt Dec 6 '18	
1 24	WWSD Aug 28	T&M		36 399 07		✓	✓	✓		✓					36 399 07				increased from $31 091 49 per Aecon's CN Rpt Dec 6 '18	
1 25	WWSD Aug 29	T&M		75 383 68		✓	✓	✓		✓					75 383 68				increased from $75 383 68 per Aecon's CN Rpt Dec 6 '18	
1 26	WWSD Aug 30	T&M		27 709 81		✓	✓	✓		✓					27 709 81				increased from $19 454 35 per Aecon's CN Rpt Dec 6 '18	
1 27	WWSD Aug 31	T&M		11 273 57		✓	✓	✓		✓					11 273 57				increased from $7 596 71 per Aecon's CN Rpt Dec 6 '18	
1 28	WWSD Sep 1	T&M		17 760 76		✓	✓	✓		✓					17 760 76				(*)	
1 29	Pumping Sep 3	T&M		3 344 07		✓	✓	✓		✓					3 344 07				(*)	
1 30	Pumping Sep 4	T&M		92 712 89		✓	✓	✓		✓					92 712 89				increased from $80 285 92 per Aecon's CN Rpt Dec 6 '18	
1 31	Pumping Sep 5	T&M		39 557 02		✓	✓	✓		✓					39 557 02				increased from $31 459 24 per Aecon's CN Rpt Dec 6 '18	
1 32	Pumping Sep 6	T&M		13 910 79		✓	✓	✓		✓					13 910 79				increased from $7 287 62 per Aecon's CN Rpt Dec 6 '18	
1 33	Pumping Sep 10	T&M		9 731 21		✓	✓	✓		✓					9 731 21				increased from $4 167 72 per Aecon's CN Rpt Dec 6 '18	
1 34	Pumping Sep 11	T&M		8 965 02		✓	✓	✓		✓					8 965 02				increased from $3 442 56 per Aecon's CN Rpt Dec 6 '18	
1 35	Pumping Sep 12	T&M		5 785 36		✓	✓	✓		✓					5 785 36				increased from $2 548 19 per Aecon's CN Rpt Dec 6 '18	
1 36	WWSD Sep 21	T&M		140 890 91		✓	✓	✓		✓					140 890 91				increased from $108 687 17 per Aecon's CN Rpt Dec 6 '18	
1 37	WWSD Sep 25	T&M		70 750 77		✓	✓	✓		✓					70 750 77				increased from $60 088 85 per Aecon's CN Rpt Dec 6 '18	
1 38	WWSD Sep 28	T&M		43 111 88		✓	✓	✓		✓					43 111 88				increased from $29 898 89 per Aecon's CN Rpt Dec 6 '18	
1 39	WWSD Oct 4	T&M		20 347 68		✓	✓	✓		✓					20 347 68				increased from $17 110 51 per Aecon's CN Rpt Dec 6 '18	
1 40	WWSD Oct 6	T&M		39 927 20		✓	✓	✓		✓					39 927 20				increased from $38 044 44 per Aecon's CN Rpt Dec 6 '18	
1 41	WWSD Oct 9	T&M		28 973 38		✓	✓	✓		✓					28 973 38				increased from 28 973 38 per Aecon's CN Rpt Dec 6 '18	
1 42	WWSD Oct 15	T&M		41 299 44		✓	✓	✓		✓					41 299 44				increased from $36 443 68 per Aecon's CN Rpt Dec 6 '18	
1 43	WWSD Oct 19	T&M		3 597 91		✓	✓	✓		✓					3 597 91				(*)	
1 44	WWSD No 8	T&M		14 778 91		✓	✓	✓		✓					14 778 91				increased from $12 475 95 per Aecon's CN Rpt Dec 6 '18	
Appro ed	1 663 894 56																		Total increased from $1 508 099 68 per Aecon's CN Rpt Dec 6 '18	
																			A total increase of $155 794 88 due to sub/material/rental costs	

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CN #	Description	Type (LS Target T&M)	Date	Requested $ Amt	Status	Agreed By Aecon Bourne	Agreed By Union Tricker or Adams	Appro als Day	Appro als Moneme	Appro als < $50k weather Tricker	Appro als < $250k Adams	Appro als < $1MM Piett	Appro als < $5 MM Lamoureux	Appro als < $25 MM Shannon	$ Amounts Appro ed	$ Amounts Rejected	$ Amounts Pending	$ Amounts Voided / Cancelled	Notes / Issue / Comment	Work Completed Tricker
* 2 0	SB Apr 25 water testing	T&M		5 760 45		✓	✓	✓		✓					5 760 45				decreased from $6 071 14 per Aecon's CN Rpt Dec 6 '18	
* 2 1	SB Apr 30 no USR	T&M		3 027 02		✓	✓	✓		✓					3 027 02				(*)	
* 2 2	SB May 1 equip loading concerns	T&M		14 734 53		✓	✓	✓		✓					14 734 53				(*)	
* 2 3	SB May 2 bridge crossing	T&M		40 071 80		✓	✓	✓		✓					40 071 80				(*)	
* 2 4	SB May 2 no USR	T&M		969 37		✓	✓	✓		✓					969 37				(*)	
* 2 5	SB May 5 no USR	T&M		848 37		✓	✓	✓		✓					848 37				decreased from $2 704 40 per Aecon's CN Rpt Dec 6 '18	
* 2 6	SB May 8 Vale utility erification	T&M		1 405 22		✓	✓	✓		✓					1 405 21				(*)	
* 2 7	SB May 15 no SMC Tech delay	T&M		5 547 40		✓	✓	✓		✓					5 547 40				(*)	
* 2 8	SB Jun 7 late decommissioning / depressure line	T&M		14 123 09		✓	✓	✓		✓					14 123 09				(*)	
* 2 9	SB Jun 15 foreign pipeline	T&M		1 815 83		✓	✓	✓		✓					1 815 83				(*)	
* 2 10	SB Jun 20 no USR inspector	T&M		6 656 27		✓	✓	✓		✓					6 656 27				increased from $4 418 49 per Aecon's CN Rpt Dec 6 '18	
* 2 11	SB Jun 20 HDD crew down / hold for CCI	T&M		11 346 40		✓		✓		rejected						11 346 40			(*)	
* 2 12	SB Jun 21 no USR present	T&M		1 561 85		✓	✓	✓		✓					1 561 85				(*)	
* 2 13	SB Jun 22 no work for 3rd Party Sur eyor	T&M		3 078 55		✓		✓		rejected						3 078 55			(*)	
* 2 14	SB Jun 29 no USR	T&M		6 553 02		✓		✓		rejected						6 553 02			(*)	
* 2 16	SB Jul 12 no USR	T&M		7 275 16		✓		✓		rejected						7 275 16			(*)	
* 2 17	SB Jul 16 HONI not appro ed for work / permitry	T&M		8 761 69		✓		✓		rejected						8 761 69			(*)	
* 2 18	SB Jul 30 for 2 unidentified lines	T&M		2 562 56		✓		✓		rejected						2 562 56			(*)	
* 2 19	SB Aug 8 no USR / inspection	T&M		6 173 12		✓		✓								6 173 13			(*)	
* 2 20	SB Aug 9 no USR / inspection	T&M		11 793 93		✓		✓		rejected						11 793 93			(*)	
* 2 21	SB Aug 10 no USR / inspection	T&M		17 196 89		✓		✓		rejected						17 196 89			(*)	
* 2 22	SB Aug 11 no USR or Inspection	T&M		9 793 44		✓		✓								9 793 44			(*)	
* 2 23	SB Aug 13	T&M		1 448 39		✓		✓								1 448 39			(*)	
* 2 24	SB Aug 14	T&M		15 985 81		✓		✓								15 985 81			(*)	
* 2 25	SB Aug 17	T&M		843 16		✓		✓								843 16			(*)	
* 2 26	SB Aug 18	T&M		1 083 52		✓		✓								1 083 52			(*)	
* 2 27	SB Aug 20	T&M		7 220 46		✓		✓								7 220 46			(*)	
* 2 28	SB Aug 21	T&M		765 86		✓		✓								765 86			(*)	
* 2 29	SB Aug 23	T&M		1 407 03		✓		✓								1 407 03			(*)	
* 2 30	SB Aug 24	T&M		4 626 77		✓		✓								4 626 77			(*)	
* 2 31	SB Aug 25	T&M		2 047 70		✓		✓								2 047 70			(*)	
* 2 32	SB Aug 30	T&M		1 499 42		✓		✓								1 499 42			(*)	
* 2 33	SB Sep 11	T&M		13 457 62		✓		✓								13 457 62			(*)	
* 2 34	SB Sep 12	T&M		8 863 61												8 863 61			(*)	
Appro ed	96 521 19																		Total increased from $96 450 15 per Aecon's CN Rpt Dec 6 '18	
Rejected	143 784 12																		A total increase of $71 05 due to sub/material/rental costs	
Total	240 305 31																			
3	Fab of isolation materials	T&M		17 147 02		✓	✓	✓	✓	✓					17 147 02				(*)	
4	Argo rental & training	T&M		17 234 81		✓	✓	✓	✓	✓					17 234 81				(*)	
5	A&L Lineman request by Vale	LS		654 168 01		✓	✓	✓	✓	✓	re ised	✓			303 123 33	351 044 68			rejected amount increased from $303 123 32 per Aecon's CN Rpt Dec 6 '18	
6	Alternate access to tailings	N/A																	(*)	
7	Additional Vale PPE requirements	LS		24 283 37		✓	✓	✓	✓	✓					24 283 37				(*)	
8	Air bridge requirements	Target		392 059 30		✓	✓	✓	✓	re ised	✓	✓			389 719 30	2 340 00			(*)	
9	En ironmental Coordinator	T&M		145 637 76		✓	✓	✓	✓	✓	✓				145 637 76				increased from $135 411 00 per Aecon's CN Rpt Dec 6 '18	
* 10	Isolation support	T&M		230 463 37		✓	✓	✓	✓	✓	re ised				172 463 37	58 000 00			(*)	
11	Rock in estigation	T&M		29 131 83		✓	✓	✓	✓	✓					29 131 83				(*)	
12	IFB to IFC initial full package ($1 315 447 38)	N/A																	(*)	
12 1	IFB to IFC - Section 2 Pipeline	N/A		161 744 64														161 744 64	(*)	
12 2	IFB to IFC - Coniston PS	Target		106 202 12														106 202 12	(*)	
12 3	IFB to IFC Garson Coniston PRS	Target		6 584 61		✓	✓	✓	re ised	✓					2 973 00	3 611 61			(*)	
12 4	IFB to IFC - Milman Mining	Target		3 885 70		✓	✓	✓	re ised	✓					333 00	3 552 70			(*)	
12 5	IFB to IFC - Barrydowne	Target		39 969 87		✓	✓	✓	✓	✓					39 969 87				(*)	
12 6	IFB to IFC - Section 2B Recei er	N/A		39 802 00														39 802 00	(*)	
12 7	IFB to IFC - Section 3 Pipeline	Target		312 214 03		✓	✓	✓	✓	✓	✓	✓			312 214 03				(*)	
12 8	IFB to IFC - Azilda Take Off	Target		128 108 99		✓	✓	✓	✓	✓	✓				128 108 99				(*)	
12 9	IFB to IFC - Clarabelle Mill	Target		25 084 84		✓	✓	✓	re ised	✓					20 211 00	4 873 84			appro ed amt increased from $11 280 00 due to grading per Chuka Dec 7 '18	
12 10	IFB to IFC - North Mine	Target		35 795 76		✓	✓	✓	re ised	✓					26 711 00	9 084 76			appro ed amt increased from $19 059 76 due to grading per Chuka Dec 7 '18	
12 11	IFB to IFC - Thaw Shed	Target		36 136 86		✓	✓	✓	re ised	✓					22 790 00	13 346 86			appro ed amt increased from $13 877 86 due to grading per Chuka Dec 7 '18	
12 12	IFB to IFC - Smelter	Target		39 224 12		✓	✓	✓	re ised	✓					35 659 00	3 565 12			appro ed amt increased from $23 225 00 due to grading per Chuka Dec 7 '18	
12 13	IFB to IFC - Air Rise	Target		30 959 01		✓	✓	✓	re ised	✓					22 097 01	8 862 00			(*)	
12 14	IFB to IFC - Copper Cliff	Target		51 539 50		✓	✓	✓	re ised	✓					39 308 00	12 231 50			appro ed amt increased from $21 352 00 due to grading per Chuka Dec 7 '18	
12 15	IFB to IFC - Sand Plant	Target		32 809 52		✓	✓	✓	re ised	✓					27 794 00	5 015 52			(*)	
12 16	IFB to IFC - Walden TBS	T&M		46 588 15		✓	✓	✓	✓	✓					46 588 15				(*)	
12 17	IFB to IFC - Nickel Refinery	Target		21 398 48		✓	✓	✓	re ised	✓					17 016 00	4 382 48			(*)	
12 18	IFB to IFC - Kelley Lake	Target		18 154 25		✓	✓	✓	re ised	✓					11 427 00	6 727 25			(*)	
12 19	IFB to IFC - Retaining Wall	N/A		32 868 27														32 868 27	(*)	
12 20	IFB to IFC - Section 2 Pipeline	LS		164 745 00		✓	✓	✓	✓	✓	✓				164 745 00				(*)	
12 21	IFB to IFC - Coniston PS	LS		145 399 00		✓	✓	✓	✓	✓	✓				145 399 00				(*)	
12 22	IFB to IFC - 2B Recei er	Target		175 186 00		✓	✓	✓	✓	✓	✓				175 186 00				(*)	
12 23	IFB to IFC - Stations	LS		126 730 91		✓	✓	✓	✓	✓	re ised				110 853 41	15 877 50			(*)	
* 13	Water sampling for PTTW	T&M		3 307 84		✓	✓	✓	✓	✓					3 307 84				decreased from $4 855 82 per Aecon's CN Rpt Dec 6 '18	
14	Additional security ser ices	T&M		209 683 06		✓	✓	✓	✓	✓	✓				209 683 06				(*)	
15 0	Butera property agreement	T&M		10 105 00		✓	✓	✓	✓	✓					10 105 00				increased from $8 019 07 per Aecon's CN Rpt Dec 6 '18	
15 1	Butera property agreement	T&M		8 180 27		✓	✓	✓	✓	✓					8 180 27				(*)	
16	Gunnite inspection training	T&M		9 123 25		✓	✓	✓	✓	✓					9 123 25				(*)	
* 17	Hazardous material - mercury	T&M		7 608 12		✓	✓	✓	✓	✓	re ised				3 804 06	3 804 06			(*)	
18	Station rock breaking	T&M		443 584 20		✓	✓	✓	✓	✓	✓				443 584 20				increased from $107 174 87 per Aecon's CN Rpt Dec 6 '18	
19 0	Additional mats - Sect 2 (2600 - 6087)	N/A		954 674 75							re ised	re ised				954 674 75			(*)	
19 1	Additional mats - Sect 3 (864 - 2363)	N/A		644 812 12							re ised	re ised				644 812 12			(*)	
19 2	Additional mats - Sect 2 Re 1	LS		954 674 75							re ised	re ised						954 674 75	(*)	
19 3	Additional mats - Sect 3 Re 1	LS		644 812 12							re ised	re ised						644 812 12	(*)	
19 1	Additional mats - Project (Dec 5 2018)	LS		1 857 052 00		✓	✓	✓	✓	✓	✓	✓	✓		1 857 052 00				(*)	
20	Turtle sweeps	T&M		7 276 30		✓	✓	✓	✓	✓					7 276 30				decreased from $31 123 93 per Aecon's CN Rpt Dec 6 '18	
21	Contaminated water disposal	T&M		51 176 51		✓	✓	✓	✓	✓					51 176 51				(*)	
22 0	Trench breakers Erin Ind	Target		345 636 22		✓	✓	✓	✓	✓	✓	✓			345 636 22				(*)	
21 0	Trench breakers Erin Ind	N/A		463 538 38						rejected						463 538 38			(*)	
* 23	Hydro anchor relocations	N/A		71 695 80							rejected					71 695 80			(*)	
* 24 0	Traffic plan adjustments Sect 2	N/A		64 465 03		✓				rejected					46 331 70	18 133 33			appro ed Dec 7 '18	
* 24 1	Traffic plan adjustments Sect 3	LS		175 012 00		✓	✓	✓	✓	✓	✓				175 012 00				(*)	
* 25	Daylighting Vale unidentified foreign pipelines	N/A		451 563 34						rejected						451 563 34			per Chuka Dec 6 '18 decission from Dan T this CO remains rejected	
26	Pipeline liquids	N/A																	(*)	
27 0	Cathodic protection	N/A		582 197 90														582 197 90	(*)	
27 1	Cathodic protection (AC/CP)	N/A		402 875 00						rejected					402 875 00				no backup for $402k much debate pre iously rejected by Dan	
27 2	Cathodic protection (anodes)	N/A		383 845 27		✓	✓	✓	✓	✓	✓	✓			383 845 27				Appro ed Dec 7 2018	
28	Sectionalizing pipe	T&M		10 849 35		✓	✓	✓	✓	✓					10 849 35				increased from $10 526 41 per Aecon's CN Rpt Dec 6 '18	
29	Additional aquadam	Target		39 768 00		✓	✓	✓	✓	✓					39 768 00				(*)	

							Agreed By		Appro als							$ Amounts					Work Completed
							Aecon	Union			< $50k weather	< $250k	< $1MM	< $5 MM	< $25 MM						
	CN #	Description	Type (LS Target T&M)	Date	Requested $ Amt	Status	Bourne	Tricker or Adams	Day	Moneme	Tricker	Adams	Piett	Lamoureux	Shannon	Appro ed	Rejected	Pending	Voided / Cancelled	Notes / Issue / Comment	Tricker
*	30	Dust control (Vale)	T&M		7 957 15		✓	✓	✓	✓	✓					7 957 15				decreased from $15 231 16 per Aecon's CN Rpt Dec 6 '18	
	31	Fire pre ention training	T&M		99 964 61		✓	✓	✓	✓	✓	✓				99 964 61				(*)	
*	32	Foreign pipeline remo al	T&M		27 362 50		✓	✓	✓	✓	✓					27 362 50				increased from $24 679 10 per Aecon's CN Rpt Dec 6 '18	
	33	Relocate running line Sect 3	T&M		57 516 79		✓	✓	✓	✓	✓					57 516 79				increased from $32 227 73 per Aecon's CN Rpt Dec 6 '18	
	34	RRC1 HDD	N/A		88 261 88														88 261 88	(*)	
	35	Additional fence	Target		14 551 21		✓	✓	✓	✓	✓					14 551 21				(*)	
*	36	Stream crossing restoration	N/A																	(*)	
	37	Wahnapitae crosso er	T&M		16 469 60		✓	✓	✓	✓	✓					16 469 60				increased from $15 995 72 per Aecon's CN Rpt Dec 6 '18	
	38	Rece ier coating	T&M		74 972 75		✓	✓	✓	✓	✓					74 972 75				increased from $70 548 00 per Aecon's CN Rpt Dec 6 '18	
	39	Vale laydown area	T&M		49 068 03		✓	✓	✓	✓	✓					49 068 03				(*)	
*	40	Unidentified gas main at RC1	N/A		88 261 88														88 261 88	(*)	
	41	RRC2 remedial work	Target		378 704 06		✓	✓	✓	✓	✓	✓	✓			357 521 21	21 182 85			appro ed Dec 6 '18	
	42	Stream crossing modifications	N/A		32 685 68														32 685 68	(*)	
*	43	SC 25 isolation & monitoring	N/A																	(*)	
	44	Garson Coniston J&B RC23	N/A																	(*)	
	45	50/50 mix backfill	N/A		165 221 88						rejected						165 221 88			(*)	
	46 1	HONI hoe hammering re 0	N/A		621 181 87														621 181 87	(*)	
	46 2	HONI hoe hammering re 1	N/A		67 172 95														67 172 95	(*)	
	47	Additional welder testing	T&M		14 295 12		✓	✓	✓	✓	✓					14 295 12				(*)	
	48	Hard fence installation	T&M		28 366 24		✓	✓	✓	✓	✓					28 366 24				increased from $20 213 65 per Aecon's CN Rpt Dec 6 '18	
	49	Coating existing facilities	N/A		137 924 25														137 924 25	(*)	
	50	Additional pipesak	LS		38 036 58		✓	✓	✓	✓	✓					38 036 58				(*)	
	51	SC schedule adjust	N/A		2 800 000 00							rejected					2 800 000 00			increased from $2 100 000 00 per Aecon's email Dec 7 '18	
	52	ECP additional stream crossings	N/A		64 603 28														64 603 28	(*)	
*	53	Isolation Support SF22	N/A	No -22	17 145 86		✓	✓	✓	✓	✓					17 145 86				appro ed No 15 '18	
	54	Contaminated Soils S3	Target	Oct-30	27 727 00		✓	✓	✓	✓	✓					27 727 00				(*)	
	55 0	Hydrotest dewatering	LS		139 971 86		✓	✓	✓	✓	✓	✓				139 971 86				(*)	
	55 1	Hydrotest dewatering	Target	No -07	50 749 00						rejected					50 749 00				(*)	
	56	Coniston PCS Atmospheric Tank	T&M		58 924 37		✓	✓	✓	✓	✓	✓				58 924 37				increased from $43 239 25 per Aecon's CN Rpt Dec 6 '18	
	57	Access at Notre Dame	N/A		35 151 63		✓	✓	✓	✓	✓					35 151 63				appro ed pre iously rejected	
	58	Pipe weight remo al	Target		19 851 74		✓	✓	✓	✓	✓					19 851 74				(*)	
	59	Additional breaker olumes	N/A		392 460 00														392 460 00	(*)	
	60	Section 3 Phase 2 Scope Change	T&M		631 514 00		✓	✓	✓	✓	✓	✓	✓			631 514 00				appro ed Dec 5 '18	
	61	2B Recei er Fence Changes	N/A		18 506 42		✓	✓	✓	✓	re ised					14 918 75	3 587 67			(*)	
	62	Walden Temp Feed	LS		67 350 00		✓	✓	✓	✓	✓	✓				67 350 00				(*)	
	63	Pole Support	Target		17 807 26		✓	✓	✓	✓	✓					17 807 26				(*)	
	64	Millman Mining Dri eway	T&M	Oct-29	8 643 61		✓	✓	✓	✓	✓					8 643 61				increased from $6 576 00 per Aecon's CN Rpt Dec 6 '18	
	65	Additional Concrete Supports	T&M	Oct-10	19 086 62		✓	✓	✓	✓	✓					19 086 62				increased from $12 152 00 per Aecon's CN Rpt Dec 6 '18	
	66	Espanola Blowdown Tank	T&M	Oct-29	13 414 67		✓	✓	✓	✓	✓					13 414 67				increased from $10 343 16 per Aecon's CN Rpt Dec 6 '18	
*	67	Commissioning Support	N/A	No -08	149 860 09		✓	✓	✓	✓	rejected					149 860 09				(*)	
	68	Fencing Changes	Target	No -15	4 167 16		✓	✓	✓	✓	✓					4 167 16				(*)	
	69	2018 Clean Up Deferred to 2019			-351 470 00		✓	✓	✓	✓	✓	✓				-351 470 00				appro ed Dec 7 '18	
					20 186 413 15											9 927 045 44	6 244 514 12	0 00	4 014 853 59		

FINAL INVOICE CALCULATION - 2018 SUDBURY REINFORCEMENT PROJECT

Project:	2018 Sudbury Replacement		
Contractor:	Aecon		
Cost Structure:	Target		
Date:	Dec 10, 2018		
Completed By:	George Adams	Major Projects	Union Gas Ltd.

Target Payback Amount / Actual (Section 2 and 3) Cost

Original Target:		$ 44,406,983.00	T
Actual Cost At Completion (Dec 11th, '18):		$ 57,463,779.93	B = ACAC (latest Aecon data Dec 11th, '18)
[redacted] Profit Margin In ECAC:		$ [redacted]	PM = ACAC - (ACAC [redacted])
Total Approved Change Orders:		$ [redacted]	ACO (See attachment)
Revised Target:		$ 54,334,028.44	RT = T + ACO
Overage (+) / Underage (-) Difference:		$ 3,129,751.49	D = ACAC - RT
Target Payback Amount (*):		**$ [redacted]**	TPA = [redacted]
Actual (Section 2 and 3) Cost:		**$ [redacted]**	AC = ACAC - TPA
Anticipated Oct 22nd Agreement NTEL:	-	$ [redacted]	A
Difference:	=	$ [redacted]	AC - A

(*) From Alliance Contract, [redacted]

Not To Exceed Limit

Proposed Section 2 and 3 ECAC:		$ [redacted]	A (from Aecon letter Oct 15th, '18)				
Additional Approved Scope per Oct 15th:	+	$ 20,347.68	CN 1.39	WWSD Oct 4			
	+	$ 39,927.20	CN 1.40	WWSD Oct 6			
	+	$ 28,973.38	CN 1.41	WWSD Oct 9			
	+	$ 41,299.44	CN 1.42	WWSD Oct 15			
	+	$ 3,597.91	CN 1.43	WWSD Oct 19			
	+	$ 14,778.91	CN 1.44	WWSD Nov 8			
	+	$ 154,163.27	CN 27	Cathodic protection (AC/CP)	Effective	Approved	
	+	$ 50,749.00	CN 55.1	Hydrotest dewatering	Effective	Approved	
	+	$ 15,685.11	CN 56.0	Coniston PCS Atmospheric Tank	Effective	Approved	
	+	$ 14,918.75	CN 61	2B Receiver Fence Changes	Effective	Approved	
	+	$ 19,086.62	CN 65	Additional Concrete Supports	Effective Oct-10	Approved	Oct-10
	+	$ 13,414.67	CN 66	Espanola Blowdown Tank	Effective Oct-17	Approved	Nov-01
	+	$ 149,860.09	CN 67	Commissioning Support	Effective	Approved	
	+	$ 4,167.16	CN 68	Fencing Changes	Effective Nov-14	Approved	Nov-15
	+	-$ 351,470.00	CN 69	2018 Clean Up Deferred to 2019	Effective Dec-07	Approved	Dec-07
Revised Section 2 and 3 ECAC:	=	$ 57,463,779.93	B = A + Approved Scope Post Oct 15th				
Target Payback Amount (*):		$ [redacted]	TPA				
Final Section 2 and 3 Cost Limit:		**$ [redacted]**	NTEL (Not To Exceed "Set" Limit [redacted]				
Cost Exceeding NTEL:		$ -	C = AC - NTEL [redacted]				

Final Invoice Amount Calculation

Outstanding Costs (incl O/H & Mark Up):		$ [redacted]	OC = 57,463,779.93 - [redacted]
MarkUp Hold Back:	+		MUHB (included in the [redacted] above)
Aecon Mining O/H & MU Credit:	-		AM
Costs Exceeding NTEL:	-	$ -	C
Target Payback Amount:	-	$ [redacted]	TPA
Final Invoice Amount:		**$ [redacted]**	**FIA = OC + MUHB - AM - C - TPA**

Signatures

Daryl Bourne, Aecon	11-Dec-18 Date	George Adams, Union Gas	Dec 11, 18 Date
Scott Ryan, Aecon	Dec 11/18 Date	Roger Piett, Union Gas	11/12/18 Date

This signed Final Invoice Calculation form to be appended to final invoice.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 12, Schedule 1, Attachment 2, pg. 1-3

Preamble:

In the Scugog Island – Community Expansion Project (EB-2017-0261) - Post Construction Financial Report on Costs and Variances, the evidence shows a 177% overage variance for Labour and Construction Costs. The description of the variance points to environmental and highway authority's requirements for the project which changed and delayed the proposed construction.

We would like to understand more about this project and the cost consequences.

Question(s):

Who bears the cost of this project overage?

a) What was driving the requirement to do winter construction?

b) What was the original commitment to be completed? To whom was this commitment made?

c) When was the project completed?

d) When the method of construction was determined to require horizontal directional drilling and other components, what held EGI back from starting the project the following October after the nesting season?

Response:

Enbridge Gas has not proposed to recover the cost overages referenced by FRPO as part of the current Application. The Company expects to request to recover such costs, as appropriate, through future rebasing applications that follow the completion of the 10-

year rate stabilization period(s) and attachment forecast term(s) associated with each community expansion-related project. As part of its review of those future applications, the Company expects that the OEB will make determinations regarding the prudence of community expansion-related project costs incurred with the benefit of a more detailed evidentiary record that will include project-specific cost detail, and actual customer attachment results. Please also see response at Exhibit I.1.12-FRPO-21

a) Pursuing winter construction was the preferred mitigation strategy to avoid impacts on Blanding's turtles that nest in the area from April 1 to Sept 30 and to minimize water-taking challenges in the area, which had the potential to undermine the integrity of the adjacent MTO highway.

b-c) The OEB granted Enbridge Gas leave to construct the project on May 31, 2018, including a condition of approval 2(a) - to begin constructing the project within 18 months (November 30, 2019) after the OEB's Decision was issued.[1] The Company's application requesting leave to construct the project included a construction schedule estimating that construction and testing would be completed by August 2019.[2]

Through correspondence in October 2018 and March 2019, the Company advised the OEB that the project had been placed on hold for a number of months pending receipt government funding approval. On November 8, 2019, Enbridge Gas informed the OEB by way of letter, of its intent to commence construction before year end and the need for an extension of the condition of approval 2(a) of three months (to the end of February 2020), including provision for potential delay related to winter construction conditions.[3]

On December 2, 2019, Enbridge Gas notified the OEB that construction of the Scugog Island project was to commence on December 9, 2019.[4] The project was subsequently completed and placed into service on May 12, 2020, which enabled the Company to meet its commitment to serve the Mississaugas of Scugog Island First Nation by the Winter of 2020 (also please see the response to part d).

[1] https://www.rds.oeb.ca/CMWebDrawer/Record/610116/File/document
[2] EB-2017-0261 Exhibit E, Tab 1, Schedule 1, p. 1
[3] https://www.rds.oeb.ca/CMWebDrawer/Record/658138/File/document
[4] https://www.rds.oeb.ca/CMWebDrawer/Record/660952/File/document

d) The main reasons that Enbridge Gas was not able to wait another year to start the project the following October (maximizing the Blanding's turtle overwintering period) are that:

- The MTO had planned road widening and repaving work along the highway and requested that Enbridge Gas complete the project in specific areas with the potential to overlap its planned works before June 2020.

- Constructing when the groundwater was frozen (Jan – April) was optimal to avoid environmental impacts to the area and structural challenges to the adjacent MTO Highway 7A road due to potential excessive water taking. Starting the following October would have exposed the project to risk of additional environmental impacts and related costs (e.g. for mitigants).

- Enbridge Gas committed to provide natural gas delivery services to the Mississaugas of Scugog Island First Nation by the start of the 2020 Winter season. To satisfy this commitment, it was necessary to commence construction sooner than October 2020.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 12, Schedule 1, Attachment 2, pg. 1-3

Preamble:

In the Scugog Island – Community Expansion Project (EB-2017-0261) - Post Construction Financial Report on Costs and Variances, the evidence shows a 177% overage variance for Labour and Construction Costs. The description of the variance points to environmental and highway authority's requirements for the project which changed and delayed the proposed construction.

We would like to understand more about this project and the cost consequences.

Question(s):

For the Scugog Island project, please provide:

a) The long-term forecast of the number of customers, filed with the Board as part of the application(s), to be added by year and customer type (i.e., residential, commercial, industrial)

b) The actual number of customers added by and customer type from year of installation until 2022.

Response:

a) Please see the Leave to Construct Application[1].

b) Please see response at Exhibit I.1.12-FRPO-21.

[1] EB-2017-0261, Exhibit C, Tab 1, Schedule 1, pg. 8, paragraph 22.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 12, Schedule 1, Attachment 2, pg. 1-3

Preamble:

In the Scugog Island – Community Expansion Project (EB-2017-0261) - Post Construction Financial Report on Costs and Variances, the evidence shows a 177% overage variance for Labour and Construction Costs. The description of the variance points to environmental and highway authority's requirements for the project which changed and delayed the proposed construction.

We would like to understand more about this project and the cost consequences.

Question(s):

For each year since the approval of the New Community Expansion Projects in EB-2016-0004, please provide the PI of each project completed in that year and the Rolling Project Portfolio at the end of the year.

Response:

The requested information is unavailable in some instances and in others will require an onerous amount of data extraction, which is not possible to complete within the timeframe for responding to written interrogatories. Further, the requested information is not immediately relevant to the current proceeding since Enbridge Gas is only requesting to include the forecasted capital costs associated with community expansion projects in rate base at this time.

Enbridge Gas will report on the actual capital costs, actual customer attachments, and final project PI through future rebasing applications, following the completion of the 10-year rate stabilization period(s) (RSP) and attachment forecast term(s) associated with each community expansion project, in accordance with the OEB's determinations in prior applications, including the Company's SES/TCS/HAF Application[1]. In its Decision and Order in that proceeding, the OEB approved Enbridge Gas's proposal to not periodically update the project PI (and potentially the SES term) for all future SES projects. The OEB found that inclusion of the forecasted capital costs in the rate base at the next rebasing before the end of the RSP is consistent with the Generic Decision's requirement for a community expansion Project and would achieve the desired goal that Enbridge Gas bear the risk of any capital cost overrun during the RSP.

Accordingly, the Company respectfully declines to produce the information requested at this time.

[1] EB-2020-0094, Decision and Order, dated November 5, 2020, sections 3.2 and 3.3.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 12, Schedule 1, Attachment 2, pg. 6-8

Preamble:

In the Dow-Moore Well Drilling Project, the evidence states: *The two new horizontal wells will form part of Enbridge's regulated storage operations and the abandoned and converted wells are a part of regulated storage assets…The capital costs will be capitalized and included in rate base…There is not anticipated to be a rate impact to Enbridge customers from the drilling of the wells until the costs are included in rate base in 2024.*

We would like to understand more about this construction and the capabilities of the pools.

Question(s):

Please summarize the purpose of drilling two new horizontal wells.

a) Please provide the total storage space and deliverability of the Dow-Moore pool in:

   i. 2007
   ii. 2022

b) Please provide a description and costs associated with any additional capital work on this pool, besides the horizontal wells, in this project since 2007.

Response:

The purpose of the horizontal wells was described in Enbridge Gas's Well Drilling - Dow-Moore Storage Pool Application[1]:

[1] EB-2017-0354, Exhibit B, Tab 1, Schedule 1, Page 1, Paragraph 2.

The drilling is a ‘like for like’ replacement and will not result in an increase in storage capacity or an increase in deliverability. The two horizontal gas storage wells are needed to replace 60% of the deliverability lost in the Dow Moore Storage Pool due to the abandonment of five gas storage wells, the abandonment of one observation well and the conversion of 1 gas storage well to an observation well in 2017. The two new horizontal wells will form part of regulated storage operations. The abandoned and converted wells were/are a part of regulated storage operations.

The wells abandoned in 2017 include: TD 7 (Obs), TD 8, TD 9, TD 21 & TD 22 (Lot 21, Con.12, Moore Twp.) and TD 12 (Lot 22, Con. 12, Moore Twp.). The storage well converted to observation well in 2017 is TD 25 (Lot 21, Con. 12, Moore Twp.) Attachment 2 shows the location of the abandoned wells and the location of the proposed wells. The two new horizontal wells have also been designed to take into consideration the deliverability lost when TD 16, Moore 4-23-XII was abandoned in 2013 and TD 23, Moore 2-21-XII was abandoned in 2015

a) The total space and deliverability of the Dow Moore pool is shown in Table 1.

Table 1
Dow Moore Space and Deliverability

Line No.	Year	Deliverability ($10^6 m^3/d$)	Space ($10^6 m^3$)
		(a)	(b)
1	2007	16	749
2	2022	6	821

The new wells in the Dow Moore pool have not recovered the deliverability lost from the abandoned wells. Enbridge Gas is evaluating whether additional wells or other mitigation will be required.

b) All costs associated with this project are provided at Exhibit 1, Tab 12, Schedule 1, Attachment 2, pages 6 to 8. The post construction report summarizes the costs associated with drilling the wells included in the Application. No additional capital work has been completed as part of this project since 2007.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 12, Schedule 1, Attachment 2, pg. 30

Preamble:

In the POST CONSTRUCTION FINANCIAL REPORT - Owen Sound Reinforcement Project - EB-2019-0183, the evidence states that the Total Project had a 2% overage variance which include a 29% overage variance in Indirect Overheads.

We would like to understand more about how the Indirect Overhead variance occurred.

Question(s):

For these incremental costs, were more people hired in the company?

a) If so, how many at what costs?

b) After accounting for those costs and keeping all other factors constant, what was the net reduction in actual O&M expenses to the company?

Response:

The incremental costs and overage variance related to indirect overheads is not a result of additional people hired to the company.

a) The increase in costs is primarily a result of the implementation of the proposed harmonized overhead capitalization policy as provided at Exhibit 2, Tab 4, Schedule 2. The Owen Sound Reinforcement budget for indirect overheads was based on the prior overhead capitalization policy for Union, whereas the actuals for the project, effective starting January 1 2020, reflected the proposed policy and overhead allocations based on actual O&M costs.

b) This question is not relevant based on the answer in part a).

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 12, Schedule 1, Attachments 1 & 2

Preamble:

We would like to understand the role of project and cost management for the projects included in these attachments.

Question(s):

Please list all of the projects whose contractor cost was greater than 30% over the Board approved cost.

a) For each project, please provide how much of the total cost over-run was borne by the contractor. Asked differently, please provide the respective contractor's final invoice amount and what was disallowed through negotiation with project management.

b) For each of these projects, were any changes made to contractual arrangement with the respective contractors to incent lower costs?

Response:

Below is the list of projects whose contractor cost was greater than 30% over the OEB-approved cost.

- EB-2015-0179: Kettle Point & Lambton Shores Expansion Project
- EB-2015-0179: Milverton, Rostock, Wartburg Expansion Project
- EB-2015-0179: Moraviantown Expansion Project
- EB-2017-0147: Fenelon Falls Community Expansion Project
- EB-2017-0180: Sudbury Replacement Project
- EB-2019-0187: Saugeen First Nation Community Expansion Project
- EB-2019-0188: North Bay Community Expansion Project
- EB-2017-0261: Scugog Island Community Expansion Project

- EB-2018-0003: 2018 Oxford Replacement Project
- EB-2018-0096: Liberty Village Reinforcement Project
- EB-2018-0097: Bathurst Street Reinforcement
- EB-2019-0006: St. Laurent Pipeline Project
- EB-2019-0218: Sarnia Reinforcement Project

a) There were no cost overruns borne by the contractor in the case of all the above listed projects whose contractor cost was greater than 30% over the OEB-approved cost

b) There were no project specific contractual arrangements with the respective contractors for all the above-listed projects to incent lower costs. Please see response at Exhibit I.1.12-FRPO-25 part a) for information on how the contractor is incented to minimize the costs of a project.

   Enbridge Gas carefully considers the unique requirements of each project and selects the best fitting commercial structure for each of its construction contracts, to incentivize the contractor to minimize its cost from start to finish.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 12, Schedule 1, Attachments 1 & 2

Preamble:

We would like to understand the role of project and cost management for the projects included in these attachments.

Question(s):

In general, what incentives does:

a) the contractor have to control costs on a project?
   i. Please explain the consequences of not controlling the costs.

b) the company have to control costs on a project?
   i. Please explain the consequences of not controlling the costs.

Response:

a)
   i. Through Enbridge Gas's Alliance Partnership agreements, pipeline contractors are incentivized to manage and/or minimize project costs by the financial model set out within their contractual agreement with the Company. Each Alliance Partner must agree to a fixed profit margin for their overall portfolio of work with Enbridge Gas. Specifically, if a contractor over-earns, they share the savings/profit realized with Enbridge Gas. Similarly, if the contractor under-earns relative to forecast/budget, they share in absorbing the unforeseen costs together with Enbridge Gas. The contractor is also incentivized to introduce productivity savings into their work under the terms of their contract. If the contractor does not reach the prescribed productivity target, they are required to pay the difference between the target and the actual back to Enbridge Gas.

   For contracts other than the Alliance Partnership agreements, Enbridge Gas carefully considers the unique requirements of each project and selects the best fitting commercial structure for each of its construction contracts, to incentivize the contractor to minimize its cost from start to finish.

b)

i. Enbridge Gas's core values of safety, integrity, respect and inclusion require the Company and its employees to control and minimize project costs. These values are entrenched within the Company's project and cost management practices and process. Enbridge Gas takes its duty to customers in this regard seriously, to ensure the best value in terms of project safety, quality, and cost management. The Company is broadly incented to effectively manage project costs by its regulatory/operating paradigm which passes prudently incurred costs through to its customers. Thus, excessive project costs serve only to increase the cost of services (i.e. natural gas delivery, storage or transmission), and to degrade the Company's core value proposition.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 12, Schedule 1, Attachments 1 & 2

Preamble:

We would like to understand the role of project and cost management for the projects included in these attachments.

Question(s):

Please file the Post Construction Financial Report for the London Lines (EB-2020-0192)

a) If not available, please file a breakdown of the budgeted costs and actual costs to this point.

b) Is EGI applying for the inclusion of the London Lines in rate base?

   i. If so, what evidence does the Board have to ascertain the appropriateness of inclusion of the London Lines cost?

c) Please file EB-2020-0181 Exhibit I.FRPO.28.

   i. Please explain the Value Measures associated with this project.

   ii. In context of those measures, please explain the priority placed on the project.

d) Prior to the project being undertaken, the feed from the Byron Transmission Station to the London Lines was removed. Please file all internal communications (emails, requisitions, studies) that pertain to the removal of that feed to the London Lines.

Response:

In its Decision and Order approving the London Lines Replacement Project[1] (the "Project"), the OEB included a Condition of Approval regarding the Post Construction Financial Report. The OEB directed that the report should be produced and filed no later than fifteen months after the in-service date, or, where the deadline falls between December 1 and May 31, the following June 1. The OEB went on to direct that the Company file a copy of the Post Construction Financial Report in the proceeding where the actual capital costs of the Project are proposed to be included in rate base or any proceeding where Enbridge Gas proposed to start collecting revenues associated with the Project, whichever is earlier.

As the in-service date for the Project was December 10, 2021, Enbridge Gas is not required to file its Post Construction Financial Report until June 2023. However, as part of its 2021 Rates (Phase 2) Application[2], the Company sought and received approval for incremental capital module (ICM) funding of $124.0 million for the portion of total Project costs forecasted to go into service in 2021.

a) A breakdown of actual costs compared to budgeted costs is set out in Tables 1 to 4 for the mainline, stations, services and abandonment components of the Project. Actuals are shown as of December 31, 2022, and do not take into account forecasted costs of remaining work scheduled in 2023.

Table 1: Project Mainline Costs

	BUDGET	**ACTUALS** (as of December 31, 2022)	**VARIANCE**
Particulars ($000's)	**Mainline**	**Mainline**	**Mainline**
Materials	5616	5329	287
Construction and Labour	77321	63032	14289
Contingencies	11402	0	11402
Interest During Construction	867	733	134
Estimated Incremental Project Capital Costs	95206	69094	26112
Indirect Overhead	21881	14739	7142
Total Estimated Project Capital Costs	117087	83833	33254

[1] EB-2020-0192
[2] EB-2020-0181

Actual costs for construction of the mainline are less than the original filed budget. The budgeted amount was based on the information available at the time of the LTC filing. As the project was developed, efficiencies were found that allowed for easier installation resulting in lower overall costs. Additionally, specialized equipment was secured that allowed for greater daily production rates during installation.

Table 2: Project Stations Costs

	BUDGET	**ACTUALS** (as of December 31, 2022)	**VARIANCE**
Particulars ($000's)	**Stations**	**Stations**	**Stations**
Materials	1823	3191	(1368)
Construction and Labour	8221	15397	(7176)
Contingencies	1310	0	1310
Interest During Construction	142	130	12
Estimated Incremental Project Capital Costs	11496	18718	(7222)
Indirect Overhead	2640	4058	(1418)
Total Estimated Project Capital Costs	14136	22776	(8640)

Actual costs for construction of stations were higher than the original filed budget. At the time of the LTC filing, the scope of the station installation and abandonment requirements were not fully developed. Issued for Construction drawings were not available to inform the original budget, and many drawings had not yet been initiated, leading to greater uncertainty regarding costs associated with the station work. For instance, without stamped drawings, material costs could not be accurately estimated. Similarly, contractors were unable to provide accurate pricing because the necessary reference materials were not available. Additionally, ongoing delays due to procurement challenges related to the COVID-19 pandemic extended the station installation schedule from one year to two years, resulting in increased costs.

Table 3: Project Services Costs

	BUDGET	ACTUALS (as of December 31, 2022)	VARIANCE
Particulars ($000's)	**Services**	**Services**	**Services**
Materials	125	126	(1)
Construction and Labour	4005	8841	(4836)
Contingencies	619	0	619
Interest During Construction	49	102	(53)
Estimated Incremental Project Capital Costs	4798	9070	(4272)
Indirect Overhead	991	2016	(1025)
Total Estimated Project Capital Costs	5789	11085	(5296)

Actual costs for construction of customer services were higher than the original filed budget. At the time of the LTC filing, the list of services needing to be replaced was not yet finalized. The total number of services that were installed exceeded the number expected, resulting in increased costs. Additionally, multiple contractors needed to be secured to complete different portions of the work, and the work itself was more complex than originally expected due to the length of some services and site conditions during some of the installations.

Table 4: Project Abandonment Costs

	BUDGET	ACTUALS (as of December 31, 2022)	VARIANCE
Particulars ($000's)	**Abandonment**	**Abandonment**	**Abandonment**
Materials	0	15	(15)
Construction and Labour	19776	3989	15787
Contingencies	2633	0	2633
Interest During Construction	0	155	(155)
Estimated Incremental Project Capital Costs	22409	4005	18404
Indirect Overhead	4677	904	3773
Total Estimated Project Capital Costs	27086	4909	22177

Actual costs for abandonment were less than the original filed budget because the majority of abandonment work has not commenced so the costs have not yet been realized.

b) Yes, the Company is requesting to include the Project in rate base as part of the current Application.

   i. Please see response at part a). The OEB previously reviewed and approved the Company's application requesting leave to construct the Project, including the forecasted costs of the same (EB-2020-0192). Similarly, the OEB previously approved ICM recovery of $124.0 million of Project costs in 2021 rates (Phase 2) (EB-2020-0181).

c) The Company's responses to FRPO's interrogatories as part of its 2021 Rates (Phase 2) application proceeding are already a matter of public record made available via the OEB's website (RESS) at: https://www.rds.oeb.ca/CMWebDrawer/Record/700810/File/document

   i. Please see response at Exhibit I.2.6-FRPO-44, including Attachment 1, page 8 for the Value Measures associated with the Project. Please note the Investment Summary report is forward looking, and only considers expenditures still in plan in the value assessment.

   ii. While the value framework was applied to this Project to understand how its value compared to other investments included in the optimized plan filed in EB-2020-0181, Exhibit C, Part 2, Schedule 3, the Project was assigned a time constraint and therefore was not optimized among other value driven investments. Please see Exhibit 2, Tab 6, Schedule 2, Page 46, Table 4.1-2, which explains that investments exceeding an established risk upper threshold are categorized as Mandatory. As stated in EB-2020-0192, Exhibit B, Tab 1, Schedule 1, page 14, Paragraph 31:

> The risk assessment also identified that some segments of the London Lines have a high risk rating for Customer Loss. This is primarily for sections where the twin pipelines cannot be isolated independently to effectively manage customer outages on the system.

High risks exceeding the established risk upper threshold require treatment. Therefore, while this investment was not identified as "Must Do" in the investment summary report, it was treated as mandatory during the optimization and review exercises for Enbridge Gas' 2021 to 2025 Asset Management Plan.

d) The need for the Project was previously examined and approved by the OEB. Enbridge Gas respectfully declines to provide the correspondence requested by FRPO since it is not relevant to the Company's request to include the OEB-approved costs of the Project in its forecast rate base as part of the current Application.

Nonetheless, Enbridge Gas has provided further context below regarding the historical development and circumstances that led to the Project.

The City Gas Company ("City Gas"), which was formed in 1864, provided manufactured gas to the City of London. Union Gas Limited ("Union Gas") purchased City Gas in 1930, and in 1935 installed a pipeline (the London South Line) from Dawn, ON to London, ON. The completion of this project marked the introduction of natural gas for the first time into the City of London. Due to the overwhelming demand for natural gas in London, a twin pipeline (the London Dominion Line) was installed in 1936, these two pipelines were thereafter referred to as the "London Lines".

The section of the London Lines, south of the Thames River, along Elviage Road required a number of leak repairs resulting in the London South Line being abandoned in 2016. The London Dominion Line, a NPS 10 bare and unprotected steel pipeline with a maximum operating pressure of 1900 kPa, remained in operation beyond 2016 but continued to experience leakage and was ultimately replaced by a NPS 4 PE 420 kPa pipeline to eliminate further leaks and to service the customers that were originally connected to the London Lines.

The supply of natural gas into the City of London changed significantly over the course of the 80+ years since the original London South Line and London Dominion Lines were installed and operated. Given these changes, Enbridge Gas determined that the London Lines would not be used as the primary feed into the City of London going forward. The Company's system planning decision in this regard resulted in the OEB-approved Project to connect the City of London to its Strathroy system.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-12-1

Question(s):

Please provide a copy of all Post-Construction Financial Reports for projects approved prior to the referenced changes in the conditions of approval in Q2 2015, for all projects in which Enbridge seeks to include actual costs in the rate base. [Note: It is sufficient to provide a link to the OEB's webdrawer for any referenced documents.]

Response:

Please see Attachment 1.

Project Name	Applicant	Docket	Link to Post Construction Financial Report	Notes
Thunder Bay Pipeline Project	Union Gas	EB-2012-0226/EB-2012-0227	https://www.rds.oeb.ca/CMWebDrawer/Record/462430/File/document	
Owen Sound Replacement Project	Union Gas	EB-2012-0430	https://www.rds.oeb.ca/CMWebDrawer/Record/471817/File/document	
Leamington Expansion Pipeline Project (Pipeline) Leamington Expansion Pipeline Project (Stations)	Union Gas	EB-2012-0431	https://www.rds.oeb.ca/CMWebDrawer/Record/461348/File/document	
2013 Panhandle Replacement	Union Gas	EB-2012-0432	https://www.rds.oeb.ca/CMWebDrawer/Record/444407/File/document	
Angus Reinforcement Project	Enbridge Gas Distribution	EB-2012-0013	https://www.rds.oeb.ca/CMWebDrawer/Record/434379/File/document	
Ottawa Reinforcement Project	Enbridge Gas Distribution	EB-2012-0099	https://www.rds.oeb.ca/CMWebDrawer/Record/477849/File/document	
Durham York Energy Centre Pipeline	Enbridge Gas Distribution	EB-2012-0382	https://www.rds.oeb.ca/CMWebDrawer/Record/477230/File/document	
GTA Reinforcement Project (without Stations)	Enbridge Gas Distribution	EB-2012-0451	https://www.rds.oeb.ca/CMWebDrawer/Record/576741/File/document	
Ottawa Innes Road Pipeline Replacement Project	Enbridge Gas Distribution	EB-2012-0438/EB-2014-0017/EB-2015-0037	https://www.rds.oeb.ca/CMWebDrawer/Record/530250/File/document	
Parkway West Project	Union Gas	EB-2012-0433	N/A	*No Post Construction Financial Report Required, Annual Cost Reporting through Deferrals Proceeding (EB-2022-0110)*
Brantford-Kirkwall Project	Union Gas	EB-2013-0074	https://www.rds.oeb.ca/CMWebDrawer/Record/562973/File/document	
Dawn Parkway NPS 26 Strathroy-Caradoc Project	Union Gas	EB-2013-0191	https://www.rds.oeb.ca/CMWebDrawer/Record/471112/File/document	
Dawn Parkway NPS 48 Replacement	Union Gas	EB-2013-0284	https://www.rds.oeb.ca/CMWebDrawer/Record/466404/File/document	
Panhandle NPS16 Replacement (Highway 40- Chatham Kent)	Union Gas	EB-2013-0407	N/A	*No Post Construction Financial Report Required - LTC Exemption*
Panhandle NPS16 Replacement Project	Union Gas	EB-2013-0420	https://www.rds.oeb.ca/CMWebDrawer/Record/597409/File/document	
Union's Dawn Parkway 2016 Expansion Project	Union Gas	EB-2014-0261	https://www.rds.oeb.ca/CMWebDrawer/Record/600177/File/document	
Sarnia Expansion Pipeline Project	Union Gas	EB-2014-0333	https://www.rds.oeb.ca/CMWebDrawer/Record/559610/File/document	
Bay of Quinte Replacement Pipeline Project	Union Gas	EB-2014-0350	https://www.rds.oeb.ca/CMWebDrawer/Record/564496/File/document	
Sudbury NPS 10 Replacement	Union Gas	EB-2015-0042	N/A	*No Post Construction Financial Report Required - LTC Exemption*
Panhandle Relocation Project	Union Gas	EB-2015-0366	N/A	*No Post Construction Financial Report Required (100% reimbursement of Project Costs)*
Ashtonbee Station (Request to Vary from GTA Project)	Enbridge Gas Distribution	EB-2012-0451/EB-2016-0034	https://www.rds.oeb.ca/CMWebDrawer/Record/619701/File/document	

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

EB-2012-0451, EGD GTA Project – Post-Construction Financial Report, dated June 30, 2017

Question(s):

With respect to the GTA Project:

a) Please file a copy of the unredacted Post- Construction Financial Report on the record in this proceeding.

b) [p.5] Please confirm that the GTA Project final cost was $180M (27%) more than what was forecast during the leave to construct proceeding (EB-2012-0451).

c) [p.5] Please provide the NBV of the GTA project at December 1, 2023, and what the NBV would have been at December 1, 2023 if the project costs were as forecast in the leave to construct application (EB-2012-0451).

d) Please provide the total amount of contingency that was included in the project budget provided during the leave to construct proceeding.

e) Please provide a comparison between the forecast and actual project schedule.

f) [p.5] Please provide the forecast and actual costs related to each of the Buttonville and Ashtonbee stations. Please explain any variances.

g) Based on the actual costs of the project, please provide the actual Profitability Index based on E.B.O. 134 and 188. Please provide the full calculations.

h) Please provide a comparison of your response to part (f) of the Profitability Index provided in EB-2012-0451.

i) Please provide a copy of all internal or external GTA project reviews, assessments, or similar documents that discusses project performance.

Response:

a) Please see Attachment 1 for a redacted version of the GTA Project Post-Construction Financial Report. For reasons set out in the confidentiality request accompanying the Company's interrogatory responses, confidential treatment is being sought for certain commercially sensitive information, which was also previously redacted in the publicly filed version of the report in the EB-2012-0451 proceeding. An unredacted confidential version of the report was filed in that proceeding in accordance with and as approved by the OEB at the time pursuant to the Practice Direction on Confidential Filings.

b) Confirmed.

c) The forecasted NBV of the GTA Project as of December 31st, 2023 is $693.5 million. The forecasted NBV of the GTA Project assuming the costs forecast in the LTC, excluding the Buttonville and Ashtonbee stations, is $552.6 million.

d) As stated in the Post-Construction Financial Report for EB-2012-0451, [p5], the total amount of contingency was $89M.

e) Please see Attachment 2 and Attachment 3 for the forecast and actual project schedules respectfully.

f) Please see the document titled "Ashtonbee Station Post-Construction Financial Report on Costs and Variances, September 13, 2018" filed in the EB-2016-0034 proceeding which is publicly on the OEB website[1].

The Buttonville Station was removed from the scope of work and as such, the only costs incurred were for engineering design work and were captured as part of the overall GTA Project actual costs reported. The original cost estimate filed for the Buttonville Station was $8.2 million.

g-h) Please see response at Exhibit I.2.1-SEC-99, Attachment 1.

i) Please see response at Exhibit I.1.12-SEC-94 part c).

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[1] EB-2016-0034, September 13, 2018, https://www.rds.oeb.ca/CMWebDrawer/Record?q=casenumber:EB-2016-0034&sortBy=recRegisteredOn-&pageSize=400#form1

ENBRIDGE

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June 30, 2017

VIA RESS, E-MAIL AND COURIER

Ms. Kirsten Walli
Ontario Energy Board
P.O. Box 2319
2300 Yonge Street, 27th Floor
Toronto, ON M4P 1E4

Dear Ms. Walli,

Re: Enbridge Gas Distribution Inc. ("Enbridge") – GTA Project
Ontario Energy Board ("Board") Docket No. EB-2012-0451
Conditions of Approval – Post Construction Financial Report

On January 30, 2014 the Board issued the Decision and Order for the above noted proceeding which included the Conditions of Approval.

As per paragraph 1.5 of the Conditions of Approval, Enbridge is to provide the Board with a Post Construction Financial Report within fifteen months of the in-service date.

Attached please find the Post Construction Financial Report for the GTA Project with the exception of the Ashtonbee and Buttonville Stations, which will be reported on separately as per our November 6, 2015 and June 15, 2017 letters to the Board.

Please note that Appendix K to the Post Construction Financial Report, titled "KPMG Assessment Report", contains commercially sensitive information on pages 10, 17 and 18 that has been redacted. An unredacted version of Appendix K is being filed with the Board in confidence under separate cover.

Please contact me if you have any questions.

Yours truly,

(Original Signed)

Brian Wikant
Technical Manager, Business Development

Attach.

cc: Zora Crnojacki (Chair, OPCC)
Nancy Marconi (Ontario Energy Board)
Andrew Mandyam (Enbridge)
Scott Dodd (Enbridge)

GTA PROJECT

POST CONSTRUCTION FINANCIAL REPORT

June 30, 2017

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1. INTRODUCTION

Enbridge Gas Distribution Inc. (“EGD” or the “Company”) applied to the Ontario Energy Board (“OEB” or the “Board”) on December 21, 2012, under Section 90 of the Ontario Energy Board Act, 1998, S.O. 1998, c. 15, Schedule B, for an Order granting Leave to Construct (“LTC”) to certain pipelines and facilities in the Greater Toronto Area (“GTA”). The project is referred to as the GTA Project (“Project”), and the Board assigned file number EB-2012-0451 to this application.

The GTA Project consists of approximately 26.7 kilometers (“km”) of Nominal Pipe Size 42 (“NPS 42”) Extra High Pressure (“XHP”) steel pipeline (“Segment A”), approximately 22.9 km of NPS 36 (“Segment B”) XHP steel pipeline, and associated station facilities and connecting pipes[1].

The Board issued a favorable decision on January 30, 2014[2].

On November 6, 2015, the Company informed the Board that the construction of Jonesville[3] Station and Buttonville stations would be delayed.

On April 13, 2016, the Company informed the Board that the GTA Project[4] had been energized.

On September 30, 2016, per Condition of Approval 3.1 in the decision, the Company filed the Interim Monitoring Report with the Board.

Per Condition of Approval 1.5 in the decision, this report summarizes the differences between the actual costs and the costs as outlined in the application for the GTA Project, excluding the Buttonville and Ashtonbee stations.

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[1] EB-2012-0451 Exhibit A Tab 3 Schedule 6
[2] EB-2012-0451 Decision and Order dated January 30, 2014
[3] Renamed Ashtonbee Station. Please refer to EB-2016-0034 February 18, 2016 decision
[4] Excludes the Ashtonbee Station and Butttonville Station

2. SUMMARY

The estimated cost for the GTA Project was $686.5 million[5] ("MM"). After deducting the forecast costs for Buttonville and Jonesville stations[6], the forecast cost was $667.4 MM.

The actual construction costs are $847.4 MM, excluding Buttonville and Ashtonbee Stations. The difference is $180.0 MM or 27% unfavorable. The Company has discussed the potential for variance during the proceeding and kept the Board apprised of the projected difference during and after construction.

The cost estimate was Class 3 as defined by the American Association of Cost Engineers ("AACE") and the unfavorable variance is within the AACE guidelines. It is also within the range of possible outcomes defined by the cost probability distribution curve that supported the initial forecast of $667.4 MM. As well, the cost is reasonable when compared to other benchmarks. Further details can be found in Section 5.

The Company retained KPMG during the construction execution phase of the Project to independently assess the efficacy and prudency of the GTA Project's management and governance practices. In doing so, KPMG found that[7]

> *"… the GTA Project team made efforts to mitigate against cost and schedule increases and demonstrated prudency in the delivery of the project. …"*

The major cost variances are categorized as follows[8]

Reference	**CATEGORY**	Estimate	Actual	Variance
4.1	Project Management	57.2	53.4	(3.8)
4.2	Engineering	19.1	35.7	16.6
4.3	Land	85.0	72.5	(12.5)
4.4	Materials	63.1	76.4	13.3
4.5	Pipeline ("Mainline") Construction	217.3	424.5	207.2
4.6	Horizontal Direction Drilling ("HDD") Construction	68.8	56.9	(11.9)
4.7	Facilities Construction	20.1	45.7	25.6
4.8	Construction Support	26.8	51.6	24.8
4.9	Commissioning and Start Up	1.2	5.7	4.5
4.10	Interest During Construction ("IDC")	19.8	25.0	5.2
	Contingency	89.0	-	(89.0)
	TOTAL	667.4	847.4	180.0

[5] EB-2012-0451 Exhibit C Tab 2 Schedule 1 unredacted
[6] EB-2012-0451 Exhibit C Tab 2 Schedule 1 unredacted. Escalation and direct engineering costs have been apportioned to the two stations.
[7] KPMG Assessment Report, page 1 included as Appendix K
[8] Minor variances to the KPMG Assessment Report, page 13 reflect timing differences between Oct, 2016 and Apr, 2017, including reclassification of certain costs to better align actuals to estimate.

The Company attributes $191.6 MM of the variance, which is more than the total variance after applying contingency, to the following three root causes: a) bid to estimate variance; b) permit delays; and, c) construction complexity, particularly related to crossings. The latter two in turn led to a schedule delay, which increased the indirect costs associated with the duration of the Project.

Section 3 of the report is organized to explain the variances related to the three root causes mentioned above. Section 4 provides a more detailed explanation of these variances by individual cost category.

Section 6 contains some lessons learned which may be useful for future large diameter projects of similar scale and environment.

3. COST OVERAGE ROOT CAUSES

3.1. Bid Prices Relative to Estimate

Ninety five million ($95.2 MM) of the overall variance is due to the increase in bid prices relative to the estimate.

Contractor prices are generally reflective of the competitive market for their services at the time of a Request for Proposal ("RFP") and the degree of complexity and risk associated with the work. Major contracts involved RFP processes with multiple, pre-qualified parties in order to ensure a competitive process. Alternate contract structures were requested and evaluated for both the mainline and facilities RFP's in an attempt to reduce price.

With regards to process, all major contracts were supported with a Contract Development Plan ("CDP") document, detailing the specific contracting strategy to be employed. Prior to awarding the contract, a Contract Award Recommendation ("CAR") was prepared to document the successful proponent and the rationale for their selection. CDP's and CAR's were approved in accordance Enbridge's governance process.

In reviewing the mainline, HDD, and facilities contracts and contracting process, KPMG found[9]

> *"… the process of contract procurement to be competitive and well documentded. The contract terms are relatively favorable to EGD and in-line with industry practice in terms of level of security and change management."*

The cost variance breakdown by each of the three construction activity categories is as follows.

Construction Activity	Cost Estimate ($MM)	Bid Price ($MM)	Bid to Estimate Variance ($MM)	Actual Cost ($MM)	Actual to Bid Variance ($MM)	Actual to Estimate Variance ($MM)
Mainline	$217.3	$320.0	$102.6	$424.5	$104.6	$207.2
Facilities	$20.1	$34.8	$14.7	$45.7	$10.8	$25.6
HDD	$68.8	$46.6	($22.1)	$56.9	$10.2	($11.9)
Total	$306.2	$401.4	$95.2	$527.1	$125.7	$220.9

More details on the contracting strategies, processes, and results follow.

[9] KPMG Assessment Report, page 1 included as Appendix K

3.1.1. Mainline Contract

The mainline RFP was issued to four pre-qualified proponents, two of which formed a joint venture to bid. In order to eliminate the risks associated with a time and material ("T&M") contract, the form of contract was Base Lay (ie. lump sum) plus Unit Prices ("UPI") for items that could not be quantified and priced in advance without adding significant risk premium to the contract. UPI examples include shoring, boring, rock excavation, topsoil stripping, matting, and drilling mud disposal.

Due to the perceived construction risk associated with the Project, one of the three proponents refused to complete the entire job on a Base Lay basis. They indicated that they would complete either the NPS 42 or NPS 36 as Base Lay but the other half would be T&M.

A second proponent indicated that they already had two crews committed to other work in 2015 and could only commit to resource one "super-sized" crew to complete the GTA Project. Their high bid price reflected their lack of need for the work in what was expected to be a generally busy pipeline construction season in 2015/16, before the overall downturn in the energy markets was foreseen. Their ambivalence was also reflected in a low technical evaluation score, which was the result of incomplete or insufficiently detailed bid documents.

A Target Price was also requested as a possible option to reduce the bid price. One proponent refused to bid on a target price basis. For the remaining two, the target prices were higher than the lowest Base Lay + UPI price received and the limitations they placed on the cap did not justify the additional risk associated with a T&M contract structure.

The contract was awarded to the low bidder with an initial contract price of $320.0 MM, comprised of $231.2 MM in fixed costs (Base Lay, HDD support, final tie-ins and Performance Bond) and $88.8 MM in projected variable costs for UPI's. This represented a $31.3 MM reduction from the successful contractor's original RFP submission, which was achieved through bid clarifications, negotiation, and economies of scale associated with awarding the entire job to a single contractor. The second lowest proponent's price was considerably higher than the successful bidder.

The mainline bid to estimate variance of $102.6 MM can be attributed to the following items.

- The expectation of a tight labour market for pipeline construction services in 2015. This was supported by one of the contractor's ambivalent approach to the bid process as described above.
- The greater design definition provided with the 2014 Mainline RFP relative to the 2012 estimate, which was prepared without the benefit of subsurface utility engineering or agency circulation/feedback. The contractor's bid price reflected the greater number of

longer and deeper bores than originally estimated, which is explained in greater detail in Section 3.3. While some of the crossing changes were made during construction to resolve field challenges, most of the changes were included in the detailed design and crossing drawings that the contractor reviewed before finalizing its bid price. Over the entire 50 km pipeine route, the longest stretch between crossings was 1.4 km and the longest stretch installed without requiring depth of cover greater than 1.5 m (1.2 m is standard) was 0.5 km. The productivity impacts associated with these complexities resulted in higher labour hours in the bid relative to what was included in the estimate.

The following table reflects this final point. It provides a comparison of the labour hours to the mainline construction costs for each of the estimate, bid, and final actuals. On a percentage basis the increase in construction costs generally correlate with the increase in labour hours at each of these three milestones. The reasons for the actual to bid variance are explained in greater detail in Section 4.5.

	Estimate	**Bid**	**Actual**	**Variance Bid to Estimate**	**Variance Actual to Bid**
Labour Hours	978,000[10]	1,288,000	1,668,000	32%	30%
Mainline Construction Cost ($MM)	$217.3	$320.0	$424.5	47%	33%

3.1.2. <u>HDD Contract</u>

The HDD RFP included 14 drills, which was three less than the 17 included in the cost estimate. The variance was a result of the detailed design process that eliminated two drills, added one drill, and in two cases combined two drills into one longer drill. The cost estimate of $68.8 MM included a provision of $18.4 MM for three potential failures.

Five additional drills[11] were later added to the mainline contractor's scope of work to overcome constructability challenges and/or resolve permitting issues. The Alden Road HDD is in the mainline bid price as it was added prior to signing the mainline contract. The remaining four were added during construction as discussed in Section 4.5.

A Request for Information ("RFI") was sent to five HDD contractors in order to prequalify them for the RFP process. Of those five, four were deemed to be technically qualified to complete the work and received the RFP package, with one declining to submit a proposal. RFP submissions were received from the remaining three proponents and a decision was made to split the drills between the proponent with the highest technical evaluation and the one with the lowest cost.

[10] Contractor hours extrapolated to reflect mainline cost increase in final estimate as compared to original contractor cost model. This reflects mainline scope changes between the initial cost estimate filed December 21, 2012 and the final estimate filed July 22, 2013.
[11] Alden Road HDD, West Don HDD, Torbram Road HDD, Leslie Street Direct Pipe, Lisgar-Meadowbrook Direct Pipe.

Because the drilling program was on the critical path, the decision to split the drills was made in order to maintain maximum schedule flexibility in the event that one contractor ran into problems. By not having all rigs from a single contractor committed to the Project, the capacity to add resources was available. The decision to split the drills was rewarded as the Project required additional resources due to the addition of five HDD crossings in order to overcome constructability and permitting challenges during construction.

The combined bid price of the two successful HDD contractors was $46.6 MM, or $3.8 MM less than the $50.4 MM base estimate (ie. before failure provision). This can be attributed to the fact that a significant portion of the early engineering effort was spent progressing the HDD designs, because this is where the Project team initially perceived the greatest risk. This additional design definition, relative to the mainline and facilities, allowed for improved accuracy in the HDD cost estimate.

3.1.3. Facilities Contract

The facilities RFP was issued to two proponents, both of which are existing EGD extended alliance (“EA”) partners and have experience with constructing facilities. The Project team believed that proceeding in this manner would afford competitive pricing and also reduce the contract preparation and execution time. The initial RFP was for lump sum pricing and excluded Buttonville Station.

Initial lump sum prices from both parties were just over $49 MM. These initial price submissions were thought to be too high so three additional proponents were requested to provide proposals. Of these three, one had a substantially higher price than the EA partners, one provided an incomplete proposal, and one provided competitive pricing but ranked low on the technical evaluation. The GTA Project’s procurement process combined both a commercial and technical ranking when selecting contractors to ensure that a low price was not being driven by sub-standard capabilities and inferior quality.

A decision was made to re-engage the two EA partners and request revised proposals. The proponent with the highest technical score proposed a T&M Target Price of $41 MM with a sharing of overruns and underruns and an effective cap[12]. This proposal was the lowest price, represented an $8 MM savings over the initial lump sum, and was accepted.

Subsequent to contract award, Jonesville station was removed from scope which reduced the final target price from $41 MM to $34.8 MM. This represents an overage of $14.7 MM compared to the facilities construction estimate of $20.1 MM, excluding Jonesville and Buttonville . This bid to estimate variance is attributed to a combination of higher field labour

[12] 50%/50% sharing on any overage up to $2 MM and on any savings below $41 MM. Any costs over $43 MM were to the contractor’s account which effectively capped the Company’s cost, subject to escalation due to change orders, at $42 MM.

hours and higher average hourly labour rates required to construct the stations. The underestimate of the work effort was a result of the lack of detailed design definition at time of estimate.

3.2. Permit Delays and Additional Rquirements

The Company attributes $40.6 MM of the variance to the incremental costs associated with permit delays.

Appendix B shows the number of permits received from the respective agencies each month until the final permit was received for the Argentia Road crossing in December, 2015. As of the start of construction in January, 2015, EGD had only obtained 24 (10%) of the 236 permits and private easements required to complete the pipeline portion of the Project. Appendix C shows a timeline of discussions with five permitting agencies where the late issuance permits had an impact on the Project schedule.

Discussions with permitting agencies were initiated in early 2012. These were helpful in determining anticipated conflicts with future works and developing mitigation plans. Appendix D shows 46 such conflicts and the resulting mitigations, which typically involved either pipeline design changes or construction schedule accommodations.

Despite these meetings, most agencies did not initiate the formal permitting circulation and review process until stamped engineering crossing/alignment drawings were available. Through the review process substantive design changes were often necessary to satisfy individual agency requirements, as well as the collective requirements where multiple agencies were involved in a single crossing. In fact, of the 236 permits required, 97 had complicating issues as shown in Appendix E. Requests for design changes were often unforeseeable and driven by the following agency future constraints.

1. A desire to protect their right of way for their own use in the future and/or avoid any conflict with potential future works.
2. A requirement that the pipeline be installed in a location that ensured there would be no conflict or cost impact with maintenance work on their existing facilities in the future – often below the deepest foreign utility in the crossing.

The best example of the first point was HONI, who requested several significant last minute design changes in the fall of 2014 on both Segment A and B to protect their corridor for future buried hydro ducts and a new tower line running parallel to, and south of, Highway 407. This request caused major design re-work including the introduction of an additional HDD at Alden Road, which was the only option to maintain HONI's minimum 10 m clearance requirement to the tower footings.

The second point is best exemplified by both York and Peel Region's preference that we cross below, rather than above, their water and sewer mains. Peel also requested 2 m of clearance to their existing infrastructure rather than the municipal standard of 0.6 m and our project design criteria of 1 m. These two requirements caused many crossings to be extremely deep in order to locate the pipeline below the deepest utility within the crossing with above normal separation.

In addition, several crossings required permits from multiple agencies, sometime with disparate requests. This required close coordination amongst the parties, often prolonging the permitting timeline. The best examples of this were the crossings at German Mills Creek, West Don River, Torbram Road, and Fletchers Creek as described in Appendix E. In the case of German Mills Creek, it took 294 days from the initial permit submission until the final permit required to construct the crossing was received on August 17, 2015.

Finally, some agencies required new agreements for the GTA Project that were previously not required for permitting of projects. For example:

1. Highway 407's approval was historically done through conditions attached to the Ministry of Transportation ("MTO") agreement. However, for the GTA Project Highway 407 required a new legal agreement specific to the Project. This was first discussed on August 5, 2014 and the signed agreement was received on February 26, 2015.
2. The Company had operated under the existing Municipal Franchise Agreement in Peel Region. However, Peel Region required that a Franchise Agreement specific to the Region be in place prior to issuing any permits for the Project. The Peel Region Franchise Agreement was executed and received on December 22, 2014.

All of the above permitting complexities resulted in delays in obtaining many permits. A majority of the 24 permits that EGD had received by the end of 2014 were to enable EGD to start the HDD program on time at the start of January 2015 and complete the 4 winter drills. EGD had prioritized these permits because the HDD program, with its inherent risks, was driving the Project's critical path at that time.

The following additional actions were taken by EGD in an effort to expedite the permitting process and mitigate the negative impacts associated with the delays.

- One senior team member was assigned accountability for managing the permit acquisition process.
- Additional resources were added to EGD's permitting group to improve the turnaround time on permit submissions and re-submissions where changes were requested by the agencies.
- In addition to the detailed permit tracker, a one page dashboard was created and utilized to prioritize the permits. These priorities were reviewed through a daily team meeting, with a

focus on expediting those permits that would best mitigate the impact on the contractor's construction schedule.

- The Senior Project Director led weekly meetings with EGD's land and permitting groups, to communicate priorities and develop agency escalation strategies as necessary.
- Daily morning construction meetings were held with the mainline contractor that included discussion of which permits they required to minimize the impact on their proposed schedule as well as to adjust their work plan to reflect the permits already obtained.

These actions helped EGD to acquire 68% of the permits from March to May, 2015, at which point EGD had 89% of the required permits in hand. Unfortunately, this caused much of the winter work that the contractor had planned to be pushed into the summer/fall period, thereby driving the Project delay that was communicated to the Board on June 30, 2015.

3.3. Construction Complexity

The Company attributes $55.7 MM of the overall variance to the incremental costs associated with construction complexity. Appendix J provides construction pictures that reflect many of the challenges.

In the original estimate, crossing depth assumptions and methods were driven by typical planning requirements below ditch lines, rail tracks, creek bottoms, and foreign pipelines. However, once the subsurface utility engineering confirmed the depths of all foreign utilities, constructability assessments were completed, and agency feedback was taken into consideration, the number of bores increased by 61% compared to the estimate. In addition, the pipe depth at crossings increased significantly, from an average of 2.1 m to 3.0 m at open cut crossings (a 44% increase) and to 5.7 m at bored crossings (a 170% increase). The following table[13] summarizes the changes in crossing method, depth and length from estimate to final design.

CROSSING METHOD	Number of Crossings		Average Depth of Cover (m)		Average Length (m)		% Increase/Decrease (Actual versus Estimate)		
	Estimate	Actual	Estimate	Actual	Estimate	Actual	Number	Depth	Length
Open Cut	50	24	2.1	3.0	33.6	49.3	-52%	44%	47%
Boring	33	53	2.1	5.7	50.4	70.4	61%	170%	40%

Unfortunately, temporary work space limitations and the proximity to parallel linear facilities, such as sewers, would not allow the deep bore pit trench walls to be sufficiently sloped to meet health and safety regulations. As a result, 96% of all entry and exit bore pits, representing 102 excavations, required some form of sheet pile, slide rail and/or trench box shoring.

[13] See Appendix F for for the crossing method, length and depth analysis (actual vs estimate) by individual crossing.

On average, shoring set-up and bored installations took 19 days and 17 days respectively, or 5 weeks in total[14]. This compares to an estimated duration of 2 weeks per bore in the cost estimate and 1 week per bore in the mainline contractor's original schedule. More bores of longer duration was a significant contributor to the cost overage and schedule delay.

With the crossing work not starting until mid-June, it was July before the full schedule impact of the extended crossing durations was understood and plans were developed to mitigate the impact. The plan involved an accelerated ramp up in the number of shoring crews, followed by a significant increase in the number of boring crews once the deep excavations were safe to enter. Finding sufficient material/equipment and qualified resources to safely deliver this ramp up in such a short period of time was challenging. Local shoring and boring businesses were unable to meet the Project's demand and, as a result, additional time was required to source equipment from other jurisdictions across North America. Starting in early September, EGD and the contractor initiated weekly senior management schedule review meetings focused on the early identification and resolution of issues related to the aggressive crossing schedule.

Appendix I shows the weekly ramp up/down from the beginning of July until the final shoring removal. As shown, the number of shoring crews peaked at 17 the week of September 21, 2015 and the boring crews at 16 the week of November 9. This represents an almost doubling of resources within a two month period. Although the volume and cost of shoring was higher than estimated, this ramp up prevented an even longer schedule extension and associated incremental overhead costs.

Construction challenges were also experienced at several trenchless crossings, largely due to complex ground conditions that weren't identifiable from the geotechnical investigations. In some cases, more expensive and challenging HDD's were added as the only construction method that could resolve permitting issues. Sections 4.5 and 4.6 provide specific examples where this was the case.

[14] See Appendix G and H for the shoring and boring schedules respectively.

4. VARIANCE EXPLANATIONS BY CATEGORY

The following provides a further sub-categorization and explanation of the major variances by cost category.

4.1. Project Management

Sub-Category	Variance ($MM)	Comments
Project development	0.3	
Project execution	($7.3)	The underage of $7.3 MM is primarily attributable to labour savings in Procurement ($4.2 MM), Quality Management ($1.9 MM), Regulatory ($1.5 MM), and Commissioning ($0.5 MM) offset by $0.8 MM in added cost for the KPMG prudency assessment. Savings were identified during the development of the detailed organizational structure required to execute the Project. In addition, resources were managed effectively and came in under budget despite a five month extension in the construction schedule.
Administrative and general	2.8	The overage of $2.8 MM is primarily attributable to the resolution of First Nation issues ($1.9 MM), the addition of an EGD project integration team to ensure effective change management and operational readiness ($0.6 MM), and additional legal costs related to various Project challenges ($0.3 MM).
Insurance	0.4	
Total category	($3.8)	

4.2. Engineering

Sub-Category	Variance ($MM)	Comments
Pipeline design	6.6	Pipeline design and drawing escalation, driven primarily by the work complexity required to accommodate the varying and unique information requirements of the multiple permitting agencies. This lack of consistency required significant individual drawing customization which added to the Engineering and drafting costs. There was also increased design complexity required to accommodate the various agencies existing and future infrastructure plans as referenced in Appendix D. This required plan and profile alignment sheets for the entire 50 km length in addition to crossing drawings at roads, railroads, pipeline, and water crossings, whereas a typical pipeline has a plan drawing of the entire route and profile drawings only at the crossings. For the GTA Project, Engineering would typically involve approximately 25 plan view drawings at a scale of 1:2000 and 100 crossing drawings as compared to the 571 alignment, crossing, and environmental drawings that were actually required to permit the

		Project. This represents an over fivefold increase in the scope of engineering and drafting work. Finally, there was considerable rework required to incorporate agency feedback and permitting requests. The primary example of this was HONI's last minute request to re-route sizeable sections of the pipeline to accommodate their future infrastructure builds. On average there were five revisions for each of the 571 pipeline drawings. While a large number of these revisions were attributable to EGD's review and comment, it's fair to say that a significant portion were the result of changes requested through the agency review and permitting process.
Facilities design	1.4	Facilities design and drawing escalation, driven primarily by an increase in the work effort to complete the station designs. At Albion and Parkway West Gate Stations, the estimate provisioned for 113 and 134 drawings respectively. The actual number of drawings required to engineer these two stations were 368 and 369 respectively, or three times the number originally estimated.
Geotechnical investigation	1.8	Additional costs incurred to complete 220 boreholes at facilities, HDD's, and other major road and rail crossings. Boreholes were primarily required to; a) complete crossing feasibility assessments including selection of the most suitable construction method based on the ground conditions; b) meet the permitting requirements of the MTO and railways; and c) inform the civil design (ie. pipe supports, foundations, etc) at station locations. In addition, some boreholes were utilized to measure and monitor ground water levels prior to and during construction.
Project management	3.0	Additional engineering consultant project management costs, related to the protracted schedule, and incremental resources required to manage the additional design scope.
Specification development and procurement support	1.8	Development of 48 technical specifications, related to materials and construction, as well as Material Requisition (MR) development and technical review of vendor RFP technical documentation.
Construction support	1.6	Engineering support during the extended construction phase of the Project. This included evaluation and engineering of field changes required to execute the Project.
Miscellaneous	0.4	
Total category	16.6	

4.3. Land

Sub-Category	Variance ($MM)	Comments
Permanent easement	($16.2)	Savings are attributable to Infrastructure Ontario land costs that were 25% less than estimated.

Landowner resolutions	(2.8)	Costs incurred for property damage and business interruption were lower than estimated. This is attributable to the care and diligence taken by the contractors when working near affected businesses and homes.
Temporary work space	6.5	The overage in temporary work space (TWS) costs are due to the Project acquiring as much TWS as was reasonably possible given the constraints of the corridor(s) that the pipeline is located in. In some instances this was still insufficient and additional TWS was requested from agencies during construction. Maximizing the TWS reduced congestion on the right of way, provided more room for stockpiling spoil, and reduced the need to temporarily store it off the right-of way. While difficult to quantify, the cost to maximize the TWS was certainly offset by a reduction in the contractor's base lay price. This was a learning from the Ottawa Reinforcement Project.
Total category	($12.5)	

4.4. Materials

Sub-Category	Variance ($MM)	Comments
Currency	5.9	Pipe price variance attributable to the reduction in the Canadian vs. US dollar between the time of estimate and the time of payment for the pipe, which is in USD.
Pipe quantity	2.7	Pipe quantity increased by 3,700 m. This was necessary to provide sufficient contingency pipe, including a provision for two failed HDD's. The amount of pipe also increased due to an 88% increase (from 70 to 132) in the actual number of induction bends purchased for the final design relative to the number originally estimated.
Stockpiling and storage	4.3	Stockpiling and pipe storage costs that were not uniquely identified in the original cost estimate.
Miscellaneous	0.4	
Total category	13.3	

4.5. Mainline Construction

Sub-Category	Variance ($MM)	Comments
Bid to estimate	102.6	As discussed in Section 3.1.1.
Construction complexity	30.6	Additional shoring costs as discussed in Section 3.3
Permit delays	37.5	The contractor requested additional payment of $81.5 MM under the contract for incremental costs associated primarily with the negative impacts caused by the EGD's delay in obtaining permits. EGD recognized that its delay in obtaining permits had negatively impacted

		the schedule and the contractor's ability to execute the work in an unfettered manner. However, it argued that the contractor's underestimation of the work complexity and failure to properly plan the work were also contributing factors, neither of which are compensable events. Through negotiation, EGD agreed to compensate the contractor an amount of $30 MM, 64% less than the initial request, for its contribution to the hardship caused by the permitting delays. The Company's decision to proactively resolve the dispute in order to maintain a positive working relationship with the contractor, for the betterment of the overall Project, is consistent with expert opinion on construction disputes[15]. EGD incurred an additional $7.5 MM in costs related to the permit delays. Some of these were paid prior to the contractor's request for additional compensation and some were conditions of the compensation settlement. These costs included: • Standby payments to the contractor in the winter of 2015 due to a lack of available work ($1.4 MM) • Work acceleration in April 2015 to meet landowner commitments for work completion ($1.5 MM). This included work at the driving ranges on both the east and west sides of the Highway 404 HDD crossing, necessary to allow them to open their golf operations as soon as possible in the spring and mitigate additional loss of business claims. • Incremental costs (ie. night shift premiums, lights, direct supervision, mechanic, and paramedic costs) to implement a night shift bore crew, beginning in September, 2015, to accelerate schedule ($1.4 MM). • An incentive payment awarded to the contractor for achieving a February 15, 2016 milestone to have Segment A ready for hydrotesting ($1 MM). • Payment for the contractor's indirect costs to extend field support after February 15, 2016 solely for hydrotest support activities and final tie-ins ($2.1 MM).
Construction complexity	16.9	Construction challenges primarily related to; a) ground conditions that differed from the geotechnical evaluations, primarily at bore and HDD entry and exit locations, or; b) changes made to resolve permitting or stakeholder issues. This includes the: • Addition of the Leslie Street Direct Pipe due to flowing sand conditions that continually seized the boring augers[16] ($4.6 MM). • Addition of the Lisgar-Meadowbrook Direct Pipe due to flowing sand conditions that prevented the excavation of a stable bore pit[17] ($4.9 MM).

[15] EB-2016-0152, Exhibit M1, pages 64 and 65
[16] Pictures on page 7 of Appendix J
[17] Pictures on pages 25 and 26 of Appendix J

		• Addition of an HDD to avoid a conflict with the Torbram Road reconstruction ($2.6 MM). • Addition of an HDD as the only way to align York Region and TRCA on the West Don River crossing method ($1.4 MM). • Short water main relocation and casing installation at Argentia Road, required by Peel Region as a condition of allowing us to cross over their water main[18] ($0.9 MM). • Relocation of Airport Road alignment, crossing under the existing NPS 36 integrity main, due to post-permitting retaining wall/parking lot construction ($0.9 MM). • Procurement of special rock tooling equipment[19] required to overcome difficult ground conditions at the Highway 407 Horizontal Directional Bore ($0.5 MM). • Removal and subsequent replacement of a short section of the Don Valley line to allow for a short section of parallel pipeline construction beneath it ($0.2 MM). • Installation of an 80" steel casing under the pipeline at German Mills Creek, required by York Region to enable the easy replacement of their sewer in the future ($0.2 MM).
Scope changes	12.2	This includes situations where the contractor was requested to perform additional work that was not clearly defined in the scope of work documents. This included: • Longer and sturdier bridge structures required to meet permitting requirements[20] ($3.2 MM). • Additional costs to provide secondary isolation at several tie in points, thereby providing an additional layer of protection for worker safety ($1.3 MM) • Additional redressing costs ($1.2 MM) • Additional hydrovacing for sub-surface utilities and infrastructure either; a) not identified by the agency circulation and therefore missing from the construction drawings[21], or b) required as a condition of the permit ($0.8 MM). • Additional abrasion resistant over-coating (ARO) of incremental HDD pipe required to accommodate additional drills and added length caused by HDD field changes ($0.8 MM). • Total costs associated with a large number of small changes each under $0.3 MM ($7.5 MM). • Offsetting credits of $2.6 MM received from the mainline contractor, primarily for tie-in work transferred to the facilities contractor and avoided base lay work where the construction method was changed from open cut to bore.

[18] Pictures on pages 24 and 25 of Appendix J
[19] Picture on page 28 of Appendix J
[20] See picture of temporary bridge at Spring Creek (Page 18 of Appendix J) as an example
[21] See picture of hydrovac search for 7 unidentified HONI cables at Fletchers Creek (page 22 of Appendix J) as an example

Weather	7.4	Non-productive time due to wet weather shutdowns. Rather than having the contractor price weather risk into their Base Lay price a decision was made to include a General Contract provision to compensate the contractor for the actual weather delays that they experienced. Unfortunately, the construction period from January 1, 2015 to March 31, 2016 experienced 12% more rain days and 27% greater rainfall than average for the GTA[22]. The spring of 2015, during mainline start-up, was particularly wet with 29 more rain days and 164.6 mm (6.5 inches) more rain than average.
Total category	207.2	

4.6. Horizontal Directional Drilling

Sub-Category	Variance ($MM)	Comments
Bid to estimate	($22.1)	As discussed in Section 3.1.2. This includes $3.8 MM savings in the bid to estimate plus the $18.3 MM failed drill provision.
Construction complexity	8.2	The Project did not experience any outright drill failures, but did have to extricate 404 m of pipe installed at Bayview Avenue due to a long dent believed to be caused by a rock falling into the hole during pullback[23]. A new pull string was welded and pulled into the hole after reconditioning it to a slightly larger size. EGD did not compensate the HDD contractor for this re-work but did have to compensate the Mainline contractor for pipe preparation and support activities. Additional examples of HDD construction challenges are as follows. • The Credit River Direct Pipe[24] failed its first attempt after encountering a wood obstruction approximately 11 m into the drill. This was considered an unforeseen ground condition and the HDD contractor was compensated $1.5 MM for additional costs associated with extracting the Tunnel Boring Machine (TBM) and waiting to begin the second drill attempt, which was successful. The mainline contractor was also compensated $2.2 MM to support the recovery efforts, including excavating to remove the obstruction and backfilling the hole with unshrinkable fill. • The Finch-Claireville HDD[25] encountered two failed pullback attempts before a successful third attempt. In both cases the pipe became stuck approximately 150 m into the pullback and had to be extricated from the hole. The HDD contractor absorbed all but approximately $0.3 MM of these costs but

[22] Average monthly rainfall data from *http://www.toronto.climatemps.com/precipitation.php* and actual monthly data during construction from *https://www.worldweatheronline.com/toronto-weather-averages/ontario/ca.aspx*
[23] Picture on page 36 of Appendix J
[24] Pictures on pages 31 and 32 of Appendix J
[25] Pictures on pages 33 and 34 of Appendix J

		compensation of $1.7 MM was paid to the mainline contractor for its support activities related to the pipe extractions and three pull attempts. • The East Don HDD[26] was extended approximately 289 m to the west to include the East Don Trib 1, which was initially going to be an open cut crossing, at a cost of $1.0 MM. This eliminated environmental concerns associated with damming the tributary for an open cut crossing, but more importantly it avoided the need for the permitting and construction of a costly engineered road on Highway 407 property which was required to construct the crossing. • An aggregate amount of $0.8 MM was paid to the HDD contractors for standby time caused by various delays at five of the 14 HDD locations.
Scope changes	2.0	• Several HDD's required the use of cranes to achieve the proper entry angle for the pullback string at a total cost of $1 MM paid to the mainline contractor. • Proximity to commercial receptors required the installation of sound barriers[27] at the Pomona and Finch-Claireville HDD's at a total cost of $0.6 MM paid to the mainline contractor. • The repair of sinkholes that developed post pullback at the Mavis Road and Bathurst Street HDD's cost a total of $0.2 MM to remediate. • Due to an inadvertent return at the Pomona HDD entry, the drill profile was changed to add depth and a wash-over casing was installed. Compensation of $0.2 MM was paid to the HDD contractor to implement these measures which were effective in preventing a reoccurrence of the inadvertent return.
Total category	(11.9)	

4.7. Facilities Construction

Sub-Category	Variance ($MM)	Comments
Bid to estimate	14.7	As discussed in Section 3.1.3.
Permit delays	3.1	This extension was primarily caused by a series of events that started with the delayed completion of the Finch-Claireville HDD (which was set up in the same location required for the two CNR bores into Albion Station) from March 14 to June 10, 2015. The HDD delay was due to slower than expected production through the 1.2 km of bedrock and two failed pullback attempts. Schedule challenges were compounded by delays in obtaining

[26] Pictures on page 37 of Appendix J
[27] Picture on page 36 of Appendix J

agreements/approvals between EGD, TCPL, City of Toronto, and CN for a temporary bridge[28] over the CN tracks on Indian Line Road. This bridge was required because the maximum allowable load for the City of Toronto's existing Indian Line Bridge was insufficient to support TCPL and EGD's movement of heavy equipment and materials to the Albion Road station site.

The final approval was obtained from CN on July 3, 2015 and construction and certification of the bridge was completed on July 24. These delays pushed back the start of the extensive sheet pile shoring[29] for the NPS 42 Albion inlet and NPS 36 Albion outlet crossings of the CNR tracks, which in turn delayed the bores. Because the enormous bore receiving pits were located in conflict with a majority of the facilities to be installed at Albion Station, it was the first week of November before crews were fully mobilized to start station construction. As a result, the majority of construction work at Albion Station was completed through the winter months, resulting in the following additional costs.

- Heating and hoarding, lighting, and snow removal ($0.5 MM).
- Productivity impacts due to cold weather ($0.4 MM).
- Civil contractor premiums - ie. mud mats, winter concrete, extra granular, Sunday work, travel allowances ($0.3 MM).
- Indirect costs for contractor project management/supervision and site office trailers/facilities due to the 5 month schedule extension ($1.6 MM).

In an effort to mitigate the schedule impacts caused by the bore and temporary bridge permitting delays, EGD worked with both the facilities and mainline contractors to execute the following mitigation strategies.

- Built a surplus of prefabricated station sections[30] for faster installation once the site became available.
- Segregated the site to avoid health and safety concerns, allowing the installation of buildings in parallel with the bore work.
- Transferred ownership of the deep bore pits and shoring removal from the mainline contractor to the facilities contractor, allowing immediate access to start facilities construction once the bore pipe was installed[31].
- Added shifts and overtime to make up schedule.
- Moved the NPS 42 hydrotest location to the north side of the CNR tracks and used pipe pre-tested to 100% SMYS for the crossing,

[28] Pictures on page 42 of Appendix J
[29] Pictures on pages 13-15 of Appendix J
[30] Picture on page 44 of Appendix J
[31] See page 43 of Appendix J for picture of facilities contractor tie-in of Albion Station outlet piping to end of bore pipe

		thereby decoupling the backfilling of the south bore pit within the station compound from the hydrotest schedule.
Scope changes	7.8	This includes situations where the contractor was requested to perform additional work that was not clearly defined in the scope of work documents. The primary drivers of these changes were; scope transfer from the mainline contractor to the facilities contractor to optimize work flow (\$1.8 MM), design development and modifications (\$2.8 MM), material quality issues (\$0.9 MM), unforeseen site conditions (\$0.2 MM), other miscellaneous (\$2.1 MM).
Total category	25.6	

4.8. Construction Support

Sub-Category	Variance (\$MM)	Comments
Third party support	8.8	Time dependent third party costs experienced an overage due to the five month schedule extension. These included: • Pipeline and facility inspection services (\$3.5 MM). • Non-destructive examination (NDE) services to confirm weld integrity (\$4.4 MM). • Field survey services to stake the pipe centerline and prepare as-built records of its permanent location (\$0.9 MM).
Testing and drying	7.3	In September of 2015, the mainline contractor was requested to provide a cost to hydrotest and dry the pipelines. Their cost exclusive of water management, which is the greatest logistical challenge for any test, was \$15.6 MM. Due to the high price, a competing quote was requested from a reputable testing company. This company's quote was \$8.5 MM, with an additional \$2.5 MM from the mainline contractor to provide equipment and labor for test and drying support activities. The total price of \$11.0 MM was \$4.6 MM less than the mainline contractor's and offered several benefits related to schedule. The testing company's plan included testing and drying the pipelines in five shorter segments, as they were completed, in order to preserve schedule. It also included a comprehensive water management plan that involved the construction of large "lake tanks" to hold the test water[32]. This had several benefits including being able to control flow rates during fill and discharge. By doing so the Project was not constrained by permit conditions related to fill rates from hydrants or discharge rates to the natural environment. This was a learning from the Ottawa Reinforcement project, which experienced delays because of restrictions on being able to discharge the test water directly from the pipeline to the environment. The tanks also allowed the same water to be used to test each half of Segment A and each half of Segment B thereby providing an environmental benefit.

[32] See page 52 of Appendix J for picture of Segment B lake tank and page 53 for Segment A lake tanks

		Final testing and drying costs of $11.3 MM were in line with the contractor(s) proposal of $11.0 MM but were above the cost estimate of $4.1 MM. The estimate included 46 days for testing and drying of all the pipelines, whereas the testing contractor's actual duration was 74 days or a 61% increase. A breakdown of the cost overage is as follows: • Mainline contractor test support ($0.9 MM) • Lake tank construction and associated civil work ($1.7 MM) • Additional testing and drying costs due to the greater number of testing/drying days as well as variances in the crew/equipment mix and rates ($3.4 MM) • Costs attributed to heating for winter test conditions ($1.3 MM)
Construction monitoring	4.4	Unanticipated costs required by agencies for monitoring of their infrastructure during construction. This included: • Settlement monitoring of highway and railway crossings, including the installation and removal of the settlement points and report preparation ($3.5 MM). • Vibration, settlement, and tilt monitoring of hydro transmission towers in proximity to the pipeline alignment ($0.5 MM). • Railway flagging at pipeline crossing and access locations ($0.4 MM).
Miscellaneous	4.3	Various costs as follows. • Rig mats purchased directly by the Project, rather than the mainline contractor, to enable HDD site preparation to begin in December, 2014 ($1.4 MM). • Indirect costs to support EGD field employees - ie. trucks, PPE, site office equipment and supplies ($0.6 MM) • Contaminated soil clean-up ($0.6 MM). • Permit acquisition costs paid to agencies ($0.6 MM) • Decommissioning and reclamation of groundwater monitoring wells ($0.4 MM) • Various additional indirect costs ($0.7 MM).
Total category	24.8	

4.9. <u>Commissioning and Start Up</u>

Sub-Category	Variance ($MM)	Comments
Third party support	0.5	Incremental cost to hire a third party contractor with expertise in the commissioning of large scale station facilities. The decision to utilize a dedicated, knowledgeable commissioning contractor, augmented with EGD labour, was made to compress the commissioning schedule in order to meet the already delayed in service date. These third party contractor costs were offset by a $0.5 MM savings in internal

		commission labour included in the Project Management estimate.
Segment B gas investigation	2.4	Cost incurred to investigate the source of gas detected shortly after energization of Segment B. This involved isolating and re-testing a section of the pipeline with nitrogen and helium, and performing sub-surface monitoring to test for the presence of pipeline gas. These activities ruled out Segment B as the source of the methane.
In-line inspection	1.6	Cost incurred for baseline in-line inspections of Segments A and B.
Total category	4.5	

4.10. Interest During Construction

The $5.2 MM variance in IDC is attributable to the extended Project duration and increased cost relative to the original schedule.

5. COST BENCHMARKING AND VALIDATION

The actual construction costs are $847.4 MM[33] compared to the estimated cost of $667.4 MM.

The estimate and the actual costs have been compared with various benchmarks before and after construction.

The estimate was based on a bottom up approach that was then verified using:

- a high level cost per meter estimate provided by a reputable pipeline contractor.
- a comparison to the final Portlands Energy Centre ("PEC") cost for the NPS 36 pipe installation completed in 2008. The GTA Project estimate of $12 MM per kilometer was approximately 70% higher than the $7 MM per kilometer cost for PEC.

Both of these secondary checks supported the sufficiency of the cost estimate.

The Company has discussed the potential of variance during the proceeding[34]

> *"…While the contingency and escalation models account for some portion of these risks, variability in the final cost outcome is almost a certainty. Inclusive of contingency, which is expected to be spent, there is equal probability that the final project costs will be over or under the estimate…"*

and kept the Board apprised of the projected difference during and after construction[35].

The unfavorable variance is less than the upper end of the AACE[36] expected accuracy range of +30%. It is also within the range of possible outcomes[37] defined by the cost probability distribution curve that supported the initial forecast of $667.4MM. Please refer to Appendix A.

The unfavorable variance is also less than TCPL's 37% overage for the NPS 36 Kings North Connector project, for which TCPL reported a final cost of approximately $310 MM[38] compared to their upwardly revised estimate of $227 MM[39]. Kings North is an excellent comparator of cost performance as it was constructed in a similar urban environment as the GTA Project at around the same time.

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[33] Includes forecasted costs of $1.0 MM to completion
[34] EB-2012-0451 Transcript Volume 9 page 137
[35] April 1, 2015 Stakeholder day Presentation; EB-2015-0122, Exhibit D, Tab 1, Schedule 2; EB-2012-0451 June 30, 2015 letter; EB-2012-0451 November 6, 2015 letter; March 30, 2016 Stakeholder Day Presentation; EB-2016-0142, Exhibit D, Tab 1, Schedule 2; EB-2017-05-09, Exhibit D, Tab 1, Schedule 2.
[36] AACE International Recommended Practice No. 18R-97 "Cost Estimate Classification System – As Applied in Engineering, Procurement, and Construction for the Process Industries"
[37] Enbridge's Cost Modelling and Contingency Assessment Process included as Appendix A
[38] Page 4 of TCPL Fourth Quarter and Year-End 2016 Financial Results NewsRelease dated February 16, 2017 stating "In fourth quarter 2016, we placed in service the approximate $310 million Kings North Connector …".
[39] Section 7.3 of NEB Reasons for Decision GHW-001-2014

In KPMG's performance benchmarking, the GTA Project was compared against four other projects and KPMG concluded that[40]

> *"In benchmarking the performance of the EGD GTA Project, on a cost per kilometer of pipeline the GTA Project is relatively favourable with the benchmark average, particularly when removing the costs related to the facilities."*

[40] KPMG Assessment Report, page 21 included as Appendix K

6. LESSONS LEARNED

6.1. Cost Estimating Process

The GTA Project, given its complexity, was a significant departure from typical large diameter pipeline projects that are built in much less constrained environments with minimal conflicting infrastructure. With a lack of applicable reference cost data, and limited design definition (10-40% for a Class 3 estimate), the use of standard estimating tools, assumptions, and Enbridge's experience failed to accurately quantify the incremental cost risk associated with the GTA Project's complexity.

In order to mitigate the risk of cost overages on future large scale projects with similar scope to the GTA the Company will certainly utilize the reference cost data obtained from the Project, but it will also consider the following:

i. Utilizing a higher confidence level than P50 when using an estimate with limited design definition; or,

ii. Preparing a higher class of estimate provided that time permits and there are mechanisms in place for the Company to recover the incremental development costs. A Class 2 estimate (30-75% design definition) would provide sufficient design detail to obtain reliable contractor bid estimates for purposes of establishing the contract value, which is the single largest cost component of any major pipeline project.

6.2. Resources

Based on the GTA experience, execution on future large projects could potentially be improved by:

i. Including a subject matter expert dedicated to the oversight of the contractor's boring plan and execution.

ii. Including geotechnical engineering expertise on the project team, whose key responsibility would be to interpret the results of the geo-tech program and identify areas of potential concern where additional investigation may be required. This individual would work very closely with the boring subject matter expert as referenced above.

iii. Ensuring that critical project functions, such as permitting, land, and legal, have dedicated project team members to prevent a division of priorities among several projects from negatively impacting the timely completion of project deliverables.

iv. Having a dedicated Project Scheduler for both the Company and contractor located in the field, providing pro-active real time information to the construction management team so that areas of concern can be identified and addressed in a timely manner.

v. Local or insourcing the pipeline survey and drafting functions to provide greater control and improve the turnaround time on drawing changes requested by, and re-issued to, the permitting agencies.

vi. Embedding a greater number of engineers at the Engineering Consultants office to monitor their progress and quality as well as to act as a conduit for the timely resolution of technical questions.

6.3 <u>Scheduling and Constructability</u>

i. Include a greater focus on the contractor's scheduling capabilities, particularly as it relates to the use of Enbridge's preferred software, in the pre-qualification process.

ii. For complex projects, require the contractor to prepare a detailed crossing plan and schedule for submission with the RFP. This would include sufficient detail to validate their cost and schedule assumptions related to shoring requirements, boring methods/techniques, and durations.

iii. Where project rationale and benefits allow, consider phasing project to mitigate constraints on construction and permiting resources, both internal and external. However, this may not reduce overall project cost due to substantial equipment and manpower mobilization and demobilization associated with large scale projects. This must be evaluated on a case by case basis.

APPENDIX A

Enbridge Cost Modelling and Contingency Assessment Process

2017-06-30, GTA Project - Post Construction Financial Report, Appendix A

Cost Modelling and Contingency Assessment Process

Enbridge's Major Projects Group uses a contingency model that accounts for both systemic and project specific risks. Systemic risks are quantified using a parametric model that was developed using industry research and data as per AACE[1]. This is then combined with the project specific risk analysis that uses a Monte-Carlo cost simulation. The output correlates the total project cost, excluding escalation and interest during construction (IDC), with the probability of over or under-running the estimate.

Systemic risks are those that could be experienced by any and all projects. Typical factors considered as systemic risks include the degree to which new technology is being applied, complexity of the project, level of project scope definition, and quality of the source information.

Project specific risks result from attributes, conditions, activities and characteristics that are unique to a single project. GTA project specific risks with the greatest contribution to contingency were; a) construction delays due to extenuating circumstances magnified by the highly urban construction; b) seasonal watercourses planned for isolated open cut being forced to HDD's; c) bridge access to Albion station not meeting construction requirements; d) higher drill failure ratios than expected; e) re-routing of Langstaff Road between Yonge and Bayview; and f) historical resources or archaeological findings discovered during construction. All of these project specific risks except (d) were realized.

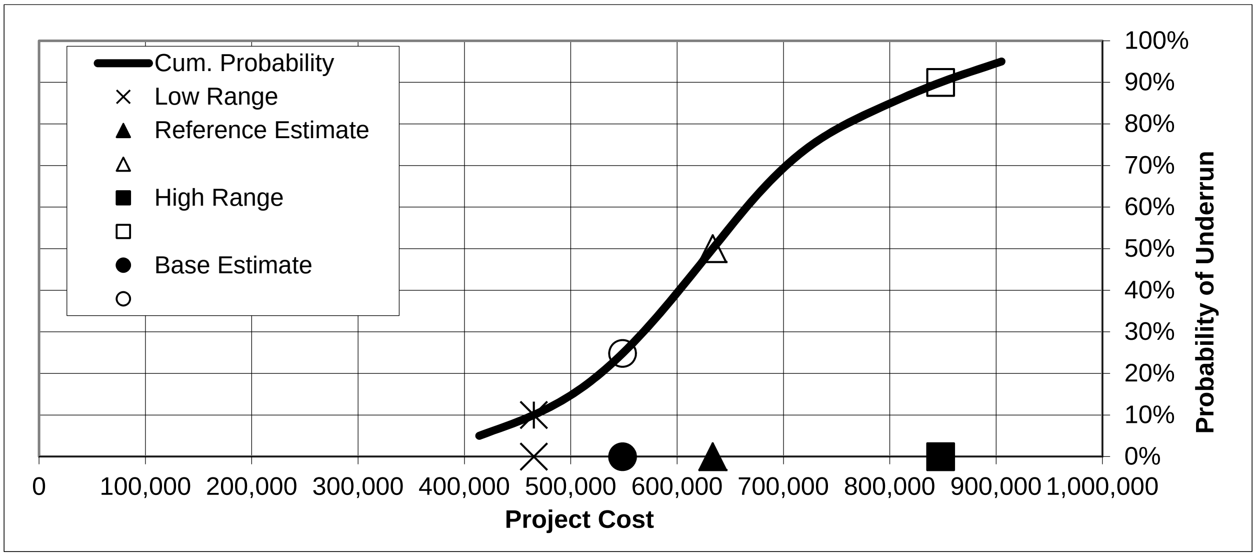
The model provides a probabilistic estimate (i.e. cost distribution curve) based on the identified project risks, their concurrence probability and potential impacts. Enbridge typically authorizes funding for projects at a P50 confidence level, which has been validated by a cost accuracy analysis of actuals to estimates for Enbridge's portfolio of completed projects. The P50 represents the amount of contingency required to produce a capital cost estimate that has an equal chance of an over or under-run. Enbridge calls this the reference estimate and the contingency is simply the difference between the reference and base estimate.

The shape of the probability curve is determined by the class of estimate[2]. As the project definition and class of estimate improves, the distribution of the curve becomes "tighter" with less variation between the minimum and maximum costs. It therefore follows that for an equivalent confidence level the contingency for a Class 2 estimate (30-75% detailed design) will be less than for a Class 3 estimate (10-40% detailed design). However, for the same class of estimate the contingency is driven by the confidence level ("P") selected and a P90 will have a larger contingency than P70, which will have a larger contingency than P50.

Normalizing the GTA Project's P90 of $847.8 MM to remove Buttonville and Ashtonbee Stations (decrease of $22.7 MM), and include IDC and escalation (increase of $51.2MM), gives a P90 value of $876.3 MM. The actual construction costs of $847.4 MM are less than this High Range predicted by the GTA cost model.

[1] AACE Recommended Practice 43R-08: Risk Analysis and Contingency Determination using Parametric Estimating
[2] AACE uses a lower value to denote a better estimate, with a Class 1 being the most mature and a Class 5 the least

GTA Project Cost Probability Curve



ESTIMATE SUMMARY			
	Estimate ($MM)	Confidence of Cost Under-run	Variance to Reference
Base Estimate	548.7		
Contingency	84.5		
Reference Estimate (P50)	633.2	50%	
Low Range (P10)	465.3	10%	-27%
High Range (P90)	847.8	90%	+34%

APPENDIX B

Pipeline Permits Received by Agency by Month

PIPELINE PERMITS RECEIVED BY AGENCY BY MONTH

Month	Regions			Cities					Railways						Government Agencies			Conservation Authorities			Foreign Pipelines				Private	Total	Percentages	
	Peel	York	Halton	Toronto	Markham	Vaughan	Brampton	Mississauga	CNR	CPR	Metrolinx	OBRY	TTC	Magna	MTO	MNR	MOE	TRCA	Credit Valley	Halton	TCPL	Enbridge	TNPL	NEB 24	Easements[1]		By Month	Cumulative
Oct-14		1																				1				2	0.8%	0.8%
Nov-14		1		1														1					1		1	5	2.1%	3.0%
Dec-14	1			2		1		2					1		1		4		3						2	17	7.2%	10.2%
Jan-15	1	1			2		1								4	2		1		1	1				1	15	6.4%	16.5%
Feb-15	1	1			1			1		2		1			4											11	4.7%	21.2%
Mar-15	4	2		1	1		3		2						28			16		4	1				6	68	28.8%	50.0%
Apr-15	6	1			1		2		1						21			9	1	1	10					53	22.5%	72.5%
May-15	3		1	1	1		3		5						4			8	4	2	2			1	5	40	16.9%	89.4%
Jun-15	2						1			1	2							3		1						10	4.2%	93.6%
Jul-15	2						1	1	2									3								9	3.8%	97.5%
Aug-15		1												1				2								4	1.7%	99.2%
Sep-15																		1								1	0.4%	99.6%
Oct-15																										0	0.0%	99.6%
Nov-15																										0	0.0%	99.6%
Dec-15	1																									1	0.4%	100.0%
Total	21	8	1	5	6	1	11	4	10	3	2	1	1	1	62	2	4	44	8	9	14	1	1	1	15	236	100.0%	

1. Excluding Condor (signed July, 2016) and Angus Glen (signed Nov 24, 2016) developers

APPENDIX C

Consultation Timeline with Permitting Agencies

HONI CONSULTATION TIMELINE (2011 – 2015)

2011-12

- **Nov 21/11** – Pre-Consultation meeting at Hydro One Network Inc's (HONI) Markham office with HONI, IO and GTA Project
- **Apr 11/12** – Pre-Consultation meeting at HONI's Markham office to discuss proposed project and route.
- **Apr 25** – Received letter from HONI Real Estate confirming a preference for Jonesville Station to be expanded at the current station site.
- **May 2** – Pre-consultation meeting with Town of Markham and HONI Real Estate to discuss proposed GTA Project.
- **May 28** – Met to discuss HONI and IO land easement/TWS requirements and process.
- **Jun 14** – Response from HONI Asset Management/Engineering ("AM") acknowledging the preferred route for the GTA Project and recommending that EGD work directly with the Real Estate group as the main point of contact.

2012

- **Jul 9** – Met with HONI at the existing Jonesville Station site to review the proposed station expansion.
- **Jul 13** – Met HONI and IO at HONI Markham office to follow up on action items from the May 28, 2012 meeting and discuss status of EGD access permits on HONI/IO lands to perform due diligence work in preparation for the easements.
- **Aug 13** – Request from EGD for IBM Substation and foundation information. Response from HONI that request was sent to HONI's System Planning group to provide the information.
- **Sep 20** – GTA Project update meeting with HONI and IO at HONI Markham office. HONI equipment loads/info provided by System Planning.
- **Oct 10** – Met at HONI's Markham office to discuss GTA Project proposed route alignment and offsets from HONI structures.

2013

- **Jan 18** – Met with HONI and IO at HONI Markham office.
- **Feb 12** – Met at EGD offices with HONI and Bell to discuss the relocation of the 4 HONI conduits north of 14th Ave (3 empty conduits & 1 with Bell fibre).
- **Feb 25** – Met at EGD offices with HONI, IO, MTO, 407, MAH to discuss proposed route in IO and HONI corridors.
- **Feb 27** – EGD forwarded to HONI the HDD drawings for Beaver Creek/Hydro Towers n/o 14th Ave and the Steeles Ave/IBM Sub-station. Information on roadway crossing methods between McNicoll Ave and 407 was also provided.
- **Mar 26** – Comments received from HONI Real Estate on the Class III alignment drawings and proposed pipeline location in HONI corridor between Miller/Rodick and McNicoll (Spread 1).
- **May 1** – EGD submitted alignment drawings to HONI Real Estate for the east/west pipeline sections (Spreads 2 & 3) for circulation and comments.

HONI CONSULTATION TIMELINE (2011 – 2015)

2013

- **May 2** – Met with HONI at their Markham office to discuss tower foundation depths and proposed pipeline location in HONI corridor.
- **May 13** – EGD submitted alignment drawings to HONI Real Estate for the north/south Buttonville Corridor (Spread 1) for circulation and comments.
- **May 17** – HONI forwarded Standard Conditions from Engineering for EGD to comply with on the GTA Project. Offsets from towers and AC/CP requirements need HONI approval.
- **May 28** – HONI forwarded a chart of horizontal clearances and vertical footing depths (from AM) for the Spread 1 right of way from Miller Rd/Rodick Rd (Markham) to McNicoll Ave (Scarborough).
- **Jun 27** – HONI forwarded comments on the drawings submitted in May 2013 for the proposed GTA Project pipeline in the Parkway Belt (Spread 2 and 3 - west to east sections).
- **July 12** – Meeting at HONI's Markham office with EGD and IO to provide an update on the GTA Project and follow up on some outstanding items and/or responses that EGD is seeking from IO and HONI.

2014

- **May 1** – Submitted easement R-Plans to HONI for review.
- **May 7** – EGD submitted updated alignment and profile drawings to HONI Real Estate for all 3 Spreads for HONI circulation and approval. These incorporated comments and revisions received from HONI.
- **Jun 19** – HONI provided approval for EGD's request to perform a non-destructive study of the HONI Tower foundations north of 14th Avenue where EGD is proposing to drill underneath.
- **Jul 16** – Approval request sent to HONI for work agreement to perform the fence alteration work around the Rogers (Fido) structure in HONI corridor just south of Denison to allow the space for the agreed proposed GTA Project pipeline on the east side of the HONI corridor.
- **Jul 31** – HONI provided initial comments on the open cut route on Spread 1, from the Field Tech and Land group. HONI confirmed the proposed alignment is with HONI AM group for review and approval.
- **Aug 12** – HONI confirmed that detailed comments on the proposed alignments will be provided within 2 weeks.

2014

- **Sep 2** – HONI Real Estate email with new comments from HONI AM that the proposed GTA Project alignment, communicated to HONI and revised based on HONI comments over the past 2 years, is now not valid due to conflicts with their future infrastructure plans.
- **Sep 8** – Met with HONI for an explanation of the recent changes and requirement for the GTA Team to redesign the Spread 1 alignment.
- **Sep 16** – Follow up meeting with HONI to review Spread 1 re-route alignments and for HONI to provide comments on Spread 2 and 3 alignments.
- **Sep 23** – Working session with HONI and GTA Team to review Spread 2 and 3 alignments and HONI requested changes.

HONI CONSULTATION TIMELINE (2011 – 2015)

2014

Sep 26
HONI provided feedback on the proposed Spread 1 re-route alignments and requested that EGD confirm alignment/clearance information prior to HONI approval. Provided update that HONI AM would have comments on Spread

Oct 16
Met with HONI and IO to discuss status of required land easements, process and timing.

Oct 24
Met with HONI to discuss the Spread 2 and 3 required re-routes.

Dec 5
Met to discuss pipeline alignments, AC mitigation and settlement monitoring requirements.

2015

Mar 11
Met to review and discuss proposed Jonesville Station upgrade, instrumentation buildings and above ground components. HONI expressed concerns about new above ground infrastructure under their wires. Also discussed IBM Sub-Station grounding grid clearance requirements.

Apr 7
HONI senior management advised EGD that expansion of Jonesville Station would not be approved and that EGD would have to find an alternate site.

May 25
Met to review and discuss the IBM Sub-Station grounding grid clearance requirements.

MTO/407 CONSULTATION TIMELINE (2012 – 2015)

2012

Feb 9

Pre-Consultation meeting at MTO's Toronto office. Met with MTO, 407 ETR and Transitway to discuss the project and proposed route and crossings.

May 3

Follow up meeting to discuss the project route and permission/approval requirements to conduct pre-engineering work (geotech, survey and SUE) within the vicinity of the MTO/407 infrastructure.

2013

Feb 25

Met with MTO, 407, Transitway, IO, MAH and HONI to review the proposed GTA Project route alignment and crossings.

Sep 4

Met with MTO, 407, Transitway at the MTO Toronto office to provide project updates and discuss proposed crossings, future Transitway projects and other MTO/407 proposed work.

Sep 17

Met to discuss the GTA Project pipeline alignment, and interactions with Transitway and 407 ETR (via SHMO) and the required permitting process.

Nov 20

Met to discuss MTO designated lands, 407 jurisdiction, Transitway, Brown Lands and set-back requirements. Provided project updates and discussed geotech borehole requirements for permitting.

2014

Apr 10

Met for project updates and follow-up/pick up of pre-engineering work permits.

May 7

Met to review 60% drawings/plans with MTO, 407, Transitway to identify and discuss all of the locations where the 407 Transitway could be impacted by the proposed pipe.

Jun 13

Met with MTO, 407, Transitway to provide project updates and discuss proposed alignment, crossings and temporary working space/access.

MTO/407 CONSULTATION TIMELINE (2012 – 2015)

2014

Aug 5

Met with MTO and 407 to provide project updates. 407 management informed EGD Project Team that a legal agreement between EGD and 407ETR is now required prior to any approval being granted for the proposed work.

Sep 30

Met with MTO, 407 and IO to discuss the lands owned by IO that are also considered MTO Lands, Transitway Lands, or 407 Lands, and correctly identify which properties will require Occupation Agreements, MTO permits or Encroachment Permits. Reviewed the permit process.

Oct 6

EGD received a sample/template agreement from 407ETR to review, revise (for the GTA Project proposed work) and submit to 407ETR for review/approval.

2015

Feb 26

Legal Agreement between EGD and 407ETR executed.

Mar 27

Met to discuss the clearance requirements for the future Transitway design at locations where the proposed pipeline will cross or is within the Transitway areas.

Nov 27

Site meeting to provide updates, review and discuss the HWY 407 Horizontal Directional Bore crossing.

YORK REGION CONSULTATION TIMELINE (2011 – 2015)

2011-12

Dec 14/11
Pre-Consultation meeting with York Region and the City of Vaughan at City of Vaughan offices. Discussed the GTA Project, proposed route and crossings.

Feb 13/12
Pre-Consultation meeting with York Region at York Region office. Reviewed the project's proposed route/alignment and crossings.

2013-14

Sep 19/13
Met with York Region to discuss GTA Project proposed route and required permits.

Oct 15/13
Met with York Region to review 60% design drawings in the area of the Bathurst Street Water main Replacement Project.

Apr 14/14
Met with York Region to review the 60% design drawings and obtain feedback.

Jun 20/14
Met with York Region to provide GTA Project updates and discuss hydrotest water and disposal of test water into sanitary sewers.

2015

Feb 10
Met to discuss the set-up of the Beaver Creek HDD relative to York Region's sewer and their follow up information requests. Also discussed crossings of York Region infrastructure in general, timing/priority, and the permit approval process/requirements.

Mar 5
Beginning of Weekly Working Sessions to review project status, schedule and upcoming crossings. Discussion on crossing drawings/documents for review and approval by York Region. (**Ongoing Mar 5 to Nov 6, 2015)**

Mar 11
Met with York Region management to provide GTA project updates (outside of the Weekly Working Sessions).

YORK REGION CONSULTATION TIMELINE (2011 – 2015)

2015

Jun 4

TRCA & York Region Meeting with EGD on West Don River. Met to discuss the proposed Isolated Open Cut crossing of the West Don River and the York Region infrastructure.

Jun 16

Met with York Region to review German Mills and West Don River proposed IOC crossings.

Oct 9

Met with York Region to discuss dewatering for the GTA Project.

Nov 6

Last of the Weekly Working Sessions to review project status, schedule and upcoming crossings. Discussion on crossing drawings/documents for review and approval by York Region. **(Mar 5 to Nov 6, 2015)**

PEEL REGION CONSULTATION TIMELINE (2012 – 2016)

2012

Feb 15
Pre-Consultation meeting with Peel Region at the Region's office. Discussed the GTA Project, proposed route and crossings.

Mar 1
Pre-Consultation meeting with the Regional Chair of Peel Region at their office. Reviewed the Project's proposed route/alignment and crossings.

Nov 28
Met with Peel Region at the Region's office to provide updates on the GTA Project. Reviewed the Project's proposed route, timing and current status.

2013

Jul 25
Met with Peel Region to provide updates on the GTA Project, discuss the permit approval process, required field meetings, and identification of additional Peel Region reps to be engaged.

Oct 16
Met with Peel Region to follow-up and to discuss the GTA Project proposed route/alignment, required permits, and the franchise agreement between Peel Region and EGD.

Nov 7
Attended the 2013 Utility Meeting to provide Project information, routing, schedule and updates for Peel Region and the other utilities.

2014

Apr 22
EGD and Peel Region touch point meeting. Provided updates on the GTA Project and discussed franchise agreement requirements and timing.

Jun 17
Met with Peel Region to review the 60% design drawings for feedback.

Jul 17
Met with Peel Region to discuss the GTA Project proposed alignment and possible road/site restrictions for the PanAm Games

PEEL REGION CONSULTATION TIMELINE (2012 – 2016)

2015

Mar 13
EGD and Peel Region coordination and project update meeting. Reviewed project alignment and Peel Region infrastructure crossing locations.

Mar 26
Met to review permit requirements for the GTA project.

Mar 30
EGD and Peel Region touch point meeting to discuss timelines for review and approval of crossing locations and easements.

2015

Mar 31
Beginning of Weekly Working Sessions to review project status, schedule and upcoming crossings. Discussion on crossing drawings/documents for review and approval by Peel Region. **(Ongoing Mar 31 to Jun 24, 2015)**

May 26
Working session with Peel Region to review and discuss individual locations where the 42" pipeline was crossing a Peel water main.

Jun 5
Met with Peel Region for follow-up discussion on proposals for the Argentia Road crossing, agreeing to extend the casing around the water main and install the pipeline over top of it using open cut construction.

2015-16

Jul 6/15
Site Meeting to review Argentia Road crossing of Peel Region water main.

Jan 8/16
Conference call with Peel Region for follow-up and approval status on the Peel water main casing work by EGD Contractor.

Apr 1/16
Site meeting to review construction status of Argentia Road casing work for existing Peel Region water main by EGD Contractor.

TRCA CONSULTATION TIMELINE (2012 – 2015)

2012-13

- **Jan 20/12** – Pre-consultation meeting with the Toronto & Region Conservation Authority (TRCA) to discuss the GTA Reinforcement Project.
- **Jul 26/12** – Pre-Consultation meeting at TRCA's head office to discuss the proposed Project and route.
- **Apr 29/13** – Attended TRCA monthly meeting.
- **Jun 4/13** – GTA Project overview and West Humber River Meeting.
- **Jul 25/13** – Met with TRCA to review the full scope of the GTA Project.
- **Aug 1/13** – TRCA Visit to Claireville Reservoir to discuss design, archaeology and ecology.

2013-14

- **Oct 18/13** – Met with TRCA to discuss GTA Project methodology.
- **Nov 12/13** – Met TRCA on site to review the EGD Regulation Facility at Jonesville and Eglinton Avenue.
- **Dec 6/13** – Met to review the crossing methods considered, regulatory process, Project update, easements/temporary work space and archaeology.
- **Jan 17/14** – Beaver Creek Site Visit.
- **May 27/14** – Met with TRCA to conduct a number of site visits for review and discussion.

2014

- **May 28** – Site visits to Dufferin and Centre Street (wetland and access route).
- **Jun 5** – Met with TRCA to follow up on comments, drawings, etc.
- **Jul 11** – Met at TRCA offices to review GTA Project restoration.
- **Aug 7** – Joint meeting with TRCA, MNR, and 407 to discuss the Project..
- **Oct 1&2** – Met to discuss Species at Risk (SAR) as well as the East Don and East Don Tributary 1 crossing set up.

TRCA CONSULTATION TIMELINE (2012 – 2015)

2014-15

Oct 8/14	Nov 4/14	Nov 7/14	Nov 28/14	Jan 23/15	Feb 26/15
Field visit to East Don and East Don Tributary 1 with MNR and TRCA.	Met with TRCA to discuss permit submissions. Discussed West Don crossing.	TRCA Executive Committee Meeting re GTA Project Claireville Reservoir crossing.	TRCA Meeting to discuss pipeline crossing under Claireville Reservoir.	Bramalea HDD Site Visit with TRCA.	GTA Project team meeting with TRCA Senior Leadership.

2015

Mar 4	Mar 9	Mar 26	Mar 31	Apr 9
Visited multiple sites re flumes.	Follow up meeting between EGD GTA Project Team and TRCA to review proposed crossings.	GTA Project Bi-weekly Meeting with TRCA Staff.	GTA Project Visitor Orientation - West Don site visit with TRCA.	GTA Project Bi-weekly Meeting with TRCA Staff.

2015

Apr 10	Apr24	May 5	May 7	May 14	May 14
TRCA Executive Committee Meeting.	GTA Project Bi-weekly Meeting with TRCA Staff.	Site Visit to Etobicoke Creek Tributary 3.	GTA Project Bi-weekly Meeting with TRCA Staff.	TRCA Markham Site Tour - introduced sites to TRCA conservation officer.	Etobicoke Creek Site Visit re bank stabilization.

TRCA CONSULTATION TIMELINE (2012 – 2015)

2015

Date	Event
Jun 4	Meeting to discuss the West Don River crossing with the TRCA and York Region.
Jun 16	Met TRCA to discuss German Mills Creek crossing.
Jul 30	TRCA site meeting for TW13 Site.
Aug 18	Met TRCA and conducted various site visits.
Sep 17	Met at GTA Project Construction office for Visitor Orientation followed by a German Mills Creek site visit.
Oct 27	Met TRCA to discuss Project restoration.

APPENDIX D

Conflicting Projects Requiring Design and/or Construction Mitigations

Conflicting Projects Requiring Design and/or Construction Mitigations

Item	Spread	Segment	General Location	Municipality	Owner	Description	Proposed Timing	Mitigation Result
1	1	B	Sheppard Ave	Toronto	Developer at 3220 Sheppard	New condo construction due east of Sheppard Ave tie-in and valves.	Spring 2015	Developer postponed construction until after GTA construction was complete.
2	1	B	South of Huntsmill Blvd (North leg)	Toronto	Hydro One Networks Inc	Proposed future buried 230 kva cable(s) identified after design completed and plans submitted for final approval.	TBD	The alignment and depth of the Steeles Ave HDD was revised to avoid future buried 230 kva cable(s).
3	1	B	South of Denison Rd	Markham	Hydro One Networks Inc	Proposed future buried 230 kva cable(s) identified after design completed and plans submitted for final approval.	TBD	The alignment and depth of the pipeline needed to be changed to west side of Hydro One tower line to avoid future buried 230 kva cable(s).
4	1	B	14th Avenue to Alden Rd	Markham	Hydro One Networks Inc	Proposed future buried 230 kva cable(s) identified after design completed and plans submitted for final approval.	TBD	The alignment and installation of the pipeline needed to be changed to a HDD to avoid future buried 230 kva cable(s).
5	1	B	South of Hwy 407 at Beaver Creek trib 1	Markham	Hydro One Networks Inc	Proposed future buried 230 kva cable(s) identified after design completed and plans submitted for final approval.	TBD	The alignment and depth of the Beaver Creek trib 1 HDD was revised to avoid future buried 230 kva cable(s).
6	1	B	South of Hwy 407	Markham	City of Markham	Planned reconstruction of Beaver Creek Trib 1 ditch to stop flooding on Rodick Rd.	Summer 2015	Based on additional information provided by the GTA Project the ditch reconstruction was redesigned and postponed to 2017.
7	1	B	East of Rodick Rd	Markham	City of Markham	Proposed future Miller Ave extension crosses Spread 1 south of Hwy 407.	TBD	Based on GTA input the road alignment is being reviewed and modified to account for the location and depth of GTA pipeline.
8	1	B	East of Rodick Rd	Markham	Miller Paving	Miller Paving's planned construction of a new storm water pond on the east side of Rodick Rd at Miller Ave, required as a condition of their proposed development in the area.	summer 2015	Based on GTA input the storm pond was relocated and postponed to coordinate with Item 6.
9	2	B	East of Rodick Rd	Markham	Beaver Valley Stone (8101 Woodbine Ave)	Beaver Valley Stone's site preparation for their new landscape yard - east of Rodick Rd.	2015	Beaver Valley Stone delayed site preparation/construction to eliminate conflicts with the GTA Project. This allowed Beaver Valley to refine their site proposal to match final GTA project reinstatement - completed 2016.
10	2	B	East of Woodbine Ave	Markham	Beaver Valley Stone (8101 Woodbine Ave)	Beaver Valley Stone's site preparation for their new landscape yard - east of Woodbine Ave.	2015	Beaver Valley coordinated site preparations during the GTA construction and the Woodbine bore was extended to avoid the new driveway alignment - site construction completed 2016
11	2	B	East of Woodbine Ave	Markham	MTO 407 Transitway	Proposed Woodbine/Rodick bus rapid transitway ("BRT") station.	TBD	The pipeline design was modified to accommodate the future transit station.
12	2	B	East of Woodbine Ave	Markham	Miller Paving	Miller Paving's proposed rock crushing plant sited in the utility corridor. The location would have straddled the GTA Project pipeline.	2015	Based on additional information provided by the GTA Project, Miller Paving redesigned the crusher siting to avoid the GTA pipeline and the York Region sewer - now proposed for summer 2017.
13	2	B	East of Leslie St	Markham	York Region	York Region's requirement to access their infrastructure to manage sewer flows to enable upgrades to their pumping station at Steeles Ave required overlapping work zones during the GTA Project construction.	Fall 2015	York Region and the GTA Project coordinated site access during the Leslie Street crossing.
14	2	B	West of Leslie St	Markham	MTO 407 Transitway	Proposed Leslie BRT station.	TBD	The pipeline design was modified to accommodate the future transit station.
15	2	B	West of Bayview Ave	Markham	Angus Glen Developments	Start of site clearing for the proposed high density condo development.	Fall 2015	Angus Glen delayed site preparation and clearing to 2017.
16	2	B	East and West of Essex Ave	Markham	Holy Cross Cemetery	Holy Cross Cemetery's submission to the City of Markham for a new Mausoleum. The proposed improvements required for the Mausoleum, including new drainage ditches, overlapped the GTA construction.	Summer 2015	The Cemetery delayed the start of construction until summer 2016.
17	2	B	East of Yonge St	Markham	Condor Developments	Start of site clearing for the proposed high density condo development.	2015	Condor delayed site preparation and clearing to spring 2016.
18	2	B	Yonge St	Vaughan	TTC	Proposed future Yonge Street subway with proposed station on the pipeline alignment.	TBD	TTC reviewed and coordinated our pipeline design with the preliminary subway design, to avoid future design conflicts. Subway timing has since been advanced - started in 2016.
19	2	B	Between Yonge St and Bathurst Rd	Vaughan	Hydro One Networks Inc	Proposed future high voltage transmission tower routing was identified after the pipeline design was completed and plans submitted for final approval. HONI also confirmed that the above ground valve could not be located under their existing or future power lines.	TBD	The alignment and depth of the pipeline needed to be changed to avoid the future hydro towers and move the valve to a clear location.
20	2	B	East Don River between Yonge St and Bathurst Rd	Vaughan	York Region	Planned lining and remediation of the East Don River trunk sanitary sewer.	2015	To avoid overlapping construction sites, York Region postponed their remediation work to 2016.
21	2	B	Bathurst St	Vaughan	OPP/IO	New OPP station proposed for the east side of Bathurst St south of Hwy 407.	2015	The GTA project required the OPP station site as an access point for construction. To avoid construction overlap the station construction was postponed until GTA construction was complete.
22	2	B	Bathurst St	Vaughan	York Rapid Transit	Design/construction of the new BRT at Bathurst St.	2016	The design for the BRT was coordinated with the design/installation of the GTA pipeline - construction starting 2017
23	2	B	Bathurst St	Vaughan	York Region Water	New watermain design/construction on Bathurst St.	2016	The design for the trunk watermain was coordinated with the design/installation of the GTA pipeline - construction started 2016
24	2	B	Centre St west of Dufferin St	Vaughan	York Rapid Transit	Design/construction for new BRT.	2015	The depth of the GTA pipeline was increased to avoid conflict with the BRT. Installation timing was also coordinated with BRT construction delayed to late 2016.
25	2	B	Between Keele St and Dufferin St	Vaughan	Metrolinx	Railway upgrades in preparation for all day train service on the Barrie train line.	2015	Metrolinx delayed the installation of signal improvements at this location until the GTA pipeline was completed - cable install started fall of 2015.

Conflicting Projects Requiring Design and/or Construction Mitigations

Item	Spread	Segment	General Location	Municipality	Owner	Description	Proposed Timing	Mitigation Result
26	2	B	Keele St	Vaughan	York Region	Proposed widening of the railway bridge/road on Keele Street north of Steeles Avenue.	2015	York Region revised their project schedule to delay the start of utility relocations for the road construction until 2016.
27	3	A	West of Hwy 427	Toronto	City of Toronto	Planned reconstruction of the Indian Line Road bridge in 2015.	2015	The City delayed the bridge remediation to 2017 at the earliest to accommodate the pipeline construction.
28	3	A	Goreway Rd	Brampton	City of Brampton	Design and construction of Goreway Drive/CNR overpass.	2015	The City construction schedule was revised to delay the start of utility relocations until 2016.
29	3	A	West of Airport Rd	Brampton	7900 Airport Road Development Inc	Proposed new subdivision and warehouse at 7900 Airport Rd adjacent to the pipeline alignment.	2014/2015	The landowner agreed to provide an easement and allow the pipeline construction to proceed prior to the final building construction. However, early construction of the warehouse, parking lot, and a retaining wall resulted in a field design change to realign the pipeline.
30	3	A	Torbram Rd	Brampton	Cities of Brampton and Mississauga andCNR	Torbram Road reconstruction involving a new underpass of the CNR tracks, temporary CNR track realignment, and a temporary Torbram Rd bypass.	2015 - 2020	To avoid the myriad of construction activity and coordination between multiple parties, the GTA Project changed the construction method to HDD to add depth and avoid the conflict.
31	3	A	West of Bramalea Rd	Brampton	Emerald Energy - an energy from waste owner	Emerald Energy's preliminary design for the location of a new energy from waste plant.	2016+	The GTA pipeline alignment was adjusted to enable the future EFW plant.
32	3	A	East of Tomken Rd	Brampton	TRCA	Proposed project for the naturalization of Etobicoke Creek.	2015	TRCA delayed their project until pipeline construction was complete.
33	3	A	East of Hurontario St	Brampton	Metrolinx	New LRT and maintenance facility proposed along Hurontario St.	2018	The pipeline design was modified to accommodate the future maintenance facility location and tracks in accordance with Transport Canada Order E-10.
34	3	A	East of Hurontario St	Brampton	MTO 407 Transitway	Proposed LRT station east of Hurontario St.	TBD	The pipeline design was modified to accommodate the future transit station.
35	3	A	East of Mavis Rd	Brampton	MTO 407 Transitway	Proposed LRT station east of Mavis Rd.	TBD	The pipeline design was modified to accommodate the future transit station.
36	3	A	Mavis Rd	Brampton	Bell Mobility	Bell Mobility's upgrading of the CP mitigation for their cell antenna mounted on the Hydro One tower at Mavis Rd.	2015	Bell waited until the GTA project was completed at Mavis Rd to install their deep grounding wells - completed fall 2015.
37	3	A	Financial Dr	Brampton	City of Brampton	Widening of the Hwy 407 bridge and Financial Drive south of Hwy 407.	2015	Brampton changed their construction schedule to construct north of Hwy 407 in 2015 and south of Hwy 407 in 2016 after pipeline construction was complete.
38	3	A	East of Mississauga Rd	Brampton	Hydro One Brampton (HOB)	Proposed construction of a new hydro line between Mississauga Road and 2nd Line W, south of Hwy 407, that conflicted with the GTA pipeline route.	2015	HOB avoided the GTA pipeline by realigning their proposed hydro line and changing the proposed construction timing to 2017.
39	3	A	East of Winston Churchill Rd	Brampton	City of Brampton	Proposed construction of a new Bram-West Parkway, running north-south between Heritage Rd and Winston Churchill Blvd. The alignment and design of the new road overlapped and conflicted with the GTA pipeline route.	2016	The City modified the design of the road and interchange to avoid crossing both the GTA pipeline and the existing 36" pipeline. They also delayed the start of construction to 2018.
40	3	A	East of Winston Churchill Rd	Brampton	MTO 407 Transitway	Proposed LRT station east of Winston Churchill Blvd.	TBD	The pipeline design was modified to accommodate the future transit station.
41	3	A	West of 10th Line	Mississauga	Land developer Prologis Inc	Proposed new warehouse on the west side of Lisgar Meadow Brook that overlapped the temporary construction area needed for the Lisgar Meadow Brook pipeline crossing.	2015	Prologis agreed to delay the start of the site preparation and building construction until 2016
42	3	A	East of 9th Line	Mississauga	Erin Mills Development	Design build offer for a proposed new building on the east side of 9th Line that overlapped the GTA pipeline construction area.	2015	Erin Mills delayed the start of the building construction until 2016.
43	3	A	9th Line	Mississauga	City of Mississauga	Proposed future underpass at the CP rail crossing just south of the pipeline alignment.	TBD	City of Mississauga had their consultant prepare an expected future vertical alignment for the road. The 9th Line pipeline crossing was then redesigned deeper to avoid conflicting with the future road underpass.
44	3	A	9th Line	Mississauga	Erin Mills Development/City of Mississauga	Construction of a turn lane on the east side of 9th Line, required for the Argentia Rd Subdivision - Phase 2, that overlapped the GTA pipeline construction area.	2015	Construction of the road turn lane was delayed to early 2016.
45	3	A	Hwy 407 between Hwy 401 and Derry Rd	Mississauga	MTO 407 Transitway	Proposed LRT station east of Hwy 407.	TBD	The length of the Hwy 407 pipeline bore was extended to accommodate the future transit station and tracks.
46	3	A	CP Railway between Hwy 401 and Derry Rd	Milton	Canadian Pacific Railway (CPR)	Proposed future third set of railway tracks at the CPR pipeline crossing west of Hwy 407.	TBD	The length and depth of the railway bore was increased to meet Transport Canada E-10 requirements for the third set of tracks.

APPENDIX E

Crossings with Permit Challenges

CROSSINGS WITH PERMIT CHALLENGES

Agency	# of Permits Affected
Peel Region	16
York Region	10
Toronto	2
Markham	7
Mississauga	1
Vaughan	2
Brampton	2
MTO	8
407 ETR	2
TCPL	1
CN	9
Metrolinx	3
TRCA	8
CVCA	1
CH	3
HONI	11
Private Landowner(s)	8
MEDEI	2
MNR	1
TOTAL	97

Crossings Affected by Permit Challenges		Description of Challenges	Agencies Involved		
	All Spreads/Segments				
1	Multiple Crossings (MTO Encroachment/407 Legal Agreement)	MTO required an encroachment permit (18 locations) for any location where the pipeline crossed under the controlled access highway or any road or ramp within 395 m of the highway. Fourteen of these locations required Highway 407 approval. Historically, Highway 407's approval has been included as part of the MTO encroachment permit. However, for the GTA Project Highway 407 requested an entirely separate legal agreement which was without precedent and required drafting and negotiation. This resulted in delays obtaining MTO's encroachment permits, which they would not issue until the 407 legal agreement was signed.	MTO	407 ETR	
2	Multiple Crossings (CN Peer Review)	At all 8 CN railway crossings, peer review of the CN Permit Package by Golder Associates led to additional time for permitting. This was not identified as a permit requirement by CN during earlier consultation in 2014.	CN		
3	Multiple Crossings (CN Flagging)	At 7 of 8 railway crossings, the schedule was delayed by at least two weeks due to CN's failure to provide sufficient flag people to allow the installation of settlement monitoring points (4 instances) and/or execute the track bore (6 instances). Flagging requirements were also inconsistent. Once the sacrificial casing was completely installed, some crossings were allowed to proceed with the pipe installation without flagging while others were not, thereby stopping construction.	CN		
	Spread 1 (Segment B)				
4	Steeles Ave/Huntsmill Blvd (N)	Due to HONI's last minute identification of future 230 kva cable requirements, the HDD drill had to be extended and the alignment had to be changed at the south end of the drill. HONI also required 3 metres of cover where we crossed their corridor. Last minute conditions for the IBM grounding grid were identified.	City of Toronto	HONI	
5	CN Alden	Crossing method changed to HDD and the alignment was shifted due to HONI's late identification of future 230 kva cable requirements, and grillage footing type on Tower 9. This required additional review by CN and HONI and extended the duration of monitoring requirements.	CN	HONI	
6	Alden Rd.	Crossing method changed to HDD and alignment was shifted due to HONI's late identification of future 230 kva cable requirements, and grillage footing type on Tower 9. This required additional review by City of Markham and HONI and extended the duration of monitoring requirements.	City of Markham	HONI	
7	Riviera Dr	Crossing method changed to HDD and alignment was shifted due to HONI's late identification of future 230 kva cable requirements, and grillage footing type on Tower 9. This required additional review by City of Markham and HONI and extended the duration of monitoring requirements.	City of Markham	HONI	
8	Beaver Creek Trib 1	Due to HONI's last minute identification of future 230 kva cable requirements, the HDD drill alignment was changed and the connection at the south end was also realigned, requiring 3 meters of cover where it crossed the HONI corridor. This required additional review by HONI and extended the duration of the monitoring requirements. York Region delayed the start of HDD to resolve issues related to the positioning of the entry rig relative to their sanitary sewer.	HONI	York Region	
	Spread 2 (Segment B)				
9	Beaver Creek Trib 2	Late reclassification during permitting as a Tributary on the East side, but not on the West side, affected the planning of construction and permitting for the Rodick Valve site.	TRCA		
10	Hwy 404	MTO/407 required extended duration of settlement monitoring. York Region required camera inspection of their sewer, locating of a sewer cut off wall that was never found, and settlement monitoring. MTO required an extra 1 metre depth for the future MTO transitway clearances.	MTO	407 ETR	York Region
11	Leslie St.	MTO required 2 m of extra depth for the future MTO transitway, storm water pond and parking lot west of Leslie Street. York Region required additional clearances, settlement monitoring, and camera inspection of two sewers. The close proximity of the pipeline to one sewer and a conflict with the golf driving range access road required the crossing to be lengthened.	MTO	York Region	
12	German Mills	This crossing was changed from a deep track bore to an open cut and realigned to avoid the 407 storm ponds. Delays were caused by challenges aligning York Region and TRCA on the proposed crossing method. TRCA conditioned their approval on York Region, who agreed to an open cut on the condition that an 80" casing was installed underneath the gas pipeline to enable a future sewer replacement. They also required inspections and settlement monitoring of their infrastructure. The realigment also required the permitting of two additional York Region watermain crossings as well as HONI approval.	TRCA	York Region	
13	Bayview Avenue	City of Markham (Parks Department) permit conditions for working near the Langstaff Woods trees required a pre-inspection, which resulted in changes to the HDD drill set up and a reduction of working space.	City of Markham		
14	Langstaff Road East	The secondary plan for Markham Gateway required a revision to this crossing, adding 1.0 m of depth to avoid a future watermain connection.	City of Markham	Private Landowner(s)	
15	CN Pomona	Landowner requirements for the future CN crossing bridge (part of the Markham Gateway development) contributed to the requirement for a deep HDD crossing. The adjacent cemetary's City of Markham site plan application delayed their approval of necessary temporary work space over concerns that it could complicate the site plan application for the new mausoleum west of Langstaff Road.	Private Landowner(s)	City of Markham	CN
16	Cedar Ave	Rather than a relatively easy open cut this crossing became part of the Pomona HDD to avoid future infrastructure conflicts with the proposed Markham Gateway development. The adjacent cemetary's City of Markham site plan application delayed their approval of necessary temporary work space over concerns that it could complicate the site plan application.	Private Landowner(s)	City of Markham	
17	Ruggles Ave	Rather than a relatively easy open cut this crossing became part of the Pomona HDD to avoid future infrastructure conflicts with the proposed Markham Gateway development.	Private Landowner(s)	City of Markham	

Crossings Affected by Permit Challenges		Description of Challenges	Agencies Involved		
	All Spreads/Segments				
18	Pomona Creek	The crossing became part of the Pomona HDD, which was required to avoid future infrastructure conflicts with the Markham Gateway development. Proximity to a York Region sewer and chamber at the drill entry required camera inspection and settlement monitoring. The need for temporary work space from the Cemetary in their maintenance building parking lot required negotiation and a mitigation plan to maintain access to the building during construction.	Private Landowner(s)	York Region	
19	HONI Realignment (West of Yonge Street)	HONI's last minute identification of plans for a row of future hydro towers, as well as their decision to not allow above ground infrastructure under their wires, resulted in the need to realign the pipeline and mainline valve to the south side of the IO corridor.	HONI		
20	East Don River and Tribs	Concerns over Hwy 407 permitting requirements for an engineered access road (on 407 property) required to open cut the East Don Trib 1, led to a decision to extend the HDD west to include the Trib. An HDD of the Trib, rather than open cut, was also preferable to TRCA and facilitated their permit. York Region required camera inspection of their trunk sewer along the Don River.	TRCA	York Region	
21	Bathurst Street	HONI's last minute identification of plans for a future row of hydro towers required a minor realignment, bringing the pipeline closer to the existing towers. This in turn necessitated a lengthening of the HDD to avoid the Reaman archaeological site and extended the timeline for MEDEI approval. Closer proximity to the existing towers required settlement monitoring.	HONI	MEDEI	
22	Dufferin St	Permit was delayed due to coordination of permitting and records between York Region and City of Toronto. Once the missing City of Toronto records for their water main were obtained, the design was revised to a depth of 6.9 m for permit submission in order to provide adequate clearance to the water main.	York Region	City of Toronto	
23	HONI Cable Slip Bore	Two HONI 230 kva cables located during construction, which were not previously identified by HONI during the permitting process, necessitated a 10 m long slip bore with 3.4 m of additional depth.	HONI		
24	Centre St	The design of York Region's future bus transitway improvements on Centre Street added 1.9 m of depth and 10 m of length to the crossing compared to the original permit submission. The permit was also delayed until the transitway preliminary design was completed.	York Region		
25	West Don River	Delays were caused by challenges aligning York Region and TRCA on the proposed crossing method. York Region initially requested 2 m clearance below their sanitary sewer which made the depth of a potential track bore unfeasible and unsafe. York Region was amenable to an open cut with the pipeline crossing above their sewer, but TRCA expressed concerns about the long term adverse impacts of an open cut. The crossing method was changed to an HDD as the only option to facilitate both approvals. York Region also required pre and post camera inspection of the sanitary sewer.	TRCA	York Region	
26	Metrolinx 2	The Metrolinx permit required changes to the track bore set-up methodology and extended the duration of settlement monitoring requirements. It also prevented construction during the Pan Am Games.	Metrolinx		
27	Great Gulf Drive East	City of Vaughan permit conditions required a pre-inspection. During pre-inspection Vaughan changed the crossing method from an open cut to a track bore after the contractor had already mobilized to execute the open cut.	City of Vaughan		
28	Great Gulf Drive West	City of Vaughan permit conditions required a pre-inspection. During pre-inspection Vaughan changed the crossing method from an open cut to a track bore after the contractor had already mobilized to execute the open cut.	City of Vaughan		
29	CN Keele St	The CN permit required changes to the track bore set-up methodology and extended the duration of settlement monitoring.	CN		
30	Keele St. (Tie-In)	Due to their planned widening of Keele Street at the tie-in location, York Region required extraordinary permit conditions to mitigate impacts on their design and anticipated construction requirements. They also required camera inspection of the sewer and settlement monitoring.	York Region		
	Spread 3 (Segment A)				
31	Mimico Creek	Peel Region's requested 2 m of clearance to their sewer, exceeding the municipal standard of 0.6 m and the 1 m proposed by the project. The extra depth was reviewed with Peel Region and, because the additional excavation required on the storm pond berm would have caused excess damage to the berm, Peel agreed to approve the permit with the depth of cover originally submitted. They also required camera inspection of the sewer.	Peel Region		
32	Goreway Drive	Approvals for the Goreway Road crossing were delayed by the additional reviews required for Brampton's new railway overpass design. Once the overpass design was set Peel Region's requirement for additional separation to their water main added 0.8 m of depth to the crossing.	City of Brampton		
33	CN Goreway - Temporary Crossing	CN's requirement to install the level crossing themselves resulted in delays gaining access to the "rail triangle" required to complete construction.	CN		
34	CN Airport	Insufficient flag people to utilize the CN Goreway level crossing, required for access to the CN Airport track bore, caused delays in the track bore.	CN		
35	East of Airport Road (Kruger lands)	Peel had no records for two sewers, and didn't even know one existed, which delayed permitting. Time was also required to obtain agreement to cross over the sewers rather than under, which Peel did grant in this particular instance.	Peel Region		
36	Airport Rd	Peel Region's requirement to provide additional clearance to their sewer and water main added 2 m of depth and 15 m of length to the crossing. Despite previous discussions, the landowner built a retaining wall in conflict with the pipe alignment requiring us to shift the alignment to the south and re-permit.	Peel Region	Private Landowner(s)	
37	Torbram Rd[3]	Conflicts with the Torbram Road reconstruction and temporary bypass, including a CN track realignment, caused coordination problems between our design and the municipal design, which ultimately delayed the crossing until all civil work was complete. The pipeline depth required to cross underneath the very congested subsurface infrastructure was not constructable as a track bore. The crossing method was changed to an HDD to satisfy all stakeholders.	CN	City of Mississauga	
38	Mimico Trib 2	Repermitting with TRCA was required due to the change in crossing method to HDD (the creek was part of the Torbram Road HDD.	TRCA		
39	CN Torbram - Temporary Crossing	CN's requirement to install the level crossing themselves resulted in delays gaining access to the "rail triangle" required to complete construction.	CN		
40	Metrolinx 1	The Metrolinx permit required changes to the track bore set-up methodology and extended the duration of settlement monitoring requirements. It also prevented construction during the Pan Am Games.	Metrolinx		
41	East of Bramalea Road	HONI requested a last minute alignment change to go around, rather than between, their 500 kV hydro towers at this location.	HONI		
42	East of Bramalea Road	Peel Region required a camera inspection of their sewer.	Peel Region		
43	MTO Transitway - West Bramalea	MTO required 4.1 m of additional depth where the pipeline crossed under the future Transitway and a redesign at Spring Creek to avoid the future transitway bridge. Hydro One Brampton required 1 m of additional depth under their cable conduits. The landowner required a last minute realignment to avoid a newly proposed energy from waste plant.	MTO	Private Landowner(s)	
44	Spring Creek	Peel Region's permit required extra clearance beneath their sewer, but allowed a reduction in clearance in the event of bedrock (to appease TRCA who had concerns about the duration of the crossing if breaking of bedrock was required). Bedrock was realized. Peel also required camera inspection of their sewer. Brampton would not approve an easement until Peel Region gave permission to cross their sewer.	Peel Region	City of Brampton	
45	Etobicoke Creek trib 3	TRCA's delay approving the temporary bridge crossing in turn delayed construction, because equipment was uable to access the lands between Dixie and Bramalea roads. This access was also required for Spring Creek Trib 1 construction. The redesign of Etobicoke Creek Trib 3 also resulted in a depth change at Dixie Road and associated repermitting.	TRCA		
46	Etobicoke Creek	Peel Region's requirement for extra clearance to their two sewers added 2 m of depth to the crossing, which was entirely in bedrock. They also requested that both sewer crossings be combined with the creek crossing, which added 48 m of length. Peel also required camera inspection of their sewers. These additional requirements from Peel Region wastewater necessitated repermitting with TRCA.	Peel Region	TRCA	

Crossings Affected by Permit Challenges		Description of Challenges	Agencies Involved		
	All Spreads/Segments				
47	Tomken Rd	Peel Region's clearance requirements for the crossing of three water mains, one of which they had no record of (but we did due to our previous NPS 36 crossing in 1986), added 1.3 m of depth (in bedrock) and 26 m of length to the crossing.	Peel Region		
48	Hwy 410	The Highway 410 crossing was delayed due to TRCA's permit delays for the temporary bridges required for the HDD pullback.	TRCA		
49	Kennedy Rd	Peel Region's clearance requirements for their water mains added 3.4 m of depth to the crossing.	Peel Region		
50	MTO Transitway - East Hurontario	MTO required 1.8 m of extra depth under their future transitway infrastructure and parking lot. Metrolinx also required 1.8 m of extra depth under their future LRT infrastructure at the same location.	MTO	Metrolinx	
51	Hurontario St.	Peel Region's clearance requirements to their water main added 1.0 m of extra depth. HONI required the mainline valve to be relocated at the last minute from under their power lines.	Peel Region	HONI	
52	Fletcher's Creek	HONI's inability to provide location information for seven buried high voltage cables on the east side of Fletchers Creek resulted in incremental time and hydrovac costs for field locating. Peel Region's request for extra vertical clearance to their sewer, and an extension of the track bore under the sewer, was reviewed with Peel Region but due to the placement of the HONI cables (referenced above) east of the sewer we could not deepen or extend the crossing. Based on this situation Peel agreed to an open cut of the sewer but required unshrinkable fill between the sewer and the pipeline and between the sewer and the bore pit shoring, as well as camera inspection of their sewer. The inability to extend the crossing, as well as Peel's request to avoid equipment set-up on top of the sewer, required additional TWS within the 30 m Species at Risk buffer, which further complicated the acquisition of the MNR permit. The multiple issues and coordination across agencies resulted in significant permitting delays.	HONI	Peel Region	MNR
53	Fletcher's Creek Trib 1	CVCA setbacks for Fletchers Creek Trib 1 required a redesign of the pipeline crossing and a relocation of the temporary bridge crossing.	CVCA		
54	MTO Transitway - East Mavis	MTO required 2 m of extra depth under the future MTO Transitway parking lot.	MTO		
55	McLaughlin Road	Peel Region's clearance requirements for their water main added 0.8 m of extra depth.	Peel Region		
56	Mavis Rd.	Easement was delayed due to extended Private Landowner negotiations. This in turn delayed access to the Mavis Road HDD entry location and the Credit River crossing sites.	Private Landowner(s)		
57	Archaelogy Site - Pengilley	Extended timelines for MEDEI approvals, related to the First Nation burial site, delayed the mainline construction and tie-in work west of the Credit River.	MEDEI		
58	Heritage Rd.	Peel Region's clearance requirements beneath two water mains (initial design had the pipe crossing over them with adequate clearance) resulted in a redesign that added 5.8 m of depth.	Peel Region		
59	Working Near TCPL Pipelines	TCPL required detailed work plans for any work within 30 m of their pipelines. A requirement to mat prior to placing topsoil above, or crossing over their lines with equipment (irrespective of depth), resulted in a substantial amount of addtional matting that otherwise would not have been required.	TCPL		
60	MTO Transitway - East Meadowpine	MTO required 2 m of extra depth under the future MTO transitway and parking lot.	MTO		
61	Winston Churchill Blvd	Peel Region required 1.6 m of added depth to minimize the pipeline relocation potential in the event of a future Winston Churchill road widening.	Peel Region		
62	10th Line	Our design was based on Peel Region's proposed facility design to supply a development on 10th line. Actual water main installation, completed subsequent to our design, was deeper than proposed (confirmed by field locating due to lack of as-built records). The actual water main depth, and Peel's new requirement for 2m of clearance beneath the water main, resulted in an additional 0.8 m of depth to the originally proposed design and a change in crossing method from open cut to track bore.	Peel Region		
63	Argentia Rd	This road did not exist at the FEED stage. The initial permit issued by the City of Mississauga was for a track bore crossing. However, Peel Region retracted their approval due to concerns with flowing sand being disturbed under the water main. Peel Region then requested and permitted the pipeline to cross above their water main on the condition that the casing around it be extended (the casing was already installed under both the existing TCPL line and EGD's Parkway North line) to facilitate easy replacement if required in the future. Incorrect as-built records (confirmed in the field after hydrovacing) necessitated the relocation of a short section of the water main before the casing could be installed.	Peel Region		
64	Lisgar Meadow Brook	The new commercial/industrial development between 9th and 10th Lines did not exist at the FEED stage. The sewer as-constructed record did not exist at the design/permitting stage so our crossing was based on the proposed design. Subsequent to the permit application, the installed sewer location had to be field verified and was found to be deeper than the proposed design. The actual sewer depth, and the new requirement for 2 m of clearance beneath the sewer, resulted in an additional 3 m of depth to the originally proposed design. This extra depth increased the required bore pit size and work space that in turn caused encroachment on the environmental setbacks required for Lisgar Meadow Brook creek. This necessitated a lengthening of the track bore by 95 m (and ultimately a Direct Pipe due flowing sand conditions in the track bore pit). As landowner, City of Mississauga conditioned their approval of the pipeline easement on the issuance of Peel Region's permit. They also required camera inspection of the sewer.	Peel Region		
65	MTO Transitway - West of Ninth Line	MTO required 2 m of extra depth under the future MTO transitway and parking lot.	MTO		
66	16 Mile Creek 1C	Delay in obtaining the temporary bridge permit from Conservation Halton resulted in contractor move arounds to complete the site preparation work.	CH		
67	16 Mile Creek 1A	Delay in obtaining the temporary bridge permit from Conservation Halton resulted in contractor move arounds to complete the site preparation work.	CH		
68	16 Mile Creek 1B	Delay in obtaining the temporary bridge permit from Conservation Halton resulted in contractor move arounds to complete the site preparation work.	CH		

APPENDIX F

Crossing Method, Length, and Depth Analysis (Estimate to Actual)

CROSSING METHOD, LENGTH AND DEPTH ANALYSIS (ESTIMATE TO ACTUAL)

CROSSING LOCATION	Spread	Segment	Crossing Method		Depth of Cover (m)		Length (m)		Shoring (Yes/No)	
			Estimate	Actual	Estimate	Actual	Estimate	Actual	West/North	East/South
Bridlewood Boulevard	1	B	OC	TB	1.2	4.3	23	35	Y	Y
Huntingwood Drive	1	B	OC	TB	1.2	4.0	27	36	Y	Y
Collingsbrook Boulevard	1	B	OC	TB	1.2	7.0	22	35	Y	Y
Pinemeadow Boulevard	1	B	OC	TB	1.2	6.7	28	36	Y	Y
Finch Avenue East	1	B	TB	TB	1.2	5.7	85	85	Y	Y
Huntingdale Drive	1	B	TB	TB	1.2	6.1	36	36	Y	Y
Beverly Glen Boulevard	1	B	OC	TB	1.2	6.6	26	47	Y	Y
McNicholl Avenue	1	B	TB	TB	1.2	7.7	60	60	Y	Y
Huntsmill Boulevard (S)	1	B	TB	TB	1.2	6.4	48	48	Y	Y
Steeles Avenue (hydro substation)	1	B	HDD	HDD			708	940	N	N
Denison Street	1	B	TB	TB	1.2	5.6	28	48	Y	Y
Alden Road	1	B	OC		1.2		34			
CNR Tracks north of Alden	1	B	TB	HDD	3.1		38	883	N	N
Riviera Drive	1	B	OC		1.2		20			
14th Avenue	1	B	TB	TB	1.5	4.5	20	44	N	Y
Beaver Creek Trib 1 (hydro towers)	1	B	HDD	HDD			367	356	N	N
Rodick Road	2	B	TB	TB	2.3	6.5	65	97	Y	Y
Beaver Creek Trib 2	2	B	OC	OC	2.5	2.2	354	354	N	N
Beaver Creek Trib 3a	2	B	OC	OC	2.5	2.5	20	20	N	N
Beaver Creek Trib 3b	2	B	OC	OC	2.5	2.5	20	20	N	N
Woodbine Avenue	2	B	TB	GB	1.5	6.1	28	130	Y	Y
Burncrest Road	2	B	OC	GB	1.2	4.4	37	105	Y	Y
Miller Parking Lot	2	B		GB		3.8		226	Y	Y
Highway 404	2	B	HDD	HDD			436	416	N	N
Leslie Street	2	B	TB	DP	1.5		51	261	Y	Y
Little German Mills Creek	2	B	OC	OC	2.5	2.7	25	25	N	N
German Mills Creek	2	B	OC	OC	2.5	3.0	33	64	N	N
Bayview Avenue	2	B	HDD	HDD			343	389	N	N
Langstaff Road East	2	B	OC	HDB	1.2	4.1	20	58	Y	Y
Essex Avenue	2	B	n/a	SB	n/a	4.1	n/a	20	Y	Y
Cedar Ave	2	B	n/a		n/a		n/a			
CNR (west of Essex)	2	B	TB	HDD	5.0		35	916	Y	N
Ruggles Road	2	B	n/a		n/a		n/a			
Pomona Creek	2	B	OC		2.5		20			
Langstaff Road (West)	2	B	OC	OC	1.2	2.6	20	20	N	N
Yonge Street	2	B	HDD	TB		5.2	383	88	Y	Y
Don River East Trib 3 (crossing A)	2	B	OC		2.5		15			
Don River East Trib 3 (crossing B)	2	B	OC		2.5		15			
Don River East	2	B	HDD	HDD			613	1006	N	N
Don River East Trib 1 (crossing A)	2	B	OC		2.5		20			
Don River East Trib 1 (crossing B)	2	B	OC		2.5		20			
Don River East Trib 1 (crossing C)	2	B	OC		2.5		20			
Bathurst Street	2	B	HDD	HDD			741	640	N	N
Dufferin Street	2	B	TB	TB	1.5	6.9	54	97	Y	Y
Power Cable	2	B	n/a	SB	n/a	4.6	n/a	9	N	N
Centre Street	2	B	TB	TB	1.5	5.6	53	73	Y	Y
Highway 7 (untravelled)	2	B	OC	SB	1.5	5.0	44	31	Y	Y
Don River West	2	B	OC	HDD	2.5		30	431	N	N
Metrolinx 2	2	B	TB	TB	3.0	4.0	70	71	Y	Y
Great Gulf Drive East	2	B	OC	TB	1.2	5.5	25	48	Y	Y
Creek B1	2	B	OC	OC	2.5	2.5	20	20	N	N
Great Gulf Drive West	2	B	OC	TB	1.2	3.5	9	35	N	N
CNR (east of Keele)	2	B	TB	HDB	7.7	9.5	90	122	Y	Y
CNR Albion (NPS 36 Outlet)	3	A	n/a	TB	n/a	6.0	n/a	58	Y	Y
CNR Albion (NPS 42 Inlet)	3	A	TB	TB	3.0	6.0	27	58	Y	Y
Claireville Reservoir	3	A	HDD	HDD			513	1144	N	N
Finch Avenue West	3	A	HDD				393		N	N
Mimico Creek Trib 5	3	A	OC	OC	2.5	4.4	25	45	N	N
Mimico Creek	3	A	OC	TB	2.5	6.0	30	63	Y	Y
Goreway Drive	3	A	TB	TB	1.2	5.8	16	63	Y	Y
CNR Goreway	3	A	TB	TB	3.1	4.2	56	44	Y	Y
CNR Airport	3	A	TB	TB	3.1	5.7	65	88	Y	Y
Airport Road	3	A	TB	HDB	1.2	7.2	80	112	Y	Y
Mimico Creek Trib 3	3	A	OC	OC	2.5	3.4	25	55	N	N
Torbram Road (and detour)	3	A	TB	HDD	2.6		20	380	N	N
Mimico Creek Trib 2	3	A	OC		2.5		45		N	N
CNR Torbram	3	A	TB	TB	3.1	6.9	40	86	Y	Y
Metrolinx 1/Mimico Trib 1	3	A	TB	TB	3.1	6.0	30	71	Y	Y
Industrial Access	3	A	OC	HDD	2.5		61	466	N	N
Bramalea Road	3	A	HDD				433		N	N
Spring Creek	3	A	OC	OC	2.5	2.9	42	71	N	N
Spring Creek Trib 1	3	A	OC	OC	2.5	2.7	29	32	N	N
Etobicoke Creek Trib 3	3	A	OC	OC	2.5	2.5	27	42	N	N
Dixie Road	3	A	TB	TB	1.2	8.2	51	98	Y	Y
Etobicoke Creek	3	A	OC	TB	2.5	8.5	40	98	Y	Y
Tomken Road	3	A	TB	TB	1.2	6.9	51	101	Y	Y
Highway 410	3	A	HDD	HDD			501	498	N	N
Etobicoke Creek Trib 2a	3	A	OC	OC	2.5	2.7	25	30	N	N
Etobicoke Creek Trib 2	3	A	OC	OC	2.5	3.4	20	20	N	N
Kennedy Road	3	A	TB	TB	1.2	8.0	35	53	Y	Y
Etobicoke Creek Trib 1A	3	A	n/a	OC	n/a	3.3	n/a	20	N	N
Etobicoke Creek Trib 1	3	A	OC	OC	2.5	3.4	25	25	N	N

CROSSING METHOD, LENGTH AND DEPTH ANALYSIS (ESTIMATE TO ACTUAL)

CROSSING LOCATION	Spread	Segment	Crossing Method		Depth of Cover (m)		Length (m)		Shoring (Yes/No)	
			Estimate	Actual	Estimate	Actual	Estimate	Actual	West/North	East/South
Hurontario Street	3	A	TB	TB	1.5	4.2	72	140	Y	Y
Fletchers Creek	3	A	HDD	TB	2.5	9.5	370	73	Y	Y
Fletchers Creek Trib 1	3	A	n/a	OC	n/a	3.4	n/a	75	N	N
McLaughlin Road	3	A	TB	TB	1.2	4.1	63	89	Y	Y
Mavis Road	3	A	HDD	HDD			525	488	N	N
Second Line West	3	A	OC	OC	1.2	1.9	21	60	N	N
Credit River Trib 1	3	A	OC	OC	2.5	3.1	20	20	N	N
Railway (Orangeville/Brampton)	3	A	HDD	DP			769	388	Y	N
Credit River	3	A								
Creditview Road	3	A	OC	OC	1.2	1.2	17	40	N	N
Financial Drive	3	A	HDD				413			
Levi's Creek	3	A		HDD				1015	N	N
Mississauga Road	3	A	HDD				408			
Mullett Creek	3	A	OC	OC	2.5	3.8	30	30	N	N
Heritage Road	3	A	TB	TB	1.2	7.0	65	95	Y	Y
Meadowpine Boulevard	3	A	TB	TB	1.2	6.9	46	72	Y	Y
Winston Churchill Boulevard	3	A	TB	TB	1.2	5.0	55	71	Y	Y
Highway 401	3	A	HDD	HDD			328	350	N	N
10th Line	3	A	OC	TB	1.2	4.2	40	69	Y	Y
Argentia Road	3	A	n/a	TB	n/a	2.8	n/a	33	N	Y
Lisgar-Meadowbrook Creek Trib 2a	3	A	OC		2.5		65			
Lisgar-Meadowbrook Creek	3	A	OC	DP	2.5		15	465	N	N
Lisgar-Meadowbrook Creek Trib 1	3	A	OC		2.5		15			
9th Line	3	A	OC	TB	1.2	5.6	20	54	Y	Y
16 Mile Creek Trib 1c	3	A	OC	OC	2.5	3.4	25	25	N	N
Highway 407	3	A	TB	HDB	1.5	6.1	108	132	Y	Y
CPR (St Lawrence & Hudson)	3	A	TB	TB	3.0	4.1	21	42	N	N
16 Mile Creek Trib 1b	3	A	OC	OC	2.5	4.3	35	35	N	N
16 Mile Creek Trib 1a	3	A	OC	OC	2.5	3.6	35	35	N	N
Derry Road	3	A	n/a	HDB	n/a	4.7	n/a	77	Y	Y
CPR HONI (Spread 3 Parkway Outlet)	3	A	n/a	TB	n/a	3.7	n/a	35	Y	Y
CPR HONI (Spread 4 Parkway Outlet)	4	A	n/a	TB	n/a	4.3	n/a	36	Y	Y

CROSSING METHOD	Estimate	Actual
Open Cut (OC)	50	24
Track Bore (TB)	33	42
Horizontal Directional Bore (HDB)	0	5
Guided Bore (GB)	0	3
Slip Bore (SB)	0	3
Horizontal Directional Drill (HDD)	17	16
Direct Pipe (DP)	0	3
Total	100	96

DEPTH/LENGTH SUMMARY BY CROSSING METHOD	Method		Average Depth of Cover (m)		Average Length (m)		% Increase/Decrease		
	Estimate	Actual	Estimate	Actual	Estimate	Actual	Method	Depth	Length
Open Cut	50	24	2.1	3.0	33.6	49.3	-52%	44%	47%
Bore Methods	33	53	2.1	5.7	50.4	70.4	61%	170%	40%
HDD/DP	17	19	n/a	n/a	484.9	601.7	12%	n/a	24%
Total	100	96							

SHORING SUMMARY	
Receiving/Entry Pits (Bore Method)	106
Number of Pits Requiring Shoring	102
Percentage of Bore Pits Shored	96%

APPENDIX G

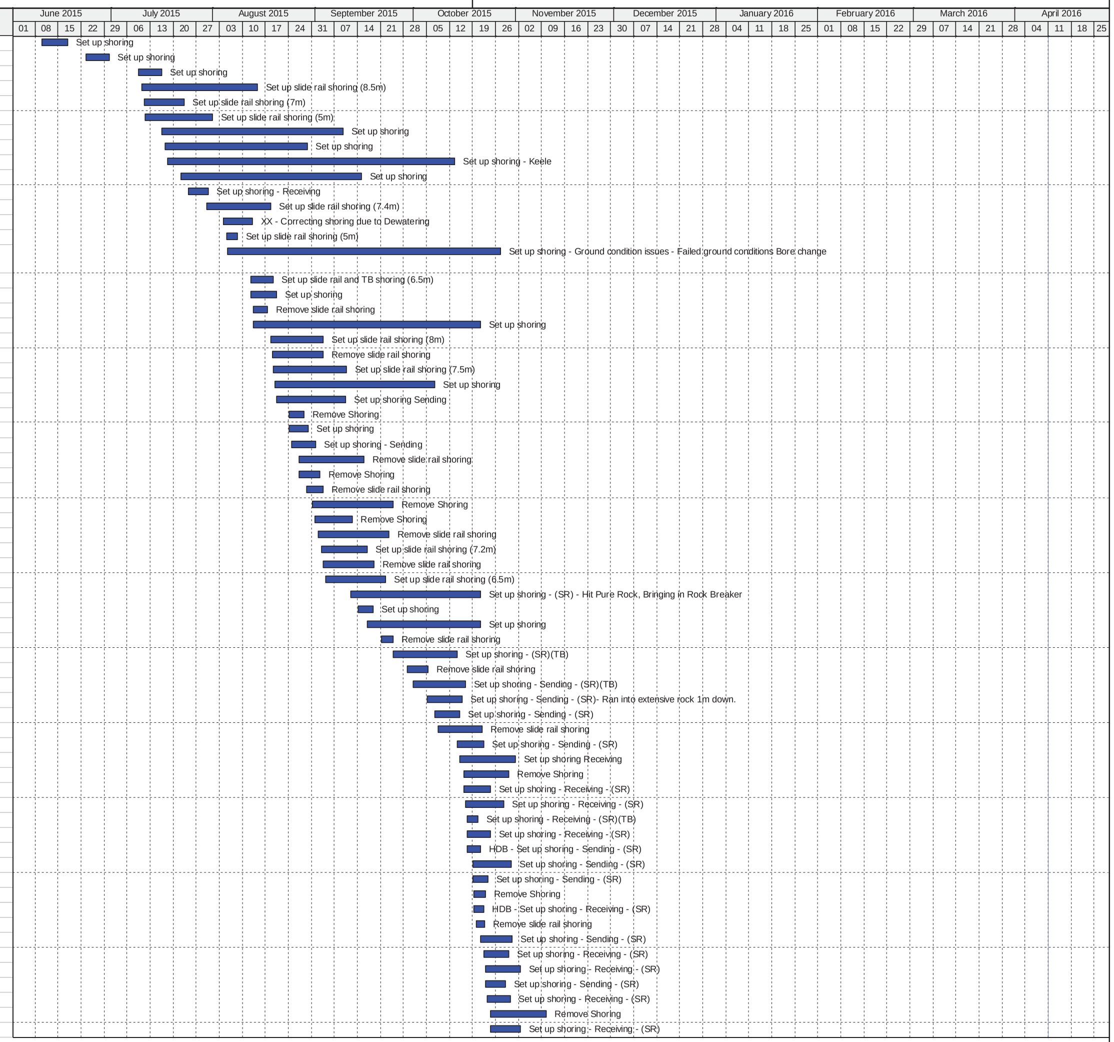
Shoring Schedule

Michels Mainline - Spread 1...

Michels GTA Schedule - Shoring Activities

20-Apr-16 09:04

Activity ID	Activity Name	WBS Name	Actual Duration	Start	Finish
A10981	Set up shoring	McLaughlin Road - 71m KP 12.18 (SR)	7d	10-Jun-15 A	18-Jun-15 A
A11601	Set up shoring	Hurontario Street - 115m KP 13.56 (SR)	6d	23-Jun-15 A	30-Jun-15 A
A10582	Set up shoring	Center Street - 68m (KP 2.68)	6d	09-Jul-15 A	16-Jul-15 A
A9972	Set up slide rail shoring (8.5m)	McNICOLL - 58m (KP 4.42)	30d	10-Jul-15 A	14-Aug-15 A
A9984	Set up slide rail shoring (7m)	HUNTSMILL - 33m (KP 4.24)	10d	11-Jul-15 A	23-Jul-15 A
A10130	Set up slide rail shoring (5m)	BRIDLEWOOD BLVD - 32m (KP 7.31)	17d	11-Jul-15 A	01-Aug-15 A
A10802	Set up shoring	Miller - 204m (KP 14.30) (Wetland to Golf Net)	45d	16-Jul-15 A	09-Sep-15 A
A10742	Set up shoring	Metrolinx 2 - 59m (KP 1.3)	36d	17-Jul-15 A	29-Aug-15 A
A10692	Set up shoring - Keele	CNR Rail Road Keele - 118m (KP 0.05)	72d	18-Jul-15 A	13-Oct-15 A
A11302	Set up shoring	CNR Rail (Albion Station) - 36" - 51mKP 0 Spr	45d	22-Jul-15 A	15-Sep-15 A
A10652	Set up shoring - Receiving	Roddick Road - 108m (KP 15.16)	5d	24-Jul-15 A	30-Jul-15 A
A10090	Set up slide rail shoring (7.4m)	BEVERLY GLEN BLVD - 45m (KP 5.12)	16d	30-Jul-15 A	18-Aug-15 A
A9993	XX - Correcting shoring due to Dewatering	McNICOLL - 58m (KP 4.42)	8d	04-Aug-15 A	13-Aug-15 A
A10222	Set up slide rail shoring (5m)	HUNTINGWOOD - 33m (KP 6.90)	4d	05-Aug-15 A	08-Aug-15 A
A10952	Set up shoring - Ground condition issues - Failed ground conditions Bore change	Lisgar Meadow Brook - 240m, 42" KP 3.09 - Track Bore	69d	05-Aug-15 A	27-Oct-15 A
A9952	Set up slide rail and TB shoring (6.5m)	DENISON - 41m (KP 2.02)	6d	12-Aug-15 A	19-Aug-15 A
A11532	Set up shoring	Tomken Road - 92m KP 16.39	7d	12-Aug-15 A	20-Aug-15 A
A9991	Remove slide rail shoring	HUNTSMILL - 33m (KP 4.24)	4d	13-Aug-15 A	17-Aug-15 A
A11332	Set up shoring	CNR Rail (Albion Station) - 42" - 62m KP 0 Sp	57d	13-Aug-15 A	21-Oct-15 A
A10160	Set up slide rail shoring (8m)	COLLINGSBROOK BLVD - 29m (KP 6.41)	14d	18-Aug-15 A	03-Sep-15 A
A10300	Remove slide rail shoring	BRIDLEWOOD BLVD - 32m (KP 7.31)	14d	19-Aug-15 A	03-Sep-15 A
A10182	Set up slide rail shoring (7.5m)	PINEMEADOW BLVD - 34m (KP 5.97)	19d	19-Aug-15 A	10-Sep-15 A
A10544	Set up shoring	Leslie St & Little German Mills Trib 1 - 250m (K	40d	20-Aug-15 A	07-Oct-15 A
A10853	Set up shoring Sending	Woodbine (Woodbine to Miller) - 95m	17d	20-Aug-15 A	10-Sep-15 A
A11820	Remove Shoring	Hurontario Street - 115m KP 13.56 (SR)	5d	24-Aug-15 A	28-Aug-15 A
A12090	Set up shoring	Tenth Line - 62m KP 4.19	6d	24-Aug-15 A	30-Aug-15 A
A10653	Set up shoring - Sending	Roddick Road - 108m (KP 15.16)	6d	25-Aug-15 A	01-Sep-15 A
A9955	Remove slide rail shoring	DENISON - 41m (KP 2.02)	16d	27-Aug-15 A	16-Sep-15 A
A11830	Remove Shoring	McLaughlin Road - 71m KP 12.18 (SR)	6d	27-Aug-15 A	02-Sep-15 A
A10225	Remove slide rail shoring	HUNTINGWOOD - 33m (KP 6.90)	4d	29-Aug-15 A	03-Sep-15 A
A10620	Remove Shoring	Center Street - 68m (KP 2.68)	21d	31-Aug-15 A	25-Sep-15 A
A10746	Remove Shoring	Metrolinx 2 - 59m (KP 1.3)	10d	01-Sep-15 A	12-Sep-15 A
A9975	Remove slide rail shoring	McNICOLL - 58m (KP 4.42)	18d	02-Sep-15 A	23-Sep-15 A
A10060	Set up slide rail shoring (7.2m)	HUNTINGDALE BLVD - 33m (KP 5.43)	11d	03-Sep-15 A	17-Sep-15 A
A10420	Remove slide rail shoring	BEVERLY GLEN BLVD - 45m (KP 5.12)	13d	03-Sep-15 A	19-Sep-15 A
A9962	Set up slide rail shoring (6.5m)	FINCH - 86m (KP 5.59) (7.5m) (SR)	15d	04-Sep-15 A	22-Sep-15 A
A11562	Set up shoring - (SR) - Hit Pure Rock, Bringing in Rock Breaker	Kennedy Road - 60m KP 14.97	33d	12-Sep-15 A	21-Oct-15 A
A10445	Set up shoring	Langstaff Rd (Sussex Ave) - 45m (KP 9.67) Fa	5d	14-Sep-15 A	18-Sep-15 A
A10492	Set up shoring	Yonge St - 86m (KP 8.16)	29d	17-Sep-15 A	21-Oct-15 A
A10320	Remove slide rail shoring	COLLINGSBROOK BLVD - 29m (KP 6.41)	4d	21-Sep-15 A	25-Sep-15 A
A11144	Set up shoring - (SR)(TB)	Fletchers Creek - 72m KP 12.81	15d	25-Sep-15 A	14-Oct-15 A
A10340	Remove slide rail shoring	PINEMEADOW BLVD - 34m (KP 5.97)	6d	29-Sep-15 A	05-Oct-15 A
A11084	Set up shoring - Sending - (SR)(TB)	Ninth Line - 48m KP 2.6	13d	01-Oct-15 A	17-Oct-15 A
A11502	Set up shoring - Sending - (SR)- Ran into extensive rock 1m down.	Etobicoke Creek - 104m KP 17.2	9d	05-Oct-15 A	16-Oct-15 A
A11014	Set up shoring - Sending - (SR)	Heritage Road - 91m KP 6.5	6d	07-Oct-15 A	15-Oct-15 A
A10380	Remove slide rail shoring	HUNTINGDALE BLVD - 33m (KP 5.43)	10d	08-Oct-15 A	22-Oct-15 A
A11442	Set up shoring - Sending - (SR)	Airport Road - 99m - KP 22.37	7d	14-Oct-15 A	22-Oct-15 A
A10854	Set up shoring Receiving	Woodbine (Woodbine to Miller) - 95m	15d	15-Oct-15 A	01-Nov-15 A
A10657	Remove Shoring	Roddick Road - 108m (KP 15.16)	12d	16-Oct-15 A	30-Oct-15 A
A11015	Set up shoring - Receiving - (SR)	Heritage Road - 91m KP 6.5	7d	16-Oct-15 A	24-Oct-15 A
A11503	Set up shoring - Receiving - (SR)	Etobicoke Creek - 104m KP 17.2	10d	17-Oct-15 A	28-Oct-15 A
A11085	Set up shoring - Receiving - (SR)(TB)	Ninth Line - 48m KP 2.6	3d	17-Oct-15 A	20-Oct-15 A
A12761	Set up shoring - Receiving - (SR)	Metrolinx 1 / Mimico Trib 1 - 71m KP 20.45	6d	17-Oct-15 A	24-Oct-15 A
A11114	HDB - Set up shoring - Sending - (SR)	Highway 407 Ramp - 122m KP 2.18	3d	17-Oct-15 A	21-Oct-15 A
A12760	Set up shoring - Sending - (SR)	Metrolinx 1 / Mimico Trib 1 - 71m KP 20.45	11d	19-Oct-15 A	30-Oct-15 A
A13110	Set up shoring - Sending - (SR)	Burncrest (Burncrest to Pit #2) - 127m	5d	19-Oct-15 A	23-Oct-15 A
A10806	Remove Shoring	Miller - 204m (KP 14.30) (Wetland to Golf Net)	4d	19-Oct-15 A	23-Oct-15 A
A11115	HDB - Set up shoring - Receiving - (SR)	Highway 407 Ramp - 122m KP 2.18	3d	19-Oct-15 A	22-Oct-15 A
A9965	Remove slide rail shoring	FINCH - 86m (KP 5.59) (7.5m) (SR)	3d	20-Oct-15 A	22-Oct-15 A
A11475	Set up shoring - Sending - (SR)	Dixie Road - 110m KP 17.87	9d	21-Oct-15 A	31-Oct-15 A
A11443	Set up shoring - Receiving - (SR)	Airport Road - 99m - KP 22.37	7d	22-Oct-15 A	30-Oct-15 A
A12150	Set up shoring - Receiving - (SR)	Mimico Creek - 60m - KP 23.97	9d	23-Oct-15 A	02-Nov-15 A
A12140	Set up shoring - Sending - (SR)	Mimico Creek - 60m - KP 23.97	5d	23-Oct-15 A	29-Oct-15 A
A11205	Set up shoring - Receiving - (SR)	Derry Road - 78m KP 0.61	6d	23-Oct-15 A	30-Oct-15 A
A11305	Remove Shoring	CNR Rail (Albion Station) - 36" - 51mKP 0 Spr	14d	24-Oct-15 A	10-Nov-15 A
A11476	Set up shoring - Receiving - (SR)	Dixie Road - 110m KP 17.87	7d	24-Oct-15 A	02-Nov-15 A



Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

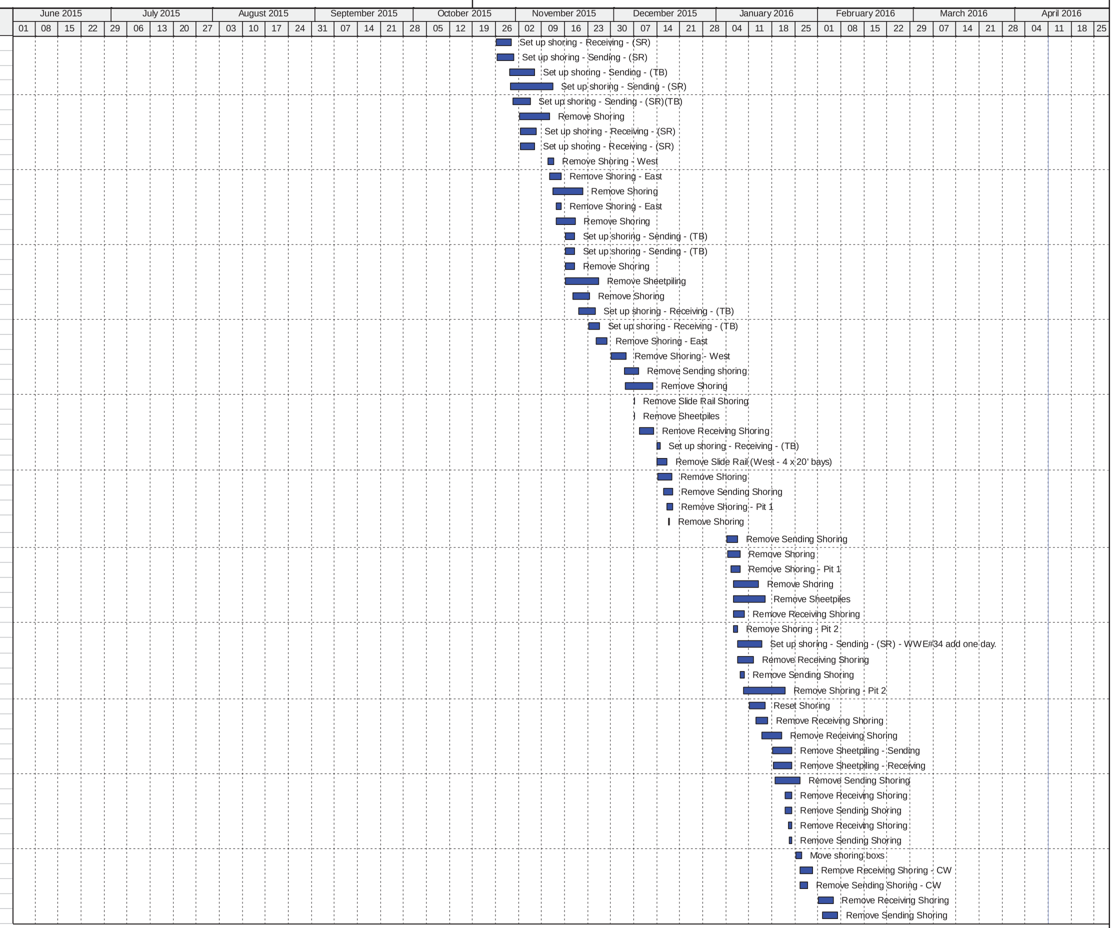
TASK filter: Mike - TEMP Code.

Michels Mainline - Spread 1...

Michels GTA Schedule - Shoring Activities

20-Apr-16 09:04

Activity ID	Activity Name	WBS Name	Actual Duration	Start	Finish
A10903	Set up shoring - Receiving - (SR)	CNR Torbram - 85m KP 20.64	5d	26-Oct-15 A	30-Oct-15 A
A11204	Set up shoring - Sending - (SR)	Derry Road - 78m KP 0.61	5d	26-Oct-15 A	31-Oct-15 A
A11415	Set up shoring - Sending - (TB)	CNR Railroad - 71m (CNR - Goreway KP 23.4	7d	30-Oct-15 A	07-Nov-15 A
A11362	Set up shoring - Sending - (SR)	Goreway Drive - 62m KP 23.78	11d	30-Oct-15 A	12-Nov-15 A
A10902	Set up shoring - Sending - (SR)(TB)	CNR Torbram - 85m KP 20.64	5d	31-Oct-15 A	05-Nov-15 A
A11790	Remove Shoring	Tomken Road - 92m KP 16.39	9d	02-Nov-15 A	11-Nov-15 A
A11363	Set up shoring - Receiving - (SR)	Goreway Drive - 62m KP 23.78	5d	02-Nov-15 A	07-Nov-15 A
A11393	Set up shoring - Receiving - (SR)	CNR Railroad - 89m (CNR - Airport KP 22.87)	4d	02-Nov-15 A	07-Nov-15 A
A10858	Remove Shoring - West	Woodbine (Woodbine to Miller) - 95m	2d	11-Nov-15 A	12-Nov-15 A
A13150	Remove Shoring - East	Burncrest (Burncrest to Pit #2) - 127m	4d	11-Nov-15 A	15-Nov-15 A
A13280	Remove Shoring	HDB Langstaff Rd (Sussex Ave) - 45m (KP 9.6	8d	12-Nov-15 A	21-Nov-15 A
A10866	Remove Shoring - East	Woodbine (Woodbine to Miller) - 95m	1d	13-Nov-15 A	15-Nov-15 A
A10497	Remove Shoring	Yonge St - 86m (KP 8.16)	4d	13-Nov-15 A	19-Nov-15 A
A11235	Set up shoring - Sending - (TB)	Hydro One Railway - 36" - 36m - KP 0.14	3d	16-Nov-15 A	19-Nov-15 A
A11265	Set up shoring - Sending - (TB)	Hydro One Railway - 42" - 36m - KP 0.14	3d	16-Nov-15 A	19-Nov-15 A
A11870	Remove Shoring	Ninth Line - 48m KP 2.6	3d	16-Nov-15 A	19-Nov-15 A
A13170	Remove Sheetpiling	Burncrest (Burncrest to Pit #2) - 127m	9d	16-Nov-15 A	26-Nov-15 A
A11810	Remove Shoring	Kennedy Road - 60m KP 14.97	4d	18-Nov-15 A	23-Nov-15 A
A11236	Set up shoring - Receiving - (TB)	Hydro One Railway - 36" - 36m - KP 0.14	4d	20-Nov-15 A	25-Nov-15 A
A11266	Set up shoring - Receiving - (TB)	Hydro One Railway - 42" - 36m - KP 0.14	4d	23-Nov-15 A	26-Nov-15 A
A11910	Remove Shoring - East	Fletchers Creek - 72m KP 12.81	4d	25-Nov-15 A	29-Nov-15 A
A11310	Remove Shoring - West	Fletchers Creek - 72m KP 12.81	5d	30-Nov-15 A	04-Dec-15 A
A12790	Remove Sending shoring	Metrolinx 1 / Mimico Trib 1 - 71m KP 20.45	5d	04-Dec-15 A	08-Dec-15 A
A12179	Remove Shoring	Mimico Creek - 60m - KP 23.97	8d	04-Dec-15 A	12-Dec-15 A
A13470	Remove Slide Rail Shoring	Leslie St & Little German Mills Trib 1 - 250m (K	0d	07-Dec-15 A	07-Dec-15 A
A13490	Remove Sheetpiles	Leslie St & Little German Mills Trib 1 - 250m (K	0d	07-Dec-15 A	07-Dec-15 A
A12800	Remove Receiving Shoring	Metrolinx 1 / Mimico Trib 1 - 71m KP 20.45	4d	08-Dec-15 A	13-Dec-15 A
A11416	Set up shoring - Receiving - (TB)	CNR Railroad - 71m (CNR - Goreway KP 23.4	1d	14-Dec-15 A	15-Dec-15 A
A13610	Remove Slide Rail (West - 4 x 20' bays)	Leslie St & Little German Mills Trib 1 - 250m (K	3d	14-Dec-15 A	17-Dec-15 A
A11950	Remove Shoring	Derry Road - 78m KP 0.61	5d	14-Dec-15 A	18-Dec-15 A
A11850	Remove Sending Shoring	Heritage Road - 91m KP 6.5	3d	16-Dec-15 A	19-Dec-15 A
A11970	Remove Shoring - Pit 1	Hydro One Railway - 36" - 36m - KP 0.14	2d	17-Dec-15 A	19-Dec-15 A
A11890	Remove Shoring	Highway 407 Ramp - 122m KP 2.18	1d	17-Dec-15 A	18-Dec-15 A
A11367	Remove Sending Shoring	Goreway Drive - 62m KP 23.78	4d	04-Jan-16 A	07-Jan-16 A
A10760	Remove Shoring	CNR Rail Road Keele - 118m (KP 0.05)	4d	04-Jan-16 A	08-Jan-16 A
A11350	Remove Shoring - Pit 1	Hydro One Railway - 42" - 36m - KP 0.14	3d	05-Jan-16 A	08-Jan-16 A
A12120	Remove Shoring	Tenth Line - 62m KP 4.19	8d	06-Jan-16 A	14-Jan-16 A
A13630	Remove Sheetpiles	Leslie St & Little German Mills Trib 1 - 250m (K	10d	06-Jan-16 A	16-Jan-16 A
A11860	Remove Receiving Shoring	Heritage Road - 91m KP 6.5	4d	06-Jan-16 A	09-Jan-16 A
A11980	Remove Shoring - Pit 2	Hydro One Railway - 36" - 36m - KP 0.14	2d	06-Jan-16 A	07-Jan-16 A
A11392	Set up shoring - Sending - (SR) - WWE#34 add one day.	CNR Railroad - 89m (CNR - Airport KP 22.87)	7d	07-Jan-16 A	15-Jan-16 A
A11377	Remove Receiving Shoring	Goreway Drive - 62m KP 23.78	4d	07-Jan-16 A	12-Jan-16 A
A11770	Remove Sending Shoring	Etobicoke Creek - 104m KP 17.2	2d	08-Jan-16 A	09-Jan-16 A
A11990	Remove Shoring - Pit 2	Hydro One Railway - 42" - 36m - KP 0.14	13d	09-Jan-16 A	22-Jan-16 A
A11481	Reset Shoring	Dixie Road - 110m KP 17.87	5d	11-Jan-16 A	16-Jan-16 A
A11780	Remove Receiving Shoring	Etobicoke Creek - 104m KP 17.2	4d	13-Jan-16 A	16-Jan-16 A
A11740	Remove Receiving Shoring	Airport Road - 99m - KP 22.37	6d	15-Jan-16 A	21-Jan-16 A
A10810	Remove Sheetpiling - Sending	CNR Rail Road Keele - 118m (KP 0.05)	6d	18-Jan-16 A	24-Jan-16 A
A10820	Remove Sheetpiling - Receiving	CNR Rail Road Keele - 118m (KP 0.05)	6d	18-Jan-16 A	24-Jan-16 A
A11730	Remove Sending Shoring	Airport Road - 99m - KP 22.37	8d	19-Jan-16 A	26-Jan-16 A
A11430	Remove Receiving Shoring	CNR Railroad - 71m (CNR - Goreway KP 23.4	2d	22-Jan-16 A	24-Jan-16 A
A11420	Remove Sending Shoring	CNR Railroad - 71m (CNR - Goreway KP 23.4	2d	22-Jan-16 A	24-Jan-16 A
A10916	Remove Receiving Shoring	CNR Torbram - 85m KP 20.64	1d	23-Jan-16 A	24-Jan-16 A
A10915	Remove Sending Shoring	CNR Torbram - 85m KP 20.64	1d	23-Jan-16 A	24-Jan-16 A
A11396	Move shoring boxs	CNR Railroad - 89m (CNR - Airport KP 22.87)	2d	25-Jan-16 A	27-Jan-16 A
A11750	Remove Receiving Shoring - CW	Dixie Road - 110m KP 17.87	4d	26-Jan-16 A	30-Jan-16 A
A11520	Remove Sending Shoring - CW	Dixie Road - 110m KP 17.87	3d	26-Jan-16 A	29-Jan-16 A
A11406	Remove Receiving Shoring	CNR Railroad - 89m (CNR - Airport KP 22.87)	5d	01-Feb-16 A	05-Feb-16 A
A11405	Remove Sending Shoring	CNR Railroad - 89m (CNR - Airport KP 22.87)	5d	02-Feb-16 A	07-Feb-16 A



Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

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TASK filter: Mike - TEMP Code.

APPENDIX H

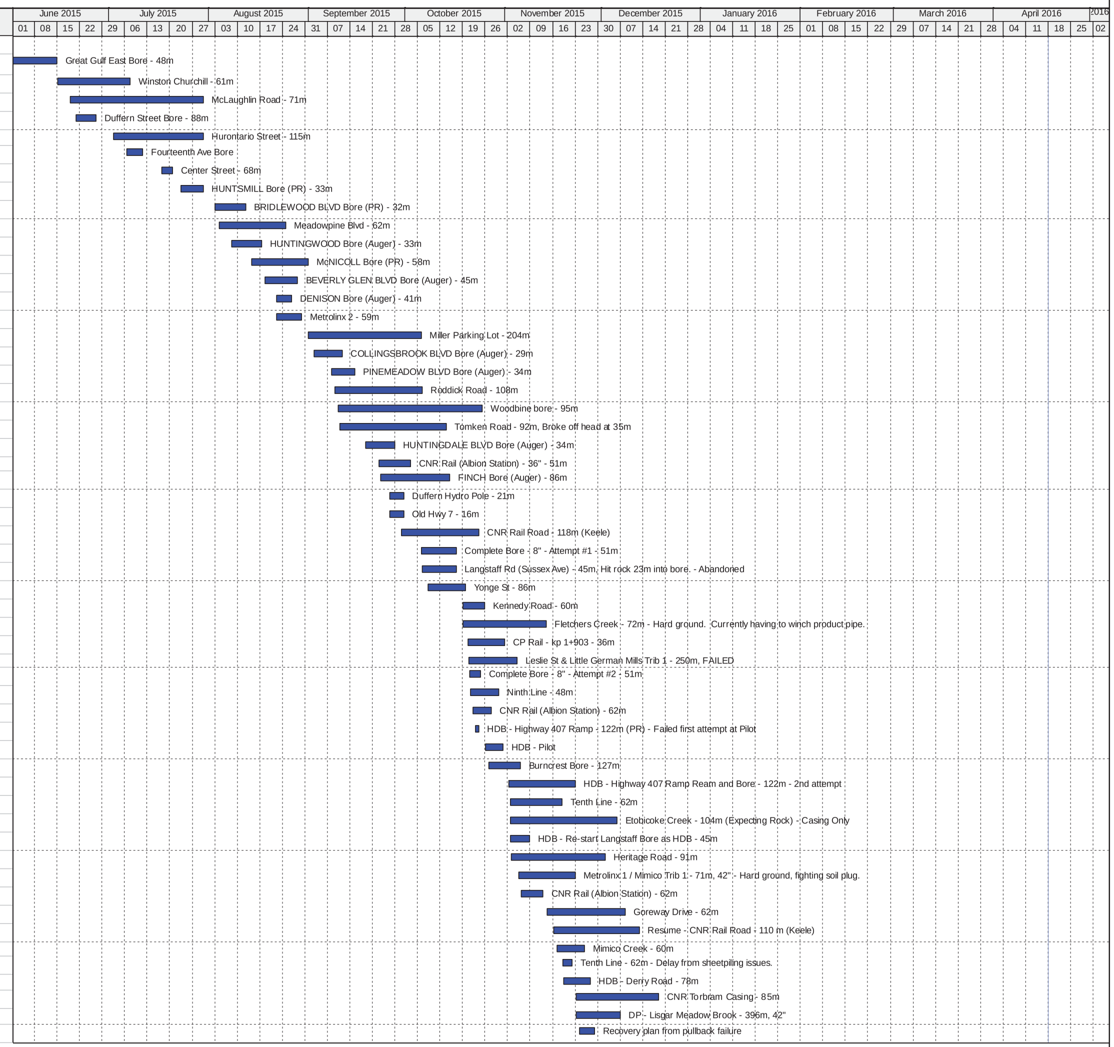
Boring Schedule

Michels Mainline - Spread 1...

Michels GTA Schedule - Track Bores

22-Apr-16 08:41

Activity ID	Activity Name	WBS Name	Actual Duration	Start	Finish
A12240	Great Gulf West Bore - 20m	Great Gulf West - 20m (KP 0.89)	6d	01-Mar-15 A	09-Mar-15 A
A12230	Great Gulf East Bore - 48m	Great Gulf East - 48m (KP 0.32)	17d	26-May-15 A	15-Jun-15 A
A13250	Winston Churchill - 61m	Winston Churchill - 61m KP 5.07	19d	15-Jun-15 A	07-Jul-15 A
A10990	McLaughlin Road - 71m	McLaughlin Road - 71m KP 12.18 (SR)	35d	19-Jun-15 A	30-Jul-15 A
A12430	Duffern Street Bore - 88m	Duffern St - 88m (KP 3.42)	5d	21-Jun-15 A	27-Jun-15 A
A11610	Hurontario Street - 115m	Hurontario Street - 115m KP 13.56 (SR)	22d	02-Jul-15 A	30-Jul-15 A
A13220	Fourteenth Ave Bore	FOURTEENTH AVE - 39m (KP 0.90)	5d	06-Jul-15 A	11-Jul-15 A
A10590	Center Street - 68m	Center Street - 68m (KP 2.68)	3d	17-Jul-15 A	21-Jul-15 A
A9985	HUNTSMILL Bore (PR) - 33m	HUNTSMILL - 33m (KP 4.24)	7d	23-Jul-15 A	30-Jul-15 A
A10140	BRIDLEWOOD BLVD Bore (PR) - 32m	BRIDLEWOOD BLVD - 32m (KP 7.31)	8d	03-Aug-15 A	12-Aug-15 A
A11050	Meadowpine Blvd - 62m	Meadowpine Blvd - 62m KP 5.28	18d	04-Aug-15 A	25-Aug-15 A
A10223	HUNTINGWOOD Bore (Auger) - 33m	HUNTINGWOOD - 33m (KP 6.90)	8d	08-Aug-15 A	17-Aug-15 A
A9973	McNICOLL Bore (PR) - 58m	McNICOLL - 58m (KP 4.42)	14d	14-Aug-15 A	01-Sep-15 A
A10100	BEVERLY GLEN BLVD Bore (Auger) - 45m	BEVERLY GLEN BLVD - 45m (KP 5.12)	9d	18-Aug-15 A	28-Aug-15 A
A9953	DENISON Bore (Auger) - 41m	DENISON - 41m (KP 2.02)	4d	22-Aug-15 A	27-Aug-15 A
A10743	Metrolinx 2 - 59m	Metrolinx 2 - 59m (KP 1.3)	7d	22-Aug-15 A	30-Aug-15 A
A10803	Miller Parking Lot - 204m	Miller - 204m (KP 14.30) (Wetland to Golf Net)	29d	01-Sep-15 A	06-Oct-15 A
A10170	COLLINGSBROOK BLVD Bore (Auger) - 29m	COLLINGSBROOK BLVD - 29m (KP 6.41)	7d	03-Sep-15 A	11-Sep-15 A
A10183	PINEMEADOW BLVD Bore (Auger) - 34m	PINEMEADOW BLVD - 34m (KP 5.97)	6d	08-Sep-15 A	15-Sep-15 A
A10655	Roddick Road - 108m	Roddick Road - 108m (KP 15.16)	23d	09-Sep-15 A	06-Oct-15 A
A10855	Woodbine bore - 95m	Woodbine (Woodbine to Miller) - 95m	38d	10-Sep-15 A	25-Oct-15 A
A11540	Tomken Road - 92m, Broke off head at 35m	Tomken Road - 92m KP 16.39	27d	11-Sep-15 A	14-Oct-15 A
A10070	HUNTINGDALE BLVD Bore (Auger) - 34m	HUNTINGDALE BLVD - 33m (KP 5.43)	7d	19-Sep-15 A	28-Sep-15 A
A11303	CNR Rail (Albion Station) - 36" - 51m	CNR Rail (Albion Station) - 36" - 51mKP 0 Spr	9d	23-Sep-15 A	03-Oct-15 A
A9963	FINCH Bore (Auger) - 86m	FINCH - 86m (KP 5.59) (7.5m) (SR)	17d	23-Sep-15 A	15-Oct-15 A
A13100	Dufferin Hydro Pole - 21m	Dufferin Hydro Pole - 21m	4d	26-Sep-15 A	30-Sep-15 A
A13090	Old Hwy 7 - 16m	Old Hwy 7 - Slip Bore - 16m	4d	26-Sep-15 A	30-Sep-15 A
A10700	CNR Rail Road - 118m (Keele)	CNR Rail Road Keele - 118m (KP 0.05)	20d	30-Sep-15 A	24-Oct-15 A
A13310	Complete Bore - 8" - Attempt #1 - 51m	CNR Rail (Albion Station) - 8" - 51m	9d	06-Oct-15 A	17-Oct-15 A
A10446	Langstaff Rd (Sussex Ave) - 45m, Hit rock 23m into bore. - Abandor	Langstaff Rd (Sussex Ave) - 45m (KP 9.67) Fa	9d	06-Oct-15 A	17-Oct-15 A
A10493	Yonge St - 86m	Yonge St - 86m (KP 8.16)	9d	08-Oct-15 A	20-Oct-15 A
A11570	Kennedy Road - 60m	Kennedy Road - 60m KP 14.97	6d	19-Oct-15 A	26-Oct-15 A
A11150	Fletchers Creek - 72m - Hard ground. Currently having to winch pr	Fletchers Creek - 72m KP 12.81	23d	19-Oct-15 A	14-Nov-15 A
A11180	CP Rail - kp 1+903 - 36m	CP Rail - kp 1+903 - 36m KP 1.9	10d	20-Oct-15 A	01-Nov-15 A
A10545	Leslie St & Little German Mills Trib 1 - 250m, FAILED	Leslie St & Little German Mills Trib 1 - 250m (K	13d	21-Oct-15 A	05-Nov-15 A
A13330	Complete Bore - 8" - Attempt #2 - 51m	CNR Rail (Albion Station) - 8" - 51m	4d	21-Oct-15 A	24-Oct-15 A
A11090	Ninth Line - 48m	Ninth Line - 48m KP 2.6	8d	21-Oct-15 A	30-Oct-15 A
A11333	CNR Rail (Albion Station) - 62m	CNR Rail (Albion Station) - 42" - 62m KP 0 Sp	5d	22-Oct-15 A	28-Oct-15 A
A11120	HDB - Highway 407 Ramp - 122m (PR) - Failed first attempt at Pilot	Highway 407 Ramp - 122m KP 2.18	1d	23-Oct-15 A	24-Oct-15 A
A11318	HDB - Pilot	Highway 407 Ramp - 122m KP 2.18	6d	26-Oct-15 A	31-Oct-15 A
A13130	Burncrest Bore - 127m	Burncrest (Burncrest to Pit #2) - 127m	9d	27-Oct-15 A	06-Nov-15 A
A11328	HDB - Highway 407 Ramp Ream and Bore - 122m - 2nd attempt	Highway 407 Ramp - 122m KP 2.18	18d	02-Nov-15 A	23-Nov-15 A
A12100	Tenth Line - 62m	Tenth Line - 62m KP 4.19	14d	03-Nov-15 A	19-Nov-15 A
A11510	Etobicoke Creek - 104m (Expecting Rock) - Casing Only	Etobicoke Creek - 104m KP 17.2	29d	03-Nov-15 A	06-Dec-15 A
A13260	HDB - Re-start Langstaff Bore as HDB - 45m	HDB Langstaff Rd (Sussex Ave) - 45m (KP 9.6	5d	03-Nov-15 A	09-Nov-15 A
A11020	Heritage Road - 91m	Heritage Road - 91m KP 6.5	25d	03-Nov-15 A	02-Dec-15 A
A12770	Metrolinx 1 / Mimico Trib 1 - 71m, 42" - Hard ground, fighting soil plu	Metrolinx 1 / Mimico Trib 1 - 71m KP 20.45	15d	05-Nov-15 A	23-Nov-15 A
A11337	CNR Rail (Albion Station) - 62m	CNR Rail (Albion Station) - 42" - 62m KP 0 Sp	6d	06-Nov-15 A	13-Nov-15 A
A11364	Goreway Drive - 62m	Goreway Drive - 62m KP 23.78	22d	14-Nov-15 A	08-Dec-15 A
A10750	Resume - CNR Rail Road - 110 m (Keele)	CNR Rail Road Keele - 118m (KP 0.05)	25d	16-Nov-15 A	13-Dec-15 A
A12160	Mimico Creek - 60m	Mimico Creek - 60m - KP 23.97	8d	17-Nov-15 A	26-Nov-15 A
A12105	Tenth Line - 62m - Delay from sheetpiling issues.	Tenth Line - 62m KP 4.19	3d	19-Nov-15 A	22-Nov-15 A
A11210	HDB - Derry Road - 78m	Derry Road - 78m KP 0.61	7d	19-Nov-15 A	27-Nov-15 A
A10904	CNR Torbram Casing - 85m	CNR Torbram - 85m KP 20.64	25d	23-Nov-15 A	19-Dec-15 A
A13504	DP - Lisgar Meadow Brook - 396m, 42"	Lisgar Meadow Brook - 396m, 42" KP 3.09 - D	13d	23-Nov-15 A	07-Dec-15 A
A11348	Recovery plan from pullback failure	Highway 407 Ramp - 122m KP 2.18	5d	24-Nov-15 A	29-Nov-15 A



Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

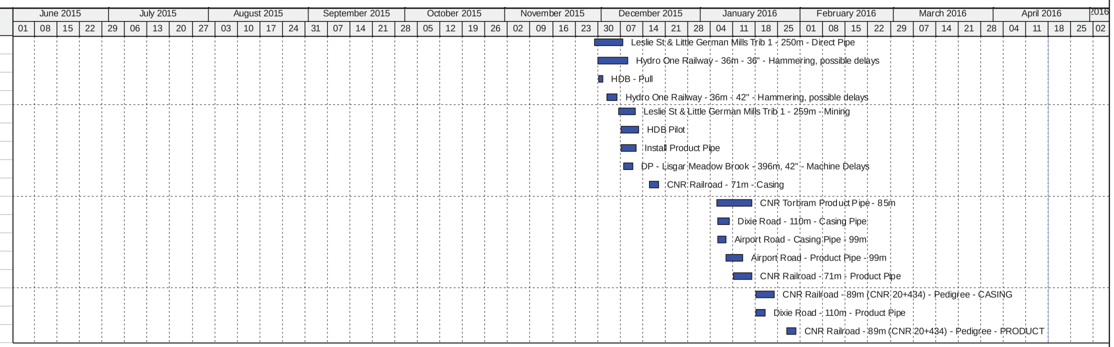
TASK filter: Mike - TEMP Code.

Michels Mainline - Spread 1...

Michels GTA Schedule - Track Bores

22-Apr-16 08:41

Activity ID	Activity Name	WBS Name	Actual Duration	Start	Finish
A13370	Leslie St & Little German Mills Trib 1 - 250m - Direct Pipe	Leslie St & Little German Mills Trib 1 - 250m (K	9d	29-Nov-15 A	07-Dec-15 A
A11240	Hydro One Railway - 36m - 36" - Hammering, possible delays	Hydro One Railway - 36" - 36m - KP 0.14	9d	30-Nov-15 A	09-Dec-15 A
A11215	HDB - Pull	Derry Road - 78m KP 0.61	2d	30-Nov-15 A	01-Dec-15 A
A11270	Hydro One Railway - 36m - 42" - Hammering, possible delays	Hydro One Railway - 42" - 36m - KP 0.14	3d	03-Dec-15 A	06-Dec-15 A
A13560	Leslie St & Little German Mills Trib 1 - 259m - Mining	Leslie St & Little German Mills Trib 1 - 250m (K	6d	06-Dec-15 A	11-Dec-15 A
A11447	HDB Pilot	Airport Road - 99m - KP 22.37	6d	07-Dec-15 A	12-Dec-15 A
A11511	Install Product Pipe	Etobicoke Creek - 104m KP 17.2	5d	07-Dec-15 A	12-Dec-15 A
A13505	DP - Lisgar Meadow Brook - 396m, 42" - Machine Delays	Lisgar Meadow Brook - 396m, 42" KP 3.09 - D	3d	08-Dec-15 A	11-Dec-15 A
A11417	CNR Railroad - 71m - Casing	CNR Railroad - 71m (CNR - Goreway KP 23.4	3d	16-Dec-15 A	19-Dec-15 A
A10905	CNR Torbram Product Pipe - 85m	CNR Torbram - 85m KP 20.64	11d	06-Jan-16 A	17-Jan-16 A
A11480	Dixie Road - 110m - Casing Pipe	Dixie Road - 110m KP 17.87	4d	06-Jan-16 A	10-Jan-16 A
A11448	Airport Road - Casing Pipe - 99m	Airport Road - 99m - KP 22.37	3d	06-Jan-16 A	09-Jan-16 A
A11450	Airport Road - Product Pipe - 99m	Airport Road - 99m - KP 22.37	5d	09-Jan-16 A	14-Jan-16 A
A11418	CNR Railroad - 71m - Product Pipe	CNR Railroad - 71m (CNR - Goreway KP 23.4	6d	11-Jan-16 A	17-Jan-16 A
A11394	CNR Railroad - 89m (CNR 20+434) - Pedigree - CASING	CNR Railroad - 89m (CNR - Airport KP 22.87)	6d	18-Jan-16 A	24-Jan-16 A
A11485	Dixie Road - 110m - Product Pipe	Dixie Road - 110m KP 17.87	3d	18-Jan-16 A	21-Jan-16 A
A11397	CNR Railroad - 89m (CNR 20+434) - Pedigree - PRODUCT	CNR Railroad - 89m (CNR - Airport KP 22.87)	3d	27-Jan-16 A	30-Jan-16 A

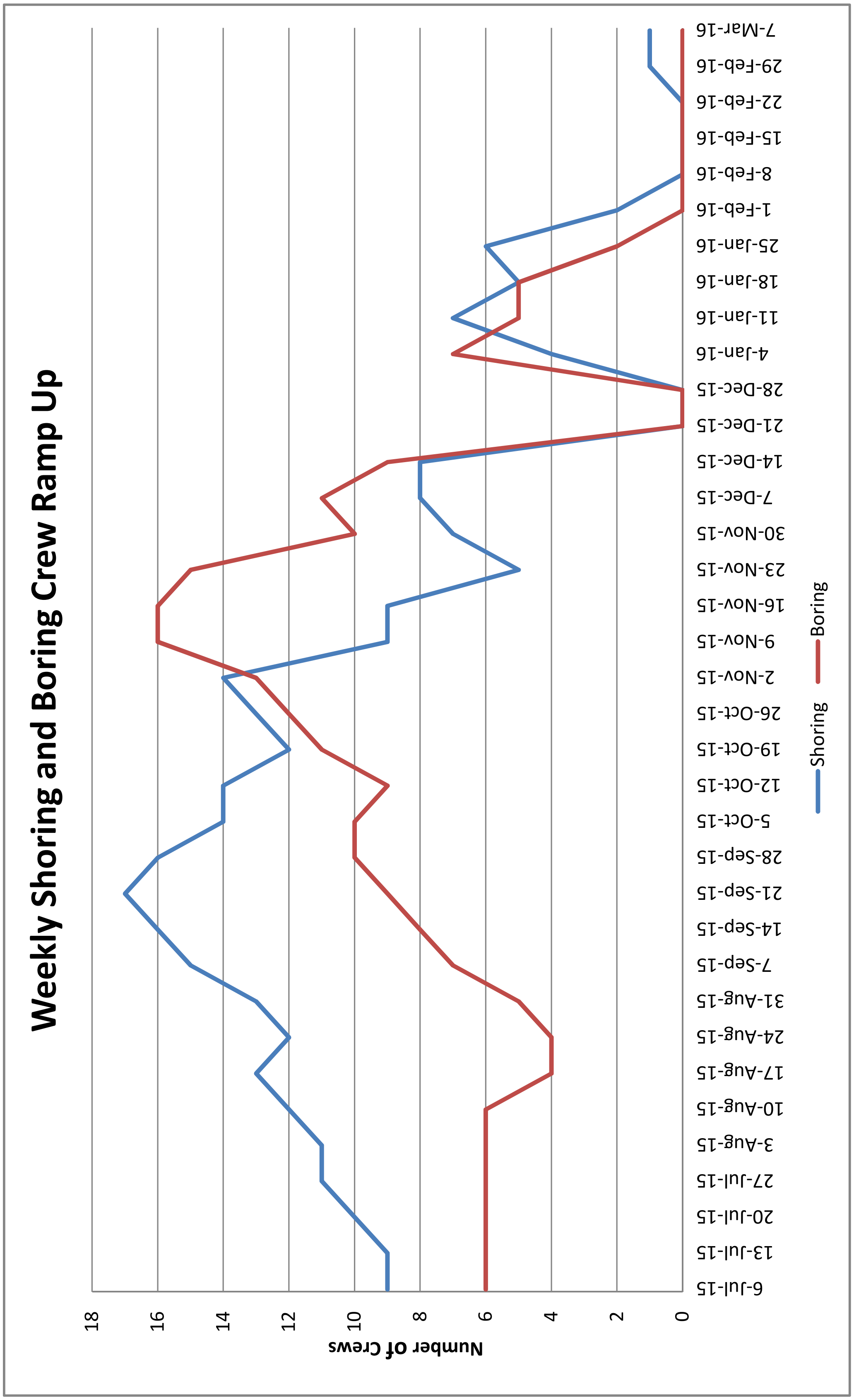


Actual Work
Remaining Work
Critical Remaining Work
Milestone
Summary

TASK filter: Mike - TEMP Code.

APPENDIX I

Shoring and Boring Crew Ramp Up


Weekly Shoring and Boring Crew Ramp Up
Number of Crews
0
2
4
6
8
10
12
14
16
18
6-Jul-15
13-Jul-15
20-Jul-15
27-Jul-15
3-Aug-15
10-Aug-15
17-Aug-15
24-Aug-15
31-Aug-15
7-Sep-15
14-Sep-15
21-Sep-15
28-Sep-15
5-Oct-15
12-Oct-15
19-Oct-15
26-Oct-15
2-Nov-15
9-Nov-15
16-Nov-15
23-Nov-15
30-Nov-15
7-Dec-15
14-Dec-15
21-Dec-15
28-Dec-15
4-Jan-16
11-Jan-16
18-Jan-16
25-Jan-16
1-Feb-16
8-Feb-16
15-Feb-16
22-Feb-16
29-Feb-16
7-Mar-16
Shoring
Boring

APPENDIX J

Construction Pictures

MAINLINE CONSTRUCTION

SHEPPARD CROSSOVER TIE-IN

COLLINGSBROOK BOULEVARD TRACK BORE

PINEMEADOW BOULEVARD TRACK BORE PIT

MCNICHOLL AVENUE TRACK BORE PIT

<u>14th AVENUE TRACK BORE (TYPICAL BORE PIT SLOPING)</u>

RODICK ROAD TRACK BORE (WEST SIDE)

RODICK ROAD TRACK BORE PIT (EAST SIDE)

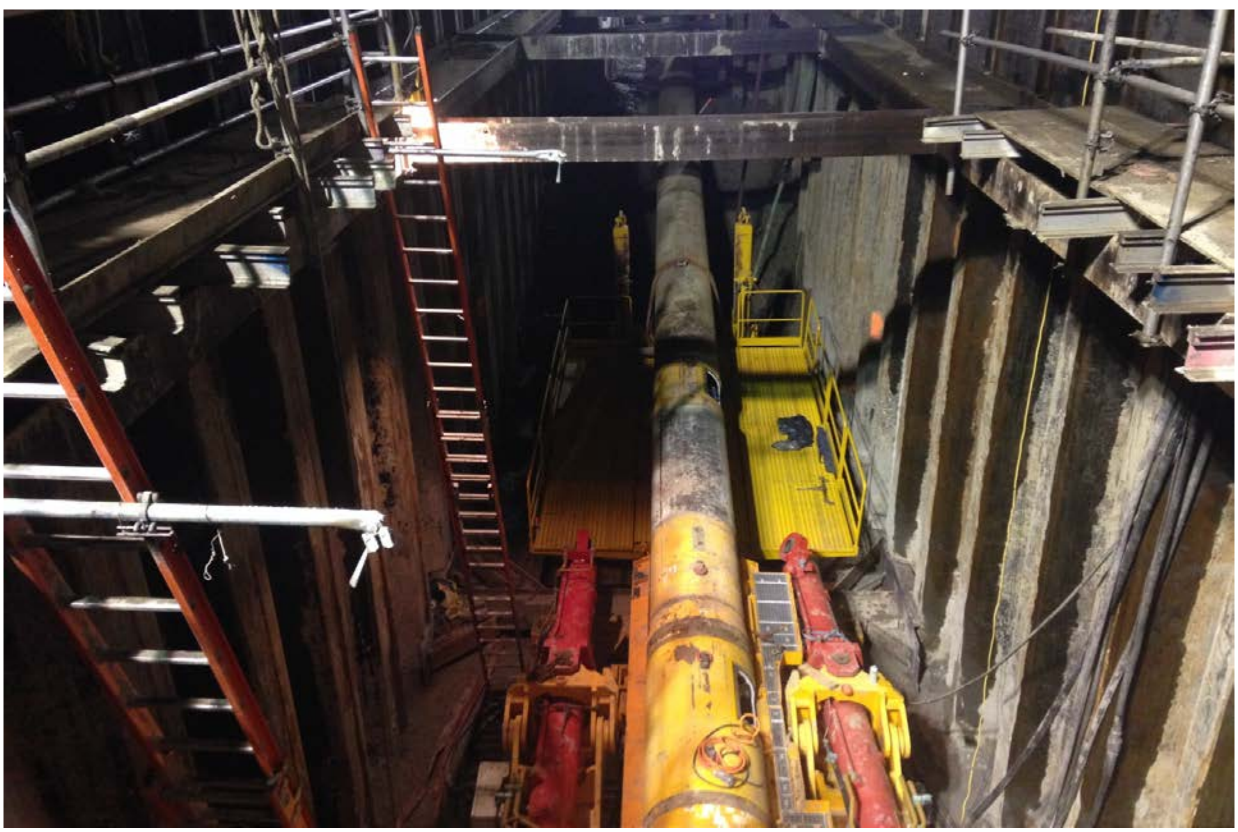
BEAVER CREEK TRIB 2 (INSTALLING CONCRETE COATED PIPE)

MILLER PARKING LOT (EAST TRACK BORE PIT)

LESLIE STREET BORE PIT (EAST SIDE)

LESLIE TRACK BORE (SANDED AUGERS LED TO DIRECT PIPE METHOD)

LESLIE STREET DIRECT PIPE



GERMAN MILLS CREEK

LANGSTAFF ROAD EAST BORE

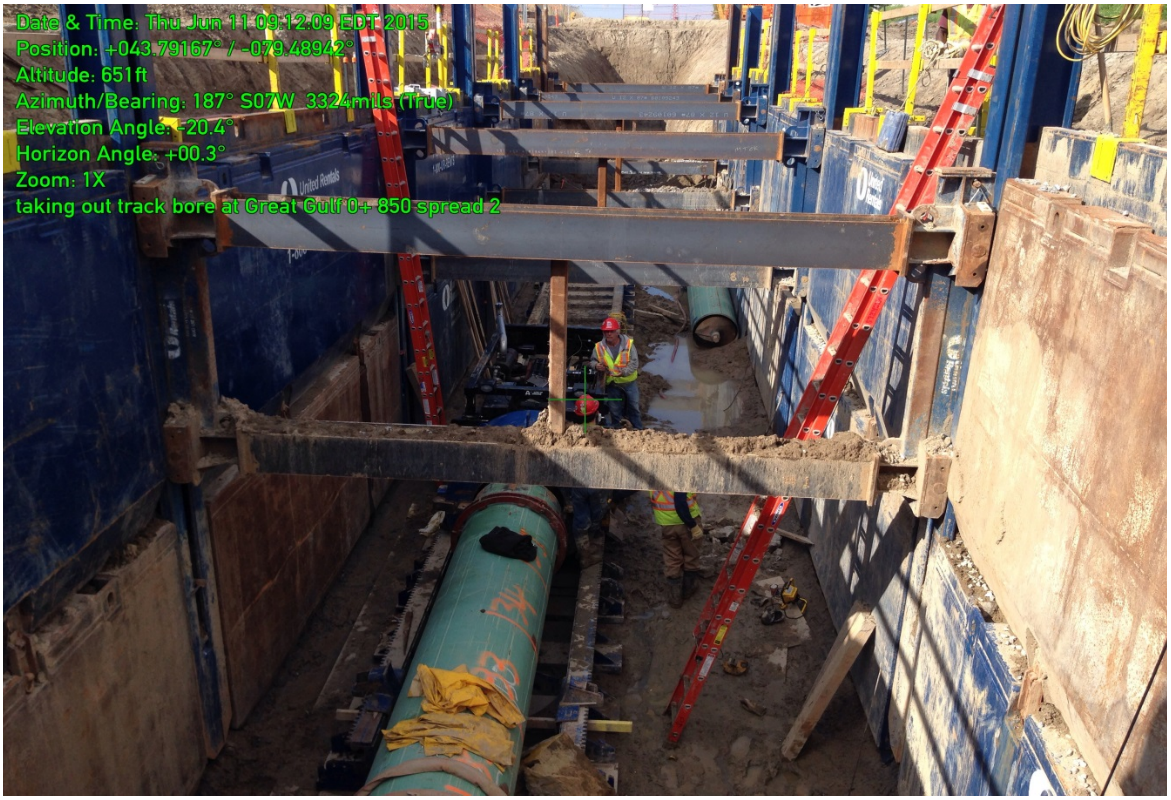
YONGE STREET (WEST BORE PIT)

DUFFERIN STREET BORE PIT (WEST SIDE)

CENTRE STREET (DEWATERING BORE PIT)

CENTRE STREET (BACKFILL AND COMPACTION AFTER PIPE INSTALLED)

GREAT GULF DRIVE EAST TRACK BORE



GREAT GULF DRIVE EAST (INSTALLING PNEUMATIC HAMMER TO BREAK BOULDER BLOCKING THE BORE)

CN/KEELE INSTALLED TRACK BORE

KEELE STREET TIE-IN (EXISTING PARKWAY NORTH STUB IN BACKGROUND)

ALBION OUTLET VALVE INSTALLATION (TYPICAL SLOPING)

NPS 36 CN TRACK BORE TO ALBION STATION (NORTH SIDE PIT WITH PIPE INSTALLED & SOUND CURTAIN)

NPS 36 CN BORE PIT (SOUTH SIDE WITHIN ALBION STATION PROPERTY)

CONSTRUCTION OF L-SHAPED NPS 42 CN TRACK BORE PIT (NORTH SIDE TO TIE IN OF FINCH-CLAIREVILLE HDD)

INSTALLATION OF SHEET PILE FOR NPS 42 CN TRACK BORE PIT (SOUTH SIDE WITHIN ALBION STATION PROPERTY

VIEW OF SHEET PILING IN ALBION STATION PROPERTY (REASON FOR DELAY IN STATION CONSTRUCTION)

MIMICO CREEK TRACK BORE

GOREWAY DRIVE (EAST BORE PIT)

CN/AIRPORT ROAD TRACK BORE PIT

CN/TORBRAM TRACK BORE

METROLINX 1 TRACK BORE

SPRING CREEK TEMPORARY BRIDGE INSTALLATION

INSTALLED PIPE AT SPRING CREEK (TEMPORARY BRIDGE ON LEFT)

ETOBICOKE CREEK TRACK BORE (EAST SIDE IN SOLID ROCK)

TOMKEN ROAD TRACK BORE (WEST SIDE IN ROCK)

KENNEDY ROAD TRACK BORE (WEST SIDE)

KENNEDY ROAD TRACK BORE (EAST SIDE)

HURONTARIO STREET TRACK BORE TIE IN (EAST SIDE)

HYDROVAC SEARCH TO LOCATE UNMARKED HONI CABLES AT FLETCHERS CREEK

FLETCHERS CREEK TRACK BORE (EAST SIDE)

MCCLAUGHLIN ROAD TRACK BORE (WEST SIDE)

WINSTON CHURCHILL BOULEVARD TRACK BORE (WEST SIDE)

10TH LINE TRACK BORE BEFORE PUMPING WATER (WEST SIDE)

ARGENTIA ROAD (NPS 42 PIPE CROSSING OVER PEEL WATER MAIN)

ARGENTIA ROAD (WATER MAIN RELOCATION TO ENABLE CASING EXTENSION)

LISGAR MEADOWBROOK EAST BORE PIT (UNSTOPPABLE SAND FLOWING INTO PIT LED TO DIRECT PIPE)

LISGAR MEADOWBROOK (BOILING SAND FLOWING THROUGH SHEET PILING)

LISGAR MEADOWBROOK DIRECT PIPE

9TH LINE TRACK BORE (EAST SIDE)

HIGHWAY 407 HORIZONTAL DIRECTIONAL BORE

HIGHWAY 407 SPECIAL ROCK TOOLS/REAMERS

CROSSING UNDER TCPL MAINLINE SOUTH OF DERRY ROAD

NPS 36 AND NPS 42 CP HONI RAIL CROSSING (EAST SIDE) AT PARKWAY WEST EXIT

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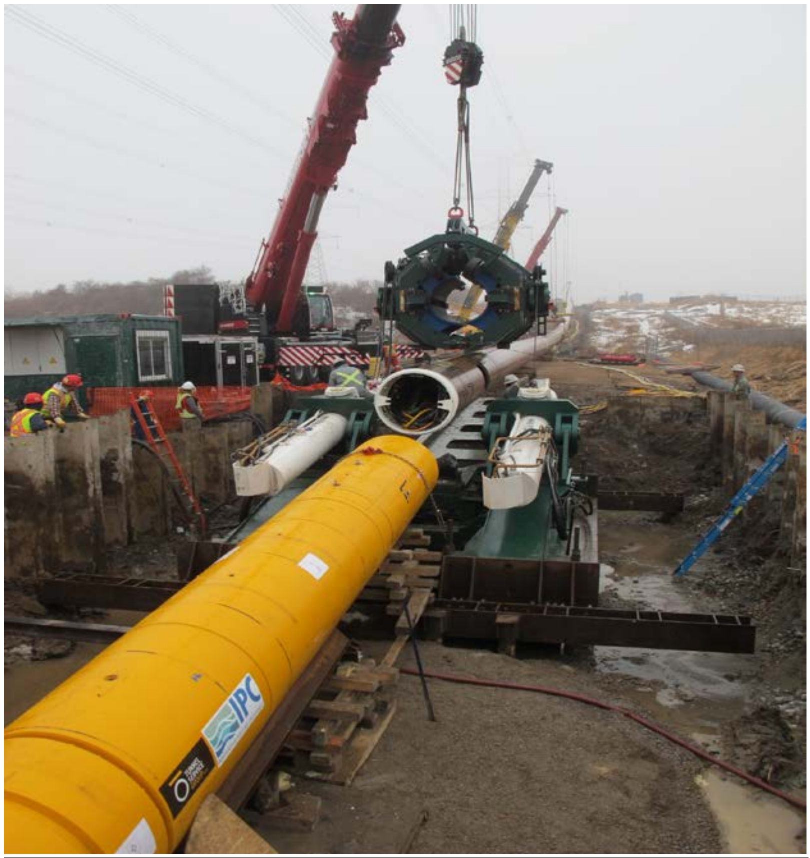
HDD CONSTRUCTION

CREDIT RIVER DIRECT PIPE TUNNELING HEAD AND THRUSTER



CREDIT RIVER PIPE STRING

CREDIT RIVER DIRECT PIPE ENTRY (AERIAL VIEW)

CREDIT RIVER MUD SYSTEM

FINCH-CLAIREVILLE DRILL ENTRY (WITH ALBION STATION IN BACKGROUND)

FINCH-CLAIREVILLE HDD PULLBACK ATTEMPT

FINCH-CLAIREVILLE "TORPEDO" PULL HEAD (THIRD ATTEMPT)

BEAVER CREEK HDD RIG

HIGHWAY 401 DRILL ENTRY PAD (TYPICAL SET UP)

STEELES AVENUE HDD (HOLE OPENER/REAMER)

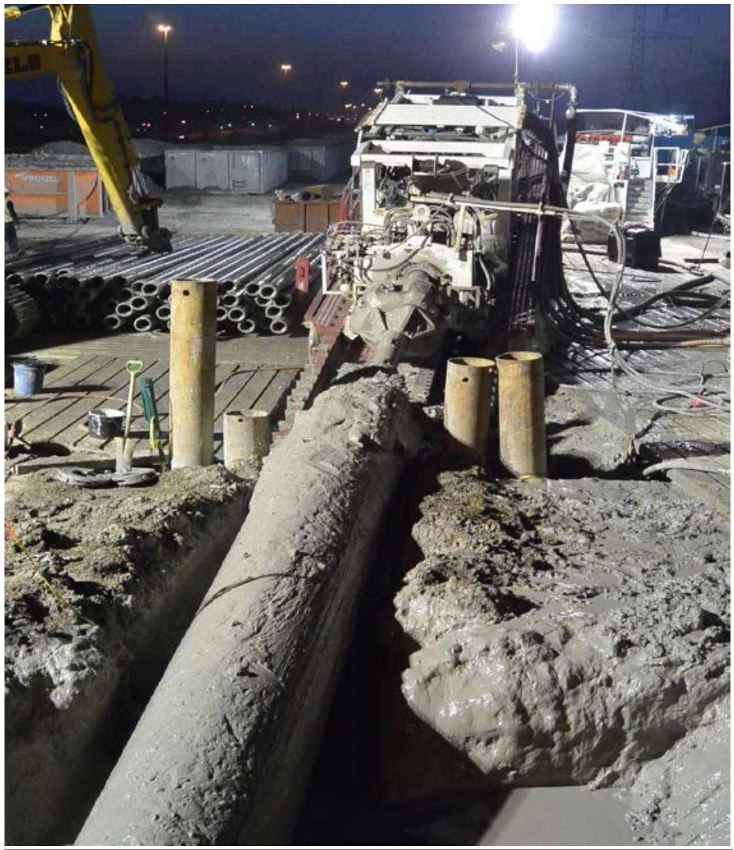
BAYVIEW AVENUE DAMAGED PIPE (FIRST PULLBACK)

POMONA DRILL (WITH SOUND BARRIER TO CEMETARY)

EAST DON RIVER INADVERTENT RETURN CONTAINMENT AND CLEAN UP (EAST OF CREEK)

EAST DON PIPE STRING SUSPENDED WITH CRANES DURING PULLBACK

BATHURST HDD - SUCCESSFUL PIPE PULLBACK



REAMER PACKED WITH CUTTINGS

BRAMALEA ROAD HDD – 54” SWAB BALL

HIGHWAY 410 HDD – 6” PLASTIC BUOYANCY PIPE INSTALLED FOR PULLBACK

MISSISSAUGA ROAD HDD – INSTALLING 60" CASING AT ENTRY

FACILITIES CONSTRUCTION

CONSTRUCTION OF INDIAN LINE TEMPORARY BRIDGE TO ALBION STATION

COMPLETED INDIAN LINE ROAD TEMPORARY BRIDGE

TRACK BORE TIE-IN OF OUTLET PIPING AT ALBION STATION

CONCRETE SLAB BUILDING FOUNDATION INSTALLATION AT ALBION STATION

VARIOUS SPOOL PIECES READY FOR WELDING AT ALBION STATION

REGULATOR RUNS AT ALBION STATION

HEAT EXCHANGER AND GLYCOL LOOP AT ALBION STATION

COMPLETED ALBION STATION

LARGE BORE FITTINGS READY FOR FABRICATION AT FAB SHOP

COMPLETED VALVE ASSEMBLY AT FAB SHOP

BOILER BUILDING CONSTRUCTION AT PARKWAY WEST

INSIDE BOILER BUILDING AT PARKWAY WEST

NPS 42 VALVE ASSEMBLY BEING LIFTED INTO PLACE (APPROX. 56 TONS) AT PARKWAY WEST

METER RUN INSTALLATION AT PARKWAY WEST

UNION GAS TIE-INS AT PARKWAY WEST

NPS 42 PIG LAUNCHER BEING LOWERED INTO PLACE AT PARKWAY WEST

COMPLETED PARKWAY WEST GATE STATION

HYDROTESTING

ONE OF TWO LAKE TANKS AT RODICK ROAD FOR SEGMENT B HYDROTESTING

TEST HEAD AT RODICK ROAD

DRYING PIG RECEIVER AT SHEPPARD AVENUE

TWIN LAKE TANKS AT KENNEDY ROAD FOR SEGMENT A HYDROTESTING

HOARDING TEST HEAD FOR WINTER HYDROTEST

SEDIMENT FILTRATION FOR DISCHARGE WATER AT KENNEDY ROAD TEST SITE

APPENDIX K

KPMG Assessment Report

Enbridge Gas Distribution

GTA Project Report

KPMG LLP

June 2017

Enbridge GTA Project Assessment Report - 23June2017

CONFIDENTIAL

KPMG

Enbridge Gas Distribution
GTA Project Report
June 2017
CONFIDENTIAL

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Enbridge Gas Distribution
GTA Project Report
June 2017
CONFIDENTIAL

Enbridge GTA Project Executive Summary

KPMG provided independent oversight of the GTA Project to Enbridge Gas Distribution ("EGD") management with respect to i) identifying gaps with leading project process, project management and governance practices, ii) monitoring project risks and iii) assessing prudency in the utilization of funds in carrying out the GTA Project.

In concluding our assessment, we have considered the performance of the EGD GTA Project team against Good Utility Practice, defined as the following:

> *Consideration of the practices, methods and acts engaged in or approved by a significant portion of the utility industry during the relevant time period, or any of the practices, methods or acts which, in the exercise of reasonable judgment in light of the facts known at the time a decision was made, could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition.*

We have further considered "prudency" as follows[1]:

- Decisions made by the utility's management should generally be presumed to be prudent unless challenged on reasonable grounds.
- Decisions must have been reasonable under the circumstances that were known or ought to have been known to the utility at the time the decision was made.
- Hindsight should not be used in determining prudence, although consideration of the outcome of the decision may be used to overcome the presumption of prudence.
- Prudence must be determined in a retrospective factual inquiry, in that the evidence must be concerned with the time the decision was made and must be based on facts about the elements that could or did enter into the decision at the time.

EGD energized the GTA Project pipeline for in-service use in March 2016 with an installed cost of $850M. This represented a $182M increase in costs and a five month delay in completion date over the initial estimates submitted to the OEB. Nevertheless, in the course of our review, KPMG found that the GTA Project team made efforts to mitigate against cost and schedule increases and demonstrated prudency in the delivery of the project. The 27% cost increase is within AACE acceptable range of accuracy for a Class III estimate guideline.

Our report initially identified 14 Project Governance and Process improvement areas, all of which were successfully implemented or mitigated by Project completion.

We conducted a Commercial Contract Review on the 4 main construction contracts and found the process of contract procurement to be competitive and well documented. The

[1] Based on the Ontario Court of Appeal's decision in *Enbridge Gas Distribution Inc v Ontario Energy Board* (2006)

contract terms are relatively favorable to EGD and in-line with industry practice in terms of level of security and change management.

During construction activities (January 2015 to March 2016), we monitored Construction Cost Challenges and Schedule Performance. Based on our review and information provided, the GTA Project team demonstrated prudency in managing cost and schedule.

Our Operational Readiness review focused on the procedures and systems utilized for an effective transition of the assets from project to commercial operations. We have identified 4 opportunity areas for consideration on future projects to ensure a successful transition.

2016-0200, GTA Project - Post Construction Financial Report, Appendix K

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Enbridge GTA Project Background

Enbridge Gas Distribution Inc. ("EGD") is a natural gas utility regulated by the Ontario Energy Board ("OEB") and is responsible for building and maintaining the infrastructure required to support the distribution of natural gas. In January 2014, EGD received approval from the OEB in the matter of an application by EGD to construct the GTA Project (EB-2012-0451) (the "GTA Project").

The GTA Project consists of the construction of two segments of a natural gas pipeline and associated facilities in and around the City of Toronto. The two segments include a 27 km pipeline running west of Toronto ("Segment A") and a 23 km pipeline running east of Toronto ("Segment B"). The GTA Project will allow for continued system reliability and increased supply diversity through access to gas supplies from the U.S. Northeast. It will also allow greater system capacity to enable EGD to prepare for future natural gas needs within the Greater Toronto Area ("GTA") now and in the long term. The initial cost estimate presented to the OEB was $686.5M for the GTA Project.

At the end of October 2014, following the completion of the initial cost estimate and the signing of the main commercial contracts, but prior to the start of project execution, EGD retained KPMG to provide independent oversight of the GTA Project to EGD management with respect to i) identifying gaps with leading project process, project management and governance practices, ii) monitoring project risks and iii) assessing prudency in the utilization of funds in carrying out the GTA Project. Specifically, the following services were provided by KPMG to EGD:

1. Review of *Project Governance and Process*
2. Review of *Contracting Process and Key Commercial Contracts*
3. Monthly review of *Construction Cost Challenges and Schedule Performance*
4. Assessment of *Operational Readiness* procedures and controls

Upon completion of the GTA Project, KPMG has prepared this report to summarize our key findings and recommendations, and our assessment of the prudency demonstrated by EGD, in delivering the GTA Project based on our review under each of the four service areas listed above.

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1 Project Governance and Process

1.1 Approach

KPMG conducted a Project Governance and Process framework assessment that included a baseline review of the existing GTA Project governance processes, project controls and project management tools in order to analyze the GTA Project with KPMG's understanding of Leading Project Management Practices.

Our review utilized a KPMG Global methodology that aligns with industry-accepted Project Management Institute ("PMI") guidelines and allows for the collection of industry benchmarks. Our review focused on 13 project management elements, grouped under five Project Control Categories ("PCC"), as follows:

Project Strategy, Organization & Administration	1. Integration Management 2. Reporting & Stakeholder Management 3. Human Resources & Labour Relations	Process, Quality & Risk Management	8. Scope Management 9. Risk Management 10. Regulatory & Environmental Management 11. Quality Management 12. Information Management
Cost & Financial Management	4. Estimating & Cost Management 5. Financial Management 6. Asset Management		
Schedule Management	7. Development, Progress, Change & Integration	Procurement Management	13. Planning, Contracting, Administration & Claims

The existing project control and governance environment for the GTA Project was assessed for maturity under the above 13 PCC sub-categories and ranked in the following categories:

Informal – Not fully developed, little or no documentation or formalized procedure exists.

Standardized – Developed, appears adequately documented and appears to function appropriately but below Leading Practices.

Monitored – Developed, adequately documented for standardized use across the organization and appears to function effectively compared to Leading Practices.

Optimized – Developed, adequately documented for standardized use across the organization and appears to be a Leading Practice.

For a project of this size and duration, using generally standard construction methodologies and materials, and within a regulated utility that requires additional scrutiny and control over costs and revenues, KPMG's experience recommends a minimum PCC maturity of 'Standardized' for each element, with leading organizations consistently achieving 'Monitored' maturity, and select PCC's achieving 'Optimized'.

Following our initial assessment in December 2014, KPMG continued to monitor and report on EGD's progress in implementing the initial governance and process recommendations during project execution. KPMG also assisted EGD with the rollout, adjustment and refinement of such recommendations, as appropriate in the context of the GTA Project.

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1.2 Assessment

KPMG's review provided the basis to identify existing gaps and to proceed with governance and process recommendations through the remaining duration of the GTA Project. Opportunities for improvement were identified based on monitoring tools, governance systems and other project management functions, and mitigation of project risks.

KPMG's assessment included: 1) the review of 45 documents provided by the GTA Project team identified as key governance and process documentation; 2) interview of six key GTA Project team personnel.

Based on the steps noted above, our overall assessment of the GTA Project's governance, process and project management was as follows:

- All five assessed PCCs had developed processes and procedures that met a minimum 'Standardized' maturity or greater;
- Six of the 13 PCC sub-categories were assessed at a 'Monitored' maturity, representing a level that is effectively comparable with Leading Practices; and
- 14 improvement areas identified across four PCCs.

KPMG recommended an improvement plan for each area that was accepted and actioned by EGD. All of the improvement areas were ultimately implemented or mitigated within the project lifecycle, with the majority accomplished within the first four months of the project. The areas of improvement are summarized in the table below.

PCC	Description	Target Date	Implemented Date	Status
Project Strategy, Organization & Administration	Detailed Role Clarification	January 2015	January 2015	☑ Implemented
	November 2014 Project Management Plan included a Roles & Responsibilities summary; Meetings were then held in January 2015 to clarify roles & responsibilities and job specific responsibility documents prepared and issued to team members for added clarity; Project controls provided training on scope, role and budget ownership			
	Clear Reporting Lines & Approvals	February 2015	February 2015	☑ Implemented
	Delegation of Authority document completed and signed by Enbridge VP to include revisions to approval lines for all documents and decision making processes; clarification of authority sent to contractors			
	Resource Needs Assessment	April 2015	April 2015	☑ Implemented
	Additional resource needs were identified through the organizational chart to ensure the necessary critical path resources were obtained and trained in a timely manner to advance various phases of the GTA Project; A comparison of the July 2014 to the January 2015 organizational charts evidenced the progress made in filling roles			
	Team Building	January 2015	January 2015	☑ Implemented
	Conducted staff workshops and team building exercises to establish relationships and facilitate communication and information sharing across functions and between employees and contractors			

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	Delegation of Approval & Authority	February 2015	February 2015	Implemented
	Allocated approval and authority of budget items and delegated responsibilities to appropriate owners to ensure they are part of the planning process to develop early buy-in and accountability			
Cost & Financial Management	Contractor Cost Overruns	March 2015	July 2015	Implemented
	Key Performance Indicators ("KPI") defined at outset in January 2015 to evaluate project performance against incurred cost; however, contractor overruns and understated cost forecasting continued; Refined metrics and enhanced procedures by July 2015 to address the challenges the project was experiencing (i.e. permits, crossings)			
	Cost Allocations	April 2015	April 2015	Implemented
	Developed allocation methodology for transmission and distribution assets; Reviewed overhead cost allocation (vs. direct billing) to ensure costs are properly assigned; allocation not required until in-service			
	Variance Analysis Baseline	March 2015	July 2015	Implemented
	EGD had been performing variance analysis since January 2015, but in July 2015 expanded root cause analysis for variance explanations; Re-forecast estimates based on available information for purposes of variance analysis, using original budget, project control baseline, and monthly forecasts			
	Financial Systems	February 2015	February 2015	Mitigated
	Refrained from any system implementations mid-project; including the new TeamWork to ECOSYS			
Project Process, Quality & Risk Management	Project Experience	February 2015	February 2015	Mitigated
	Developed relevant urban project experience and standards using external or contracted industry experts for guidance and to conduct lessons learned session			
	Quality Monitoring Resources	February 2015	February 2015	Mitigated
	Quality monitoring of materials should have resided directly under quality management, but instead resided with procurement function; at time of review material purchases had been largely completed			
Schedule Management	Detailed Baseline Schedule	February 2015	August 2015	Mitigated
	Mitigated the lack of a detailed resource loaded schedule with an activity breakdown to monitor progress; Assessed against current schedule and used as the baseline to monitor progress performance			
	Materials Delivery	April 2015	April 2015	Mitigated
	Established material management process with key pipeline and facilities suppliers to ensure regular updates and inspections are conducted to manage timing of deliveries and impact			
	Permitting	March 2015	August 2015	Mitigated
	Permit management process developed in 2014 to link permit requirements to the schedule and monitor against construction progress, however assumptions around urban permitting timelines may have been optimistic as EGD did not have all winter construction permits in place prior to the planned January 2015 construction start; Accordingly EGD developed a process for detailed management of permits identified as critical path and micro-managed the early HDD permits; Even with these efforts, the final major permit was not received until August 2015			

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Following the delivery of our recommendations in December 2014, throughout the course of the GTA Project, KPMG continued to assess the maturity level of each of the above PCCs specific to the GTA Project. Based on the progress made in implementing our recommended improvement areas as well as our assessment of the current status and progress of the construction activities, as of August 2015, ***all 14 of the improvement opportunities had been successfully implemented or mitigated***.

Priority Category	Recommendations	Closed
#1 Project Strategy, Organization & Administration	5	5
#2 Cost and Financial Management	4	4
#3 Project Process, Quality & Risk Management	2	2
#4 Schedule Management	3	3

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2 Contracting Process and Key Commercial Contract Review

2.1 Approach

KPMG carried out a commercial risk review to assess the commercial terms found in key contracts. We concluded that these commercial terms were relatively favorable to EGD and in-line with industry practice in terms of specifying the appropriate levels of security.

The four main construction contracts for EGD's GTA Project, as identified by the GTA Project team, are as follows:

1. Michels Canada Co. re Mainline – Contract No. C#2-200574 dated December 3, 2014
   - Installation of the mainline pipeline including facility tie-ins and provide Horizontal directional drilling (HDD) support.
2. Michels Canada Co. re HDD – Contract No. C#003-102601 dated November 3, 2014
   - HDD services to be provided and crossings for pipeline systems at seven individual locations to be installed.
3. Mears Canada Corp. re HDD – Contract No. C003-102600 dated November 13, 2014
   - HDD services to be provided and crossings for pipeline systems at seven individual locations to be installed.
4. Aecon Utilities Inc., a division of Aecon Construction Group – CO No. 20150129-CO-AU-66-RO dated February 10, 2015
   - Facilities projects that will connect the pipelines to the EGD gas distribution system.

Key risk areas were categorized as either Category A or B in accordance with explanations provided in the table below. The Category B rating was used when it was deemed that there was uncertainty in the particular risk area or further information or clarification was potentially thought to be needed.

Category	Definition
A	From our analysis of the information reviewed it appears that the risk has been allocated to an appropriate party; and is being managed according to what is regarded as Leading Practice.
B	Although the risk appears to be appropriately managed according to the principles in Category A; there appears to be some uncertainty in the contract documents that requires further clarification before a Category A rating can be achieved.

Each key contract was assessed and categorized as Category A or B for the following risk areas:

- Liability cap / liquidated damages;
- Indemnity;

- Performance securities and guarantees;
- Contract suspension/ termination;
- Dispute resolution;
- Changes;
- Milestones and key dates;
- Payment mechanism and penalties/ incentives; and
- Delays.

Comments and mitigation strategies were provided for each risk area and referenced the schedule or section of each key contract.

2.2 Assessment

At the time that KPMG's engagement commenced in late October 2014, the main commercial contracts had either been finalized or were in the process of being finalized. Accordingly, our assessment focused on a review of the contracting process that EGD had undertaken in selecting and entering into the contracts as well as on a review of the commercial terms and risks of the contracts that had been signed.

KPMG found evidence that there was a robust contract assessment and approval process followed for each of the main commercial contracts. EGD created Contract Development Plans ("CDP") for each of the Mainline, HDD and Facilities contracts. The plans included detailed documentation of the contract requirements, terms, milestone dates, budget and contracting strategy.

In the process leading to vendor selection, multiple bidders were assessed and considered for contract award on the basis of technical and commercial bid considerations.

In awarding the contract, EGD followed a Contract Award Recommendation ("CAR") review and approval process. The CAR documents the results of the bid assessment and the rationale for selecting the winning proponent based on the EGD technical scorecard and commercial evaluation scorecard.

With respect to the mainline contract, which was initially estimated at $215M in the Contract Development Plan, the final contract awarded to Michels at $320M represented a significant increase of $105M to the original cost estimate. However, in reviewing the multiple bids received, EGD demonstrated cost prudency in selecting Michels as the lowest bid and a high technical evaluation score. EGD were also able to negotiate a further reduced contract price from Michels following subsequent rounds of clarification meetings with Michels on the scope of work and a detailed assessment and scrutiny of Michels estimate. Further, EGD made certain commercial contracting decisions to reduce the overall GTA Project cost. For example, EGD decided to assume the cost risk by paying for work

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stoppages relating to weather and environmental delays. This allowed EGD to manage the risk and associated costs, as opposed to passing that risk on to the contractor and in turn potentially paying a higher contract price for the risk premium.

The result of the mainline contracting process are summarized as follows:

	[redacted]	[redacted]	[redacted]
Initial Bid	[redacted]	[redacted]	[redacted]
Revised Bid	[redacted]	[redacted]	[redacted]
Technical Score	[redacted]	[redacted]	[redacted]

Following our assessment of the contracting process, KPMG reviewed the commercial terms of the contracts ultimately entered into, and provided EGD with a list of recommendations and opportunities to strengthen certain conditions in the contracts. The existing contracts were not amended to incorporate the recommendations as the contracts were already signed at the time of KPMG's review. These recommendations were assessed by KPMG as not expected to have a material impact on the existing GTA Project contracts. Instead, these recommendations were accepted as opportunities to strengthen future contracts.

The contracts EGD drafted are generally strong from a commercial perspective and our assessment did not identify significant gaps or flaws in the contract documents. When assessing the opportunities identified, we took into account the prevailing local construction market conditions, the specific contracting strategy in place, payment mechanisms and the risk profile of the scope of work being executed by the contractors. In addition, the benefit of the various opportunities (i.e. additional security and risk transfer) should be balanced against the fact that a contractor may factor in a risk premium that could potentially increase the overall contract price.

Overall, the KPMG team found that the ***contract process was fair and robust*** based on the CDP and CAR process. The ***commercial terms were also relatively favorable to EGD and in-line with industry practice*** based on the key risk areas assessed for each contract, including specifying the appropriate levels of security (i.e. 50% performance bond) to increase the likelihood of successfully replacing a contractor in default. In addition, there was a reasonable contractual framework in place for requiring contractors to provide the necessary information transparency (i.e. employees, rates, classifications, etc.) in the event of a change to minimize the risk of over-payment.

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3 Construction Cost Challenges and Schedule Performance

3.1 Approach

KPMG provided monthly project management cost and schedule monitoring services. This involved reporting on the progress of the project against the initial capital expenditure and construction timeline estimates, summarizing the work progress and performance achieved each month, and identifying or validating key financial, technical and/or strategic risks to the project. Findings were developed through monthly interviews with members of the GTA Project team, independent reviews of monthly project reports (including contractor and EGD progress reports, and EGD internal management presentations), and periodic site visits.

Our monthly assessments considered:

- Construction schedule and budget updates;
- Construction progress assessment; and
- Governance and Process implementation update.

Each monthly review was designed to provide an update and inform EGD management of project developments, costs, and delays. The monthly review also provided our independent assessment of the key risk impacting the GTA Project and the actions taken by the GTA Project team.

3.2 Assessment

Based on our review of the project status as at October 2016, the following summarizes the identified cost and schedule variances against the initial estimate:

3.2.1 COST ANALYSIS – Initial $667M compared to Current $850M (excluding Ashtonbee and Buttonville which are out of scope for this report)

The total GTA Project cost was initially forecasted and filed with the OEB at $686.5M. This forecast included $19M for Buttonville and Ashtonbee, which are out of scope for this report, resulting in an adjusted control budget of $667M. Over the course of the project, actual costs increased by $182M, or 27%, driven largely by the following three factors:

- Market conditions resulting in higher contractor costs;
- Additions to scope to address technical requirements, including shoring; and
- Productivity delays due to underestimated effort required for certain activities in an urban environment, caused by EGD's delay in attaining third party permit approvals, and the execution of track bores (which were partially mitigated by the lump sum contract).

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These cost increases can be summarized over time in the tables that follow:

Forecast-At-Complete (FAC) (excluding Buttonville and Ashtonbee scope)					
[all figures in CAD millions]	Oct. 2013	Feb. 2015	Oct. 2015	Feb. 2016	Oct. 2016
Subtotal	578.4	723.5	872.4	872.3	849.6
Contingency	89.0	18.8	25.3	15.6	$0.00
TOTAL	**667.4**	**742.3**	**897.7**	**887.9**	**849.6**

Timeline *[all figures in CAD millions]*	FAC	Change	Root Cause	Management Action
Initial Estimate Oct. 2013	667.4	-	Initial OEB estimate submission	
Feb. 2015	742.3	+74.9	Market conditions resulting in **higher mainline bids** than Class III estimate and engineering overage, partially offset by contingency draw and reduced land cost forecast	EGD negotiated the bids down by providing additional information; Prioritized HDD permits that were on critical path
July 2015	802.0	+59.7	Contractor underestimation of **crossing durations** (average 7 day estimate vs 40+ days actual)	EGD worked with Michels to break down high level schedules into detailed activity based schedule to understand logic, and track and optimize crews
Aug. 2015	847.0	+45.0	**Shoring** cost underestimated in Class III, delayed permits and permit changes resulting in constructability challenges, unanticipated changes and increased complexity to track bores	Re-estimate quantities for all Unit Price Items (UPI) (mainly boring, shoring and dewatering); work with Michels to bring in additional shoring and track bore crews and added night shifts
Oct. 2015	897.7	+50.7	Early **productivity delays** during the winter and spring construction that weren't visible to address until the summer months	Bottom up estimate with provision for Michels' request for additional funding, Aecon's schedule extension, IDC and indirects
Feb. 2016	887.9	-9.8	Re-estimate of UPI costs	Reduction of UPI FAC by $10.0M
Oct. 2016	849.6	-38.3	Mainline cost less than forecast; Less project management costs; Removal of remaining contingency	No management action required

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At the time of filing the initial estimate with the OEB, the level of maturity of the estimate was categorized by EGD as a Class III estimate, reflecting a level of maturity of project definition of between 10% and 40%. As per AACE International Recommended Practice No. 18R-97, "Cost Estimate Classification System", a Class III estimate has an expected accuracy range of -10% to +30%. Accordingly, the 27% variance experienced on the GTA Project is within the acceptable accuracy range of the AACE guideline. The cost variance can be further broken down by the major tasks undertaken for the GTA Project, as follows:

Major Task *[all figures in CAD millions]*	Oct 2013 Est.	Oct 2016 Est.	Change	Variance Explanation
Management	57.1	54.5	-2.6	• Effective management of overheads
Engineering	19.1	36.4	+17.3	• Engineering rework based on subsurface utility engineering and requests from permitting agencies
Procurement	63.9	77.4	+13.5	• Pipe quantities ordered higher than estimate • USD currency exchange from time of estimate to purchase • Storage costs not included in estimate
Land / ROW	85.0	72.0	-12.0	• Lower land acquisition costs than forecasted
Construction – pipe	288.2	480.1	+191.9	• Higher than estimated initial bid • Construction challenges including shoring • Permit delays including additional payment to Michels • Change orders • Weather delays
Construction – facilities	19.3	44.5	+25.2	• Higher than estimated initial bid • Permit delays • Change orders • Trackbore at Albion and extension at Parkway
Construction support	24.7	55.8	+31.1	• Increased support service indirects, inspection and surveying costs to support construction challenges and schedule delays • Higher hydro testing costs
Commissioning	1.2	2.8	+1.6	• Immaterial increase, in-line with initial estimate
Interest During Construction	19.8	25.0	+5.2	• Interest calculated based on CWIP (rate of 4.92% in 2016) • Schedule delays and cost increase resulted in a higher CWIP balance for the project
Contingency	89.0	0.0	-89.0	• Contingency used at project completion
Total Project Execution Costs	667.4	849.6	+182.2	

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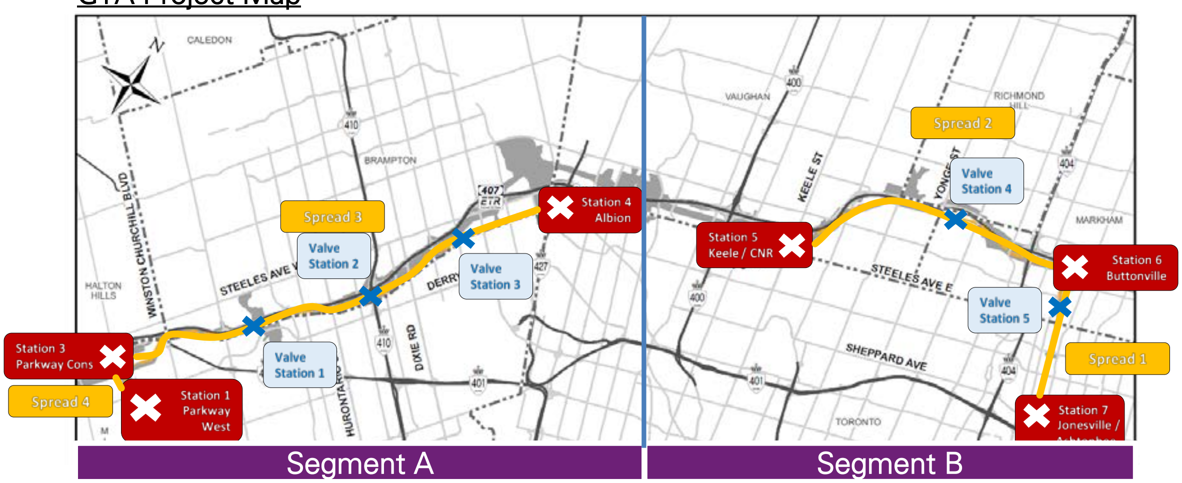
As illustrated in the above tables, the $182M cost overrun was driven by the higher material costs and underestimating the effort related to construction activities for pipe (~$190M) and facilities (~$25M) as well as construction support activities through the extended schedule (~$30M). These increases were partially offset against the contingency. EGD was also able to keep overhead, administrative and pre-construction costs such as management, procurement and Land / Right-of-Way generally in-line or lower than the initial estimate.

3.2.2 SCHEDULE ANALYSIS – Initial November 2015 compared to March 2016

The in-service date was delayed five months from the initial estimate, increasing the overall construction duration from 10 to 15 months, primarily due to permit delays as agencies took longer than expected to approve and imposed stricter requirements. The actual completion dates for the major project milestones, compared to the baseline estimate dates, are summarized as follows:

GTA Project Map



	Initial Estimate	Actual Energization	Variance (Days)
	(a)	(c)	(c) - (a)
Spread 1	01-Nov-15	30-Mar-16	+150
Spread 2		31-Mar-16	+151
Spread 3		22-Mar-16	+142
Spread 4		01-Mar-16	+121
Parkway West Station		28-Mar-16	+148
Albion Station		23-Mar-16	+143

The 5 month schedule delay was primarily on Segment A mechanical completion, with delays at Spread 3 and the Albion and Parkway stations. These delays can generally be attributable to constructability challenges resulting in additional scope to address technical requirements and productivity delays, due to underestimated effort for certain activities in an urban environment, including attaining permit approvals and the execution of track bores.

3.2.3 PERFORMANCE ASSESSMENT

KPMG assessed the general project performance during reoccurring EGD-guided site tours of the GTA Project. Four tours were conducted over the duration of GTA Project construction at the following points in time: August 2015, November 2015, February 2016 and March 2016.

KPMG used these guided site tours to ensure the overall accuracy of the monthly reports and operational documents that EGD had provided for the reporting of cost and schedule variances.

During the tours, KPMG observed that the project site was well coordinated with safety signoffs and "Job Assessment Risk Reviews" followed at every work location. Discussions with the site personnel detailed their crew's "plan of the day" and confirmed they were well versed in the quality and safety procedures for their operation. These operations generally displayed good "housekeeping" practices, and presented staging areas that were clear of obstructions and well maintained. These tours also witnessed continual challenges with geotechnical and underground obstructions.

The individual details of these site tours are summarized as follows:

August 31, 2015:
Weather 23.5 °C, Clear

Peter Simpson (KPMG),
Geoff Hayes (KPMG),
Brian Wikant (EGD)

Picture: Finch and Claireville HDD entry (Albion inlet / outlet CN crossing)

August Tour Progress & Observations:

- Track bore progress, project wide, behind schedule
- Bayview HDD Operation on Spread 2 progressing well
- 410 & Bramalea HDD Operations on Spread 3
- Keele Station operations wrapping up while Albion Station was just initiating

November 6, 2015:
Weather 13.5 °C, Light Rain

Peter Simpson (KPMG),
Brian Wikant (EGD)

Picture: Leslie bore (South of Hwy 407 and east of Leslie St)

November Tour Progress & Observations:

- Spread 1 Hydrotesting complete, drying proceeding
- Leslie St. Challenges: staging area foreman expressed concern about delays caused by pilot tube augers locking up due to silty sand during track bore operation (40m in). Direct Pipe will be required
- Lisgar-Meadowbrook Crossing Challenges: Flowing sand resulting in Direct Pipe installation requirement

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February 17, 2016:
Weather -6.0 °C, light snow cover

Peter Simpson (KPMG),
Brian Wikant (EGD)

Picture: Heating and hording operations, NW of Albion Station (west of 427 & north of Indian Line road)

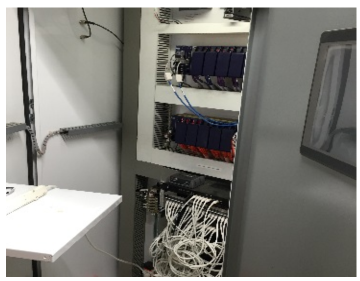
February Tour Progress & Observations:

- Riviera Drive at the location of the Segment B re-test section
- Tie-ins are completed and post-drying has finished
- Hydrotesting for Spread 4, and the east and west sections of Spread 3 were completed in the month

March 31, 2016:
Weather 12.0 °C, Heavy Rain

Peter Simpson (KPMG),
Augusto Patmore (KPMG),
Brian Wikant (EGD)

Picture: Parkway West Electrical/telemetry construction



March Tour Progress & Observations:

- All facilities are commissioned and energized
- Segment B was re-energized 31-Mar-16
- Parkway West Electrical and telemetry construction completed to enable remote operability

Construction Challenges

Construction challenges were noted in various locations along the mainline build. Based on EGD calculations, these construction challenges have been estimated to account for $56M in cost overruns to the project (included in the "Construction – pipe" cost overrun identified above). In many cases, these challenges were the result of unexpected ground conditions that would not have been anticipated as limited geotechnical work had been done at the time of the estimate preparation.

The most significant construction challenge related to $30M in additional shoring costs. The average depth of coverage per crossing in the initial estimate was slightly greater than 2 meters deep; however, the actual crossing depth exceeded 5 meters on average. Further, 96% of the bore pits ultimately ended up requiring shoring, resulting in actual total costs for Unit Price Items ("UPI") of $120M compared to the estimate of $89M.

Based on KPMG's review of the challenges experienced during construction, cost overruns appear to be generally attributable to unforeseen geological conditions or an underestimation in the initial estimate for Unit Price Items (i.e. actual cost and effort of shoring and track bores). In resolving the construction challenges, EGD appeared to demonstrate prudency as indicated through their Decision Records which detail the major GTA Project challenges at East & West Don, Lisgar Meadowbrook, Torbram Road and Leslie Street. These Decision Records included relevant information to support a prudent decision-making process, including details regarding the particular issues, multiple potential options to mitigate cost and project impacts, and the recommended course of action selected by EGD with the overall justification and rationale to support the decision.

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Permit Delays

At the outset of the GTA Project, the EGD team defined a detailed permit tracking process and implemented a permit tracker to monitor permits received by agency, identify challenges in obtaining permits, and ensure receipt or management of permits in advance of critical path.

The GTA Project team identified 236 permits required for the GTA Project, of which 97 were affected by approval delays. Based on EGD calculations, these permit delays have been summarized to account for $41M in cost overruns to the project ($38M included in the "Construction – pipe" cost overrun identified above, and $3M included in the "Construction – facilities" cost overrun). These permit delays drove additional costs primarily as a result of schedule extensions or the scheduling of additional shifts to accelerate productivity.

The most significant cost overrun component of the permit delays was related to the Michels mainline contract, discussed in the following section.

Michels Mainline Contract Productivity Delays

In April 2015, Michels submitted a request for additional compensation for the acceleration of work on Spreads 2, 3 and 4 resulting from alleged delays in EGD's procurement of permits and access/egress agreements in the amount of $81.5M. Ultimately the matter was settled in the amount of $30M.

EGD reviewed the components of the Michels' $81.5M additional compensation request and internally determined the quantum of this impact to be [redacted] as summarized below:

Request Item	Description	Impact Analysis
Extended Indirects and General Support	Additional indirect labour costs for project management, environment, safety, accounting, general administration, security, traffic control, etc. due to schedule extension. This also included additional fixed overhead costs such as construction yard and office rent.	[redacted]
Shoring	Impacts of schedule compression on installation efficiency, including the requirement for more shoring material to accommodate simultaneous construction at a greater number of locations. Depleted material from local suppliers required sourcing from jurisdictions across the U.S. and Canada.	[redacted]
Idled Equipment	Costs for mobilized equipment that was unable to be utilized due to lack of permitted access and crossings in winter/spring 2015.	[redacted]

Additional Personnel & Equipment	Condensed summer crossing work on spreads 2 & 3 carried forward from the winter delays resulted in changes to the planned work sequence which required more crews/equipment and led to right-of-way congestion and loss of efficiency. Shifting work into fall and early winter also negatively impacted efficiency due to poor weather conditions and reduced daylight work hours.	[redacted]
Productivity & Efficiency	Mainline (ie. stringing, bending, welding, coating, lowering in) impacts associated with disruption of work flow, move backs, and congestion due to overlap with crossing crews. Also includes time spent helping EGD respond to agency information requests required for permitting.	[redacted]
Delay into following season	Extension of full crew into 2016 for remaining spread 2 & 3 work, additional mobilization/demobilization costs over Christmas 2015, and higher union rates from May 2016 onwards.	[redacted]
Total		[redacted]

After a review of the impact analysis completed by EGD it is concluded that the settlement of $30M was deemed a fair and reasonable conclusion to the Michels' request as it represents a negotiated 60% reduction to the original claim request by Michels and a [redacted] reduction against EGD's own impact analysis.

Project Risk Register

The GTA Project was developed with a robust risk register that ultimately included 358 unique risks identified over the course of the project, each of which were monitored, tracked and mitigated throughout the project. The following table provides examples of some significant project risks that were identified by the GTA Project team, as well as the response strategy that was implemented to address the risk.

ID	Description	Response Strategy
325	Schedule and cost impact due to 42" pipe reorder.	• Proposed doing the 36" track bores first (spreads 1, 2 and 4); additionally 1 km of 42" HDD pipe is available for some of the 42" pipe bores (spread 3).
339	EGD's decision to change scope and require double isolation for each of the 11 tie-in locations.	• Determine a prioritized schedule so that the critical items to make the line operational are completed first.

106	Unsatisfactory vendor data quality and delays in submission by vendors.	• Vendor data requirements will be clearly communicated through the Vendor Data Requirements Table included in the MR. • PM will ensure quality reviews of MRs to mitigate any potential errors/omissions. • Purchase Orders will clearly delineate deliverables associated with vendor drawings. • Expediting meetings will be held with vendors and the engineering consultant as required. • Expediting with Stantec to finalize documentation with vendors.
203	Difficulty in obtaining Metrolinx permits.	• Pull forward crossing drawings for permits. • Two permit packages submitted, have received feedback. Communication lines are open which should mitigate portion of this risk. • Lessons Learned from Metrolinx 1 and 2 have been incorporated into Metrolinx 3, to reduce changes. • Pomona drill rescheduled. • Permits submitted, Metrolinx 2 has been approved by AECOM (Metrolinx's agent) waiting for documentation from Metrolinx. • Metrolinx 1 resubmitted due to Hydro 1 change.
262	Schedule delays due to PAN AM games	• Sept 24 meeting with municipal coordinator to begin logistics discussions. Continue to plan and coordinate the construction schedule. • Transportation of goods and materials off peak hours. 407 Permit to move pipe will incorporate times that we are not allowed due to the Pan Am activities. Work with individual municipalities. • Internal session to go over maps received from PAN AM by municipality, determine our questions and concerns, create requests if needed for future meeting. • Meeting supplied schedule and routes. Large loads will be delivered off-hours. Contractors are aware. Waiting for timing.
343	Mainline Schedule and productivity risk	• Adding track bore crews.

Performance Benchmarking

KPMG benchmarked the GTA Project performance against the following four recently completed pipeline projects with respect to cost incurred per kilometer of pipeline, cost incurred per month of construction activities and pipeline progress per month.

Project	Cost ($M) / km pipeline	Cost ($M) / month	Km pipeline / month
Spectra Energy New Jersey – New York Expansion *$1,650M | 33 km | 30 inch | 17 months*	50.00	97.06	1.94
TransCanada King's North Connection *$310M | 11 km | 36 inch | 12 months*	28.18	25.83	0.92
Union Gas Brantford – Kirkwall *$116M | 14 km | 48 inch | 6 months*	8.29	19.33	2.33
ATCO Northeast Calgary Connector *$78M | 16.7 km | 24 inch | 5 months*	4.67	15.60	3.34
Average	22.79	39.46	2.13
Enbridge GTA Project – Total *$848M | 50 km | 36/42 inch | 15 months*	16.96 26% < avg.	56.53 43% > avg.	3.33 56% > avg.
GTA Project – excl. Facility Construction *$803M | 50 km | 36/42 inch | 15 months*	16.06 30% < avg.	53.53 36% > avg.	3.33 56% > avg.

In benchmarking the GTA Project, it is important to note that there can be variations between the projects used for comparison. While these benchmarks were selected as all can generally be categorized as "urban" projects, each project may be impacted by unique project-specific circumstances, including the geography, pipe size, local regulations, facilities, and other overhead and planning charges, etc. Further, final cost figures have not been disclosed for TransCanada and ATCO projects. The figures above are current estimates for those projects.

Similar to the various construction challenges, delays and risks noted above that were experienced on the GTA Project, our benchmark projects also experienced delays and cost overruns due to a number of circumstances, including weather and permitting. For example, Spectra Energy's New York – New Jersey Expansion[2] was delayed by six months on the outset of the project, and although the schedule was caught up and completed on time, it was done so at a 40% cost overrun due to increased labour to accelerate the schedule. TransCanada's King's North Connection[3] project was placed in to service in December 2016 for $310M, representing a delay of four months and a cost overrun of $90M primarily associated with some issues on their horizontal drilling alignment and depth, and historical environmental contamination that required clean-up. ATCO's Northeast Calgary Connector[4] project also experienced a cost increase from the initial $44M estimate to an adjusted $78M cost, substantially as a result of increased contractor construction costs from the time the initial competitive bid information was provided for the cost estimate to the actual start of construction.

In benchmarking the performance of the EGD GTA Project, on a cost per kilometer of pipeline the GTA Project is relatively favourable with the benchmark average, particularly when removing the costs related to the facilities.

While the cost per month was significantly higher than the benchmark average, this is tied to the kilometers per month also being significantly higher than the benchmark average, indicating that EGD was effective in being able to construct the GTA Project at a faster rate than the benchmark comparative projects.

Assessment Conclusion

EGD energized the GTA Project in March 2016 at a cost of $848M, representing a $181M cost overrun and five months delay over the initial estimate submitted to the OEB. Based on our review of the issues that drove the cost and schedule variance, and the actions undertaken by EGD to address these issues in a timely and effective manner, and in consideration of the performance challenges and risks experienced during the GTA Project (those that were within and those that were beyond the reasonable control of EGD), KPMG's observations generally found the GTA Project team made efforts to mitigate against cost and schedule increases and *demonstrated prudency in managing the cost and schedule on the GTA Project*.

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[2] http://trenchlessonline.com/project-of-the-year-new-installation/
http://www.spectraenergy.com/Newsroom/News-Archive/Spectra-Energy-Places-New-JerseyNew-York-Natural-Gas-Pipelie-into-Service/

[3] http://www.transcanada.com/announcements-article.html?id=1957529&t
https://www.vaughan.ca/council/minutes_agendas/AgendaItems/CW(WS)0304_14_1.pdf

[4] http://www.atcopipelines.com/upr/Projects/Documents/NE_CGY_Brochure_FINAL.pdf
http://www.atcopipelines.com/upr/Projects/NE-Calgary-Connector
http://www.rbsomerville.com/project/regent-street-district-energy-piping/

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4 Operational Readiness

4.1 Approach

The Operational Readiness Review ("ORR") focused on the procedures and management control systems utilized by the project management team responsible for the effective delivery of the asset to commercial operations.

4.2 Assessment

Our scope included a review of the Ready to Operate ("RTO") process used by the GTA Project, utilizing KPMG's Operational Readiness framework as a guideline. Based on our review, a summary of the strengths and opportunities are provided below:

Key Strengths:

<u>Strategy</u>

- ✓ EGD strategic priorities to (1) drive safety and operational reliability; (2) Execute; (3) Secure the longer-term future; and (4) Maintain that the foundation are clearly and effectively incorporated into key project documents such as the Operation Plan, RTO Standard and workshop presentations and ELT updates. This ensures that the GTA Project is aligned with the EGD strategic priorities to provide safe and reliable delivery of natural gas to EGD customers.
- ✓ The GTA Project objectives and requirements were well understood across the organization and aligned with the organization's strategic plan.

<u>Program Integration</u>

- ✓ The RTO standard provided EGD with a robust process for operational readiness of a major project with a formal project life-cycle stage gating process.
- ✓ The JIRA Issue Resolution Workflow software is a comprehensive issues tracking management system that was rolled out across the organization to provide an effective day-to-day issues management process.
- ✓ The reporting to the Executive Management Team ("EMT") provided key information related to project scope, cost, and schedule to ensure transparent and robust decision-making. This included a 'Monthly RTT ("Ready to Transition") Status Update' documenting the outstanding issues on the project and tracked to an issue owner, and a 'High Level GTA Project Integration Timeline' to inform the EMT on the project integration schedule.

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<u>Operations Management</u>

- ✓ A concerted effort was made to include all RTT area stakeholders at an early stage in the project to assist with issue resolution. Operations was held accountable for completing a formal inspection prior to energizing activities approved by the EMT.
- ✓ Strong safety culture within EGD was noted in the project documents and presentations with a focus on Process Safety Records ("PSR"), Pre Start-up Safety Reviews ("PSSR"), and Change Management.

<u>Asset & Risk Management</u>

- ✓ A comprehensive risk register was developed with documented probabilities, consequences, contingencies and mitigation plans.
- ✓ Developed a 42" pipeline manual including documentation of policies, procedures, and requirement for qualified personnel to work on or near the pipeline.

<u>External Stakeholder Management</u>

- ✓ Communication plans related to customer care and the community were proactive and adequately addressed project issues.

Key Opportunities:

<u>RTO Standard</u>

- ✓ RTO standard provides a robust guideline for Operational Readiness, but it has been developed specifically for Enbridge Liquid Pipelines and is not necessarily applicable to EGD. As part of the GTA project, additional requirements for Enbridge Gas Distribution were identified through stakeholder engagement to ensure appropriate safety and reliability for gas distribution. Leveraging the standards and lessons learned from the GTA Project, EGD should develop its own project integration standard for use on future projects of similar scale to the GTA Project.

<u>Roles & Responsibilities</u>

- ✓ While accountabilities for project integration are generally understood for the GTA Project, for a future gas distribution specific integration plan, EGD should document the roles and responsibilities specific to each member of the Project Integration team in the RTO standard to provide clear accountabilities across the project lifecycle.

<u>Perform Quality Checks on Completed Actions</u>

- ✓ Develop a process to independently audit the issues marked as resolved to ensure quality, consistency and completeness by each issue owner.

<u>Documentation and Records</u>

- ✓ Complete a review of the project documentation management process to ensure a successful transfer of all project related information to Operations.

Enbridge GTA Project Lessons Learned

In general, KPMG found that the GTA Project team demonstrated prudency in managing cost and schedule against the original budget and mitigating the impact from change events on cost and schedule. Based on our assessment throughout the Project, we would recommend EGD incorporate the following lessons learned into future projects:

Increase awareness between project progress and cost, and improve cost variance & trend analysis

It was noted that actual spend consistently varied from monthly forecasts, even after re-estimates were completed that should have reflected current trends in actual spending levels. The table below shows the monthly estimated spend versus actual spend during the main summer construction months, with an average underspend of approximately 30%.

Timeline	Monthly est.	Actual	Change
June 2015 plan	$72M	$41M	-$31M
July 2015 plan	$99M	$73M	-$26M
August 2015 plan	$85M	$48M	-$37M
September 2015 plan	$75M	$58M	-$17M

There is a future opportunity to increase the level of communication and information sharing between the project controls team and the site cost control and accounting team. This will help to ensure that future forecasts issued by the project controls team take account of the realities of earned value and costs incurred in the previous months. In particular, any schedule delays or impacts incurred need to be accurately reflected in future forecasts both in terms of earned value and cost projections to increase the accuracy and reliability of these projections. Past productivity levels and performance progress should be carried forward to base future performance estimates on historical performance data.

Adding additional scheduling resources early on in the field will help ensure that contractors and the owner's team are communicating effectively and updating future progress projections based on past performance data and risks affecting future performance.

Conduct cause analysis on permit delays and benchmark time to obtain

Permit delays were identified as a significant contributor to the schedule extension and cost overruns. Mainline winter construction was delayed as the required permits were not in-hand, with only 10% available by December 2014 (primarily related to critical path HDDs). Further, the last outstanding permit was not received until August 2015, which would have been only three months before the Project's initially estimated completion date and is reflective of the overall schedule delays experienced by the project.

The permit tracker was managed by EGD during construction based on upcoming critical path activities. As a result of EGD initiating early engagement with the various agencies, additional technical requirements and design changes were identified and incorporated in the drawings by EGD to accommodate agency design requests. In some cases, this required EGD to add revised scope elements and cost to the project. Further, despite this early engagement, many agencies would not complete their detailed permitting review until final construction drawings were issued to the agency. For future projects, a mitigating action would be to further advance detailed engineering to ensure final construction drawings are available earlier for permitting, providing more time for permit issuance in advance of construction start.

Permit delays were noted as the primary cause for overall project execution delays and were the basis of Michels' request for additional compensation due to delayed productivity and stand-by time. To control claim amounts for issues related to project delays, in future contracts EGD could consider including a flat rate per crew for compensation for floating equipment / manpower (per Km) where move-arounds are company caused.

Hold contractor responsible for providing a sufficiently detailed schedule on critical items (i.e. crossings) in advance of project execution and consider some form of exposure or risk transfer to the contractor for late completion of milestones

Michels did not provide an adequately detailed schedule until the project was more than 50% complete; as a result there were challenges for the owner in measuring progress against baseline and in identifying resource constrained items on the critical path.

In future contracts, EGD could require contractors to provide sufficient detail on the higher risk critical path activities (such as crossings) in the schedule, so that the owner can challenge the schedule assumptions made by the contractor.

In evaluating bids, more focus / weighting should be placed on bidders' project control methodologies in order to take into account contractors' ability to deliver on schedule. For example, EGD should test the contractors on their ability to produce a valid and realistic schedule. Including penalty clauses in the contract could also be considered as a mechanism to transfer more risk to the contractor for non-compliance in providing contractually required documents (such as the detailed schedule).

Perform lessons learned analysis on the final impact of change orders, UPIs and claims, and ensure future similar projects capture the impact of these items in the forecast

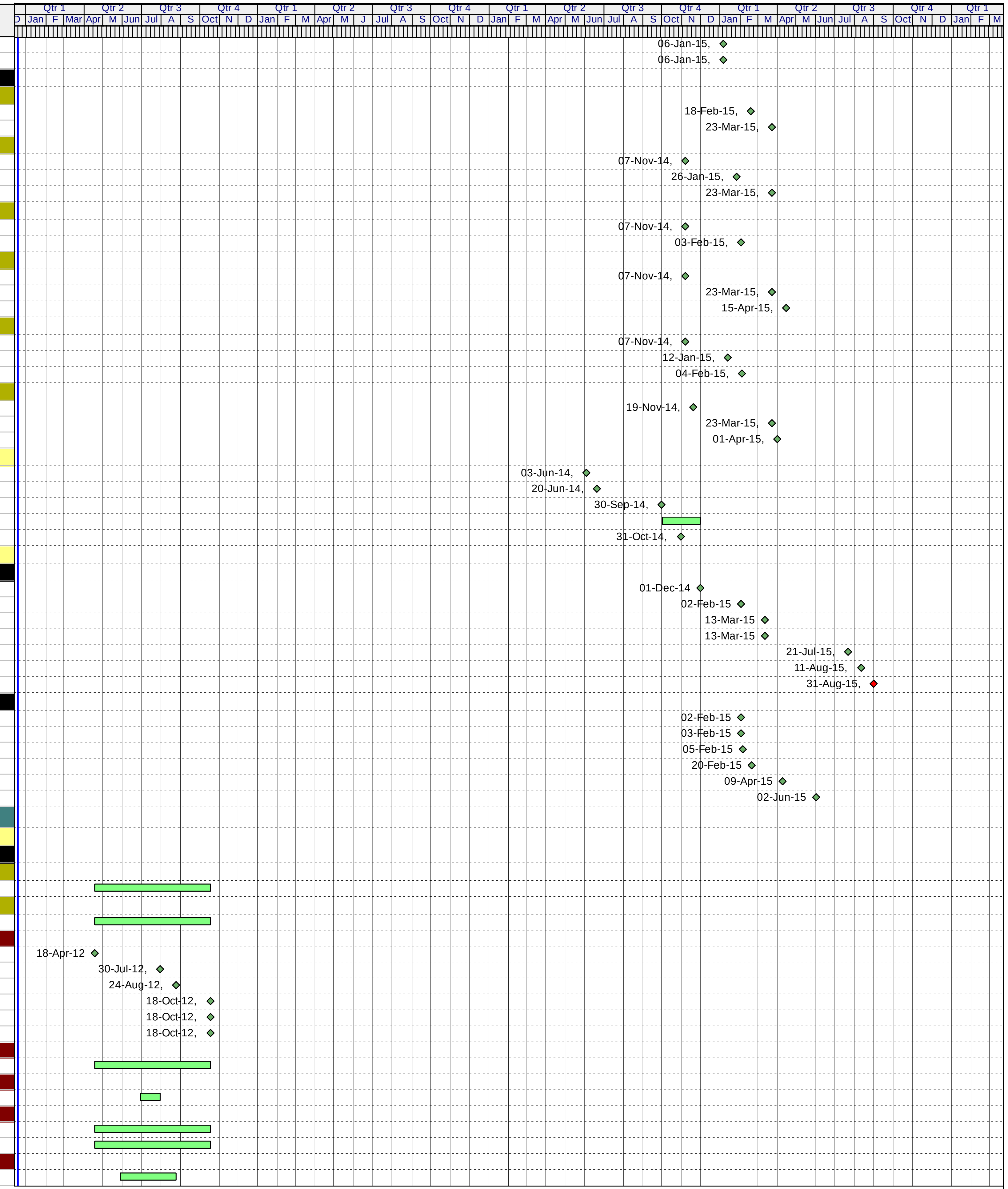
Total costs for Unit Price Items ("UPI") were 32% higher than the contractor's initial bid estimate ($120M vs $89M). This was largely driven by shoring costs which alone were observed to be 5-times the initial contractor bid estimate ($39M vs $8M). Michels was initially selected as they were willing to lower their initial bid during the contract negotiation process, but with change orders and claims throughout the GTA Project the final cost ended up higher than the initial bid estimate.

Future estimates could be more conservative on level of effort and associated costs for shoring, increasing the allowances and unit costs of shoring, as well as reviewing quantities and ensuring higher quantities are allocated to items such as shoring that represent a greater risk of causing cost variances.

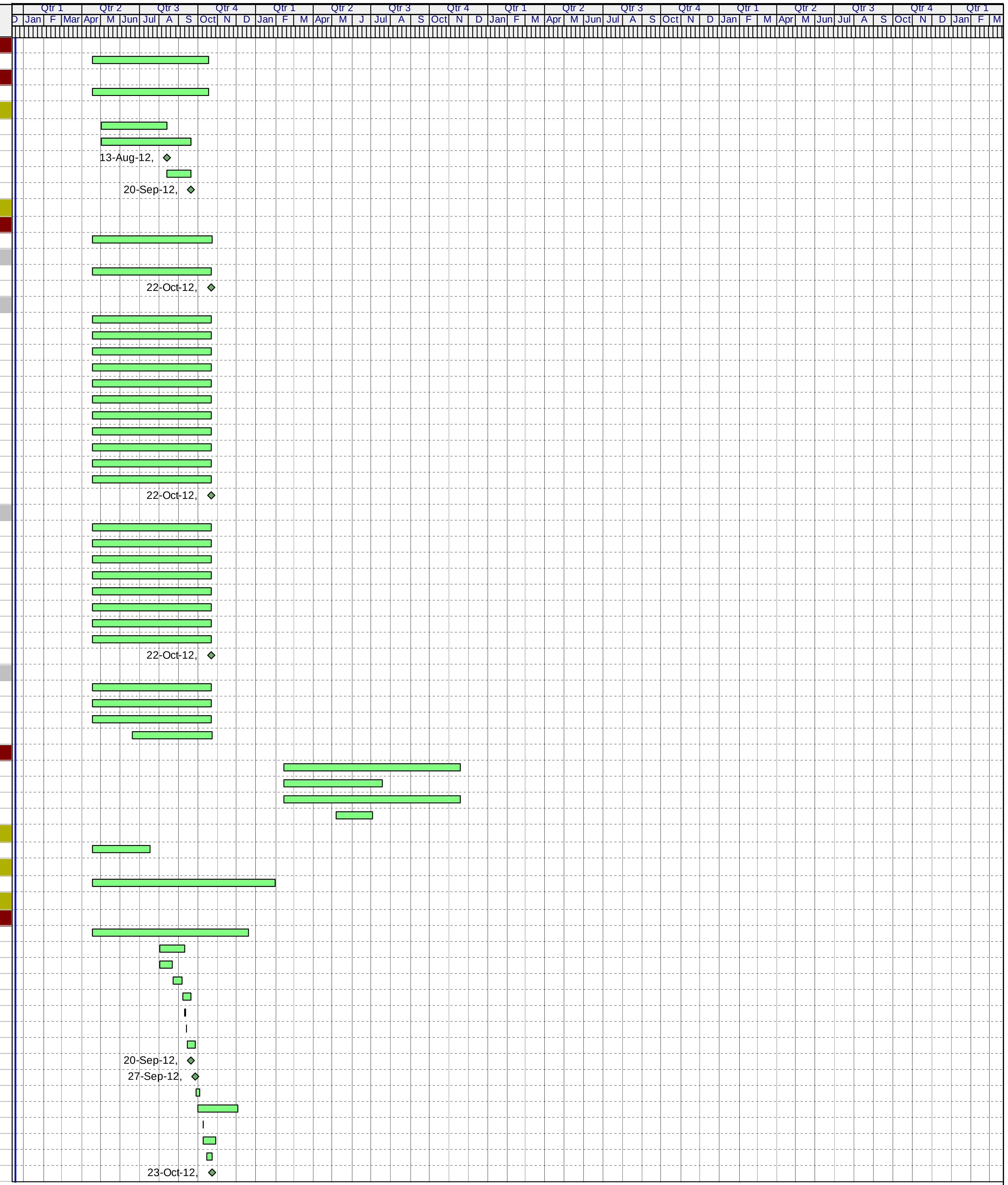
UPIs also provided the contractor with a variable cost mechanism that made it harder for EGD to estimate total final costs, given uncertainties in the quantities that would be claimed. EGD developed its own estimate of the take-off quantities, and also requested that the contractor provide unit estimates to validate its internal estimates. Certain UPIs, such as shoring, were underestimated across all contractor bids when compared to the EGD internal estimate. Accordingly, EGD should consider higher shoring cost allowances for future project estimates in urban areas. Further, for future contracts EGD could also consider including certain UPIs, such as matting and top-soiling, as part of the fixed price portion of the contract, thereby reducing the numbers of items subject to variable unit price changes.

Activity ID	Activity Name	Original Duration	Start	Finish
GTA.Schedule-2 GTA - Master Schedule - Dec 2013		979.2d	19-Dec-11	24-Nov-16
GTA.Schedule-2.GTA MILESTONES MILESTONES		979.2d	19-Dec-11	24-Nov-16
GTA.Schedule-2.GTA MILESTONES.0 GTA MAJOR MILESTONES		979.2d	19-Dec-11	24-Nov-16
MS1000	Class 5 Start	0.0d	19-Dec-11	
MS1025	Class 5 Complete	0.0d		17-Apr-12
MS1035	Start of FEED	0.0d	18-Apr-12	
MS1050	FEED Completed	0.0d		18-Oct-12
MS1065	Start of Pull Forward Planning & Consultants Procurement Activities	0.0d	02-Nov-12	
MS1075	Issue Class 3 Project Proposal	0.0d		02-Nov-12
MS1085	Submit LTC Application to OEB	0.0d		20-Dec-12
MS1185	OEB Decision	0.0d		31-Jul-13
MS1190	Start Detailed Engineering Design	0.0d	03-Sep-13	
MS1420	Finish Detailed Engineering Design	0.0d		08-Aug-14
MS1490	Start HDD Construction	0.0d	01-Dec-14	
MS1580	Start Facilities Construction	0.0d	02-Feb-15	
MS1590	Start Mainline Construction	0.0d	02-Feb-15*	
MS1690	Finish Construction Parkway Cons By-Pass Regulation Station	0.0d		09-Apr-15
MS1700	Start Commissioning Parkway Cons By-Pass Regulation Station	0.0d	10-Apr-15	
MS1740	Finish Commissioning Parkway Cons By-Pass Regulation Station	0.0d		30-Apr-15
MS1930	Start Commissioning Spread 1	0.0d	21-Jul-15	
MS1940	Finish Construction (Mainline & Stations) - Spread 1	0.0d		21-Jul-15
MS1960	Finish Construction (Mainline & Stations) - Spread 2	0.0d		12-Aug-15
MS1970	Start Commissioning Spread 2	0.0d	12-Aug-15	
MS1900	Finish Construction (Mainline & Stations) - Spread 3	0.0d		31-Aug-15
MS1980	Finish Commissioning Spread 2	0.0d		01-Sep-15
MS1910	Start Commissioning Spread 3	0.0d	02-Sep-15	
MS2010	Finish Commissioning Spread 1	0.0d		02-Sep-15
MS2000	Start-up - In Service Date (ISD)	0.0d		15-Oct-15
MS1990	Finish Commissioning Spread 3	0.0d		15-Oct-15
MS2040	Finish Project Close Out Process	0.0d		24-Nov-16
GTA.Schedule-2.GTA MILESTONES.5 PLGC Gates		786.0d	23-Feb-12	09-Feb-16
MS1015	PLGC Entrance	0.0d	23-Feb-12	
MS1040	Stage Gate 1	0.0d		09-May-12
MS1100	Stage Gate 2	0.0d		13-Feb-13
MS1230	Stage Gate 3	0.0d		28-Nov-13
MS1460	Stage Gate 4	0.0d		19-Sep-14
MS2020	Stage Gate 5	0.0d		13-Nov-15
MS2030	Stage Gate 6	0.0d		09-Feb-16
GTA.Schedule-2.GTA MILESTONES.1 Major Engineering Milestones		319.3d	18-Oct-12	03-Jun-14
GTA.Schedule-2.GTA MILESTONES.1.1 PFE Major Milestones		125.6d	11-Feb-13	26-Sep-13
MS1095	Commencement of PFE Works	0.0d	11-Feb-13	
PRT-1280	Metrolinx 1 - IFP	0.0d		26-Aug-13
PRT-1290	Metrolinx 2 - IFP	0.0d		26-Aug-13
PRT-1300	Metrolinx 3 - IFP	0.0d		05-Sep-13
MS1110	Alternative Assessments Complete (Levi's & Fletcher's)	0.0d		26-Sep-13
MS1135	Alternative Assessments Complete (All Crossings of Spread 3)	0.0d		26-Sep-13
MS1120	Alternative Assessments Complete (All Crossings of Spread 2)	0.0d		26-Sep-13
MS1150	HDD IFB Package to Procurement for RFP	0.0d		26-Sep-13
MS1160	Rec'd PFE Deliverables from ESP	0.0d		26-Sep-13
GTA.Schedule-2.GTA MILESTONES.1.2 DED Milestones		319.3d	18-Oct-12	03-Jun-14
A14060	SVT - BOD Start DED	171.7d	18-Oct-12	30-Aug-13
MS1200	Commencement of Detailed Engineering Design	0.0d	03-Sep-13	
MS1220	30% Design IFR	0.0d		04-Dec-13
MS1290	60% Design IFR	0.0d		18-Feb-14
MS2900	Start Phase I ESAs	0.0d	18-Feb-14	
MS1350	90% Design IFR	0.0d		15-Apr-14
MS1370	IFB Package Completion	0.0d		13-May-14
MS1450	IFC Package Completion	0.0d		03-Jun-14
GTA.Schedule-2.GTA MILESTONES.2 PROCUREMENT MILESTONES		116.6d	15-Sep-14	15-Apr-15
GTA.Schedule-2.GTA MILESTONES.2.1 Contracts		18.3d	06-Nov-14	08-Dec-14
MS1510	HDD Contract Kickoff	0.0d	06-Nov-14	
MS1560	Mainline Contract Kickoff	0.0d	08-Dec-14	
GTA.Schedule-2.GTA MILESTONES.2.3 Mainline		61.2d	15-Sep-14	06-Jan-15
GTA.Schedule-2.GTA MILESTONES.2.3.2 Procurement Readiness - Material Delivery		61.2d	15-Sep-14	06-Jan-15
MS1830	SP1 Mainline Pipes - Ready to Deliver to Site	0.0d		15-Sep-14
MS1840	SP2 Mainline Pipes - Ready to Deliver to Site	0.0d		15-Sep-14
MS1730	SP3 Mainline Pipes - Ready to Deliver to Site	0.0d		15-Sep-14
MS1540	SP1&2 HDD Pipes - Ready to Deliver to Site	0.0d		15-Sep-14
MS1480	SP3 HDD Pipes - Ready to Deliver to Site	0.0d		06-Oct-14

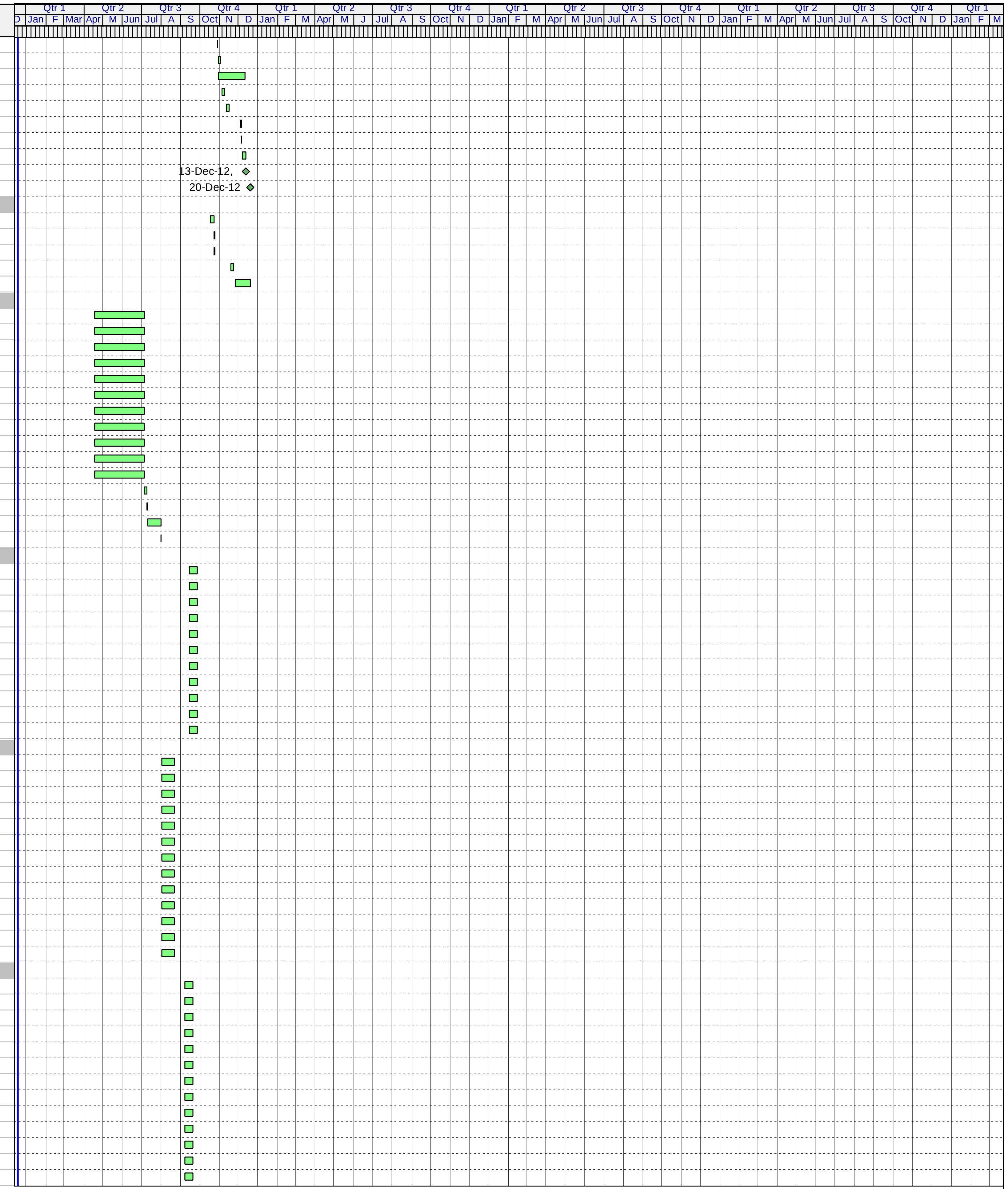
Activity ID	Activity Name	Original Duration	Start	Finish
MS2910	Induction Bends - Ready to Deliver to Site - SP1 & SP2	0.0d		06-Jan-15
MS2920	Induction Bends - Ready to Deliver to Site - SP3	0.0d		06-Jan-15
GTA.Schedule-2.GTA MILESTONES.2.4 Stations		86.4d	07-Nov-14	15-Apr-15
GTA.Schedule-2.GTA MILESTONES.2.4.1 Jonesville		34.8d	18-Feb-15	23-Mar-15
MS1810	Receive Shop Fabricated Spools	0.0d		18-Feb-15
MS1820	Receive Station Equipment & Prefab Buidlings	0.0d		23-Mar-15
GTA.Schedule-2.GTA MILESTONES.2.4.2 Buttonville		73.6d	07-Nov-14	23-Mar-15
MS2050	Receive Hot Tap Fittings	0.0d		07-Nov-14
MS1650	Receive Shop Fabricated Spools	0.0d		26-Jan-15
MS1670	Receive Station Equipment & Prefab Buidlings	0.0d		23-Mar-15
GTA.Schedule-2.GTA MILESTONES.2.4.3 Keele		47.4d	07-Nov-14	03-Feb-15
MS2060	Receive Hot Tap Fittings	0.0d		07-Nov-14
MS1870	Receive Shop Fabricated Spools	0.0d		03-Feb-15
GTA.Schedule-2.GTA MILESTONES.2.4.4 Albion		86.4d	07-Nov-14	15-Apr-15
MS2070	Receive Hot Tap Fittings	0.0d		07-Nov-14
MS1750	Receive Station Equipment & Prefab Buidlings	0.0d		23-Mar-15
MS1720	Receive Shop Fabricated Spools	0.0d		15-Apr-15
GTA.Schedule-2.GTA MILESTONES.2.4.5 Parkway Cons Bybass		48.2d	07-Nov-14	04-Feb-15
MS2080	Receive Hot Tap Fittings	0.0d		07-Nov-14
MS1620	Receive Shop Fabricated Spools	0.0d		12-Jan-15
MS1640	Receive PRVs	0.0d		04-Feb-15
GTA.Schedule-2.GTA MILESTONES.2.4.6 Parkway West Gate		73.4d	19-Nov-14	01-Apr-15
MS1715	Receive Odourant Package	0.0d		19-Nov-14
MS1710	Receive Station Equipment & Prefab Buildings	0.0d		23-Mar-15
MS1680	Receive Shop Fabricated Spools	0.0d		01-Apr-15
GTA.Schedule-2.GTA MILESTONES.3 Permits Major Milestones		100.0d	03-Jun-14	01-Dec-14
PLE-07-1250	Rec'd Mainline IFC/IFP Packages from ESP	0.0d		03-Jun-14
PLE-07-5820	Rec'd Facilities IFC/IFP Packages from ESP	0.0d		20-Jun-14
PLE-07-7360	Mainline Permits Rec'd	0.0d		30-Sep-14
PLE-07-7370	SVT - Mainline Permits Buffer	34.0d	01-Oct-14	01-Dec-14
PLE-07-7420	MNR SAR Approval in Hand	0.0d		31-Oct-14
GTA.Schedule-2.GTA MILESTONES.4 Construction Milestones		275.0d	01-Dec-14	31-Aug-15
GTA.Schedule-2.GTA MILESTONES.4.1 Mainline & HDDs		275.0d	01-Dec-14	31-Aug-15
MS1500	Start Construction of SP3 HDDs	0.0d	01-Dec-14	
MS1570	Start Mainline Construction of SP3	0.0d	02-Feb-15	
MS1780	Start Mainline Construction of SP2	0.0d	13-Mar-15	
MS1790	Start Mainline Construction of SP1	0.0d	13-Mar-15	
MS1920	Finish Construction of Spread 1	0.0d		21-Jul-15
MS1950	Finish Construction of Spread 2	0.0d		11-Aug-15
MS1890	Finish Construction of Spread 3	0.0d		31-Aug-15
GTA.Schedule-2.GTA MILESTONES.4.2 Facilities		123.6d	02-Feb-15	02-Jun-15
MS1600	Parkway Cons Bypass - Start Construction	0.0d	02-Feb-15	
MS1610	Parkway Gate - Start Construction	0.0d	03-Feb-15	
MS1630	Buttonville - Start Construction	0.0d	05-Feb-15	
MS1660	Albion - Start Construction	0.0d	20-Feb-15	
MS1800	Jonesville - Start Construction	0.0d	09-Apr-15	
MS1850	Keele - Start Construction	0.0d	02-Jun-15	
GTA.Schedule-2.1.P GTA PROJECT DEVELOPMENT		378.8d	19-Dec-11	18-Nov-13
GTA.Schedule-2.1.P.PP Project Planning		315.6d	18-Apr-12	18-Nov-13
GTA.Schedule-2.1.P.PP.QAA Project Planning, External		315.6d	18-Apr-12	18-Nov-13
GTA.Schedule-2.1.P.PP.QAA.SVY Project Planning - Survey		101.6d	18-Apr-12	18-Oct-12
PFC1050	Topographic Survey & SUE	101.6d	18-Apr-12	18-Oct-12
GTA.Schedule-2.1.P.PP.QAA.RAA Project Planning - Engineering		101.6d	18-Apr-12	18-Oct-12
PFC1030	Summary - Front End Engineering Design	101.6d	18-Apr-12	18-Oct-12
GTA.Schedule-2.1.P.PP.QAA.RAA.1 FEED Milestones		101.6d	18-Apr-12	18-Oct-12
PFC1060	Start of FEED	0.0d	18-Apr-12	
PFC1140	DBM submitted to Enbridge	0.0d		30-Jul-12
PFC1150	EWP & CEP to Enbridge	0.0d		24-Aug-12
PFC1160	FEED Completed	0.0d		18-Oct-12
PFC1170	BoE & Class III Estimate to Enbridge	0.0d		18-Oct-12
PFC1180	FEED Package Submitted to Enbridge	0.0d		18-Oct-12
GTA.Schedule-2.1.P.PP.QAA.RAA.2 PM & Support Activities		101.6d	18-Apr-12	18-Oct-12
PFC1070	PM & Support	101.6d	18-Apr-12	18-Oct-12
GTA.Schedule-2.1.P.PP.QAA.RAA.3 Design Basis Memorandum		16.6d	29-Jun-12	30-Jul-12
PFC1130	DBM	16.6d	29-Jun-12	30-Jul-12
GTA.Schedule-2.1.P.PP.QAA.RAA.4 BoE & Class III Estimate		101.6d	18-Apr-12	18-Oct-12
PFC1080	Basis of Estimate	101.6d	18-Apr-12	18-Oct-12
PFC1090	Class III Estimate	101.6d	18-Apr-12	18-Oct-12
GTA.Schedule-2.1.P.PP.QAA.RAA.5 EWP & CEP		50.0d	28-May-12	24-Aug-12
PFC1120	Eng. Work Plan & Construction Work Plan	50.0d	28-May-12	24-Aug-12



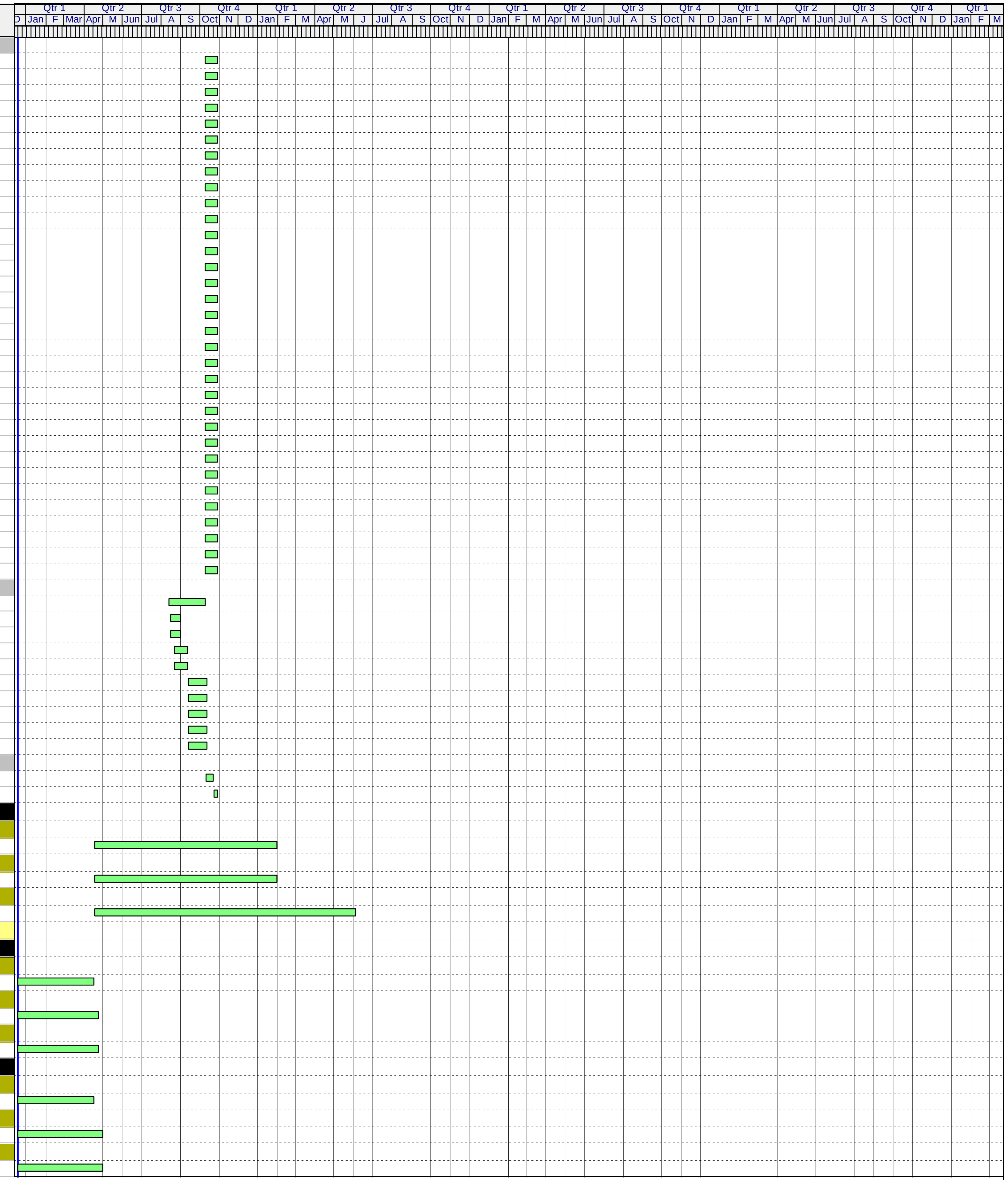
Activity ID	Activity Name	Original Duration	Start	Finish
GTA.Schedule-2.1.P.PP.QAA.RAA.6	FEED Calcs. Dwg. & Reports	101.6d	18-Apr-12	18-Oct-12
PFC1100	FEED Design Work	101.6d	18-Apr-12	18-Oct-12
GTA.Schedule-2.1.P.PP.QAA.RAA.7	3rd Party ESP Activities	101.6d	18-Apr-12	18-Oct-12
PFC1110	Engineering Support from 3rd Part ESPs	101.6d	18-Apr-12	18-Oct-12
GTA.Schedule-2.1.P.PP.QAA.ENV	Project Planning - Environment	78.4d	02-May-12	20-Sep-12
PEO1390	Environmental Studies	56.8d	02-May-12	13-Aug-12
PEO1400	WBS - Environmental Studies	78.4d	02-May-12	20-Sep-12
PEO1410	Final Draft ER Submitted to Enb	0.0d		13-Aug-12
PEO1420	Review/Finalize ER	21.6d	14-Aug-12	20-Sep-12
PEO2000	Submit ER to Enbridge	0.0d		20-Sep-12
GTA.Schedule-2.1.P.PP.QAA.LND	Project Planning - Land	315.6d	18-Apr-12	18-Nov-13
GTA.Schedule-2.1.P.PP.QAA.LND.1	Pre LTC Submission	104.0d	18-Apr-12	23-Oct-12
PLE3900	Summary - Land Acquisition & Easements Negotiations	104.0d	18-Apr-12	23-Oct-12
GTA.Schedule-2.1.P.PP.QAA.LND.1.1	Spread 1	103.2d	18-Apr-12	22-Oct-12
PLE1010	Negotiate Options for Easements with Infrastructure Ontario & Hydro One.	103.2d	18-Apr-12	22-Oct-12
PLE1260	Have Land in hand	0.0d		22-Oct-12
GTA.Schedule-2.1.P.PP.QAA.LND.1.5	Spread 2	103.2d	18-Apr-12	22-Oct-12
PLE1020	10 Ruggless Ave. Development (Condor Development)	103.2d	18-Apr-12	22-Oct-12
PLE1030	5 Landstaff Rd East Development (Condor Development)	103.2d	18-Apr-12	22-Oct-12
PLE1040	9 Landstaff Rd East Development (Condor Development)	103.2d	18-Apr-12	22-Oct-12
PLE1050	Contango Holding (Angus & Glen Development)	103.2d	18-Apr-12	22-Oct-12
PLE1060	M.A.N Enterprises (Angus & Glen Development)	103.2d	18-Apr-12	22-Oct-12
PLE1070	A.G.S. Consultant (Angus & Glen Development)	103.2d	18-Apr-12	22-Oct-12
PLE1080	Tony Ucci	103.2d	18-Apr-12	22-Oct-12
PLE1090	John Fontana	103.2d	18-Apr-12	22-Oct-12
PLE1100	Albert Schingal	103.2d	18-Apr-12	22-Oct-12
PLE1110	Negotiate Options for Easements with Infrastructure Ontario & Hydro One.	103.2d	18-Apr-12	22-Oct-12
PLE1120	5 Ruggless Ave. Development Inc. (Condor Development)	103.2d	18-Apr-12	22-Oct-12
PLE1270	Have Land in hand	0.0d		22-Oct-12
GTA.Schedule-2.1.P.PP.QAA.LND.1.3	Spread 3	103.2d	18-Apr-12	22-Oct-12
PLE1130	Negotiate Options for Easements with Infrastructure Ontario & Hydro One.	103.2d	18-Apr-12	22-Oct-12
PLE1140	Toronto Region Conservation Authorities	103.2d	18-Apr-12	22-Oct-12
PLE1150	Negotiate with Private Owner (1083131 Ontario Inc.)	103.2d	18-Apr-12	22-Oct-12
PLE1160	Negotiate with Metrolinx	103.2d	18-Apr-12	22-Oct-12
PLE1170	Negotiate with Private Owner (Airport 407 Business Campus Inc.)	103.2d	18-Apr-12	22-Oct-12
PLE1180	Negotiate with Private Owner (2074070 Ontario Inc.)	103.2d	18-Apr-12	22-Oct-12
PLE1190	Negotiate with Private Owner (Clara Ball)	103.2d	18-Apr-12	22-Oct-12
PLE1200	Negotiate with Private Owner (Cherie Barbara Davidson)	103.2d	18-Apr-12	22-Oct-12
PLE1280	Have Land in hand	0.0d		22-Oct-12
GTA.Schedule-2.1.P.PP.QAA.LND.1.4	Stations	104.0d	18-Apr-12	23-Oct-12
SLE1000	Parkway West - Purchase / Negotiation with Union Gas	103.2d	18-Apr-12	22-Oct-12
SLE1010	Albion Road - Documentation Checking	103.2d	18-Apr-12	22-Oct-12
SLE1020	Buttonville - Purchase / Negotiate with City of Markham	103.2d	18-Apr-12	22-Oct-12
SLE1030	Jonesville Negotiations with Hydro One and Infrastructure Ontario (IO)	68.8d	20-Jun-12	23-Oct-12
GTA.Schedule-2.1.P.PP.QAA.LND.2	Post LTC Submission	152.8d	13-Feb-13	18-Nov-13
PLE3910	Spread 2 Private Owners Options/Agreements	152.8d	13-Feb-13	18-Nov-13
SLE1380	Buttonville Land Purchasing Process (prior to LTC)	85.6d	13-Feb-13	18-Jul-13
PLE3940	TRCA Claiville Access Agreement	152.8d	13-Feb-13	18-Nov-13
PLE3930	IO & HO Easement Agreements	31.6d	07-May-13	03-Jul-13
GTA.Schedule-2.1.P.PP.QAA.GEO	Project Planning - Geotechnical	51.2d	18-Apr-12	18-Jul-12
PFC1040	Geotechnical Investigations	51.2d	18-Apr-12	18-Jul-12
GTA.Schedule-2.1.P.PP.QAA.OTH	Project Planning - External Other Support Groups	156.0d	18-Apr-12	31-Jan-13
MF1050	External Support Groups	156.0d	18-Apr-12	31-Jan-13
GTA.Schedule-2.1.P.PP.QAA.LAW	Project Planning - Regulatory (Incl. Legal)	137.4d	18-Apr-12	20-Dec-12
GTA.Schedule-2.1.P.PP.QAA.LAW.1	LTC Application	137.4d	18-Apr-12	20-Dec-12
MZE-161110	Summary - Reg. Evidence Prep (Pre Submital for LTC)	137.4d	18-Apr-12	20-Dec-12
MZE-161160	Exhibit A: Prepare 1st Draft Evidence	20.8d	02-Aug-12	10-Sep-12
MZE-161170	Exhibits B-F: Prepare 1st Draft Evidence	11.2d	02-Aug-12	22-Aug-12
MZE-161360	Exhibits B-F: Review 1st Draft Evidence with Internal Contributors	8.0d	23-Aug-12	06-Sep-12
MZE-161370	Exhibits B-F: Prepare 2nd Draft Evidence	8.0d	07-Sep-12	20-Sep-12
MZE-161510	Exhibit A: Distribute 1st Draft Evidence	1.6d	11-Sep-12	12-Sep-12
MZE-161520	Exhibit A: Team Meeting Review - Review 1st Draft Evidence	0.8d	13-Sep-12	13-Sep-12
MZE-161580	Exhibit A: Prepare 2nd Draft Evidence	8.0d	14-Sep-12	27-Sep-12
MZE-161700	Exhibits B-F 2nd Draft Complete	0.0d		20-Sep-12
MZE-161710	Exhibit A: 2nd Draft Complete	0.0d		27-Sep-12
MZE-161720	Exhibit A-F: Distribute 2nd Draft Evidence for Review	4.0d	28-Sep-12	04-Oct-12
MZE-161730	External Review: Expert Opinion Evaluation	36.0d	01-Oct-12*	03-Dec-12
MZE-161740	Exhibit A-F: Team Meeting with External Counsel	0.8d	09-Oct-12	09-Oct-12
MZE-161750	Exhibits A-F: Prepare 3rd Draft Evidence (Compile 2nd Draft Evidence Exhibits A-F)	11.2d	10-Oct-12	29-Oct-12
MZE-162100	Network Analysis: Document Final Results	5.6d	15-Oct-12	23-Oct-12
MZE-162130	Land Documentation Ready for Regulatory	0.0d		23-Oct-12



Activity ID	Activity Name	Original Duration	Start	Finish
MZE-162160	Intervenor Consultation	0.8d	29-Oct-12*	29-Oct-12
MZE-162170	Circulate Evidence to Regulatory/ Internal Team for Review	3.2d	30-Oct-12	02-Nov-12
MZE-162180	Circulate Environmental Report (ER) to OPCC for Review	24.8d	30-Oct-12	11-Dec-12
MZE-162190	Circulate Evidence to External Counsel/ Senior Management for Review	4.0d	05-Nov-12	09-Nov-12
MZE-162200	Circulate Evidence to Guy Jarvis for Review	4.0d	12-Nov-12	16-Nov-12
MZE-162230	Review Expert Opinon Evaluation	1.6d	04-Dec-12	05-Dec-12
MZE-162240	Exhibit A: Update 3rd Draft with content received by Expert Opinion	0.8d	06-Dec-12	06-Dec-12
MZE-162250	Exhibit A: Team Review/ Final Update with content received by Expert Opinion	4.0d	07-Dec-12	13-Dec-12
MZE-162260	Submit Expert Opinion to OEB	0.0d		13-Dec-12
MZE-162270	Submit LTC Application to OEB	0.0d	20-Dec-12	
GTA.Schedule-2.1.P.PP.QAA.LAW.1.1 Exhibits A-F Final Updates		36.3d	18-Oct-12	20-Dec-12
MZE-162110	Exhibit E: Update Economic Analysis with Revised Project Costs (Cimarron Informa	2.4d	18-Oct-12	23-Oct-12
MZE-162140	Exhibit A: Update to include Network Analysis information	1.6d	24-Oct-12	25-Oct-12
MZE-162150	Exhibit D: Update with Land Documentation	1.6d	24-Oct-12	25-Oct-12
MZE-162210	Exhibits A-F: Final Edits	4.0d	19-Nov-12	23-Nov-12
MZE-162220	Preparation for Filing	15.0d	26-Nov-12	20-Dec-12
GTA.Schedule-2.1.P.PP.QAA.LAW.1.2 Exhibit A - Prepare Preliminary Draft Evidence		59.2d	18-Apr-12	01-Aug-12
MZE-161000	Project Summary - Preliminary Draft	44.0d	18-Apr-12	05-Jul-12
MZE-161010	History of Natural Gas Supply in the GTA - Preliminary Draft	44.0d	18-Apr-12	05-Jul-12
MZE-161020	Current Operation - Preliminary Draft	44.0d	18-Apr-12	05-Jul-12
MZE-161030	Gas Demand and Supply - Preliminary Draft	44.0d	18-Apr-12	05-Jul-12
MZE-161040	Market Growth (Customer Additions Forecast) - Preliminary Draft	44.0d	18-Apr-12	05-Jul-12
MZE-161050	Issues with Current Operation - Preliminary Draft	44.0d	18-Apr-12	05-Jul-12
MZE-161060	Limitations of Existing Facilities - Preliminary Draft	44.0d	18-Apr-12	05-Jul-12
MZE-161070	Alternatives - Preliminary Draft	44.0d	18-Apr-12	05-Jul-12
MZE-161080	Operations of Proposed Facilities - Preliminary Draft	44.0d	18-Apr-12	05-Jul-12
MZE-161090	Timing - Preliminary Draft	44.0d	18-Apr-12	05-Jul-12
MZE-161100	Cost Benefit Summary - Preliminary Draft	44.0d	18-Apr-12	05-Jul-12
MZE-161120	Exhibit A: Distribute Preliminary Draft Evidence for Review	1.6d	06-Jul-12	09-Jul-12
MZE-161130	Exhibit A: Team Meeting Review - Preliminary Draft Evidence	0.8d	10-Jul-12	10-Jul-12
MZE-161140	Prepare Project Scope Document for External Counsel	12.0d	11-Jul-12	31-Jul-12
MZE-161150	Review Project Scope (incl. Exhibit A) w/ External Counsel	0.8d	01-Aug-12	01-Aug-12
GTA.Schedule-2.1.P.PP.QAA.LAW.1.3 Exhibit A: Prepare 2nd Draft Evidence		8.0d	14-Sep-12	27-Sep-12
MZE-161590	Project Summary - 2nd Draft	8.0d	14-Sep-12	27-Sep-12
MZE-161600	History of Natural Gas Supply in the GTA - 2nd Draft	8.0d	14-Sep-12	27-Sep-12
MZE-161610	Current Operation - 2nd Draft	8.0d	14-Sep-12	27-Sep-12
MZE-161620	Gas Demand and Supply - 2nd Draft	8.0d	14-Sep-12	27-Sep-12
MZE-161630	Market Growth (Customer Additions Forecast) - 2nd Draft	8.0d	14-Sep-12	27-Sep-12
MZE-161640	Issues with Current Operation - 2nd Draft	8.0d	14-Sep-12	27-Sep-12
MZE-161650	Limitations of Existing Facilities - 2nd Draft	8.0d	14-Sep-12	27-Sep-12
MZE-161660	Alternatives - 2nd Draft	8.0d	14-Sep-12	27-Sep-12
MZE-161670	Operations of Proposed Facilities - 2nd Draft	8.0d	14-Sep-12	27-Sep-12
MZE-161680	Timing - 2nd Draft	8.0d	14-Sep-12	27-Sep-12
MZE-161690	Cost Benefit Summary - 2nd Draft	8.0d	14-Sep-12	27-Sep-12
GTA.Schedule-2.1.P.PP.QAA.LAW.1.4 Exhibits B-F: Prepare 1st Draft Evidence		11.2d	02-Aug-12	22-Aug-12
MZE-161180	Tree Inventory and Condition Assessment - 1st Draft	11.2d	02-Aug-12	22-Aug-12
MZE-161190	Environmental Implementation Plan - 1st Draft	11.2d	02-Aug-12	22-Aug-12
MZE-161200	Design Specifications - 1st Draft	11.2d	02-Aug-12	22-Aug-12
MZE-161210	Hydrostatic Test Procedures - 1st Draft	11.2d	02-Aug-12	22-Aug-12
MZE-161220	Total Estimated Project Costs - 1st Draft	11.2d	02-Aug-12	22-Aug-12
MZE-161230	Proposed Construction Schedule - 1st Draft	11.2d	02-Aug-12	22-Aug-12
MZE-161240	Land Requirements - 1st Draft	11.2d	02-Aug-12	22-Aug-12
MZE-161250	Permits Required - 1st Draft	11.2d	02-Aug-12	22-Aug-12
MZE-161260	Negotiations to Date - 1st Draft	11.2d	02-Aug-12	22-Aug-12
MZE-161270	Affidavit Search of Title - 1st Draft	11.2d	02-Aug-12	22-Aug-12
MZE-161280	Aboriginal Consultation - 1st Draft	11.2d	02-Aug-12	22-Aug-12
MZE-161290	Alternative Route Description - 1st Draft	11.2d	02-Aug-12	22-Aug-12
MZE-161300	Preferred Route Description - 1st Draft	11.2d	02-Aug-12	22-Aug-12
GTA.Schedule-2.1.P.PP.QAA.LAW.1.5 Exhibits B-F: Prepare 2nd Draft Evidence		8.0d	07-Sep-12	20-Sep-12
MZE-161380	Preferred Route Description - 2nd Draft	8.0d	07-Sep-12	20-Sep-12
MZE-161390	Alternative Route Description - 2nd Draft	8.0d	07-Sep-12	20-Sep-12
MZE-161400	Tree Inventory and Condition Assessment - 2nd Draft	8.0d	07-Sep-12	20-Sep-12
MZE-161410	Environmental Implementation Plan - 2nd Draft	8.0d	07-Sep-12	20-Sep-12
MZE-161420	Design Specifications - 2nd Draft	8.0d	07-Sep-12	20-Sep-12
MZE-161430	Hydrostatic Test Procedures - 2nd Draft	8.0d	07-Sep-12	20-Sep-12
MZE-161440	Total Estimated Project Costs - 2nd Draft	8.0d	07-Sep-12	20-Sep-12
MZE-161450	Proposed Construction Schedule - 2nd Draft	8.0d	07-Sep-12	20-Sep-12
MZE-161460	Land Requirements - 2nd Draft	8.0d	07-Sep-12	20-Sep-12
MZE-161470	Permits Required - 2nd Draft	8.0d	07-Sep-12	20-Sep-12
MZE-161480	Negotiations to Date - 2nd Draft	8.0d	07-Sep-12	20-Sep-12
MZE-161490	Affidavit Search of Title - 2nd Draft	8.0d	07-Sep-12	20-Sep-12
MZE-161500	Aboriginal Consultation - 2nd Draft	8.0d	07-Sep-12	20-Sep-12

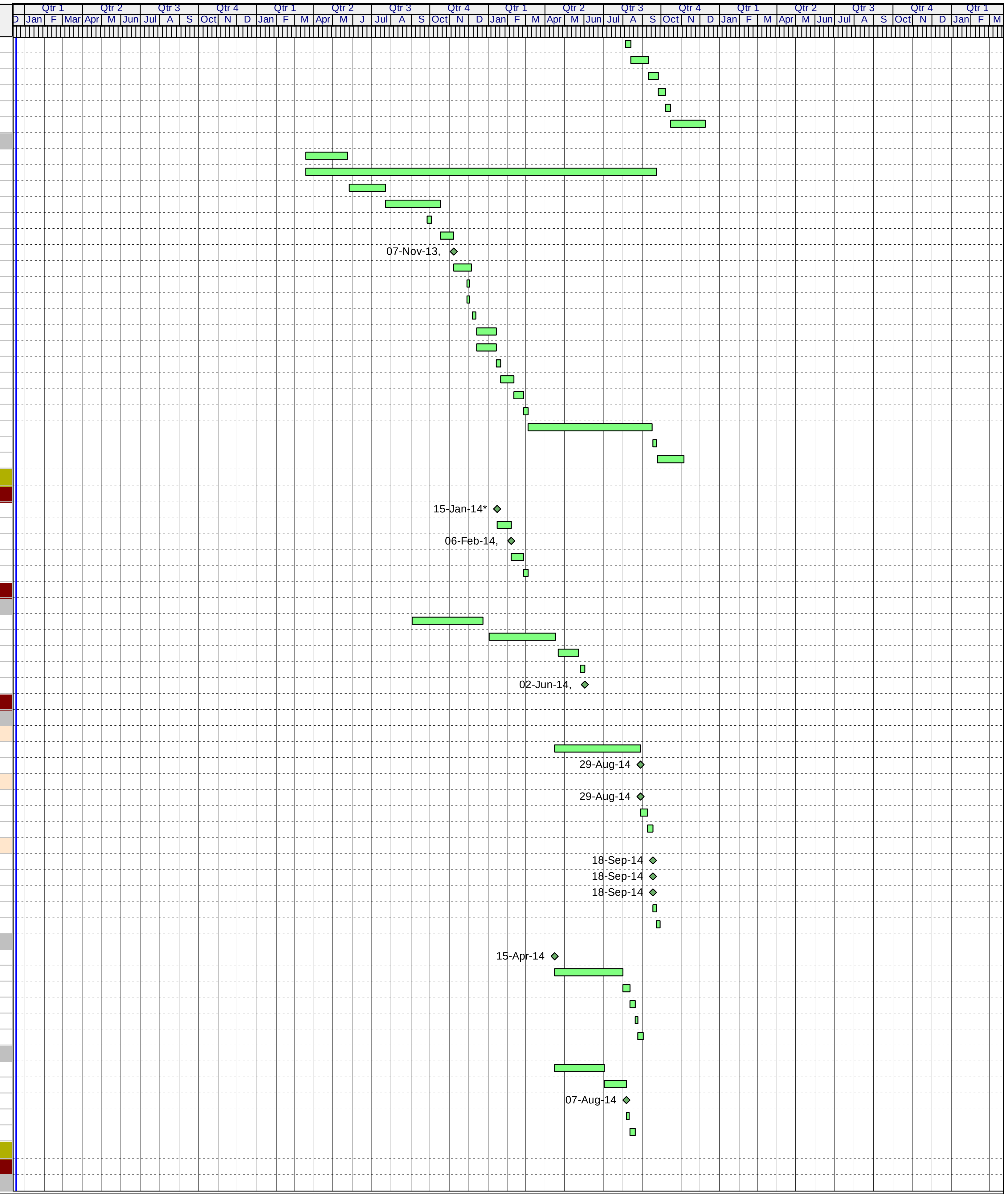


Activity ID	Activity Name	Original Duration	Start	Finish
GTA.Schedule-2.1.P.PP.QAA.LAW.1.6 Exhibits A-F: Prepare 3rd Draft Evidence (Compile 2nd Draft Ev		11.2d	10-Oct-12	29-Oct-12
MZE-161760	Exhibit List Completion	11.2d	10-Oct-12	29-Oct-12
MZE-161770	Confirm OPCC Distribution List	11.2d	10-Oct-12	29-Oct-12
MZE-161780	Confirm List of Interested Parties Completion	11.2d	10-Oct-12	29-Oct-12
MZE-161790	Project Summary - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161800	History of Natural Gas Supply in the GTA - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161810	Current Operation - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161820	Gas Demand and Supply - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161830	Market Growth (Customer Additions Forecast) - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161840	Issues with Current Operation - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161850	Limitations of Existing Facilities - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161860	Alternatives - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161870	Operations of Proposed Facilities - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161880	Timing - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161890	Cost Benefit Summary - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161900	Preferred Route Description - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161910	Alternative Route Description - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161920	Maps: Alternate and Final Route for Section A and Section B	11.2d	10-Oct-12	29-Oct-12
MZE-161930	Environmental Report (ER)	11.2d	10-Oct-12	29-Oct-12
MZE-161940	Archeological Assessment	11.2d	10-Oct-12	29-Oct-12
MZE-161950	Tree Inventory and Condition Assessment - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161960	Environmental Implementation Plan - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161970	Design Specifications - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161980	Hydrostatic Test Procedures - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-161990	Total Estimated Project Costs - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-162000	Proposed Construction Schedule - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-162010	Land Requirements - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-162020	Permits Required - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-162030	Negotiations to Date - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-162040	Affidavit Search of Title - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
MZE-162050	Economic Feasibility	11.2d	10-Oct-12	29-Oct-12
MZE-162060	Stage 1 Analysis	11.2d	10-Oct-12	29-Oct-12
MZE-162070	Economic Feasibility of Alternative Means of Supply	11.2d	10-Oct-12	29-Oct-12
MZE-162080	Aboriginal Consultation - 3rd Draft	11.2d	10-Oct-12	29-Oct-12
GTA.Schedule-2.1.P.PP.QAA.LAW.1.8 Required Supporting Studies/Documents		33.6d	14-Aug-12	12-Oct-12
MZE-161310	Finalize Environmental Report (ER)	32.0d	14-Aug-12	10-Oct-12
MZE-161320	Network Analysis: Finalize and Approve Customer Forecast	9.6d	16-Aug-12*	31-Aug-12
MZE-161330	Network Analysis: Confirm DSM Factor - Harmonize Gas Supply Factor and Base L	9.6d	16-Aug-12	31-Aug-12
MZE-161340	Network Analysis: Compile Customer Growth Information	12.0d	22-Aug-12	12-Sep-12
MZE-161350	Network Analysis: Create Load Files	12.0d	22-Aug-12	12-Sep-12
MZE-161530	Network Analysis: Confirm Current and Future Loads (wrt. Station Design)	16.8d	13-Sep-12	12-Oct-12
MZE-161540	Network Analysis: Verify Daily Flows	16.8d	13-Sep-12	12-Oct-12
MZE-161550	Network Analysis: Complete PISA Analysis	16.8d	13-Sep-12	12-Oct-12
MZE-161560	Network Analysis: Complete Analysis - Confirm Timing and Identify Station Design I	16.8d	13-Sep-12	12-Oct-12
MZE-161570	Network Analysis: Identify and Complete Other Required Analyses	16.8d	13-Sep-12	12-Oct-12
GTA.Schedule-2.1.P.PP.QAA.LAW.1.9 Other Matters		10.4d	11-Oct-12	29-Oct-12
MZE-162090	Review and Prepare Package for submission to OPCC	6.4d	11-Oct-12	22-Oct-12
MZE-162120	Mail Environmental Report to OPCC	4.0d	23-Oct-12	29-Oct-12
GTA.Schedule-2.1.P.PP.QSG Project Planning, Internal Support Group		223.2d	18-Apr-12	03-Jun-13
GTA.Schedule-2.1.P.PP.QSG.PMT Project Planning - Project Execution Team		156.0d	18-Apr-12	31-Jan-13
MF1070	Project Management & Office Overhead	156.0d	18-Apr-12	31-Jan-13
GTA.Schedule-2.1.P.PP.QSG.OTH Project Planning - Internal Support Groups		156.0d	18-Apr-12	31-Jan-13
MF1060	Internal Support During Planning Stage	156.0d	18-Apr-12	31-Jan-13
GTA.Schedule-2.1.P.PP.QSG.BDE Project Planning - Project Development		223.2d	18-Apr-12	03-Jun-13
MF1040	Business Development Eng. - Planning Stage	223.2d	18-Apr-12	03-Jun-13
GTA.Schedule-2.1.P.PS Project Screening		71.2d	19-Dec-11	01-May-12
GTA.Schedule-2.1.P.PS.QSG Project Screening , Internal Support Group		67.2d	19-Dec-11	24-Apr-12
GTA.Schedule-2.1.P.PS.QSG.BDE Project Screening - Project Development		63.2d	19-Dec-11	17-Apr-12
MF1000	Project Development Eng. (PS)	63.2d	19-Dec-11	17-Apr-12
GTA.Schedule-2.1.P.PS.QSG.PMT Project Screening - Project Execution Team		67.2d	19-Dec-11	24-Apr-12
MF1030	Project Execution Team	67.2d	19-Dec-11	24-Apr-12
GTA.Schedule-2.1.P.PS.QSG.OTH Project Screening - Internal Support Groups		67.2d	19-Dec-11	24-Apr-12
MF1020	Internal Support	67.2d	19-Dec-11	24-Apr-12
GTA.Schedule-2.1.P.PS.QAA Project Screening, External		71.2d	19-Dec-11	01-May-12
GTA.Schedule-2.1.P.PS.QAA.RAA Project Screening - Engineering		63.2d	19-Dec-11	17-Apr-12
PFC1000	Engineering - Conceptual (Class V)	63.2d	19-Dec-11	17-Apr-12
GTA.Schedule-2.1.P.PS.QAA.LND Project Screening - Land		71.0d	19-Dec-11	01-May-12
PLE3890	Land	71.0d	19-Dec-11	01-May-12
GTA.Schedule-2.1.P.PS.QAA.ENV Project Screening - Environment		71.2d	19-Dec-11	01-May-12
PEO1040	Environmental Studies	71.2d	19-Dec-11	01-May-12

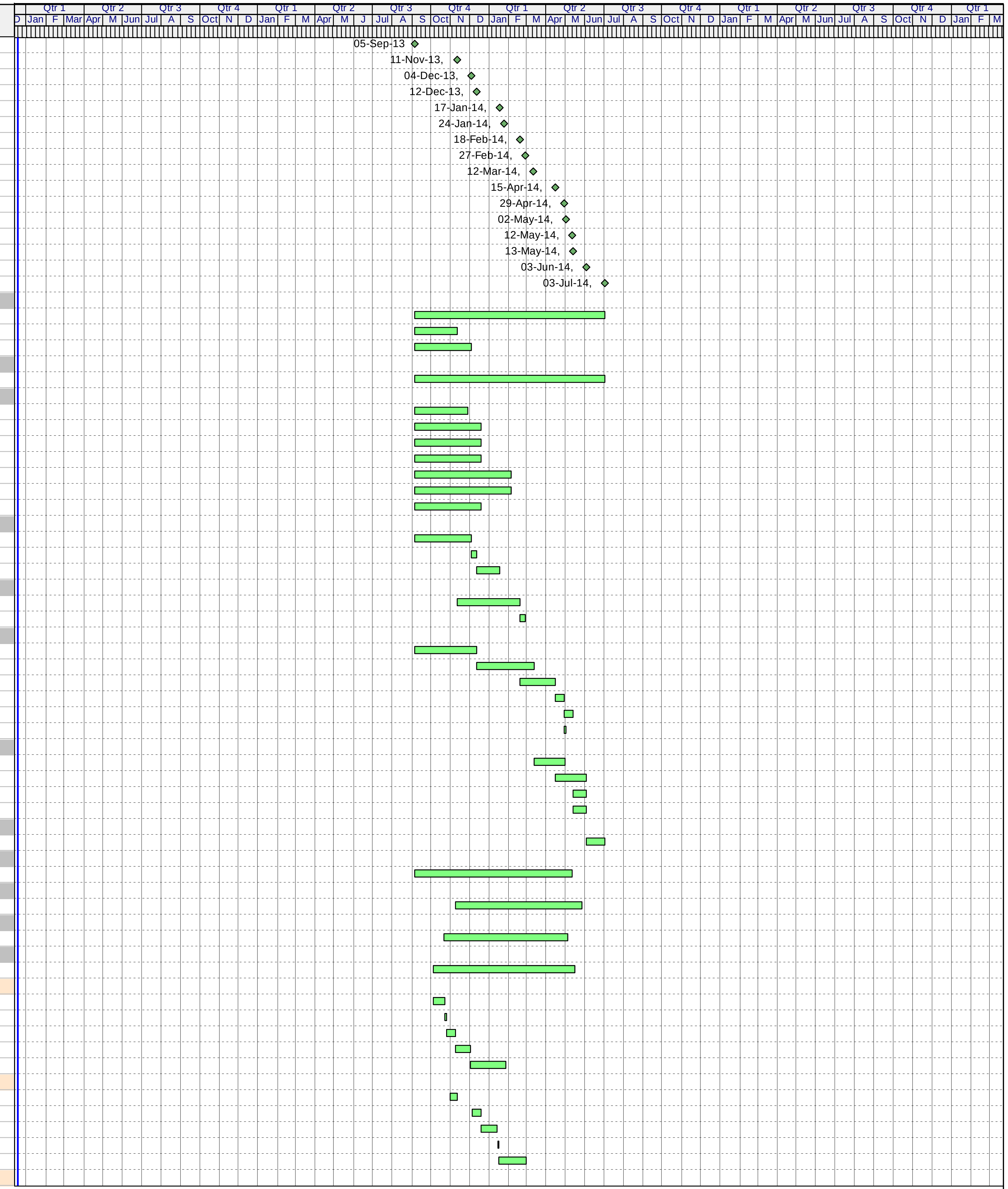


Activity ID	Activity Name	Original Duration	Start	Finish
GTA.Schedule-2.1.P.PS.QAA.OTH Project Screening - External Other Support Groups		67.2d	19-Dec-11	24-Apr-12
MFO1010	External Support	67.2d	19-Dec-11	24-Apr-12
GTA.Schedule-2.1.P.PS.QAA.SVY Project Screening - Survey		63.0d	19-Dec-11	17-Apr-12
PFC1010	Topo Mapping	63.0d	19-Dec-11	17-Apr-12
GTA.Schedule-2.1.P.PS.QAA.LAW Project Screening - Regulatory (Incl. Legal)		63.0d	19-Dec-11	17-Apr-12
MZE-16140	Regulatory & Legal (Inception)	63.0d	19-Dec-11	17-Apr-12
GTA.Schedule-2.GTA GTA PROJECT EXECUTION		979.2d	19-Dec-11	24-Nov-16
GTA.Schedule-2.GTA.1 PROJECT MANAGEMENT AND OVERHEADS		117.6d	21-Dec-12	31-Jul-13
GTA.Schedule-2.GTA.1.PM Project Management		117.6d	21-Dec-12	31-Jul-13
GTA.Schedule-2.GTA.1.PM.X Project Execution		117.6d	21-Dec-12	31-Jul-13
GTA.Schedule-2.GTA.1.PM.X.PMT Project Execution - Core Project Management		117.6d	21-Dec-12	31-Jul-13
GTA.Schedule-2.GTA.1.PM.X.PMT.RL Project Execution - External Regulatory & Legal		117.6d	21-Dec-12	31-Jul-13
GTA.Schedule-2.GTA.1.PM.X.PMT.RL.1 Post LTC Application - Pre Approval		117.6d	21-Dec-12	31-Jul-13
MZE-16200	Summary - Regulatory Proceedings	117.6d	21-Dec-12	31-Jul-13
MZE-16210	OEB Acknowledgement	0.8d	21-Dec-12	02-Jan-13
MZE-16220	OEB Review	210.0d	21-Dec-12	19-Jul-13
MZE-16230	Procedural Conference and/or other Hearings	0.0d	02-Jan-13	02-Jan-13
MZE-16240	Letter of Direction and Notice of Application	12.8d	02-Jan-13	24-Jan-13
MZE-16250	Procedural Order No.1	23.2d	24-Jan-13	07-Mar-13
MZE-16260	Board Staff and Intervenor Filed Interrogatories	8.8d	07-Mar-13	22-Mar-13
MZE-16270	Respond to Interrogatories	8.8d	22-Mar-13	09-Apr-13
MZE-16280	**TBD ¿ Potential Intervenor Evidence and Interrogatories (2 months)	16.8d	09-Apr-13	08-May-13
MZE-16290	Technical Conference	1.6d	08-May-13	10-May-13
MZE-16300	Answer Undertakings	8.0d	10-May-13	27-May-13
MZE-16310	Oral Hearing	8.0d	27-May-13	10-Jun-13
MZE-16320	Arguments (Applicant¿s, Intervenor, Appliant Response and Argument)	3.2d	10-Jun-13	14-Jun-13
MZE-16330	Schedule Reserve	6.4d	19-Jul-13	31-Jul-13
MZE-16340	OEB Decision	0.0d		31-Jul-13
GTA.Schedule-2.GTA.2 MAINLINE		979.2d	19-Dec-11	24-Nov-16
GTA.Schedule-2.GTA.2.S0 Spread 0		830.0d	19-Dec-11	01-Mar-16
GTA.Schedule-2.GTA.2.S0.L Land - Mainline		605.7d	11-Feb-13	01-Mar-16
GTA.Schedule-2.GTA.2.S0.L.LCO Land - Mainline, Consultants		374.9d	11-Feb-13	30-Dec-14
PLE3920	ESA for IO Land Application	374.9d	11-Feb-13	30-Dec-14
GTA.Schedule-2.GTA.2.S0.L.LCT Land - Mainline, Compensation		405.6d	13-Feb-13	27-Feb-15
GTA.Schedule-2.GTA.2.S0.L.LCT.002 Land - Mainline, Compensation Easements		390.4d	13-Feb-13	30-Jan-15
A13770	Land Purchases and Easements	390.4d	13-Feb-13	30-Jan-15
GTA.Schedule-2.GTA.2.S0.L.LCT.003 Land - Mainline, Compensation - Temp & Extra Temp Work Spa		405.6d	13-Feb-13	27-Feb-15
A13780	TWS and extra work space	405.6d	13-Feb-13	27-Feb-15
GTA.Schedule-2.GTA.2.S0.L.LDA Land - Mainline, Damages		246.4d	01-Dec-14	01-Mar-16
GTA.Schedule-2.GTA.2.S0.L.LDA.001 Land - Mainline, Damages - Inconvenience		246.0d	01-Dec-14	29-Feb-16
A13840	Damages	246.0d	01-Dec-14	29-Feb-16
GTA.Schedule-2.GTA.2.S0.L.LDA.002 Land - Mainline, Damages - Agricultural Losses		246.0d	01-Dec-14	29-Feb-16
A13850	damages to Agricultural Lands	246.0d	01-Dec-14	29-Feb-16
GTA.Schedule-2.GTA.2.S0.L.LDA.006 Land - Mainline, Damages - Landowner/3rd Party Costs		246.0d	01-Dec-14	29-Feb-16
A13860	3rd Party Costs	246.0d	01-Dec-14	29-Feb-16
GTA.Schedule-2.GTA.2.S0.L.LDA.007 Land - Mainline, Damages - Other Damages		246.0d	01-Dec-14	29-Feb-16
A13870	Other Land Damages	246.0d	01-Dec-14	29-Feb-16
GTA.Schedule-2.GTA.2.S0.L.LDA.008 Land - ROW Clearing		246.4d	01-Dec-14	01-Mar-16
A13880	RoW Clearing & Grabing	246.4d	01-Dec-14	01-Mar-16
GTA.Schedule-2.GTA.2.S0.M Spread 0 - Procurement		414.8d	02-Nov-12	08-Dec-14
GTA.Schedule-2.GTA.2.S0.M.PSE Procurement of Services		414.8d	02-Nov-12	08-Dec-14
GTA.Schedule-2.GTA.2.S0.M.PSE.001 Engineering Services		51.2d	02-Nov-12	11-Feb-13
PME12000	Procurement of Consultancy Services for PFE Phase	51.2d	02-Nov-12	11-Feb-13
GTA.Schedule-2.GTA.2.S0.M.PSE.002 Mainline Construction Contract		361.9d	13-Feb-13	08-Dec-14
PME12100	Summary - Tender/Award Mainline & Facilities Construction Contract	361.9d	13-Feb-13	08-Dec-14
PME14070	SVT - Market Analysis	86.0d	13-Feb-13	18-Jul-13
PME12090	Market analysis, internal and external discussions and data gathering	30.0d	19-Jul-13	12-Sep-13
PME12140	EOI from potential bidders & PQ process	60.0d	12-Sep-13	07-Jan-14
PME14080	SVT CDP	16.6d	28-Nov-13	06-Jan-14
PME12500	Contract development plan preparation and endorsement of senior management	30.0d	07-Jan-14	28-Feb-14
PME12510	RFP documents preparation	60.0d	07-Jan-14	24-Apr-14
PME12580	Legal review/endorsement of RFP documents	15.0d	24-Apr-14	22-May-14
PME12670	IFB recieved and endorsed by GTA Engineering to include in the RFP documents	5.0d	13-May-14	22-May-14
PME12680	RFP Issue	0.0d		22-May-14
PME12690	RFP Preparation by Proponents and Submit	20.0d	23-May-14	27-Jun-14
PME12700	Site Visits by Contractors	2.0d	13-Jun-14	17-Jun-14
PME12710	Pre-Bid clarification meetings	2.0d	13-Jun-14	17-Jun-14
PME12720	Preparation of documents for commercial and technical evaluation	5.0d	27-Jun-14	08-Jul-14
PME12730	Technical evaluation	15.0d	08-Jul-14	05-Aug-14
PME12740	Commercial Evaluation	15.0d	08-Jul-14	05-Aug-14

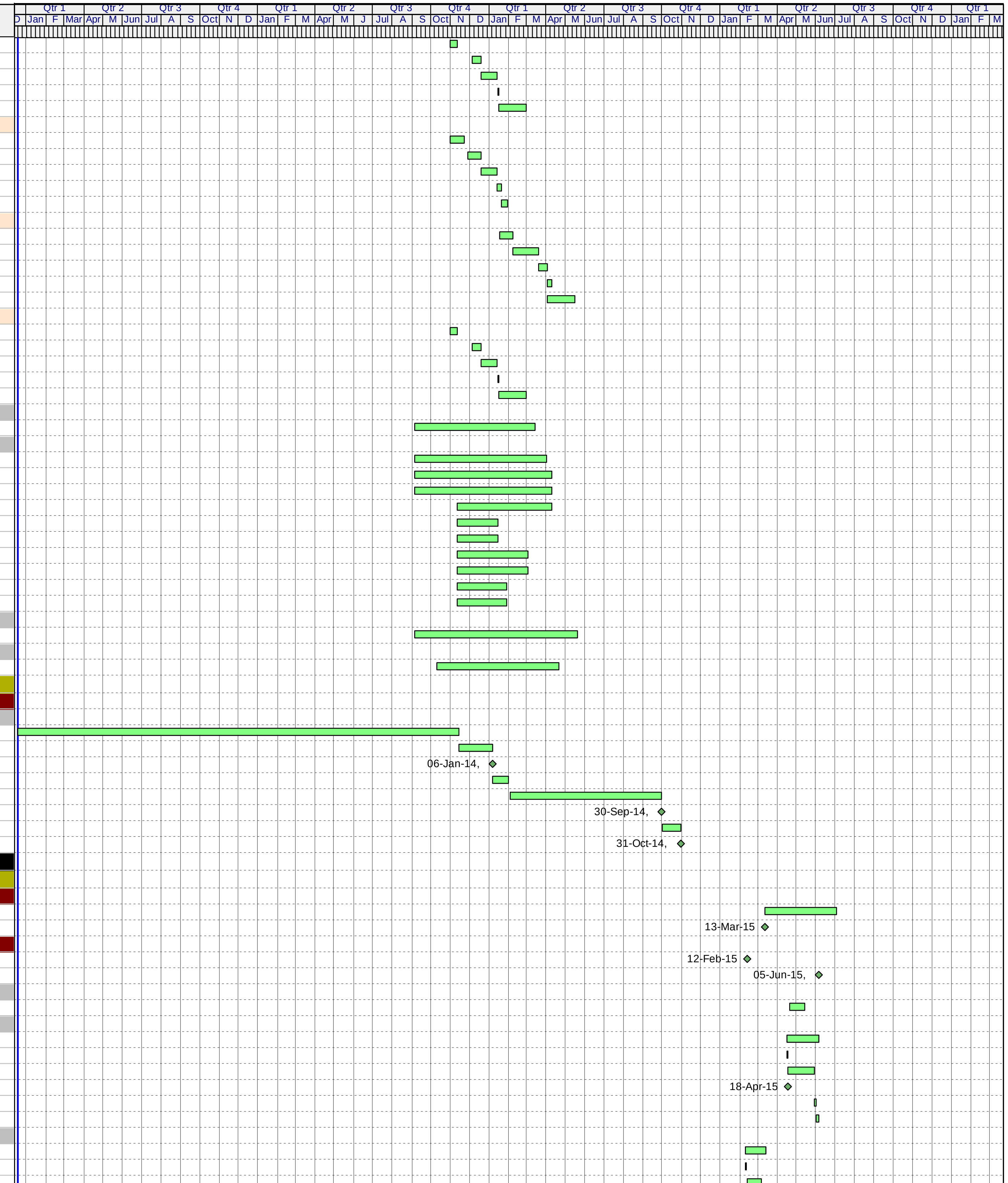
Activity ID	Activity Name	Original Duration	Start	Finish
PME12750	Contract Award recommendation	5.0d	05-Aug-14	13-Aug-14
PME12760	Contract negotiations, exceptions, terms/conditions settlement	15.0d	13-Aug-14	10-Sep-14
PME12770	Contract document preparation, peer review, legal review etc	10.0d	10-Sep-14	26-Sep-14
PME12810	Legal review	5.0d	26-Sep-14	07-Oct-14
PME12830	Contract Signoff	5.0d	07-Oct-14	16-Oct-14
PME12840	Contract Kickoff, Contractor site visit, Invoicing process setup, safety orientation, Mc	30.0d	16-Oct-14	08-Dec-14
GTA.Schedule-2.GTA.2.S0.M.PSE.003 HDD Construction Contract		325.3d	19-Mar-13	05-Nov-14
PME12010	Market analysis, internal and external discussions and data gathering	37.3d	19-Mar-13	24-May-13
PME12020	Summary - Tender/Award HDD Construction Contract	301.3d	19-Mar-13	23-Sep-14
PME12050	EOI from potential bidders & PQ process	32.0d	27-May-13	22-Jul-13
PME12080	RFP documents preparation	48.0d	23-Jul-13	17-Oct-13
PME12180	IFB recieved and endorsed by GTA Engineering to include in the RFP documents	4.0d	26-Sep-13	03-Oct-13
PME12130	Legal review/endorsement of RFP documents	12.0d	18-Oct-13	07-Nov-13
PME12230	RFP Issue	0.0d		07-Nov-13
PME12240	RFP Preparation by Proponents and Submit	16.0d	08-Nov-13	05-Dec-13
PME12250	Site Visits by Contractors	1.6d	29-Nov-13	02-Dec-13
PME12260	Pre-Bid clarification meetings	1.6d	29-Nov-13	02-Dec-13
PME12270	Preparation of documents for commercial and technical evaluation	4.0d	06-Dec-13	12-Dec-13
PME12280	Technical evaluation	12.0d	13-Dec-13	13-Jan-14
PME12290	Commercial Evaluation	12.0d	13-Dec-13	13-Jan-14
PME12340	Contract Award recommendation	4.0d	14-Jan-14	20-Jan-14
PME12350	Contract negotiations, exceptions, terms/conditions settlement	12.0d	21-Jan-14	10-Feb-14
PME12490	Contract document preparation, peer review, legal review etc	8.0d	11-Feb-14	25-Feb-14
PME12520	Legal review	4.0d	26-Feb-14	04-Mar-14
PME14090	SVT - Contract Signoff	108.0d	05-Mar-14	16-Sep-14
PME12530	Contract Signoff	4.0d	17-Sep-14	23-Sep-14
PME12820	Contract Kickoff, Contractor site visit, Invoicing process setup, safety orientation, Mc	24.0d	24-Sep-14	05-Nov-14
GTA.Schedule-2.GTA.2.S0.E Environment - Spread 0		212.4d	03-Sep-13	29-Sep-14
GTA.Schedule-2.GTA.2.S0.E.001 Spread 0, Environmental - Environmental Survey & Studies		28.0d	15-Jan-14	05-Mar-14
PEO2030	Receive Draft ESP from Env. Consultant	0.0d	15-Jan-14*	
PEO2040	Review Draft ESP (EGD EHS & GTA)	13.0d	15-Jan-14	06-Feb-14
PEO2050	Presentation of Draft ESP to IO	0.0d		06-Feb-14
PEO2060	Env. Consultant Update ESP to Final	10.0d	06-Feb-14	25-Feb-14
PEO2240	Review of Final ESP (EHS & GTA)	5.0d	25-Feb-14	05-Mar-14
GTA.Schedule-2.GTA.2.S0.E.010 Spread 0, Environmental - Environmental Studies for Land/ROW acqui		147.2d	03-Sep-13	02-Jun-14
GTA.Schedule-2.GTA.2.S0.E.010.1 Spread 0, Environmental - Class EA		147.2d	03-Sep-13	02-Jun-14
PEO2010	SVT - start Class EA	63.2d	03-Sep-13	23-Dec-13
PEO2020	Complete C & D and collate appendices	60.0d	02-Jan-14	17-Apr-14
PEO2290	IO Review Draft C & D report	19.2d	21-Apr-14	23-May-14
PEO2300	Update/Finalize C & D	4.8d	26-May-14	02-Jun-14
PEO2310	GTA Submit C & D reports to OI	0.0d		02-Jun-14
GTA.Schedule-2.GTA.2.S0.E.005 Spread 0, Environmental - Environmental Planning and Permitting		91.2d	15-Apr-14	29-Sep-14
GTA.Schedule-2.GTA.2.S0.E.005.01 Spread 0, Environmental -Environmental Protection Plan (EPP)		91.2d	15-Apr-14	29-Sep-14
GTA.Schedule-2.GTA.2.S0.E.005.01.1 Draft EPP (PFE)		75.2d	15-Apr-14	29-Aug-14
PEO2270	SVT - EPP after 90% IFR	75.2d	15-Apr-14	29-Aug-14
PEO3100	Eng. SP Complete EPP Rev.0	0.0d	29-Aug-14	
GTA.Schedule-2.GTA.2.S0.E.005.01.2 Enviromental Alignment Sheets		10.0d	29-Aug-14	17-Sep-14
PEO3080	Receive EPP Alignment Sheets from ESP	0.0d	29-Aug-14	
PEO3090	Review by GTA/EGD (Lands)	5.0d	29-Aug-14	09-Sep-14
PEO3110	Eng. SP Finalize EPP Alignment Sheets & issue EPP Rev. 0A	5.0d	09-Sep-14	17-Sep-14
GTA.Schedule-2.GTA.2.S0.E.005.01.3 Final EPP		6.0d	18-Sep-14	29-Sep-14
PEO3120	Receive Updated EPP for Review (from Eng. SP)	0.0d	18-Sep-14	
PEO3130	Receive Environmental Permits	0.0d	18-Sep-14	
PEO3140	Receive all Env. Management Plans	0.0d	18-Sep-14	
PEO3150	Review Updated EPP (GTA/EGD)	3.0d	18-Sep-14	23-Sep-14
PEO3160	Eng. SP Finalize & Issue EPP Rev. 1 for use	3.0d	23-Sep-14	29-Sep-14
GTA.Schedule-2.GTA.2.S0.E.005.02 Spread 0, Environmental - Contaminated Soil Management Plan		76.0d	15-Apr-14	02-Sep-14
PEO2250	Start of CSM Plan	0.0d	15-Apr-14	
PEO2260	Env. Consultant Conduct Subsurface Soil & Groundwater investigations	60.0d	15-Apr-14	01-Aug-14
PEO3010	Review results of Soil & Groundwater investigation and determine approach	5.0d	01-Aug-14	12-Aug-14
PEO3050	Env. Consultant Draft CSM Plan	5.0d	12-Aug-14	20-Aug-14
PEO3060	Review/Comment Draft CSM Plan (GTA)	2.0d	21-Aug-14	25-Aug-14
PEO3070	Env. Consultant Finalize CSM report	4.0d	25-Aug-14	02-Sep-14
GTA.Schedule-2.GTA.2.S0.E.005.06 Spread 0, Environmental - Agricultural Land Management Plan		69.4d	15-Apr-14	20-Aug-14
PEO2280	SVT - ESP to Prepare ALMP	42.4d	15-Apr-14	02-Jul-14
PEO3000	Eng. SP Draft ALMP & Field Work	20.0d	02-Jul-14	07-Aug-14
PEO3020	Receive Draft ALMP	0.0d	07-Aug-14	
PEO3030	GTA Review/comment on draft ALMP	2.0d	07-Aug-14	11-Aug-14
PEO3040	Eng. SP Update ALMP	5.0d	12-Aug-14	20-Aug-14
GTA.Schedule-2.GTA.2.S0.R Engineering - Non-Spread-specific		162.4d	05-Sep-13	03-Jul-14
GTA.Schedule-2.GTA.2.S0.R.RBB Detailed Design Engineering - All Spreads		162.4d	05-Sep-13	03-Jul-14
GTA.Schedule-2.GTA.2.S0.R.RBB.000 Mainline DED Key Milestones		162.4d	05-Sep-13	03-Jul-14



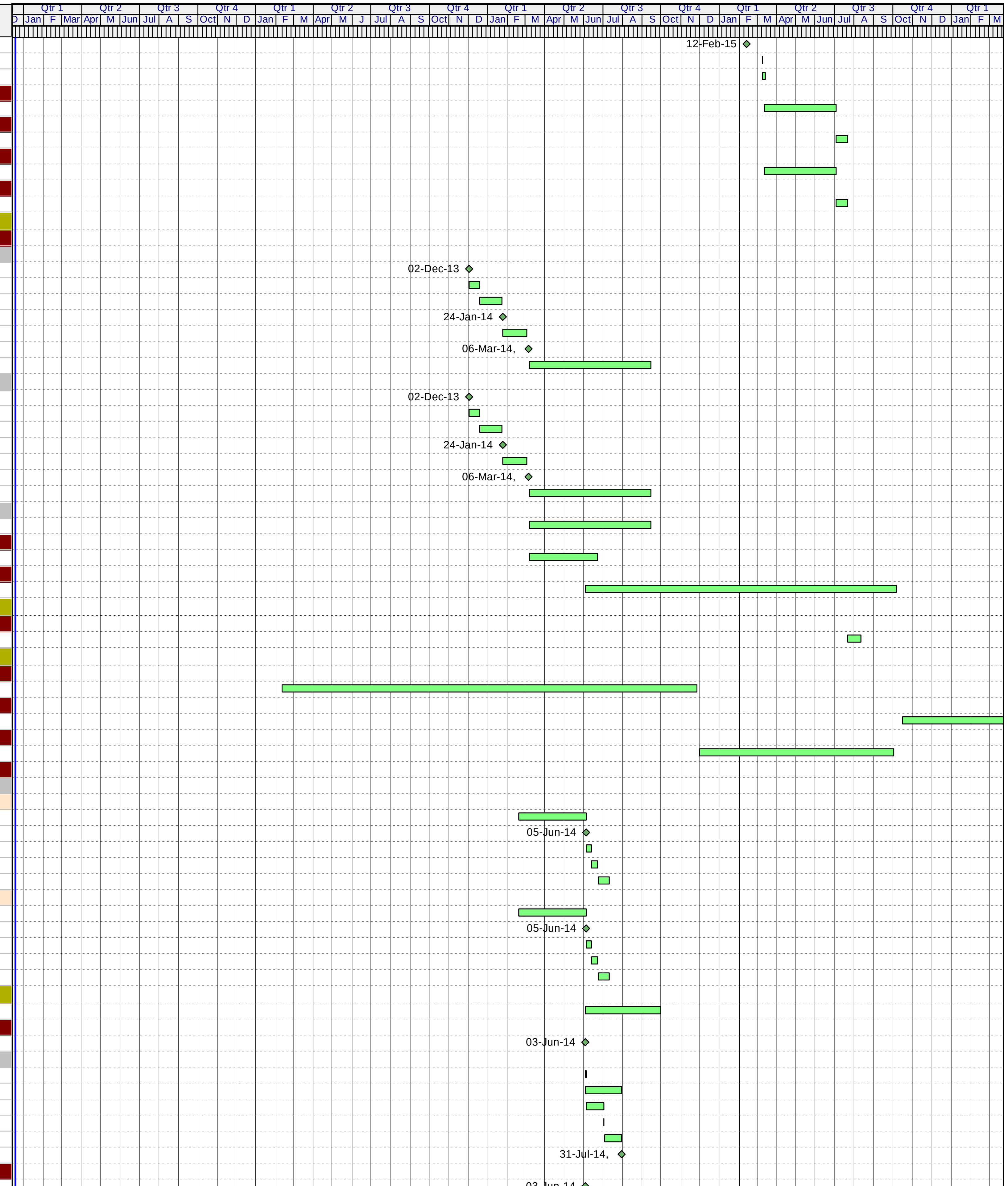
Activity ID	Activity Name	Original Duration	Start	Finish
PKM100	Project Kick Off	0.0d	05-Sep-13	
PKM110	Finalized PEP REV (0)	0.0d		11-Nov-13
PKM140	Issue for 30% Review	0.0d		04-Dec-13
PKM230	30% Review Meeting	0.0d		12-Dec-13
PKM260	Client 30% Audit	0.0d		17-Jan-14
PKM120	Issue DBM REV (B)	0.0d		24-Jan-14
PKM160	Issue for 60% Review	0.0d		18-Feb-14
PKM220	60% Review Meeting	0.0d		27-Feb-14
PKM150	HAZOP	0.0d		12-Mar-14
PKM180	Issue for 90% Review	0.0d		15-Apr-14
PKM240	90% Review Meeting	0.0d		29-Apr-14
PKM270	Client 90% Audit	0.0d		02-May-14
PKM130	Re-Issue Class 3 Cost Estimate	0.0d		12-May-14
PKM170	Package Issued - IFB	0.0d		13-May-14
PKM190	Package Issued - IFC	0.0d		03-Jun-14
PKM250	Turnover Package	0.0d		03-Jul-14
GTA.Schedule-2.GTA.2.S0.R.RBB.001 Pipeline - Project Overhead		162.0d	05-Sep-13	02-Jul-14
WBS-A9140	PM & OH	162.0d	05-Sep-13	02-Jul-14
PRT-2000	PEP (Rev0)	36.8d	05-Sep-13	11-Nov-13
PRT-2010	DBM (Rev0)	50.4d	05-Sep-13	04-Dec-13
GTA.Schedule-2.GTA.2.S0.R.RBB.002 Pipeline - Scope of Work Documents		161.6d	05-Sep-13	02-Jul-14
PRT-2220	Prepare SoW Documents	161.6d	05-Sep-13	02-Jul-14
GTA.Schedule-2.GTA.2.S0.R.RBB.003 Pipeline -& Facilities Technical Specifications		80.8d	05-Sep-13	05-Feb-14
PDS150	Required Specs for Mainline, HDDand Induction Bends Pipe	47.2d	05-Sep-13	28-Nov-13
PDS120	Required Specs for Pig Traps	59.2d	05-Sep-13	19-Dec-13
PDS160	Required Specs for Hot Tap Fittings	59.2d	05-Sep-13	19-Dec-13
PDS180	Required Specs for Induction Bends	59.2d	05-Sep-13	19-Dec-13
PDS140	Required Specs for Fittings, Flanges and Gaskets IKs and HW Pipe	80.8d	05-Sep-13	05-Feb-14
WBS120	Pipeline - Technical Specifications	80.8d	05-Sep-13	05-Feb-14
PDS170	Required Specs for Test Heads	59.2d	05-Sep-13	19-Dec-13
GTA.Schedule-2.GTA.2.S0.R.RBB.004 Pipeline - 30 Review: IFR		70.4d	05-Sep-13	17-Jan-14
PRT-2020	DED Works for 30% Review	50.4d	05-Sep-13	04-Dec-13
PRT-2050	GTA Review of 30% Submittal and Meeting	4.8d	04-Dec-13	12-Dec-13
PRT-2060	GTA Prepare for 30% DED Audit	15.2d	12-Dec-13	17-Jan-14
GTA.Schedule-2.GTA.2.S0.R.RBB.005 Pipeline - 60 Review: IFA		56.0d	11-Nov-13	27-Feb-14
PRT-2040	DED Works for 60% Review	50.4d	11-Nov-13	18-Feb-14
PRT-2080	GTA Review of 60% Submittal and Meeting	5.6d	18-Feb-14	27-Feb-14
GTA.Schedule-2.GTA.2.S0.R.RBB.006 Pipeline - 90 Review: IFB		134.4d	05-Sep-13	13-May-14
PRT-2030	JD Hair HDD 90% Stamped Dwgs	55.2d	05-Sep-13	12-Dec-13
PRT-2070	HDD 90% Design Work	45.6d	12-Dec-13	13-Mar-14
PRT-2090	DED Works for 90% Review	32.0d	18-Feb-14	15-Apr-14
PRT-2110	GTA Review of 90% DED Submittal and Meeting	7.2d	15-Apr-14	29-Apr-14
PRT-2130	Prepare IFB Package	8.0d	29-Apr-14	13-May-14
PRT-2140	GTA Prepare for 90% DED Audit	2.4d	29-Apr-14	02-May-14
GTA.Schedule-2.GTA.2.S0.R.RBB.007 Pipeline - Issue for Construction/Permit (IFC/IFP)		44.8d	13-Mar-14	03-Jun-14
PRT-2100	Prepare HDD IFC Package	27.2d	13-Mar-14	01-May-14
PRT-2120	Prepare Mainline IFC Packages	26.4d	15-Apr-14	03-Jun-14
PRT-2150	ESP assist in TBE	11.2d	13-May-14	03-Jun-14
PRT-2160	Prepare & Issue Mainline IFP Packages	11.2d	13-May-14	03-Jun-14
GTA.Schedule-2.GTA.2.S0.R.RBB.008 Pipeline Final Turnover Package		16.8d	03-Jun-14	03-Jul-14
PRT-2280	Turnover Package	16.8d	03-Jun-14	03-Jul-14
GTA.Schedule-2.GTA.2.S0.R.RBB.009 Class 3 Estimate		133.6d	05-Sep-13	12-May-14
PRT-2190	Class III Estimate	133.6d	05-Sep-13	12-May-14
GTA.Schedule-2.GTA.2.S0.R.RBB.010 Pipeline - Animation		105.6d	08-Nov-13	27-May-14
PRT-2250	Animation	105.6d	08-Nov-13	27-May-14
GTA.Schedule-2.GTA.2.S0.R.RBB.011 Pipeline - Calcs/Reports/Plans		104.6d	21-Oct-13	05-May-14
PRT-2240	Calculations/Reports/Plans	104.6d	21-Oct-13	05-May-14
GTA.Schedule-2.GTA.2.S0.R.RBB.012 Pipeline- Procurement MRs		119.6d	04-Oct-13	16-May-14
WBS210	Pipeline- Procurement MRs	119.6d	04-Oct-13	16-May-14
GTA.Schedule-2.GTA.2.S0.R.RBB.012.1 Pipe for Main Line, HDD (42" and 36")		58.4d	04-Oct-13	27-Jan-14
PPP160	Prepare Data Sheets for Main Line, HDD	9.6d	04-Oct-13	23-Oct-13
PPP220	MR Issued for Review	1.6d	23-Oct-13	25-Oct-13
PPP230	Client Review of Package	8.0d	25-Oct-13	08-Nov-13
PPP1000	MR Issued for Quote	12.8d	08-Nov-13	02-Dec-13
PPP1020	MR Issued to Enbridge for Award (IFA)	26.4d	02-Dec-13	27-Jan-14
GTA.Schedule-2.GTA.2.S0.R.RBB.012.2 Hot Tap Fittings (Materials Only)		61.8d	01-Nov-13	28-Feb-14
PPP100	Prepare Data Sheets for Hot Tap Fittings	4.8d	01-Nov-13	11-Nov-13
PPP130	MR Issued for Review	8.0d	05-Dec-13	19-Dec-13
PPP170	Client Review of Package	8.0d	19-Dec-13	13-Jan-14
PPP180	MR Issued for Quote	1.6d	14-Jan-14	16-Jan-14
PPP500	MR Issued to Enbridge for Award (IFA)	24.0d	16-Jan-14	28-Feb-14
GTA.Schedule-2.GTA.2.S0.R.RBB.012.3 Pig Traps (Materials for 42" Only)		61.8d	01-Nov-13	28-Feb-14



Activity ID	Activity Name	Original Duration	Start	Finish
PPP140	Prepare Data Sheets for Pig Traps	4.8d	01-Nov-13	11-Nov-13
PPP240	MR Issued for Review	8.0d	05-Dec-13	19-Dec-13
PPP260	Client Review of Package	8.0d	19-Dec-13	13-Jan-14
PPP270	MR Issued for Quote	1.6d	14-Jan-14	16-Jan-14
PPP530	MR Issued to Enbridge for Award (IFA)	24.0d	16-Jan-14	28-Feb-14
GTA.Schedule-2.GTA.2.S0.R.RBB.012.7 Induction Bends (Material, Labour and Coating of 42" and		45.8d	01-Nov-13	30-Jan-14
PPP290	Prepare Data Sheets for Induction Bends	12.0d	01-Nov-13	22-Nov-13
PPP360	MR Issued for Review	12.0d	28-Nov-13	19-Dec-13
PPP380	Client Review of Package	8.0d	19-Dec-13	13-Jan-14
PPP390	MR Issued for Quote	4.0d	13-Jan-14	20-Jan-14
PPP550	MR Issued to Enbridge for Award (IFA)	6.4d	20-Jan-14	30-Jan-14
GTA.Schedule-2.GTA.2.S0.R.RBB.012.10 Fittings, Flanges and Gaskets IKs and HW Pipe (Short Le		66.4d	17-Jan-14	16-May-14
PPP410	Prepare Data Sheets for Fittings, Flanges and Gaskets	12.0d	17-Jan-14	07-Feb-14
PPP470	MR Issued for Review	22.4d	07-Feb-14	20-Mar-14
PPP480	Client Review of Package	8.0d	20-Mar-14	03-Apr-14
PPP490	MR Issued for Quote	4.0d	03-Apr-14	10-Apr-14
PPP580	MR Issued to Enbridge for Award (IFA)	24.0d	03-Apr-14	16-May-14
GTA.Schedule-2.GTA.2.S0.R.RBB.012.4 Test Heads (Materials Only)		61.8d	01-Nov-13	28-Feb-14
PPP280	Prepare Data Sheets for Test Heads	4.8d	01-Nov-13	11-Nov-13
PPP190	MR Issued for Review	8.0d	05-Dec-13	19-Dec-13
PPP300	Client Review of Package	8.0d	19-Dec-13	13-Jan-14
PPP310	MR Issued for Quote	1.6d	14-Jan-14	16-Jan-14
PPP560	MR Issued to Enbridge for Award (IFA)	24.0d	16-Jan-14	28-Feb-14
GTA.Schedule-2.GTA.2.S0.R.RBB.013 Geotechnical Reports		101.6d	05-Sep-13	14-Mar-14
PRT-2200	Geotechnical Works	101.6d	05-Sep-13	14-Mar-14
GTA.Schedule-2.GTA.2.S0.R.RBB.014 Natural Environments Reports		116.8d	05-Sep-13	10-Apr-14
PDE160	Species at Risk (SAR) Investigation & Permits	112.0d	05-Sep-13	02-Apr-14
WBS230	Natural Environments Reports	116.8d	05-Sep-13	10-Apr-14
WBS235	Natural Environments Reports - 150	116.8d	05-Sep-13	10-Apr-14
PDE110	EPP Alignments Sheets	80.0d	11-Nov-13	10-Apr-14
PDE120	General Environmental Design Drawings	32.0d	11-Nov-13	15-Jan-14
PDE130	Facility Studies	32.0d	11-Nov-13	15-Jan-14
PDE140	Tree inventory Spread 2 Report	57.6d	11-Nov-13	03-Mar-14
PDE150	Tree inventory Spread 3 Report	57.6d	11-Nov-13	03-Mar-14
PDE170	Conservation Authority Pre-Consultation Meetings	40.0d	11-Nov-13	29-Jan-14
PDE180	Transport Canada Navigable Waters Permits	40.0d	11-Nov-13	29-Jan-14
GTA.Schedule-2.GTA.2.S0.R.RBB.015 Survey Deliverables		137.6d	05-Sep-13	20-May-14
PRT-2210	Topographic Survey & GIS	137.6d	05-Sep-13	20-May-14
GTA.Schedule-2.GTA.2.S0.R.RBB.016 Locates		101.6d	10-Oct-13	21-Apr-14
PRT-2230	Subsurface Utility Locates	101.6d	10-Oct-13	21-Apr-14
GTA.Schedule-2.GTA.2.S0.P Permits		567.2d	19-Dec-11	31-Oct-14
GTA.Schedule-2.GTA.2.S0.P.27 Blanket Permits All Spreads - Ministry of Natural Resources		567.2d	19-Dec-11	31-Oct-14
GTA.Schedule-2.GTA.2.S0.P.27.03 Blanket Permits All Spreads - MNR - Species at Risk (ESA Permit		567.2d	19-Dec-11	31-Oct-14
PLE-07-1000	Environmental Study by Env. Consultant	377.6d	19-Dec-11	14-Nov-13
PLE-07-1210	Information Gathering Development	24.0d	15-Nov-13	06-Jan-14
PLE-07-1220	IGF Submission	0.0d		06-Jan-14
PLE-07-1230	MNR Review of IGF submission	15.2d	07-Jan-14	31-Jan-14
PLE-07-1240	Additional Env Studies requested by MNR	132.8d	03-Feb-14	30-Sep-14
PLE-07-7380	Submit Env. Studies to MNR	0.0d		30-Sep-14
PLE-07-7390	MNR Review of Env. Studies	17.6d	01-Oct-14	31-Oct-14
PLE-07-7410	Letter of Advice from MNR (Permit Approved)	0.0d		31-Oct-14
GTA.Schedule-2.GTA.2.S1 Spread 1 - Don Valley Junction to Sheppard Ave		736.5d	11-Feb-13	24-Oct-16
GTA.Schedule-2.GTA.2.S1.W Construction - Spread 1		89.7d	09-Feb-15	21-Jul-15
GTA.Schedule-2.GTA.2.S1.W.CWP01 Construction - Spread 1, ML		115.0d	13-Mar-15	03-Jul-15
PWO252620	PP - Mainline Construction	115.0d	13-Mar-15	03-Jul-15
PWO252630	Pipe on Site - String	0.0d	13-Mar-15	
GTA.Schedule-2.GTA.2.S1.W.CWP06 Construction - Spread 1, Horizontal Directional Drilling (HDD)		64.6d	09-Feb-15	05-Jun-15
PWO253000	HDD - Start of 1st Pipe String {Latest}	0.0d	12-Feb-15	
PWO253250	SP1 - Finish HDD Construction	0.0d		05-Jun-15
GTA.Schedule-2.GTA.2.S1.W.CWP06.00 Drill X - Contingency SP1		15.0d	20-Apr-15	14-May-15
PWO12920	Contingency Drill SP1	15.0d	20-Apr-15	14-May-15
GTA.Schedule-2.GTA.2.S1.W.CWP06.01 Construction - Spread 1, HDD 1: Steeles Avenue		28.2d	16-Apr-15	05-Jun-15
PWO252920	Steeles Ave. and Hydro Sub Station - 708 m Single Shift - Rig 3	52.8d	16-Apr-15	05-Jun-15
PWO252990	Mobe	3.0d	16-Apr-15	18-Apr-15
PWO253010	Drilling	43.0d	18-Apr-15	29-May-15
PWO253020	Start - String, Weld, Coat & Pre Test	0.0d	18-Apr-15	
PWO253220	Pull	2.0d	30-May-15	01-Jun-15
PWO350010	Demob	3.0d	01-Jun-15	05-Jun-15
GTA.Schedule-2.GTA.2.S1.W.CWP06.02 Construction - Spread 1, HDD 2: Beaver Creet		18.4d	09-Feb-15	13-Mar-15
PWO253070	WC 21 and Hydro Towers	33.8d	09-Feb-15	13-Mar-15
PWO253120	Mobe	3.0d	09-Feb-15*	11-Feb-15
PWO253150	Drilling	25.0d	12-Feb-15	07-Mar-15

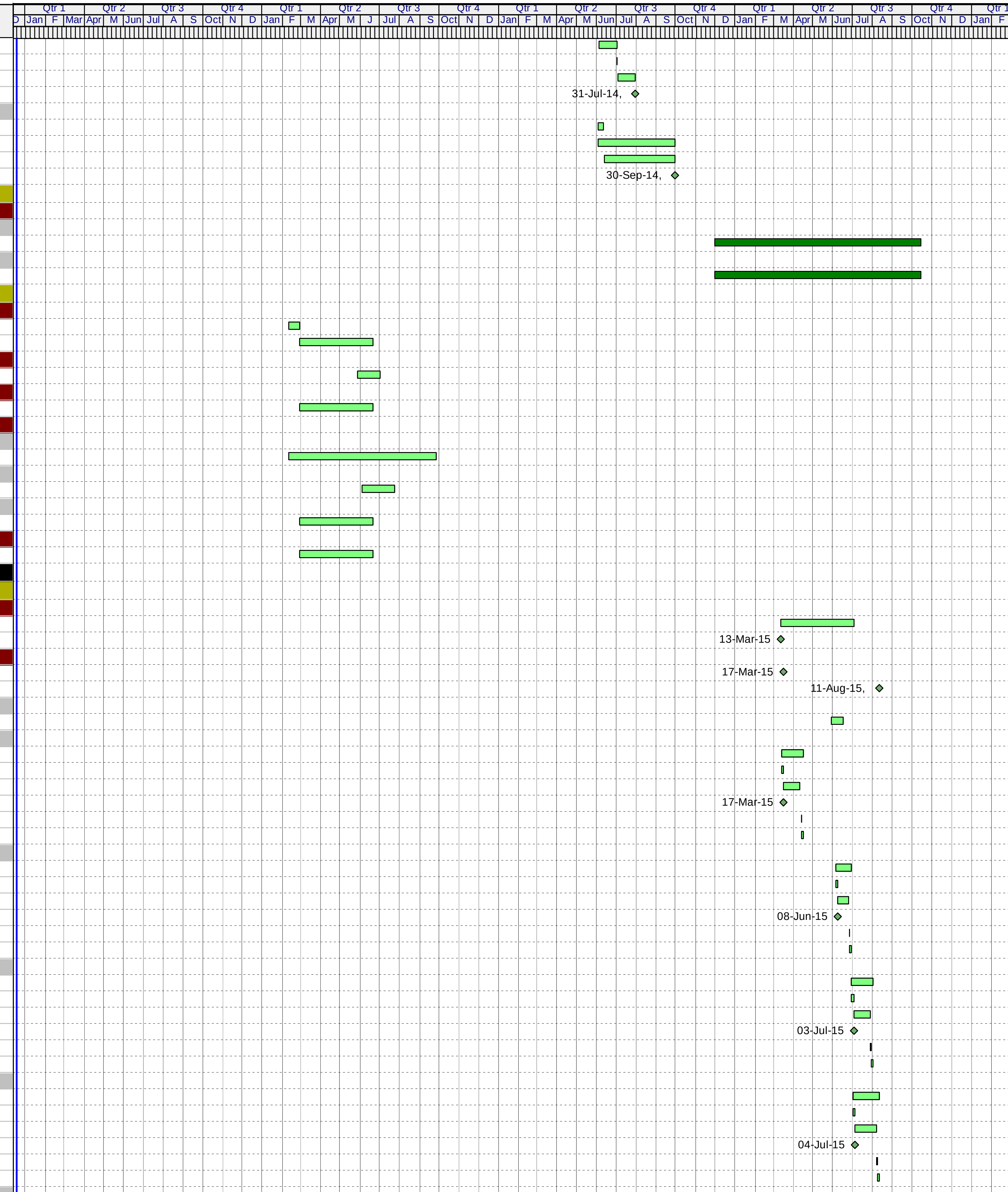


Activity ID	Activity Name	Original Duration	Start	Finish
PWO253160	Start - String, Weld, Coat & Pre Test	0.0d	12-Feb-15	
PWO253210	Pull	1.0d	09-Mar-15	09-Mar-15
PWO350020	Demob	3.0d	09-Mar-15	13-Mar-15
GTA.Schedule-2.GTA.2.S1.W.CWP07 Construction - Spread 1, Inspection Services		62.2d	13-Mar-15	03-Jul-15
PWO12010	PP - Inspection Services	62.2d	13-Mar-15	03-Jul-15
GTA.Schedule-2.GTA.2.S1.W.CWP08 Construction - Spread 1, Hot Tap Fitting Installation		10.0d	03-Jul-15	21-Jul-15
PWO12030	PP - Hot Taps & Final Tie ins	10.0d	03-Jul-15	21-Jul-15
GTA.Schedule-2.GTA.2.S1.W.CWP09 Construction - Spread 1, NDE Services		62.2d	13-Mar-15	03-Jul-15
PWO12000	PP - NDE Services	62.2d	13-Mar-15	03-Jul-15
GTA.Schedule-2.GTA.2.S1.W.CWP10 Construction - Spread 1, Hydro Testing		10.0d	03-Jul-15	21-Jul-15
PWO12020	PP - Hydro Testing	10.0d	03-Jul-15	21-Jul-15
GTA.Schedule-2.GTA.2.S1.M Material Procurement - Spread 1		366.6d	02-Dec-13	06-Oct-15
GTA.Schedule-2.GTA.2.S1.M.P001 Pipe - Evraz		153.8d	02-Dec-13	15-Sep-14
GTA.Schedule-2.GTA.2.S1.M.P001.01 Spread 1 - 36 Inches HW Pipe		153.8d	02-Dec-13	15-Sep-14
PME12190	rec'd MR from ESP	0.0d	02-Dec-13	
PME12120	Final review/approval by EGD/GTA	10.0d	02-Dec-13	19-Dec-13
PME9610	CDP review/approval	15.0d	19-Dec-13	23-Jan-14
PME9620	Issue RFQ	0.0d	24-Jan-14	
PME12200	Bid & Evaluation Process (4w)	20.0d	24-Jan-14	03-Mar-14
PME12540	PO Issue	0.0d		06-Mar-14
PME12560	Fab & Deliver NPS 36X19.1mm Pipes HDD SP1	105.6d	07-Mar-14	15-Sep-14
GTA.Schedule-2.GTA.2.S1.M.P001.02 Spread 1 - 36 Inches ML Pipe		153.8d	02-Dec-13	15-Sep-14
PME16000	rec'd MR from ESP	0.0d	02-Dec-13	
PME16050	Final review/approval by EGD/GTA	10.0d	02-Dec-13	19-Dec-13
PME16060	CDP review/approval	15.0d	19-Dec-13	23-Jan-14
PME16150	Issue RFQ	0.0d	24-Jan-14	
PME16180	Bid & Evaluation Process (4w)	20.0d	24-Jan-14	03-Mar-14
PME16280	PO Issue	0.0d		06-Mar-14
PME16300	Fab & Deliver NPS 36X17.5mm Pipes ML SP1	105.6d	07-Mar-14	15-Sep-14
GTA.Schedule-2.GTA.2.S1.M.P001.03 Spread 1 - 36 Inches Track bore pipe		105.6d	07-Mar-14	15-Sep-14
PME16330	Fab & Deliver NPS 36X17.5mm Pipes TB SP1	105.6d	07-Mar-14	15-Sep-14
GTA.Schedule-2.GTA.2.S1.M.X003 Spread 1 - Shop Inspection		60.0d	07-Mar-14	23-Jun-14
PME15000	SP1 - Shop Inspection	60.0d	07-Mar-14	23-Jun-14
GTA.Schedule-2.GTA.2.S1.M.X004 Spread 1 - Storage		270.0d	03-Jun-14	06-Oct-15
PME15040	SP1 Storage	270.0d	03-Jun-14	06-Oct-15
GTA.Schedule-2.GTA.2.S1.O Commissioning - Spread 1		12.0d	21-Jul-15	12-Aug-15
GTA.Schedule-2.GTA.2.S1.O.001 Commissioning, Spread 1 - Commissioning, Pipeline Section A-2.2.2		12.0d	21-Jul-15	12-Aug-15
POE322011	PP - Mainline Commissioning - Spread 1	12.0d	21-Jul-15	12-Aug-15
GTA.Schedule-2.GTA.2.S1.E Environment - Spread 1		736.5d	11-Feb-13	24-Oct-16
GTA.Schedule-2.GTA.2.S1.E.001 Spread 1, Environmental - Environmental Survey & Studies		357.3d	11-Feb-13	26-Nov-14
A13920	Environmental Studies	357.3d	11-Feb-13	26-Nov-14
GTA.Schedule-2.GTA.2.S1.E.008 Spread 1, Environmental - Post-Construction Monitoring		202.4d	16-Oct-15	24-Oct-16
A13930	PP - Env Post Construction	202.4d	16-Oct-15	24-Oct-16
GTA.Schedule-2.GTA.2.S1.E.009 Spread 1, Environmental - Environment Inspection		168.0d	01-Dec-14	02-Oct-15
A13940	PP - Env Inspections	168.0d	01-Dec-14	02-Oct-15
GTA.Schedule-2.GTA.2.S1.E.010 Spread 1, Environmental - Environmental Studies for Land/ROW acqu		80.0d	18-Feb-14	11-Jul-14
GTA.Schedule-2.GTA.2.S1.E.010.01 Spread 1, Environmental - Phase 1 Environmental Site Assessm		80.0d	18-Feb-14	11-Jul-14
GTA.Schedule-2.GTA.2.S1.E.010.01.S1E4 Spread 1, Environmental - Phase I ESA - S1E4		80.0d	18-Feb-14	11-Jul-14
PEO2070	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2320	Receive Draft Report	0.0d	05-Jun-14	
PEO2330	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2660	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14
PEO2830	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S1.E.010.01.S1E6 Spread 1, Environmental - Phase I ESA - S1E6		80.0d	18-Feb-14	11-Jul-14
PEO2080	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2340	Receive Draft Report	0.0d	05-Jun-14	
PEO2350	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2670	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14
PEO2840	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S1.P Spread 1 Permit Work Requests		66.0d	03-Jun-14	30-Sep-14
PLE-07-4860	WBS Summary - SP1 Permits WRs	66.0d	03-Jun-14	30-Sep-14
GTA.Schedule-2.GTA.2.S1.P.10030612 WR001 Permits - Bounded by		33.2d	03-Jun-14	31-Jul-14
PLE-07-1260	Receive WR001 Dwgs from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S1.P.10030612.09 WR001 Permits - City of Toronto		33.2d	03-Jun-14	31-Jul-14
PLE-07-1270	Complete & Send Package to Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-1280	Summary - WR001 - City of Toronto	33.2d	03-Jun-14	31-Jul-14
PLE-07-4870	Receive Approval from Utilities	28.0d	04-Jun-14	02-Jul-14
PLE-07-5830	EGD Permitting to Submit to City of Toronto	1.0d	02-Jul-14	03-Jul-14
PLE-07-5930	Review by City - EGD Receive Permit	28.0d	04-Jul-14	31-Jul-14
PLE-07-6150	GTA Receive Permit	0.0d		31-Jul-14
GTA.Schedule-2.GTA.2.S1.P.10030629 Permit WR002		66.0d	03-Jun-14	30-Sep-14
PLE-07-1310	Receive WR002 Dwgs from ESP	0.0d	03-Jun-14	

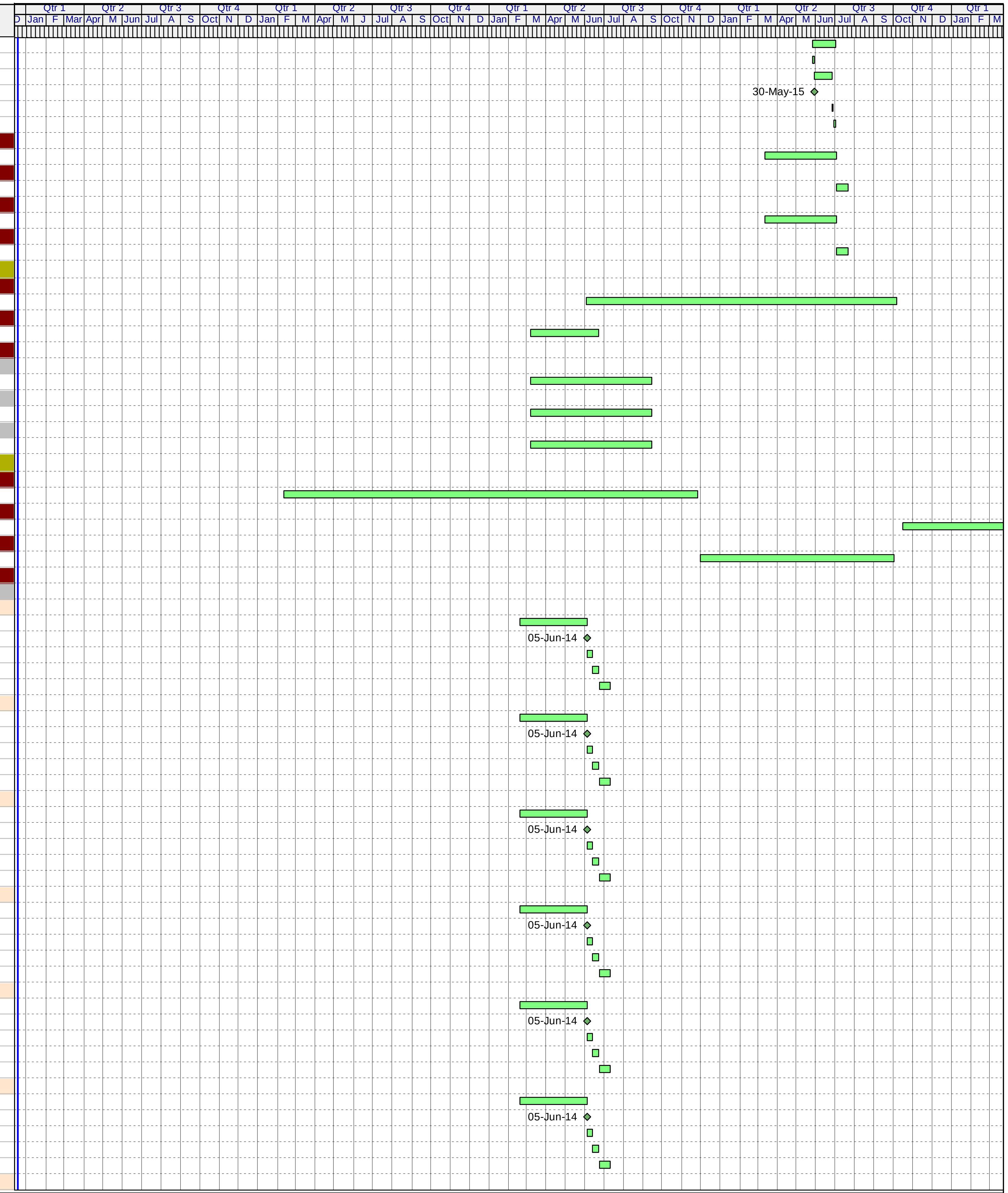


Activity ID	Activity Name	Original Duration	Start	Finish
PLE-07-1350	Receive WR002 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-1360	Receive WR002 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S1.P.10030629.09 WR002 Permits - City of Toronto		33.2d	03-Jun-14	31-Jul-14
PLE-07-1290	Complete & Send Package to Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-1300	Summary - WR002 - City of Toronto	33.2d	03-Jun-14	31-Jul-14
PLE-07-4880	Receive Approval from Utilities	28.0d	04-Jun-14	02-Jul-14
PLE-07-5840	EGD Permitting to Submit to City of Toronto	1.0d	02-Jul-14	03-Jul-14
PLE-07-5940	Review by City - EGD Receive Permit	28.0d	04-Jul-14	31-Jul-14
PLE-07-6160	GTA Receive Permit	0.0d		31-Jul-14
GTA.Schedule-2.GTA.2.S1.P.10030629.12 WR002 Permits - Enbridge Pipelines Inc.		66.0d	03-Jun-14	30-Sep-14
PLE-07-1320	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-1330	Summary - WR002 - Enb. Pipelines Crossing	66.0d	03-Jun-14	30-Sep-14
PLE-07-5250	Review of Application by Enb. Pl	45.0d	13-Jun-14	04-Sep-14
PLE-07-6690	Receive Docs by Land Dpt, sign/return	5.0d	04-Sep-14	12-Sep-14
PLE-07-6780	Final Review by Enb. Pl.	10.0d	12-Sep-14	30-Sep-14
PLE-07-6870	GTA executed Docs	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S1.P.10030629.14 WR002 Permits - TransNorthern Pipeline		66.0d	03-Jun-14	30-Sep-14
PLE-07-1340	Summary - WR002 - TransNorthern PL Crossing	66.0d	03-Jun-14	30-Sep-14
PLE-07-1370	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-5260	Review of Application by TransNorthern	45.0d	13-Jun-14	04-Sep-14
PLE-07-6700	Receive Docs by Land Dpt, sign/return	5.0d	04-Sep-14	12-Sep-14
PLE-07-6790	Final Review by TransNorthern	10.0d	12-Sep-14	30-Sep-14
PLE-07-6880	GTA Receive executed Docs	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S1.P.10030693 Permit WR003		33.2d	03-Jun-14	31-Jul-14
PLE-07-1420	Receive WR003 Dwgs from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S1.P.10030693.09 WR003 Permits - City of Toronto		33.2d	03-Jun-14	31-Jul-14
PLE-07-1400	Complete & Send Package to Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-1410	Summary - WR003 - City of Toronto	33.2d	03-Jun-14	31-Jul-14
PLE-07-4900	Receive Approval from Utilities	28.0d	04-Jun-14	02-Jul-14
PLE-07-5860	EGD Permitting to Submit to City of Toronto	1.0d	02-Jul-14	03-Jul-14
PLE-07-5960	Review by City - EGD Receive Permit	28.0d	04-Jul-14	31-Jul-14
PLE-07-6180	GTA Receive Permit	0.0d		31-Jul-14
GTA.Schedule-2.GTA.2.S1.P.10030693.07 WR003 Permits - City of Markham		33.2d	03-Jun-14	31-Jul-14
PLE-07-1380	Complete & Send Package to Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-1390	Summary - WR003 - City of Markham	33.2d	03-Jun-14	31-Jul-14
PLE-07-4890	Receive Approval from Utilities	28.0d	04-Jun-14	02-Jul-14
PLE-07-5850	EGD Permitting to Submit to City of Markham	1.0d	02-Jul-14	03-Jul-14
PLE-07-5950	Review by City - EGD Receive Permit	28.0d	04-Jul-14	31-Jul-14
PLE-07-6170	GTA Receive Permit	0.0d		31-Jul-14
GTA.Schedule-2.GTA.2.S1.P.10030704 Permit WR004		45.2d	03-Jun-14	25-Aug-14
PLE-07-1470	Receive WR004 Dwgs from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S1.P.10030704.01 WR004 Permits - York Region		45.2d	03-Jun-14	25-Aug-14
PLE-07-1450	EGD Permitting Submit to York Rg & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-1460	Summary - WR004 - York Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-4920	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6410	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S1.P.10030704.07 WR004 Permits - City of Markham		33.2d	03-Jun-14	31-Jul-14
PLE-07-1430	Complete & Send Package to Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-1440	Summary - WR004 - City of Markham	33.2d	03-Jun-14	31-Jul-14
PLE-07-4910	Receive Approval from Utilities	28.0d	04-Jun-14	02-Jul-14
PLE-07-5870	EGD Permitting to Submit to City of Markham	1.0d	02-Jul-14	03-Jul-14
PLE-07-5970	Review by City - EGD Receive Permit	28.0d	04-Jul-14	31-Jul-14
PLE-07-6190	GTA Receive Permit	0.0d		31-Jul-14
GTA.Schedule-2.GTA.2.S1.P.10030978 Permit WR005		44.6d	03-Jun-14	22-Aug-14
PLE-07-1480	Receive WR005 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-1490	Receive WR005 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-1500	Receive WR005 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S1.P.10030978.18 WR005 Permits - CN Rail		44.6d	03-Jun-14	22-Aug-14
PLE-07-1510	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-1590	Summary - WR005 - CN Rails	44.6d	03-Jun-14	22-Aug-14
PLE-07-5270	Review of Application by CN Rails	23.6d	13-Jun-14	25-Jul-14
PLE-07-6070	Receive Docs by Land Dpt, sign/return	5.0d	25-Jul-14	05-Aug-14
PLE-07-6250	Final Review by CN Rails	10.0d	05-Aug-14	22-Aug-14
PLE-07-6330	GTA Receive executed Docs	0.0d		22-Aug-14
GTA.Schedule-2.GTA.2.S1.P.10031032 Permit WR006		66.0d	03-Jun-14	30-Sep-14
PLE-07-1520	Receive WR006 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-1550	Receive WR006 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-1560	Receive WR006 Restoration Plan from ESP	0.0d	03-Jun-14	
PLE-07-2160	Receive WR006 Surface Water Report from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S1.P.10031032.07 WR006 Permits - City of Markham		33.2d	03-Jun-14	31-Jul-14
PLE-07-1530	Complete & Send Package to Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-1540	Summary - WR006 - City of Markham	33.2d	03-Jun-14	31-Jul-14

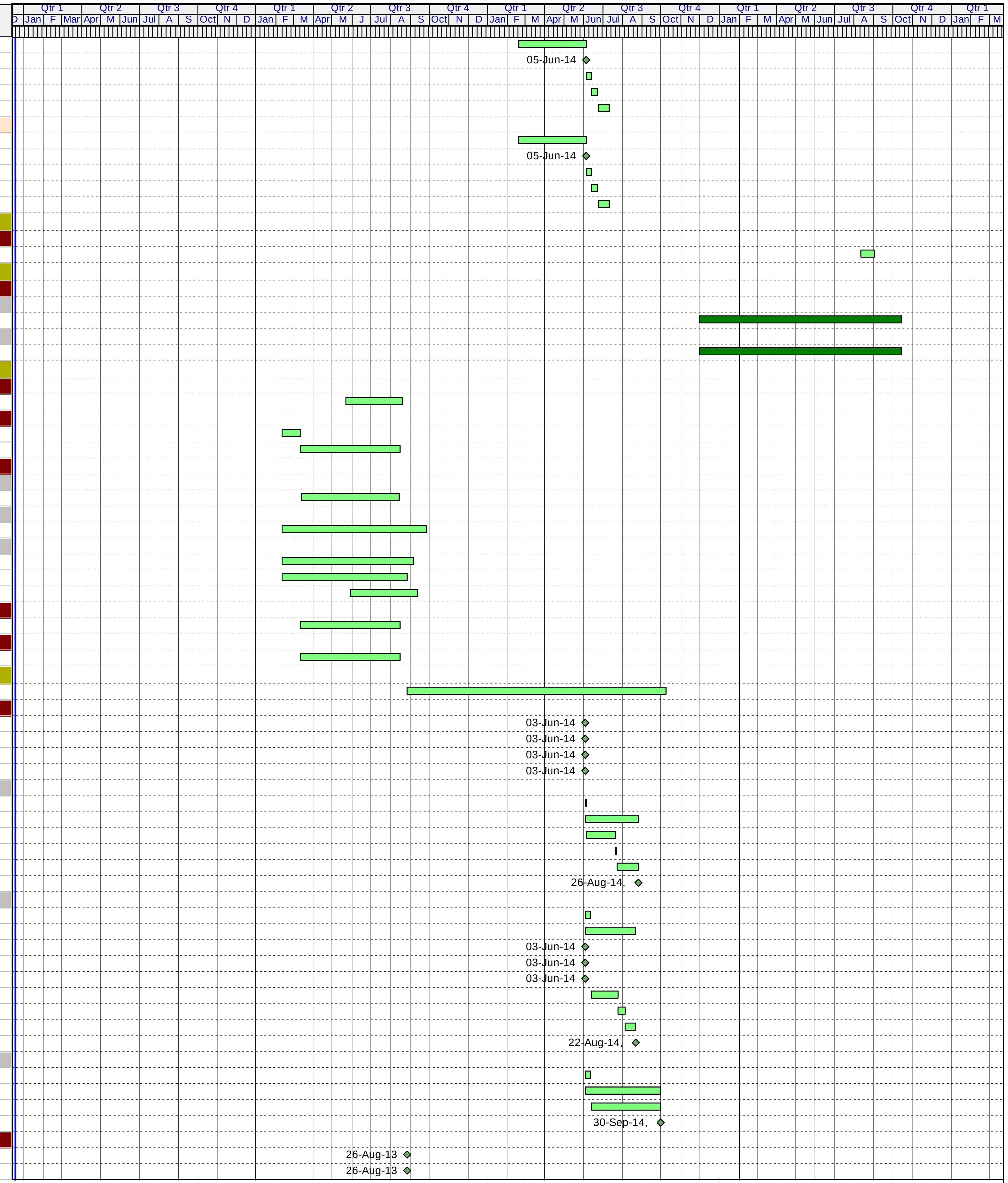
Activity ID	Activity Name	Original Duration	Start	Finish
PLE-07-4930	Receive Approval from Utilities	28.0d	04-Jun-14	02-Jul-14
PLE-07-5880	EGD Permitting to Submit to City of Markham	1.0d	02-Jul-14	03-Jul-14
PLE-07-5980	Review by City - EGD Receive Permit	28.0d	04-Jul-14	31-Jul-14
PLE-07-6200	GTA Receive Permit	0.0d		31-Jul-14
GTA.Schedule-2.GTA.2.S1.P.10031032.21 WR006 Permits - TRCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-1570	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-1580	Summary - WR006 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5280	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-6890	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S1.V Enbridge Management Construction - Spread 1		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.2.S1.V.CRS Construction Management Team - Spread 1, Construction Manageme		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.2.S1.V.CRS.01 Construction Management Team - Spread 1, Construction Mana		174.8d	01-Dec-14	15-Oct-15
A13540	PP - Construction Manager	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.2.S1.V.CRS.05 Construction Management Team - Spread 1, Environment Inspe		174.8d	01-Dec-14	15-Oct-15
A13630	PP - Environmental Inspection	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.2.S1.R Engineering - Spread 1		125.6d	11-Feb-13	26-Sep-13
GTA.Schedule-2.GTA.2.S1.R.GEO Engineering - Spread 1, Geotechnical		72.2d	11-Feb-13	20-Jun-13
PRT-1060	SP1 Field Work Prep.	9.0d	11-Feb-13	27-Feb-13
PRT-1100	Geotechnical Investigations	63.2d	27-Feb-13	20-Jun-13
GTA.Schedule-2.GTA.2.S1.R.HDD Engineering - Spread 1, HDD		19.2d	28-May-13	02-Jul-13
PRT-1230	SP1 PFE 90% HDD DED (IFR)	19.2d	28-May-13	02-Jul-13
GTA.Schedule-2.GTA.2.S1.R.LOC Engineering - Spread 1, Locates		63.2d	27-Feb-13	20-Jun-13
PRT-1120	Subsurface Utility Engineering	63.2d	27-Feb-13	20-Jun-13
GTA.Schedule-2.GTA.2.S1.R.RBB Engineering - Spread 1, Detailed Engineering		125.6d	11-Feb-13	26-Sep-13
GTA.Schedule-2.GTA.2.S1.R.RBB.01 Engineering - Spread 1, Detailed Design Engineering - Project I		125.6d	11-Feb-13	26-Sep-13
PRT-1030	SP1 PFE Project Management	125.6d	11-Feb-13	26-Sep-13
GTA.Schedule-2.GTA.2.S1.R.RBB.04 Engineering - Spread 1, Detailed Design Engineering - Detailed		28.0d	04-Jun-13	24-Jul-13
PRT-1250	SP1 PFE HDD IFB	28.0d	04-Jun-13	24-Jul-13
GTA.Schedule-2.GTA.2.S1.R.RBB.05 Engineering - Spread 1, Detailed Design Engineering - 3rd Part		63.2d	28-Feb-13	21-Jun-13
PRT-1130	SP1 PFE DED (IFD)	63.2d	28-Feb-13	21-Jun-13
GTA.Schedule-2.GTA.2.S1.R.SUR Engineering - Spread 1, Survey		63.2d	27-Feb-13	20-Jun-13
PRT-1110	Topographic Survey	63.2d	27-Feb-13	20-Jun-13
GTA.Schedule-2.GTA.2.S2 Spread 2 - Keele/CNR to Don Valley Junction		736.5d	11-Feb-13	24-Oct-16
GTA.Schedule-2.GTA.2.S2.W Construction - Spread 2		83.0d	13-Mar-15	11-Aug-15
GTA.Schedule-2.GTA.2.S2.W.CWP01 Construction - Spread 2, ML		115.4d	13-Mar-15	03-Jul-15
PWO252610	PP - Mainline Construction	115.4d	13-Mar-15	03-Jul-15
PWO252640	Pipe on Site - String	0.0d	13-Mar-15	
GTA.Schedule-2.GTA.2.S2.W.CWP06 Construction - Spread 2, Horizontal Directional Drilling (HDD)		155.5d	13-Mar-15	11-Aug-15
PWO252800	HDD - Start of 1st Pipe String {Latest}	0.0d	17-Mar-15	
PWO253260	SP2 - Finish HDD Construction	0.0d		11-Aug-15
GTA.Schedule-2.GTA.2.S2.W.CWP06.00 Drill X2 - Contingency SP2		18.8d	30-May-15	17-Jun-15
PWO12930	Contingency Drill SP2	18.8d	30-May-15	17-Jun-15
GTA.Schedule-2.GTA.2.S2.W.CWP06.03 Construction - Spread 2, HDD 3: Highway 404		33.3d	13-Mar-15	16-Apr-15
PWO252680	Highway 404 and Woodbine	33.3d	13-Mar-15	16-Apr-15
PWO252790	Mobe	3.0d	13-Mar-15	16-Mar-15
PWO252810	Drilling	26.3d	17-Mar-15	11-Apr-15
PWO252820	Start - String, Weld, Coat & Pre Test	0.0d	17-Mar-15	
PWO252980	Pull	1.0d	13-Apr-15	13-Apr-15
PWO350030	Demob	3.0d	13-Apr-15	16-Apr-15
GTA.Schedule-2.GTA.2.S2.W.CWP06.04 Construction - Spread 2, HDD 4: Bayview Avenue HDD		26.0d	05-Jun-15	30-Jun-15
PWO252960	Bayview Street	26.0d	05-Jun-15	30-Jun-15
PWO253040	Mobe	3.0d	05-Jun-15	08-Jun-15
PWO253050	Drilling	19.0d	08-Jun-15	25-Jun-15
PWO253060	Start - String, Weld, Coat & Pre Test	0.0d	08-Jun-15	
PWO253110	Pull	1.0d	26-Jun-15	26-Jun-15
PWO350040	Demob	3.0d	26-Jun-15	30-Jun-15
GTA.Schedule-2.GTA.2.S2.W.CWP06.05 Construction - Spread 2, HDD 5: Pamona Creek		34.8d	30-Jun-15	01-Aug-15
PWO252720	Pomona Creek	34.8d	30-Jun-15	01-Aug-15
PWO252840	Mobe	3.0d	30-Jun-15	03-Jul-15
PWO252850	Drilling	27.8d	03-Jul-15	29-Jul-15
PWO252860	Start - String, Weld, Coat & Pre Test	0.0d	03-Jul-15	
PWO253030	Pull	1.0d	29-Jul-15	30-Jul-15
PWO350050	Demob	3.0d	30-Jul-15	01-Aug-15
GTA.Schedule-2.GTA.2.S2.W.CWP06.06 Construction - Spread 2, HDD 6: East Don River		42.0d	02-Jul-15	11-Aug-15
PWO253090	East Don River - 613 m - Rig 2	42.0d	02-Jul-15	11-Aug-15
PWO253140	Mobe	3.0d	02-Jul-15	04-Jul-15
PWO253170	Drilling	35.0d	04-Jul-15	07-Aug-15
PWO253180	Start - String, Weld, Coat & Pre Test	0.0d	04-Jul-15	
PWO253240	Pull	1.0d	07-Aug-15	08-Aug-15
PWO350060	Demob	3.0d	08-Aug-15	11-Aug-15
GTA.Schedule-2.GTA.2.S2.W.CWP06.07 Construction - Spread 2, HDD 7: Bathurst Street		37.0d	27-May-15	02-Jul-15



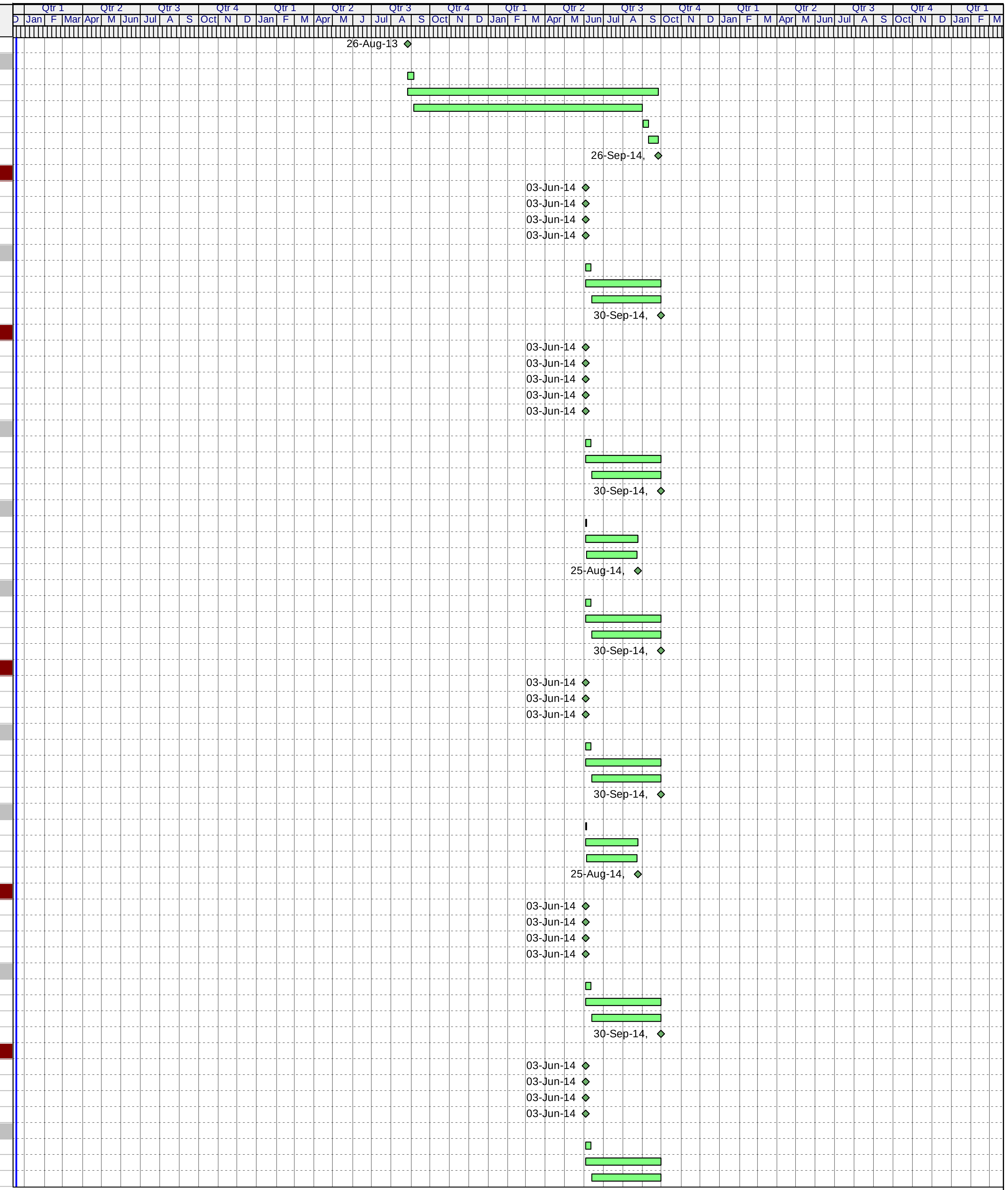
Activity ID	Activity Name	Original Duration	Start	Finish
PWO252760	Bathurst Street - 741 m - Rig 2	37.0d	27-May-15	02-Jul-15
PWO252890	Mobe	3.0d	27-May-15*	30-May-15
PWO252940	Drilling	30.0d	30-May-15	27-Jun-15
PWO252950	Start - String, Weld, Coat & Pre Test	0.0d	30-May-15	
PWO253130	Pull	1.0d	27-Jun-15	27-Jun-15
PWO350070	Demob	3.0d	29-Jun-15	02-Jul-15
GTA.Schedule-2.GTA.2.S2.W.CWP07 Construction - Spread 2, Inspection Services		62.2d	13-Mar-15	03-Jul-15
PWO13010	PP - Inspection Services	62.2d	13-Mar-15	03-Jul-15
GTA.Schedule-2.GTA.2.S2.W.CWP08 Construction - Spread 2, Hot Tap Fitting Installation		10.0d	03-Jul-15	22-Jul-15
PWO13030	PP - Hot Taps & Final Tie ins	10.0d	03-Jul-15	22-Jul-15
GTA.Schedule-2.GTA.2.S2.W.CWP09 Construction - Spread 2, NDE Services		62.2d	13-Mar-15	03-Jul-15
PWO13000	PP - NDE Services	62.2d	13-Mar-15	03-Jul-15
GTA.Schedule-2.GTA.2.S2.W.CWP10 Construction - Spread 2, Hydro Testing		10.0d	03-Jul-15	22-Jul-15
PWO13020	PP - Hydro Testing	10.0d	03-Jul-15	22-Jul-15
GTA.Schedule-2.GTA.2.S2.M Material Procurement - Spread 2		318.4d	07-Mar-14	06-Oct-15
GTA.Schedule-2.GTA.2.S2.M.X004 Spread 2 - Storage		270.0d	03-Jun-14	06-Oct-15
PME15050	SP2 Storage	270.0d	03-Jun-14	06-Oct-15
GTA.Schedule-2.GTA.2.S2.M.X003 Spread 2 - Shop Inspection		60.0d	07-Mar-14	23-Jun-14
PME15010	SP2 - Shop Inspection	60.0d	07-Mar-14	23-Jun-14
GTA.Schedule-2.GTA.2.S2.M.P001 Pipe - Evraz		105.6d	07-Mar-14	15-Sep-14
GTA.Schedule-2.GTA.2.S2.M.P001.01 Spread 2 - 36 Inches HW pipe		105.6d	07-Mar-14	15-Sep-14
PME15730	Fab & Deliver NPS 36X19.1mm Pipes HDD SP2	105.6d	07-Mar-14	15-Sep-14
GTA.Schedule-2.GTA.2.S2.M.P001.02 Spread 2 - 36 Inches ML pipe		105.6d	07-Mar-14	15-Sep-14
PME16320	Fab & Deliver NPS 36X17.5mm Pipes ML SP2	105.6d	07-Mar-14	15-Sep-14
GTA.Schedule-2.GTA.2.S2.M.P001.03 Spread 2 - 36 Inches Track bore pipe		105.6d	07-Mar-14	15-Sep-14
PME16340	Fab & Deliver NPS 36X17.5mm Pipes TB SP2	105.6d	07-Mar-14	15-Sep-14
GTA.Schedule-2.GTA.2.S2.E Environment - Spread 2		736.5d	11-Feb-13	24-Oct-16
GTA.Schedule-2.GTA.2.S2.E.001 Spread 2, Environmental - Environmental Survey & Studies		357.3d	11-Feb-13	26-Nov-14
A13950	Environmental Studies	357.3d	11-Feb-13	26-Nov-14
GTA.Schedule-2.GTA.2.S2.E.008 Spread 2, Environmental - Post-Construction Monitoring		202.4d	16-Oct-15	24-Oct-16
A13960	PP - Env Post Construction	202.4d	16-Oct-15	24-Oct-16
GTA.Schedule-2.GTA.2.S2.E.009 Spread 2, Environmental - Environment Inspection		168.0d	01-Dec-14	02-Oct-15
A13970	PP - Env Inspections	168.0d	01-Dec-14	02-Oct-15
GTA.Schedule-2.GTA.2.S2.E.010 Spread 2, Environmental - Environmental Studies for Land/ROW acqui		80.0d	18-Feb-14	11-Jul-14
GTA.Schedule-2.GTA.2.S2.E.010.01 Spread 2, Environmental - Phase I Environmental Site Assessm		80.0d	18-Feb-14	11-Jul-14
GTA.Schedule-2.GTA.2.S2.E.010.01.S2E3 Spread 2, Environmental - Phase I ESA - E3		80.0d	18-Feb-14	11-Jul-14
PEO2120	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2420	Receive Draft Report	0.0d	05-Jun-14	
PEO2430	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2710	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14
PEO2880	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S2.E.010.01.S2E4 Spread 2, Environmental - Phase I ESA - E4		80.0d	18-Feb-14	11-Jul-14
PEO2090	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2360	Receive Draft Report	0.0d	05-Jun-14	
PEO2370	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2680	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14
PEO2850	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S2.E.010.01.S2E5 Spread 2, Environmental - Phase I ESA - E5		80.0d	18-Feb-14	11-Jul-14
PEO2130	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2440	Receive Draft Report	0.0d	05-Jun-14	
PEO2450	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2720	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14
PEO2890	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S2.E.010.01.S2E6 Spread 2, Environmental - Phase I ESA - E6		80.0d	18-Feb-14	11-Jul-14
PEO2140	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2460	Receive Draft Report	0.0d	05-Jun-14	
PEO2470	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2730	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14
PEO2900	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S2.E.010.01.S2E7 Spread 2, Environmental - Phase I ESA - E7		80.0d	18-Feb-14	11-Jul-14
PEO2100	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2380	Receive Draft Report	0.0d	05-Jun-14	
PEO2390	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2690	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14
PEO2860	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S2.E.010.01.S2E8 Spread 2, Environmental - Phase I ESA - E8		80.0d	18-Feb-14	11-Jul-14
PEO2110	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2400	Receive Draft Report	0.0d	05-Jun-14	
PEO2410	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2700	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14
PEO2870	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S2.E.010.01.S2E9 Spread 2, Environmental - Phase I ESA - E9		80.0d	18-Feb-14	11-Jul-14



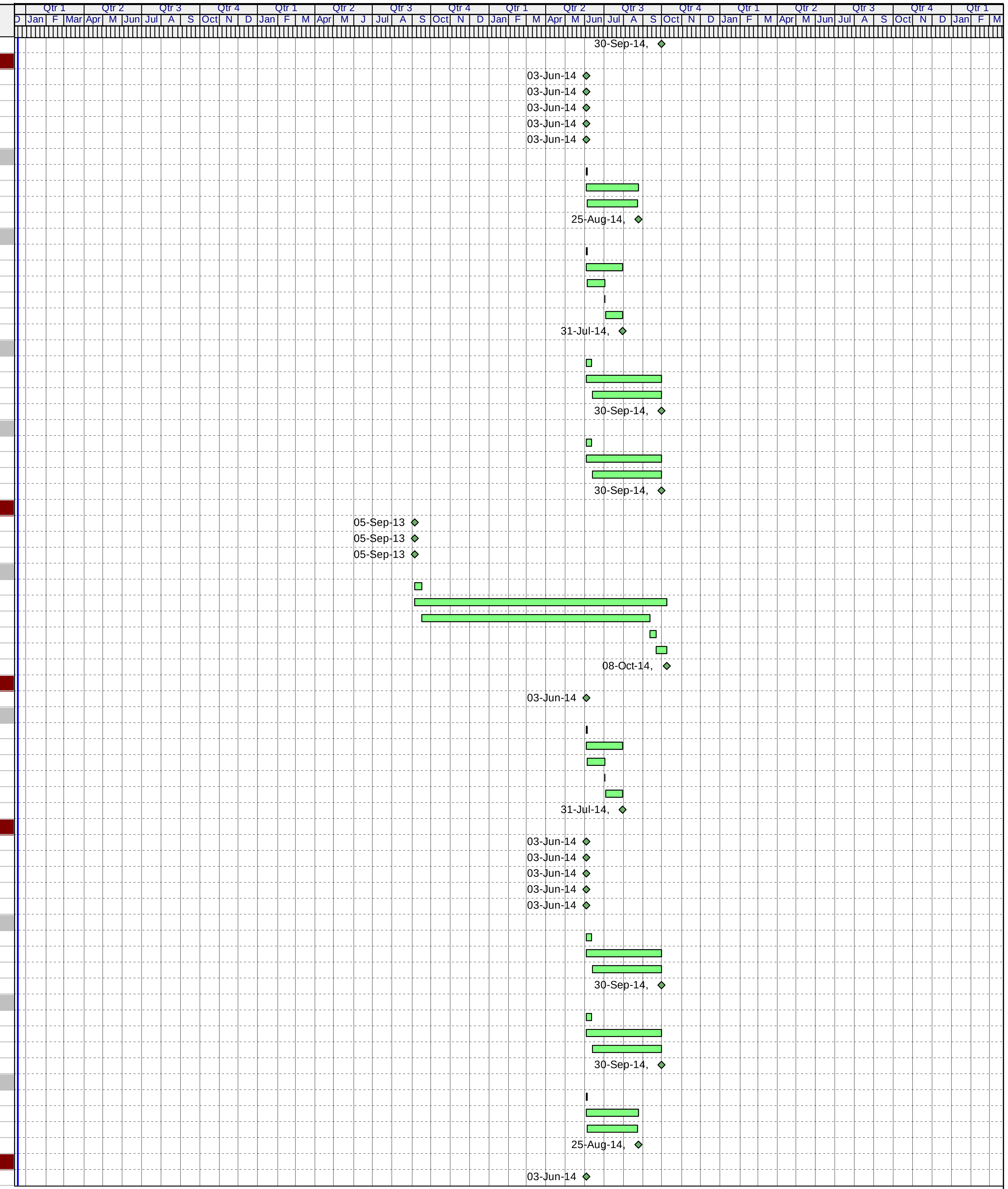
Activity ID	Activity Name	Original Duration	Start	Finish
PEO2150	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2480	Receive Draft Report	0.0d	05-Jun-14	
PEO2490	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2740	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14
PEO2910	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S2.E.010.01.S2E10 Spread 2, Environmental - Phase I ESA - E10		80.0d	18-Feb-14	11-Jul-14
PEO2160	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2500	Receive Draft Report	0.0d	05-Jun-14	
PEO2510	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2750	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14
PEO2920	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S2.O Commissioning - Spread 2		12.0d	12-Aug-15	01-Sep-15
GTA.Schedule-2.GTA.2.S2.O.001 Commissioning, Spread 2 - Commissioning, Pipeline Section A-2.2.1		12.0d	12-Aug-15	01-Sep-15
POE322010	PP - Mainline Commissioning - Spread 2	12.0d	12-Aug-15	01-Sep-15
GTA.Schedule-2.GTA.2.S2.V Enbridge Management Construction - Spread 2		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.2.S2.V.CRS Construction Management Team - Spread 2, Construction Manageme		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.2.S2.V.CRS.01 Construction Management Team - Spread 2, Construction Mana		174.8d	01-Dec-14	15-Oct-15
A13550	PP - Construction Manager	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.2.S2.V.CRS.05 Construction Management Team - Spread 2, Environment Inspe		174.8d	01-Dec-14	15-Oct-15
A13640	PP - Environmental Inspection	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.2.S2.R Engineering - Spread 2		125.6d	11-Feb-13	26-Sep-13
GTA.Schedule-2.GTA.2.S2.R.HDD Engineering - Spread 2, HDD		49.6d	22-May-13	20-Aug-13
PRT-1220	SP2 PFE 90% HDD DED (IFR)	49.6d	22-May-13	20-Aug-13
GTA.Schedule-2.GTA.2.S2.R.GEO Engineering - Spread 2, Geotechnical		102.4d	11-Feb-13	15-Aug-13
PRT-1070	SP2 Field Work Prep.	16.0d	11-Feb-13	12-Mar-13
PRT-1180	Geotechnical Investigations	86.4d	12-Mar-13	15-Aug-13
GTA.Schedule-2.GTA.2.S2.R.RBB Unknown		125.6d	11-Feb-13	26-Sep-13
GTA.Schedule-2.GTA.2.S2.R.RBB.05 Engineering - Spread 2, Detailed Design Engineering - 3rd Part		84.8d	13-Mar-13	14-Aug-13
PRT-1210	SP2 PFE DED (IFD)	84.8d	13-Mar-13	14-Aug-13
GTA.Schedule-2.GTA.2.S2.R.RBB.01 Engineering - Spread 2, Detailed Design Engineering - Project I		125.6d	11-Feb-13	26-Sep-13
PRT-1040	SP1 PFE Project Management	125.6d	11-Feb-13	26-Sep-13
GTA.Schedule-2.GTA.2.S2.R.RBB.04 Engineering - Spread 2, Detailed Design Engineering - Detailed		117.4d	11-Feb-13	12-Sep-13
PRT-1010	Metrolinx 3 90% Design	113.6d	11-Feb-13	05-Sep-13
PRT-1020	Metrolinx 2 90% Design	108.0d	11-Feb-13	26-Aug-13
PRT-1240	SP2 PFE HDD IFB	57.6d	30-May-13	12-Sep-13
GTA.Schedule-2.GTA.2.S2.R.LOC Engineering - Spread 2, Locates		86.4d	12-Mar-13	15-Aug-13
PRT-1200	Subsurface Utility Engineering	86.4d	12-Mar-13	15-Aug-13
GTA.Schedule-2.GTA.2.S2.R.SUR Engineering - Spread 2, Survey		86.4d	12-Mar-13	15-Aug-13
PRT-1190	Topographic Survey	86.4d	12-Mar-13	15-Aug-13
GTA.Schedule-2.GTA.2.S2.P Spread 2 Permit Work Requests		221.8d	26-Aug-13	08-Oct-14
PLE-07-1110	WBS Summary - SP2 Permits WRs	221.8d	26-Aug-13	08-Oct-14
GTA.Schedule-2.GTA.2.S2.P.10031049 Permit WR007		66.0d	03-Jun-14	30-Sep-14
PLE-07-1620	Receive WR007 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-1630	Receive WR007 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2210	Receive WR007 Surface Water Report from ESP	0.0d	03-Jun-14	
PLE-07-4740	Receive WR007 Restoration Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S2.P.10031049.06 WR007 Permits - City of Vaughan		46.8d	03-Jun-14	26-Aug-14
PLE-07-1600	Complete & Send Package to Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-1610	Summary - WR007 - City of Vaughan	46.8d	03-Jun-14	26-Aug-14
PLE-07-4940	Receive Approval from Utilities	47.0d	04-Jun-14	21-Jul-14
PLE-07-6050	EGD Permitting to Submit to City of Vaughan	1.0d	21-Jul-14	22-Jul-14
PLE-07-6060	Review by City - EGD Receive Permit	35.0d	23-Jul-14	26-Aug-14
PLE-07-6660	GTA Receive Permit	0.0d		26-Aug-14
GTA.Schedule-2.GTA.2.S2.P.10031049.18 WR007 Permits - CN Rail		44.6d	03-Jun-14	22-Aug-14
PLE-07-1640	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-1650	Summary - WR007 - CN Rails	44.6d	03-Jun-14	22-Aug-14
PLE-07-4560	Receive Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-4570	Receive Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-4580	Receive Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
PLE-07-5290	Review of Application by CN Rails	23.6d	13-Jun-14	25-Jul-14
PLE-07-6080	Receive Docs by Land Dpt, sign/return	5.0d	25-Jul-14	05-Aug-14
PLE-07-6260	Final Review by CN Rails	10.0d	05-Aug-14	22-Aug-14
PLE-07-6340	GTA Receive executed Docs	0.0d		22-Aug-14
GTA.Schedule-2.GTA.2.S2.P.10031049.21 WR007 Permits - TRCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-1660	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-1670	Summary - WR007 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5300	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-6900	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S2.P.10031062 Permit WR008		215.5d	26-Aug-13	26-Sep-14
PLE-07-1030	Receive WR008 Dwgs from ESP	0.0d	26-Aug-13	
PLE-07-1040	Receive WR008 Geotech Report from ESP	0.0d	26-Aug-13	



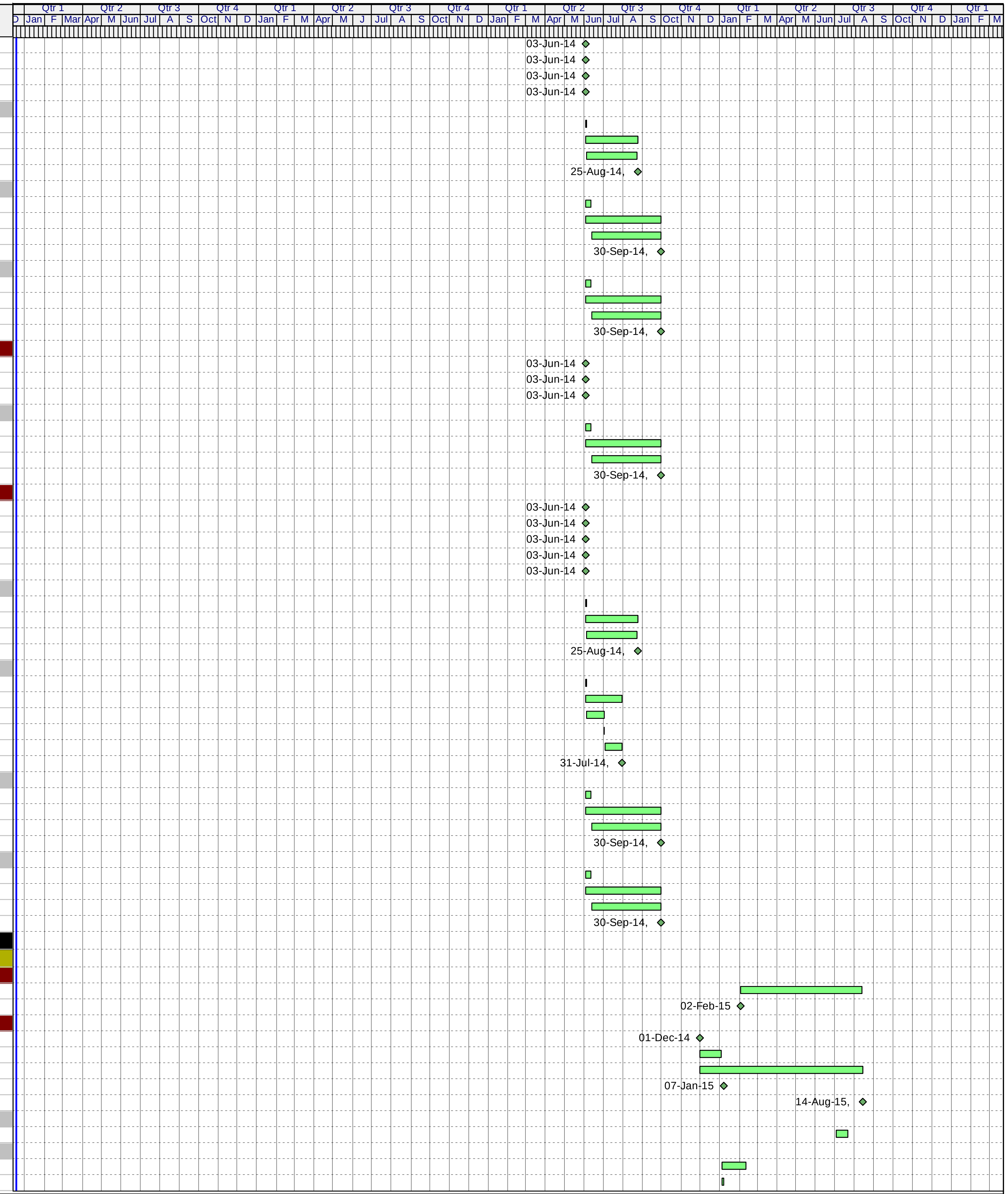
Activity ID	Activity Name	Original Duration	Start	Finish
PLE-07-1050	Receive WR008 Settlement Monitoring Plan from ESP	0.0d	26-Aug-13	
GTA.Schedule-2.GTA.2.S2.P.10031062.17	WR008 Permits - Metrolinx	215.5d	26-Aug-13	26-Sep-14
PLE-07-1010	Review Input Package, Fill application & submit	6.0d	26-Aug-13	05-Sep-13
PLE-07-1020	Summary - WR008 - Metrolinx II	215.5d	26-Aug-13	26-Sep-14
PLE-07-1180	Review of Application by Metrolinx	360.0d	05-Sep-13	31-Aug-14
PLE-07-6670	Receive Docs by Land Dpt, sign/return	5.0d	02-Sep-14	10-Sep-14
PLE-07-6750	Final Review by Metrolinx	10.0d	10-Sep-14	26-Sep-14
PLE-07-6850	GTA Receive executed Docs	0.0d		26-Sep-14
GTA.Schedule-2.GTA.2.S2.P.10031080	Permit WR009	66.0d	03-Jun-14	30-Sep-14
PLE-07-2170	Receive WR009 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2180	Receive WR009 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2190	Receive WR009 Restoration Plan from ESP	0.0d	03-Jun-14	
PLE-07-2200	Receive WR009 Surface Water Report from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S2.P.10031080.21	WR009 Permits - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-1680	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-1690	Summary - WR009 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5310	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-6910	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S2.P.10031105	Permit WR010	66.0d	03-Jun-14	30-Sep-14
PLE-07-2220	Receive WR010 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2230	Receive WR010 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2240	Receive WR010 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
PLE-07-2250	Receive WR010 Surface Water Report from ESP	0.0d	03-Jun-14	
PLE-07-4750	Receive WR010 Restoration Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S2.P.10031105.20	WR010 Permits - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-2020	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-2030	Summary - WR010 - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-5390	Review of Application by MTO	60.0d	13-Jun-14	30-Sep-14
PLE-07-6990	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S2.P.10031105.01	WR010 Permits - York Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-1900	EGD Permitting Submit to York Rg & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-1910	Summary - WR010 - York Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-4980	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6420	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S2.P.10031105.21	WR010 Permits - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-1700	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-1710	Summary - WR010 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5320	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-6920	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S2.P.10031325	Permit WR011	66.0d	03-Jun-14	30-Sep-14
PLE-07-2260	Receive WR011 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2270	Receive WR011 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2280	Receive WR011 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S2.P.10031325.20	WR011 Permits - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-2040	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-2050	Summary - WR011 - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-5400	Review of Application by MTO	60.0d	13-Jun-14	30-Sep-14
PLE-07-7000	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S2.P.10031325.01	WR011 Permits - York Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-1920	EGD Permitting Submit to York Rg & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-1930	Summary - WR011 - York Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-4990	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6430	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S2.P.10031345	Permit WR012	66.0d	03-Jun-14	30-Sep-14
PLE-07-2290	Receive WR012 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2300	Receive WR012 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2310	Receive WR012 Restoration Plan from ESP	0.0d	03-Jun-14	
PLE-07-2320	Receive WR012 Surface Water Report from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S2.P.10031345.21	WR012 Permits - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-1720	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-1730	Summary - WR012 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5330	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-6930	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S2.P.10031366	Permit WR013	66.0d	03-Jun-14	30-Sep-14
PLE-07-2330	Receive WR013 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2340	Receive WR013 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2350	Receive WR013 Restoration Plan from ESP	0.0d	03-Jun-14	
PLE-07-2360	Receive WR013 Surface Water Report from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S2.P.10031366.21	WR013 Permits - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-1740	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-1750	Summary - WR013 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5340	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14



Activity ID	Activity Name	Original Duration	Start	Finish
PLE-07-6940	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S2.P.10031389 Permit WR014		66.0d	03-Jun-14	30-Sep-14
PLE-07-2370	Receive WR014 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2380	Receive WR014 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2390	Receive WR014 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
PLE-07-2400	Receive WR014 Surface Water Report from ESP	0.0d	03-Jun-14	
PLE-07-4760	Receive WR014 Restoration Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S2.P.10031389.01 WR014 Permits - York Region		45.2d	03-Jun-14	25-Aug-14
PLE-07-1940	EGD Permitting Submit to York Rg & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-1950	Summary - WR014 - York Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-5000	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6440	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S2.P.10031389.07 WR014 Permits - City of Markham		33.2d	03-Jun-14	31-Jul-14
PLE-07-1840	Complete & Send Package to Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-1850	Summary - WR014 - City of Markham	33.2d	03-Jun-14	31-Jul-14
PLE-07-4950	Receive Approval from Utilities	28.0d	04-Jun-14	02-Jul-14
PLE-07-5890	EGD Permitting to Submit to City of Markham	1.0d	02-Jul-14	03-Jul-14
PLE-07-5990	Review by City - EGD Receive Permit	28.0d	04-Jul-14	31-Jul-14
PLE-07-6210	GTA Receive Permit	0.0d		31-Jul-14
GTA.Schedule-2.GTA.2.S2.P.10031389.20 WR014 Permits - MTO		66.0d	03-Jun-14	30-Sep-14
PLE-07-2060	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-2070	Summary - WR014 - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-5410	Review of Application by MTO	60.0d	13-Jun-14	30-Sep-14
PLE-07-7010	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S2.P.10031389.21 WR014 Permits - TRCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-1760	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-1770	Summary - WR014 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5350	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-6950	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S2.P.10033723 Permit WR015		216.2d	05-Sep-13	08-Oct-14
PLE-07-1150	Receive WR015 Dwgs from ESP	0.0d	05-Sep-13	
PLE-07-1160	Receive WR015 Geotech Report from ESP	0.0d	05-Sep-13	
PLE-07-1170	Receive WR015 Settlement Monitoring Plan from ESP	0.0d	05-Sep-13	
GTA.Schedule-2.GTA.2.S2.P.10033723.17 WR015 Permits - Metrolinx		216.2d	05-Sep-13	08-Oct-14
PLE-07-1130	Review Input Package, Fill application & submit	6.0d	05-Sep-13	16-Sep-13
PLE-07-1140	Summary - WR015 - Metrolinx III	216.2d	05-Sep-13	08-Oct-14
PLE-07-1200	Review of Application by Metrolinx	360.0d	16-Sep-13	11-Sep-14
PLE-07-6770	Receive Docs by Land Dpt, sign/return	5.0d	11-Sep-14	22-Sep-14
PLE-07-6840	Final Review by Metrolinx	10.0d	22-Sep-14	08-Oct-14
PLE-07-7400	GTA Receive executed Docs	0.0d		08-Oct-14
GTA.Schedule-2.GTA.2.S2.P.10031434 Permit WR016		33.2d	03-Jun-14	31-Jul-14
PLE-07-2410	Receive WR016 Dwgs from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S2.P.10031434.07 WR016 Permits - City of Markham		33.2d	03-Jun-14	31-Jul-14
PLE-07-1860	Complete & Send Package to Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-1870	Summary - WR016 - City of Markham	33.2d	03-Jun-14	31-Jul-14
PLE-07-4960	Receive Approval from Utilities	28.0d	04-Jun-14	02-Jul-14
PLE-07-5900	EGD Permitting to Submit to City of Markham	1.0d	02-Jul-14	03-Jul-14
PLE-07-6000	Review by City - EGD Receive Permit	28.0d	04-Jul-14	31-Jul-14
PLE-07-6220	GTA Receive Permit	0.0d		31-Jul-14
GTA.Schedule-2.GTA.2.S2.P.10031440 Permit WR017		66.0d	03-Jun-14	30-Sep-14
PLE-07-2420	Receive WR017 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2430	Receive WR017 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2440	Receive WR017 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
PLE-07-2450	Receive WR017 Surface Water Report from ESP	0.0d	03-Jun-14	
PLE-07-4770	Receive WR017 Restoration Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S2.P.10031440.21 WR017 Permits - TRCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-1780	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-1790	Summary - WR017 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5360	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-6960	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S2.P.10031440.20 WR017 Permits - MTO		66.0d	03-Jun-14	30-Sep-14
PLE-07-2080	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-2090	Summary - WR017 - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-5420	Review of Application by MTO	60.0d	13-Jun-14	30-Sep-14
PLE-07-7020	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S2.P.10031440.01 WR017 Permits - York Region		45.2d	03-Jun-14	25-Aug-14
PLE-07-1960	EGD Permitting Submit to York Rg & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-1970	Summary - WR017 - York Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-5010	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6450	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S2.P.10033742 Permit WR018		66.0d	03-Jun-14	30-Sep-14
PLE-07-2460	Receive WR018 Dwgs from ESP	0.0d	03-Jun-14	

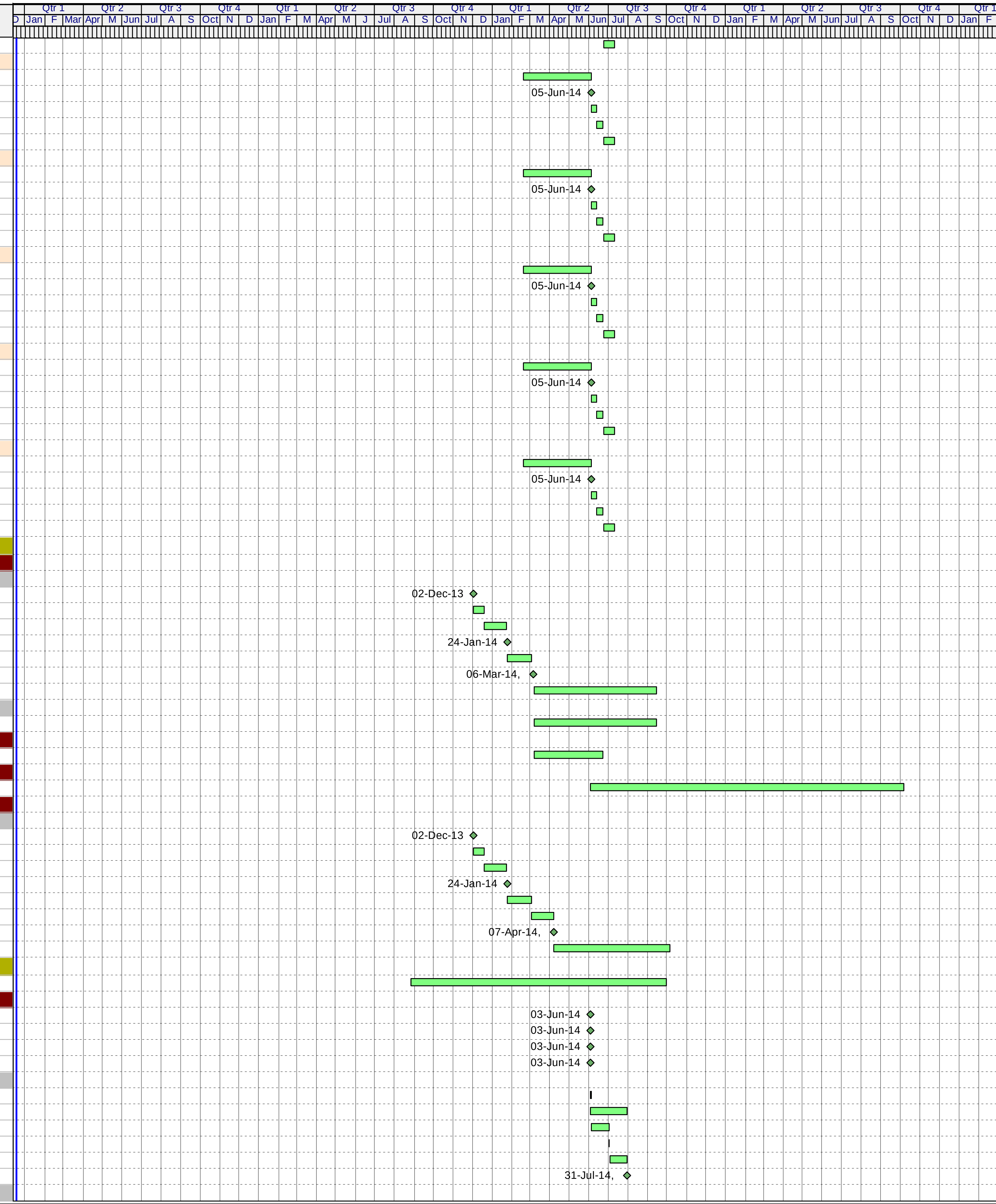


Activity ID	Activity Name	Original Duration	Start	Finish
PLE-07-2470	Receive WR018 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2480	Receive WR018 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
PLE-07-2490	Receive WR018 Surface Water Report from ESP	0.0d	03-Jun-14	
PLE-07-4780	Receive WR018 Restoration Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S2.P.10033742.01 WR018 Permits - York Region		45.2d	03-Jun-14	25-Aug-14
PLE-07-1980	EGD Permitting Submit to York Rg & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-1990	Summary - WR018 - York Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-5020	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6460	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S2.P.10033742.21 WR018 Permits - TRCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-1800	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-1810	Summary - WR018 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5370	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-6970	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S2.P.10033742.20 WR018 Permits - MTO		66.0d	03-Jun-14	30-Sep-14
PLE-07-2100	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-2110	Summary - WR018 - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-5430	Review of Application by MTO	60.0d	13-Jun-14	30-Sep-14
PLE-07-7030	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S2.P.10031500 Permit WR019		66.0d	03-Jun-14	30-Sep-14
PLE-07-2500	Receive WR019 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2510	Receive WR019 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2520	Receive WR019 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S2.P.10031500.20 WR019 Permits - MTO		66.0d	03-Jun-14	30-Sep-14
PLE-07-2120	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-2130	Summary - WR019 - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-5440	Review of Application by MTO	60.0d	13-Jun-14	30-Sep-14
PLE-07-7040	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S2.P.10075875 Permit WR020		66.0d	03-Jun-14	30-Sep-14
PLE-07-2530	Receive WR020 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2540	Receive WR020 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2550	Receive WR020 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
PLE-07-2560	Receive WR020 Surface Water Report from ESP	0.0d	03-Jun-14	
PLE-07-4790	Receive WR020 Restoration Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S2.P.10075875.01 WR020 Permits - York Region		45.2d	03-Jun-14	25-Aug-14
PLE-07-2000	EGD Permitting Submit to York Rg & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-2010	Summary - WR020 - York Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-5030	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6470	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S2.P.10075875.07 WR020 Permits - City of Markham		33.2d	03-Jun-14	31-Jul-14
PLE-07-1880	Complete & Send Package to Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-1890	Summary - WR020 - City of Markham	33.2d	03-Jun-14	31-Jul-14
PLE-07-4970	Receive Approval from Utilities	28.0d	04-Jun-14	02-Jul-14
PLE-07-5910	EGD Permitting to Submit to City of Markham	1.0d	02-Jul-14	03-Jul-14
PLE-07-6010	Review by City - EGD Receive Permit	28.0d	04-Jul-14	31-Jul-14
PLE-07-6230	GTA Receive Permit	0.0d		31-Jul-14
GTA.Schedule-2.GTA.2.S2.P.10075875.21 WR020 Permits - TRCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-1820	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-1830	Summary - WR020 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5380	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-6980	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S2.P.10075875.20 WR020 Permits - MTO		66.0d	03-Jun-14	30-Sep-14
PLE-07-2140	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-2150	Summary - WR020 - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-5450	Review of Application by MTO	60.0d	13-Jun-14	30-Sep-14
PLE-07-7050	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3 Spread 3 - Parkway West/Parkway Cons/Parkway Cons/Parkway Cons t		754.9d	11-Feb-13	24-Nov-16
GTA.Schedule-2.GTA.2.S3.W Construction - Spread 3 (Parkway West to Albion Rd Pipeline (A-1		149.6d	01-Dec-14	31-Aug-15
GTA.Schedule-2.GTA.2.S3.W.CWP01 Construction - Spread 3, ML		198.4d	02-Feb-15	12-Aug-15
PWO252430	PP - Mainline Construction	198.4d	02-Feb-15	12-Aug-15
PWO252650	Pipe on Site - String {Late}	0.0d	02-Feb-15	
GTA.Schedule-2.GTA.2.S3.W.CWP06 Construction - Spread 3, Horizontal Directional Drilling (HDD)		257.9d	01-Dec-14	14-Aug-15
PWO252000	SP3 - Start of Directional Drilling	0.0d	01-Dec-14	
PWO252010	HDD - Contractor Mobe	26.9d	01-Dec-14	03-Jan-15
PWO252020	HDD Rigs - Parkway to Albion - Spread 3	257.9d	01-Dec-14	14-Aug-15
PWO252140	HDD - Start of 1st Pipe String {Latest}	0.0d	07-Jan-15	
PWO252880	SP3 - Finish HDD Construction	0.0d		14-Aug-15
GTA.Schedule-2.GTA.2.S3.W.CWP06.00 Drill X3 - Contingency SP3		18.8d	03-Jul-15	21-Jul-15
PWO12910	Contingency Drill SP3	18.8d	03-Jul-15	21-Jul-15
GTA.Schedule-2.GTA.2.S3.W.CWP06.08 Construction - Spread 3, HDD 8: Clairville Reservoir/Finch A		40.1d	05-Jan-15	11-Feb-15
PWO252030	Clareville Reservoir / Finch Ave	40.1d	05-Jan-15	11-Feb-15
PWO252090	Mobe	3.0d	05-Jan-15	07-Jan-15

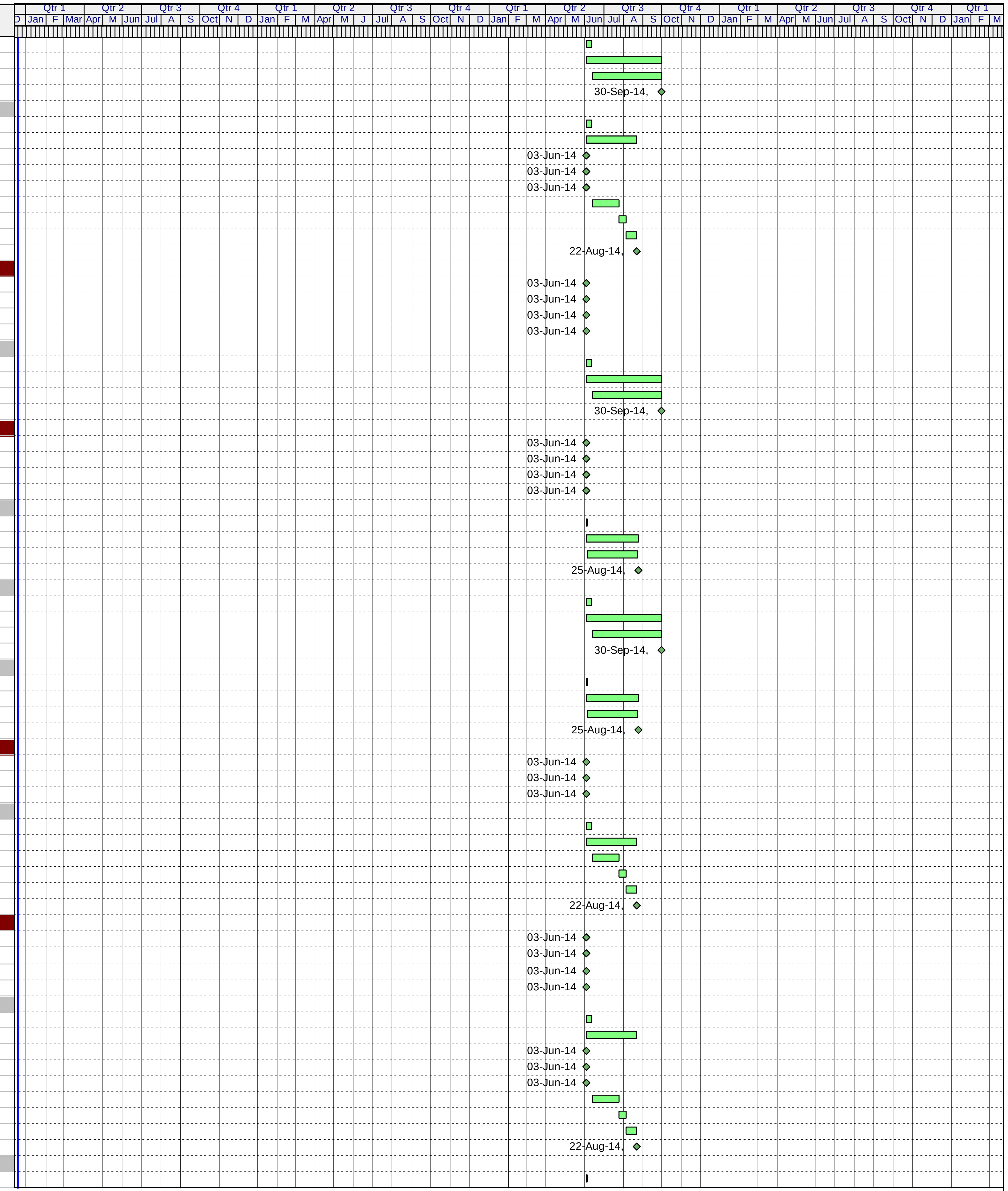


Activity ID	Activity Name	Original Duration	Start	Finish
PWO252150	Drilling	33.1d	07-Jan-15	06-Feb-15
PWO252170	Start - String, Weld, Coat & Pre Test	0.0d	07-Jan-15	
PWO252360	Pull	1.0d	06-Feb-15	07-Feb-15
PWO350080	Demob	3.0d	07-Feb-15	11-Feb-15
GTA.Schedule-2.GTA.2.S3.W.CWP06.09 Construction - Spread 3, HDD 9: Bramalea Road HDD		44.0d	05-Mar-15	17-Apr-15
PWO252230	Bramalea Road	44.0d	05-Mar-15	17-Apr-15
PWO252330	Mobe	3.0d	05-Mar-15	07-Mar-15
PWO252370	Drilling	37.0d	07-Mar-15	14-Apr-15
PWO252400	Start - String, Weld, Coat & Pre Test	0.0d	07-Mar-15	
PWO252580	Pull	1.0d	14-Apr-15	15-Apr-15
PWO350090	Demob	3.0d	15-Apr-15	17-Apr-15
GTA.Schedule-2.GTA.2.S3.W.CWP06.10 Construction - Spread 3, HDD 10: Highway 410		44.0d	17-Apr-15	29-May-15
PWO252040	Highway 410	44.0d	17-Apr-15	29-May-15
PWO252100	Mobe	3.0d	17-Apr-15	20-Apr-15
PWO252160	Drilling	37.0d	21-Apr-15	26-May-15
PWO252180	Start - String, Weld, Coat & Pre Test	0.0d	21-Apr-15	
PWO252300	Pull	1.0d	26-May-15	27-May-15
PWO350100	Demob	3.0d	27-May-15	29-May-15
GTA.Schedule-2.GTA.2.S3.W.CWP06.11 Construction - Spread 3, HDD 11: Mavis Road		33.0d	29-May-15	30-Jun-15
PWO252380	Mavis Road	33.0d	29-May-15	30-Jun-15
PWO252480	Mobe	3.0d	29-May-15	02-Jun-15
PWO252520	Drilling	26.0d	02-Jun-15	25-Jun-15
PWO252540	Start - String, Weld, Coat & Pre Test	0.0d	02-Jun-15	
PWO252780	Pull	1.0d	26-Jun-15	26-Jun-15
PWO350110	Demob	3.0d	26-Jun-15	30-Jun-15
GTA.Schedule-2.GTA.2.S3.W.CWP06.12 Construction - Spread 3, Direct Pipe: Credit River		50.9d	05-Jan-15	21-Feb-15
PWO252070	Credit River and Wetland - Direct Pipe	50.9d	05-Jan-15	21-Feb-15
PWO252130	Mobe (DP)	3.0d	05-Jan-15	07-Jan-15
PWO252190	Drilling	47.9d	07-Jan-15	21-Feb-15
PWO252200	Start - String, Weld, Coat & Pre Test	0.0d	07-Jan-15	
GTA.Schedule-2.GTA.2.S3.W.CWP06.13 Construction - Spread 3, HDD 13: Levi's Creek		47.0d	30-Jun-15	14-Aug-15
PWO252110	Levis Creek	47.0d	30-Jun-15	14-Aug-15
PWO252250	Mob	3.0d	30-Jun-15	03-Jul-15
PWO252260	Drilling	40.0d	03-Jul-15	11-Aug-15
PWO252270	Start - String, Weld, Coat & Pre Test	0.0d	03-Jul-15	
PWO252440	Pull	1.0d	11-Aug-15	12-Aug-15
PWO350120	Demob	3.0d	12-Aug-15	14-Aug-15
GTA.Schedule-2.GTA.2.S3.W.CWP06.14 Construction - Spread 3, HDD 14: Highway 401		39.0d	27-Jan-15	05-Mar-15
PWO252560	Highway 401	39.0d	27-Jan-15	05-Mar-15
PWO252710	Mobe	3.0d	27-Jan-15	29-Jan-15
PWO252740	Drilling	32.0d	29-Jan-15	02-Mar-15
PWO252750	Start - String, Weld, Coat & Pre Test	0.0d	29-Jan-15	
PWO252870	Pull	1.0d	02-Mar-15	02-Mar-15
PWO350130	Demob	3.0d	03-Mar-15	05-Mar-15
GTA.Schedule-2.GTA.2.S3.W.CWP07 Construction - Spread 3, Inspection Services		89.4d	02-Feb-15	13-Jul-15
PWO13210	PP - Inspection Services	89.4d	02-Feb-15	13-Jul-15
GTA.Schedule-2.GTA.2.S3.W.CWP08 Construction - Spread 3, Hot Tap Fitting Installation		10.0d	13-Aug-15	31-Aug-15
PWO13230	PP - Hot Taps & Final Tie ins	10.0d	13-Aug-15	31-Aug-15
GTA.Schedule-2.GTA.2.S3.W.CWP09 Construction - Spread 3, NDE Services		89.4d	02-Feb-15	13-Jul-15
PWO13200	PP - NDE Services	89.4d	02-Feb-15	13-Jul-15
GTA.Schedule-2.GTA.2.S3.W.CWP10 Construction - Spread 3, Hydro Testing		10.0d	13-Aug-15	31-Aug-15
PWO13220	PP - Hydro Testing	10.0d	13-Aug-15	31-Aug-15
GTA.Schedule-2.GTA.2.S3.E Environment - Spread 3		754.9d	11-Feb-13	24-Nov-16
GTA.Schedule-2.GTA.2.S3.E.001 Spread 3, Environmental - Environmental Survey & Studies		357.3d	11-Feb-13	26-Nov-14
A13980	Environmental Studies	357.3d	11-Feb-13	26-Nov-14
GTA.Schedule-2.GTA.2.S3.E.008 Spread 3, Environmental - Post-Construction Monitoring		220.8d	16-Oct-15	24-Nov-16
A13990	PP - Env Post Construction	220.8d	16-Oct-15	24-Nov-16
GTA.Schedule-2.GTA.2.S3.E.009 Spread 3, Environmental - Environment Inspection		168.0d	01-Dec-14	02-Oct-15
A14000	PP - Env Inspections	168.0d	01-Dec-14	02-Oct-15
GTA.Schedule-2.GTA.2.S3.E.010 Spread 3, Environmental - Environmental Studies for Land/ROW acqu		80.0d	18-Feb-14	11-Jul-14
GTA.Schedule-2.GTA.2.S3.E.010.01 Spread 3, Environmental - Environmental Site Assessment (ESA		80.0d	18-Feb-14	11-Jul-14
GTA.Schedule-2.GTA.2.S3.E.010.01.S3E1 Spread 3, Environmental - Phase I ESA - E1		80.0d	18-Feb-14	11-Jul-14
PEO2170	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2520	Receive Draft Report	0.0d	05-Jun-14	
PEO2530	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2760	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14
PEO2930	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S3.E.010.01.S3E6 Spread 3, Environmental - Phase I ESA - E6		80.0d	18-Feb-14	11-Jul-14
PEO2180	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2540	Receive Draft Report	0.0d	05-Jun-14	
PEO2550	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2770	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14

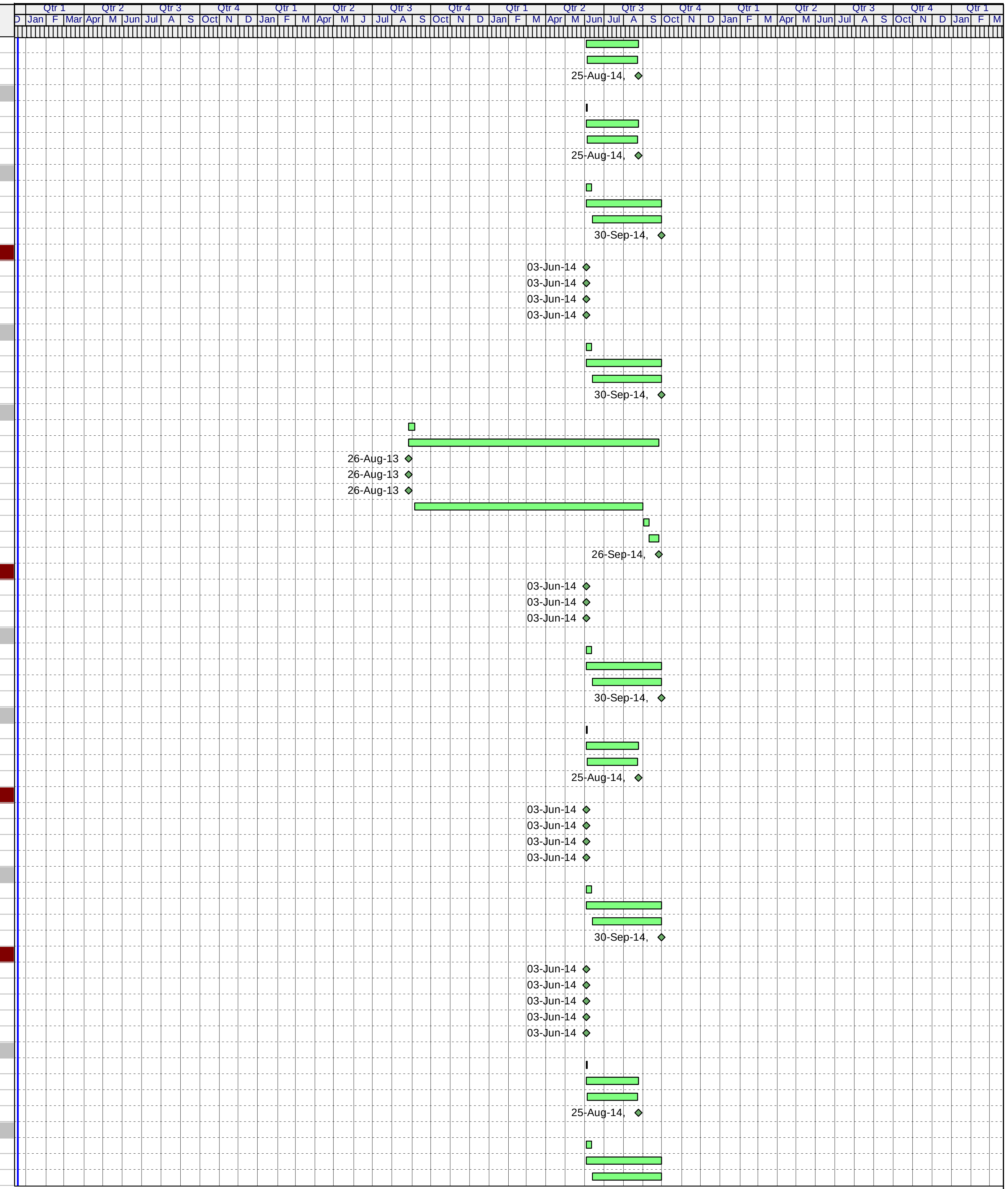
Activity ID	Activity Name	Original Duration	Start	Finish
PEO2940	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S3.E.010.01.S3E7	Spread 3, Environmental - Phase I ESA - E7	80.0d	18-Feb-14	11-Jul-14
PEO2190	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2560	Receive Draft Report	0.0d	05-Jun-14	
PEO2570	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2780	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14
PEO2950	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S3.E.010.01.S3E10	Spread 3, Environmental - Phase I ESA - E10	80.0d	18-Feb-14	11-Jul-14
PEO2200	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2580	Receive Draft Report	0.0d	05-Jun-14	
PEO2590	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2790	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14
PEO2960	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S3.E.010.01.S3E11	Spread 3, Environmental - Phase I ESA - E11	80.0d	18-Feb-14	11-Jul-14
PEO2210	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2600	Receive Draft Report	0.0d	05-Jun-14	
PEO2610	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2800	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14
PEO2970	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S3.E.010.01.S3E12	Spread 3, Environmental - Phase I ESA - E12	80.0d	18-Feb-14	11-Jul-14
PEO2220	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2620	Receive Draft Report	0.0d	05-Jun-14	
PEO2630	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2810	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14
PEO2980	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S3.E.010.01.S3E13	Spread 3, Environmental - Phase I ESA - E13	80.0d	18-Feb-14	11-Jul-14
PEO2230	Desktop Study by Env. Consultant	60.0d	18-Feb-14	05-Jun-14
PEO2640	Receive Draft Report	0.0d	05-Jun-14	
PEO2650	Review Draft Phase 1 ESA Report (GTA)	5.0d	05-Jun-14	13-Jun-14
PEO2820	Review Draft Phase 1 ESA Report (IO)	5.0d	13-Jun-14	23-Jun-14
PEO2990	Update Phase 1 ESA Report by Env. Consultant	10.0d	24-Jun-14	11-Jul-14
GTA.Schedule-2.GTA.2.S3.M	Material Procurement - Spread 3	366.6d	02-Dec-13	06-Oct-15
GTA.Schedule-2.GTA.2.S3.M.P001	Pipe - Evraz	153.8d	02-Dec-13	15-Sep-14
GTA.Schedule-2.GTA.2.S3.M.P001.01	Spread 3 - 42 Inches ML Pipe	153.8d	02-Dec-13	15-Sep-14
PME16010	rec'd MR from ESP	0.0d	02-Dec-13	
PME16040	Final review/approval by EGD/GTA	10.0d	02-Dec-13	19-Dec-13
PME16070	CDP review/approval	15.0d	19-Dec-13	23-Jan-14
PME16160	Issue RFQ	0.0d	24-Jan-14	
PME16190	Bid & Evaluation Process (4w)	20.0d	24-Jan-14	03-Mar-14
PME16290	PO Issue	0.0d		06-Mar-14
PME16310	Fab & Deliver NPS 42X19.1mm Pipes ML SP3	105.6d	07-Mar-14	15-Sep-14
GTA.Schedule-2.GTA.2.S3.M.P001.03	Spread 3 - 42 Inches Track bore pipe	105.6d	07-Mar-14	15-Sep-14
PME16350	Fab & Deliver NPS 42X19.1mm Pipes TB SP3	105.6d	07-Mar-14	15-Sep-14
GTA.Schedule-2.GTA.2.S3.M.X003	Spread 3 - Shop Inspection	60.0d	07-Mar-14	23-Jun-14
PME15020	SP3 - Shop Inspection	60.0d	07-Mar-14	23-Jun-14
GTA.Schedule-2.GTA.2.S3.M.X004	Spread 3 - Storage	270.0d	03-Jun-14	06-Oct-15
PME15060	SP3 Storage	270.0d	03-Jun-14	06-Oct-15
GTA.Schedule-2.GTA.2.S3.M.P007	Spread 3 - Heavy Walled Pipe	165.4d	02-Dec-13	06-Oct-14
GTA.Schedule-2.GTA.2.S3.M.P007.01	Spread 3 - 42 Inches HW Pipe	165.4d	02-Dec-13	06-Oct-14
PME16020	rec'd MR from ESP	0.0d	02-Dec-13	
PME16030	Final review/approval by EGD/GTA	10.0d	02-Dec-13	19-Dec-13
PME16080	CDP review/approval	15.0d	19-Dec-13	23-Jan-14
PME16170	Issue RFQ	0.0d	24-Jan-14	
PME16200	Bid & Evaluation Process (4w)	20.0d	24-Jan-14	03-Mar-14
PME16230	CAR review/approval	20.0d	03-Mar-14	07-Apr-14
PME16380	PO Issue	0.0d		07-Apr-14
PME16390	Fab & Deliver NPS 42X25.4mm Pipes HDD SP3	100.0d	07-Apr-14	06-Oct-14
GTA.Schedule-2.GTA.2.S3.P	Spread 3 Permit Work Requests	217.3d	26-Aug-13	30-Sep-14
PLE-07-1120	WBS Summary - SP3 Permits WRs	217.3d	26-Aug-13	30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031558	Permit WR021	66.0d	03-Jun-14	30-Sep-14
PLE-07-2570	Receive WR021 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2580	Receive WR021 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2590	Receive WR021 Surface Water Report from ESP	0.0d	03-Jun-14	
PLE-07-4800	Receive WR021 Restoration Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10031558.09	WR021 Permits - City of Toronto	33.2d	03-Jun-14	31-Jul-14
PLE-07-3780	Complete & Send Package to Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-3790	Summary - WR021 - City of Toronto	33.2d	03-Jun-14	31-Jul-14
PLE-07-5040	Receive Approval from Utilities	28.0d	04-Jun-14	02-Jul-14
PLE-07-5920	EGD Permitting to Submit to City of Toronto	1.0d	02-Jul-14	03-Jul-14
PLE-07-6020	Review by City - EGD Receive Permit	28.0d	04-Jul-14	31-Jul-14
PLE-07-6240	GTA Receive Permit	0.0d		31-Jul-14
GTA.Schedule-2.GTA.2.S3.P.10031558.21	WR021 Permits - TRCA	66.0d	03-Jun-14	30-Sep-14



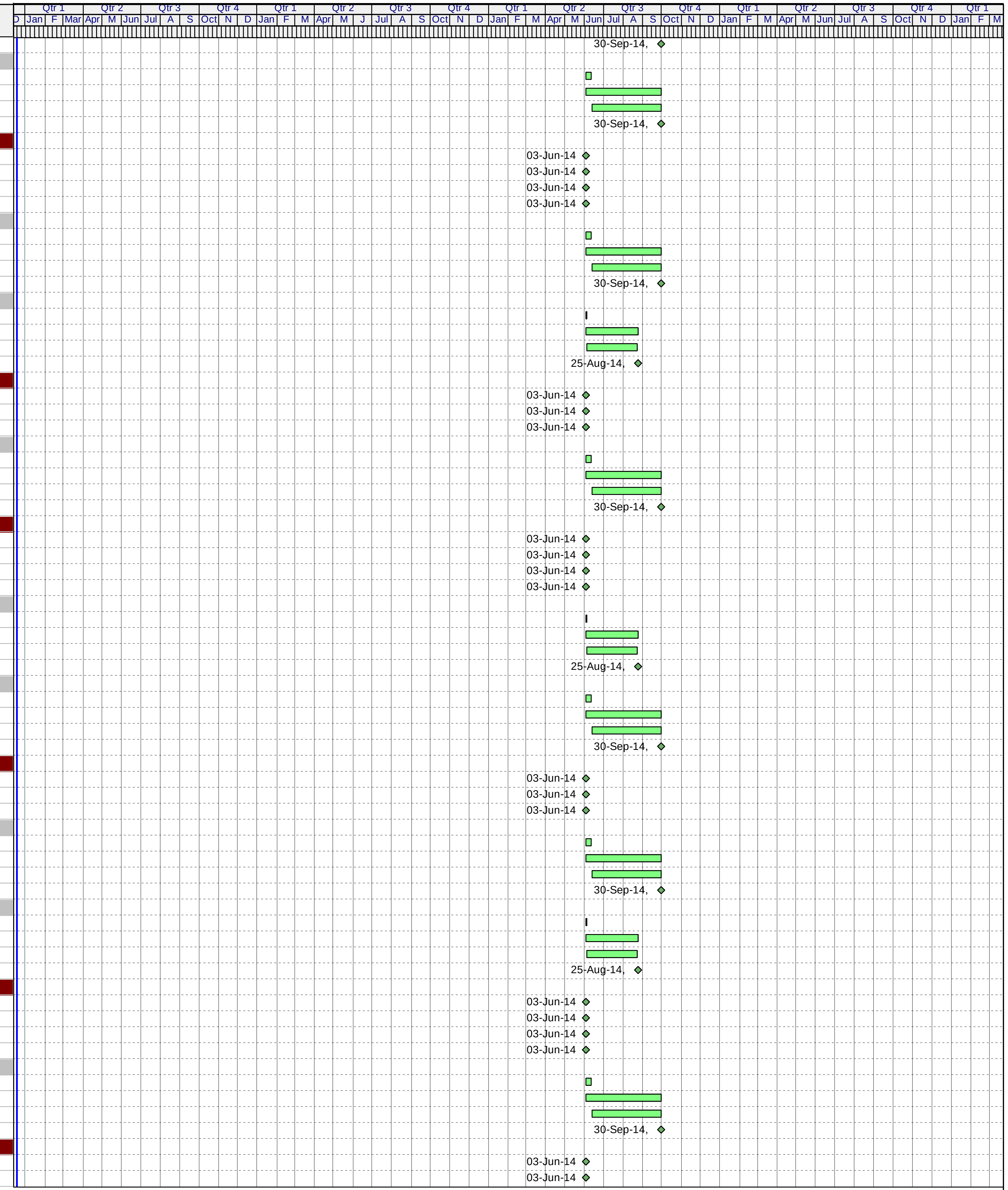
Activity ID	Activity Name	Original Duration	Start	Finish
PLE-07-3420	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3430	Summary - WR021 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5460	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-7060	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031558.18	**WR021 Permits - CN Rail**	**44.6d**	**03-Jun-14**	**22-Aug-14**
PLE-07-3800	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3810	Summary - WR021 - CN Rails	44.6d	03-Jun-14	22-Aug-14
PLE-07-4590	Receive Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-4600	Receive Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-4610	Receive Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
PLE-07-5640	Review of Application by CN Rails	23.6d	13-Jun-14	25-Jul-14
PLE-07-6090	Receive Docs by Land Dpt, sign/return	5.0d	25-Jul-14	05-Aug-14
PLE-07-6270	Final Review by CN Rails	10.0d	05-Aug-14	22-Aug-14
PLE-07-6350	GTA Receive executed Docs	0.0d		22-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10031589	**Permit WR022**	**66.0d**	**03-Jun-14**	**30-Sep-14**
PLE-07-2600	Receive WR022 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2610	Receive WR022 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2620	Receive WR022 Restoration Plan from ESP	0.0d	03-Jun-14	
PLE-07-2630	Receive WR022 Surface Water Report from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10031589.21	**WR022 Permits - TRCA**	**66.0d**	**03-Jun-14**	**30-Sep-14**
PLE-07-3440	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3450	Summary - WR022 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5470	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-7070	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031605	**Permit WR023**	**66.0d**	**03-Jun-14**	**30-Sep-14**
PLE-07-2640	Receive WR023 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2650	Receive WR023 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2660	Receive WR023 Restoration Plan from ESP	0.0d	03-Jun-14	
PLE-07-2670	Receive WR023 Surface Water Report from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10031605.08	**WR023 Permits - City of Brampton**	**45.2d**	**03-Jun-14**	**25-Aug-14**
PLE-07-3840	EGD Permitting Submit to Brampton & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-3850	Summary - WR023 - City of Brampton	45.2d	03-Jun-14	25-Aug-14
PLE-07-5060	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6490	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10031605.21	**WR023 Permits - TRCA**	**66.0d**	**03-Jun-14**	**30-Sep-14**
PLE-07-3460	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3470	Summary - WR023 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5480	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-7080	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031605.02	**WR023 Permits - Peel Region**	**45.2d**	**03-Jun-14**	**25-Aug-14**
PLE-07-3820	EGD Permitting Submit to Peel Rg & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-3830	Summary - WR023 - Peel Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-5050	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6480	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10031618	**Permit WR024**	**44.6d**	**03-Jun-14**	**22-Aug-14**
PLE-07-2680	Receive WR024 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2690	Receive WR024 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2700	Receive WR024 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10031618.18	**WR024 Permits - CN Rail**	**44.6d**	**03-Jun-14**	**22-Aug-14**
PLE-07-3880	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3890	Summary - WR024 - CN Rails	44.6d	03-Jun-14	22-Aug-14
PLE-07-5660	Review of Application by CN Rails	23.6d	13-Jun-14	25-Jul-14
PLE-07-6110	Receive Docs by Land Dpt, sign/return	5.0d	25-Jul-14	05-Aug-14
PLE-07-6290	Final Review by CN Rails	10.0d	05-Aug-14	22-Aug-14
PLE-07-6370	GTA Receive executed Docs	0.0d		22-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10031627	**Permit WR025**	**66.0d**	**03-Jun-14**	**30-Sep-14**
PLE-07-2710	Receive WR025 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2720	Receive WR025 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2730	Receive WR025 Restoration Plan from ESP	0.0d	03-Jun-14	
PLE-07-2740	Receive WR025 Surface Water Report from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10031627.18	**WR025 Permits - CN Rail**	**44.6d**	**03-Jun-14**	**22-Aug-14**
PLE-07-3860	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3870	Summary - WR025 - CN Rails	44.6d	03-Jun-14	22-Aug-14
PLE-07-4620	Receive Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-4630	Receive Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-4640	Receive Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
PLE-07-5650	Review of Application by CN Rails	23.6d	13-Jun-14	25-Jul-14
PLE-07-6100	Receive Docs by Land Dpt, sign/return	5.0d	25-Jul-14	05-Aug-14
PLE-07-6280	Final Review by CN Rails	10.0d	05-Aug-14	22-Aug-14
PLE-07-6360	GTA Receive executed Docs	0.0d		22-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10031627.02	**WR025 Permits - Peel Region**	**45.2d**	**03-Jun-14**	**25-Aug-14**
PLE-07-3900	EGD Permitting Submit to Peel Rg & Utilities	1.0d	03-Jun-14	04-Jun-14



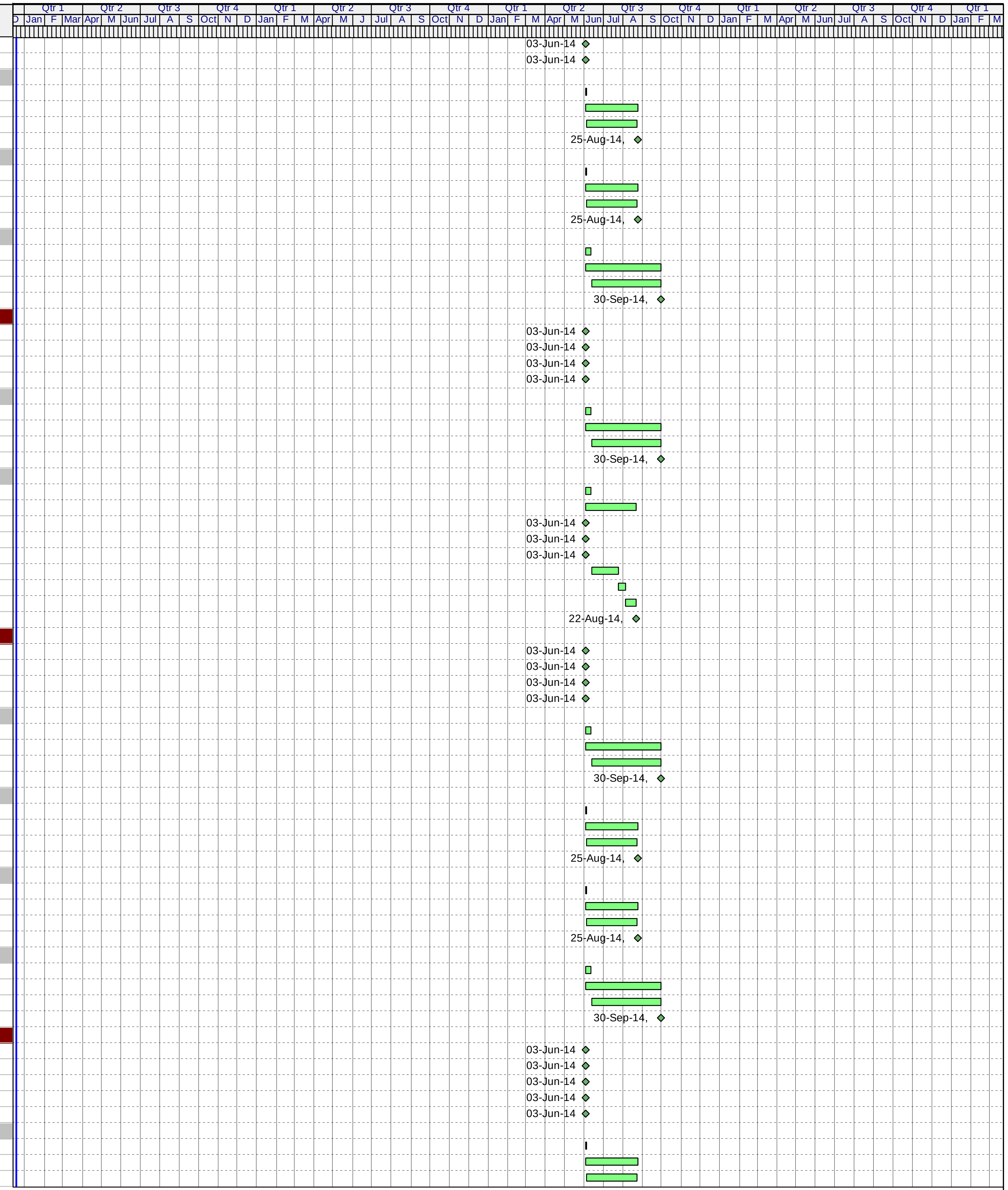
Activity ID	Activity Name	Original Duration	Start	Finish
PLE-07-3910	Summary - WR025 - Peel Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-5070	Review by Peel Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6500	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10031627.08 WR025 Permits - City of Brampton		45.2d	03-Jun-14	25-Aug-14
PLE-07-3920	EGD Permitting Submit to Brampton & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-3930	Summary - WR025 - City of Brampton	45.2d	03-Jun-14	25-Aug-14
PLE-07-5080	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6510	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10031627.21 WR025 Permits - TRCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-3480	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3490	Summary - WR025 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5490	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-7090	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031651 Permit WR026		217.3d	26-Aug-13	30-Sep-14
PLE-07-2750	Receive WR026 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2760	Receive WR026 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2770	Receive WR026 Restoration Plan from ESP	0.0d	03-Jun-14	
PLE-07-2780	Receive WR026 Surface Water Report from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10031651.21 WR026 Permits - TRCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-3500	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3510	Summary - WR026 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5500	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-7100	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031651.17 WR026 Permits - Metrolinx		215.5d	26-Aug-13	26-Sep-14
PLE-07-1060	Review Input Package, Fill application & submit	6.0d	26-Aug-13	05-Sep-13
PLE-07-1070	Summary - WR026 - Metrolinx I	215.5d	26-Aug-13	26-Sep-14
PLE-07-1080	Receive Dwgs from ESP	0.0d	26-Aug-13	
PLE-07-1090	Receive Geotech Report from ESP	0.0d	26-Aug-13	
PLE-07-1100	Receive Settlement Monitoring Plan from ESP	0.0d	26-Aug-13	
PLE-07-1190	Review of Application by Metrolinx	360.0d	05-Sep-13	31-Aug-14
PLE-07-6680	Receive Docs by Land Dpt, sign/return	5.0d	02-Sep-14	10-Sep-14
PLE-07-6760	Final Review by Metrolinx	10.0d	10-Sep-14	26-Sep-14
PLE-07-6860	GTA Receive executed Docs	0.0d		26-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031670 Permit WR027		66.0d	03-Jun-14	30-Sep-14
PLE-07-2790	Receive WR027 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2800	Receive WR027 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2810	Receive WR027 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10031670.20 WR027 Permits - MTO		66.0d	03-Jun-14	30-Sep-14
PLE-07-3660	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3670	Summary - WR027 - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-5580	Review of Application by MTO	60.0d	13-Jun-14	30-Sep-14
PLE-07-7180	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031670.08 WR027 Permits - City of Brampton		45.2d	03-Jun-14	25-Aug-14
PLE-07-3960	EGD Permitting Submit to Brampton & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-3970	Summary - WR027 - City of Brampton	45.2d	03-Jun-14	25-Aug-14
PLE-07-5100	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6530	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10031692 Permit WR028		66.0d	03-Jun-14	30-Sep-14
PLE-07-2820	Receive WR028 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2830	Receive WR028 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2840	Receive WR028 Restoration Plan from ESP	0.0d	03-Jun-14	
PLE-07-2850	Receive WR028 Surface Water Report from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10031692.21 WR028 Permits - TRCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-3520	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3530	Summary - WR028 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5510	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-7110	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031702 Permit WR029		66.0d	03-Jun-14	30-Sep-14
PLE-07-2860	Receive WR029 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2870	Receive WR029 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2880	Receive WR029 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
PLE-07-2890	Receive WR029 Surface Water Report from ESP	0.0d	03-Jun-14	
PLE-07-4810	Receive WR029 Restoration Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10031702.02 WR029 Permits - Peel Region		45.2d	03-Jun-14	25-Aug-14
PLE-07-4000	EGD Permitting Submit to Peel Rg & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-4010	Summary - WR029 - Peel Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-5110	Review by Peel Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6540	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10031702.20 WR029 Permits - MTO		66.0d	03-Jun-14	30-Sep-14
PLE-07-3980	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3990	Summary - WR029 - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-5670	Review of Application by MTO	60.0d	13-Jun-14	30-Sep-14



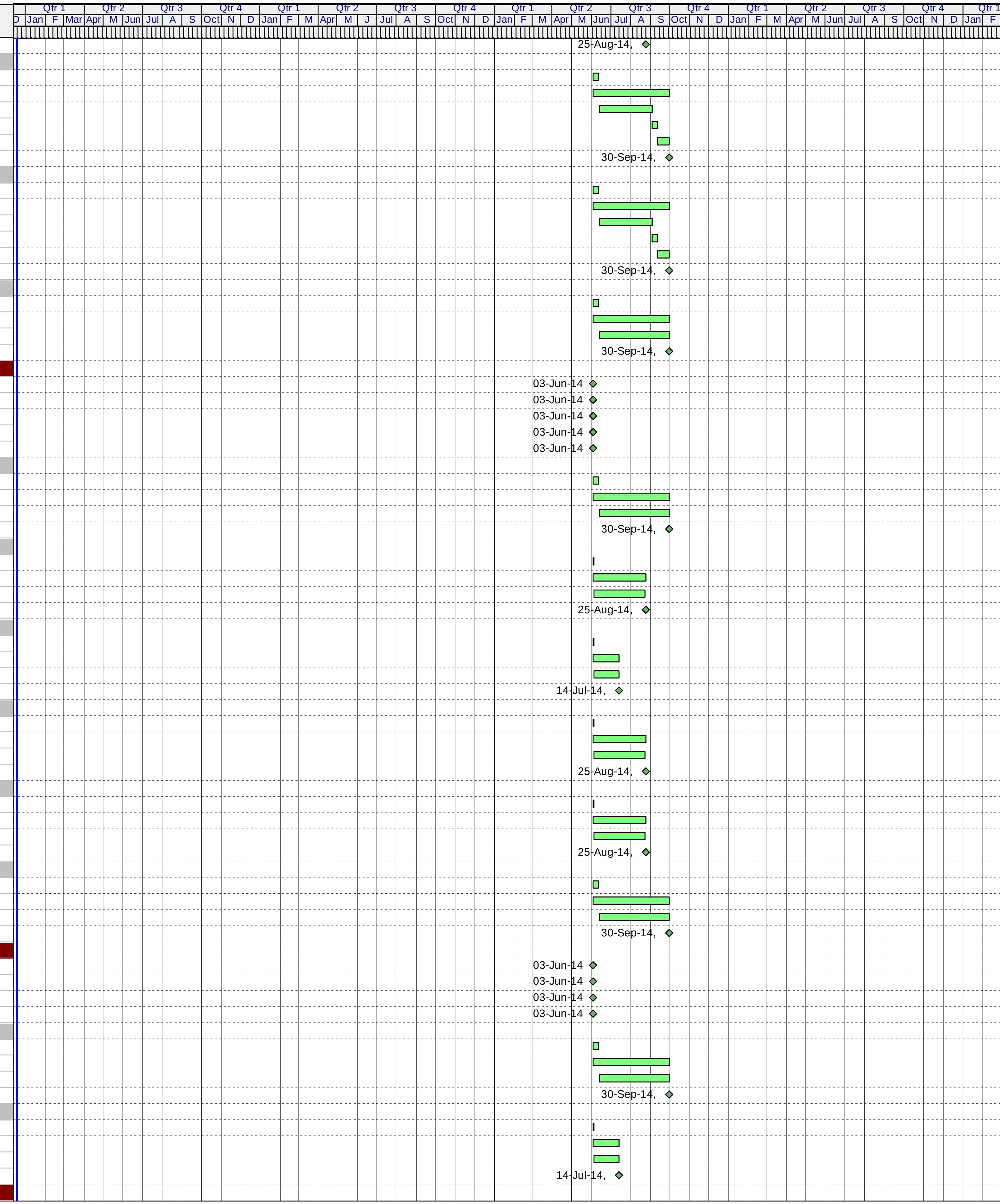
Activity ID	Activity Name	Original Duration	Start	Finish
PLE-07-7240	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031702.21 WR029 Permits - TRCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-3540	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3550	Summary - WR029 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5520	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-7120	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031708 Permit WR030		66.0d	03-Jun-14	30-Sep-14
PLE-07-2900	Receive WR030 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2910	Receive WR030 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2920	Receive WR030 Restoration Plan from ESP	0.0d	03-Jun-14	
PLE-07-2930	Receive WR030 Surface Water Report from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10031708.21 WR030 Permits - TRCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-3560	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3570	Summary - WR030 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5530	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-7130	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031708.08 WR030 Permits - City of Brampton		45.2d	03-Jun-14	25-Aug-14
PLE-07-3940	EGD Permitting Submit to Brampton & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-3950	Summary - WR030 - City of Brampton	45.2d	03-Jun-14	25-Aug-14
PLE-07-5090	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6520	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10033771 Permit WR031		66.0d	03-Jun-14	30-Sep-14
PLE-07-2940	Receive WR031 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2950	Receive WR031 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2960	Receive WR031 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10033771.20 WR031 Permits - MTO		66.0d	03-Jun-14	30-Sep-14
PLE-07-3680	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3690	Summary - WR031 - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-5590	Review of Application by MTO	60.0d	13-Jun-14	30-Sep-14
PLE-07-7190	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031863 Permit WR032		66.0d	03-Jun-14	30-Sep-14
PLE-07-2970	Receive WR032 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-2980	Receive WR032 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-2990	Receive WR032 Restoration Plan from ESP	0.0d	03-Jun-14	
PLE-07-3000	Receive WR032 Surface Water Report from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10031863.08 WR032 Permits - City of Brampton		45.2d	03-Jun-14	25-Aug-14
PLE-07-4020	EGD Permitting Submit to Brampton & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-4030	Summary - WR032 - City of Brampton	45.2d	03-Jun-14	25-Aug-14
PLE-07-5120	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6550	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10031863.21 WR032 Permits - TRCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-3580	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3590	Summary - WR032 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5540	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-7140	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031873 Permit WR033		66.0d	03-Jun-14	30-Sep-14
PLE-07-3010	Receive WR033 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-3020	Receive WR033 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-3030	Receive WR033 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10031873.20 WR033 Permits - MTO		66.0d	03-Jun-14	30-Sep-14
PLE-07-3700	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3710	Summary - WR033 - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-5600	Review of Application by MTO	60.0d	13-Jun-14	30-Sep-14
PLE-07-7200	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031873.08 WR033 Permits - City of Brampton		45.2d	03-Jun-14	25-Aug-14
PLE-07-4040	EGD Permitting Submit to Brampton & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-4050	Summary - WR033 - City of Brampton	45.2d	03-Jun-14	25-Aug-14
PLE-07-5130	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6560	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10031936 Permit WR035		66.0d	03-Jun-14	30-Sep-14
PLE-07-3040	Receive WR035 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-3050	Receive WR035 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-3060	Receive WR035 Restoration Plan from ESP	0.0d	03-Jun-14	
PLE-07-3070	Receive WR035 Surface Water Report from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10031936.22 WR035 Permits - CVCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-4060	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-4070	Summary - WR035 - CVCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5680	Review of Application by CVCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-7250	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031957 Permit WR036		66.0d	03-Jun-14	30-Sep-14
PLE-07-3080	Receive WR036 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-3090	Receive WR036 Geotech Report from ESP	0.0d	03-Jun-14	



Activity ID	Activity Name	Original Duration	Start	Finish
PLE-07-3100	Receive WR036 Restoration Plan from ESP	0.0d	03-Jun-14	
PLE-07-3110	Receive WR036 Surface Water Report from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10031957.02 WR036 Permits - Peel Region		45.2d	03-Jun-14	25-Aug-14
PLE-07-4300	EGD Permitting Submit to Peel Rg & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-4310	Summary - WR036 - Peel Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-5190	Review by Peel Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6610	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10031957.08 WR036 Permits - City of Brampton		45.2d	03-Jun-14	25-Aug-14
PLE-07-4200	EGD Permitting Submit to Brampton & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-4210	Summary - WR036 - City of Brampton	45.2d	03-Jun-14	25-Aug-14
PLE-07-5140	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6570	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10031957.21 WR036 Permits - TRCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-3600	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3610	Summary - WR036 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5550	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-7150	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10033826 Permit WR037		66.0d	03-Jun-14	30-Sep-14
PLE-07-3120	Receive WR037 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-3130	Receive WR037 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-3140	Receive WR037 Surface Water Report from ESP	0.0d	03-Jun-14	
PLE-07-4820	Receive WR037 Restoration Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10033826.22 WR037 Permits - CVCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-4080	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-4090	Summary - WR037 - CVCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5690	Review of Application by CVCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-7260	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10033826.15 WR037 Permits - OBRY		44.6d	03-Jun-14	22-Aug-14
PLE-07-4400	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-4410	Summary - WR037 - CN Rails	44.6d	03-Jun-14	22-Aug-14
PLE-07-4650	Receive Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-4660	Receive Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-4670	Receive Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
PLE-07-5750	Review of Application by CN Rails	23.6d	13-Jun-14	25-Jul-14
PLE-07-6120	Receive Docs by Land Dpt, sign/return	5.0d	25-Jul-14	05-Aug-14
PLE-07-6300	Final Review by CN Rails	10.0d	05-Aug-14	22-Aug-14
PLE-07-6380	GTA Receive executed Docs	0.0d		22-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10031994 Permit WR038		66.0d	03-Jun-14	30-Sep-14
PLE-07-3150	Receive WR038 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-3160	Receive WR038 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-3170	Receive WR038 Restoration Plan from ESP	0.0d	03-Jun-14	
PLE-07-3180	Receive WR038 Surface Water Report from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10031994.22 WR038 Permits - CVCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-4100	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-4110	Summary - WR038 - CVCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5700	Review of Application by CVCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-7270	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10031994.02 WR038 Permits - Peel Region		45.2d	03-Jun-14	25-Aug-14
PLE-07-4320	EGD Permitting Submit to Peel Rg & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-4330	Summary - WR038 - Peel Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-5200	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6620	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10031994.08 WR038 Permits - City of Brampton		45.2d	03-Jun-14	25-Aug-14
PLE-07-4220	EGD Permitting Submit to Brampton & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-4230	Summary - WR038 - City of Brampton	45.2d	03-Jun-14	25-Aug-14
PLE-07-5150	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6580	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10031994.21 WR038 Permits - TRCA		66.0d	03-Jun-14	30-Sep-14
PLE-07-3620	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3630	Summary - WR038 - TRCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5560	Review of Application by TRCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-7160	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10032013 Permit WR039		66.0d	03-Jun-14	30-Sep-14
PLE-07-3190	Receive WR039 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-3200	Receive WR039 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-3210	Receive WR039 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
PLE-07-3220	Receive WR039 Surface Water Report from ESP	0.0d	03-Jun-14	
PLE-07-4830	Receive WR039 Restoration Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10032013.08 WR039 Permits - City of Brampton		45.2d	03-Jun-14	25-Aug-14
PLE-07-4240	EGD Permitting Submit to Brampton & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-4250	Summary - WR039 - City of Brampton	45.2d	03-Jun-14	25-Aug-14
PLE-07-5160	Review by York Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14

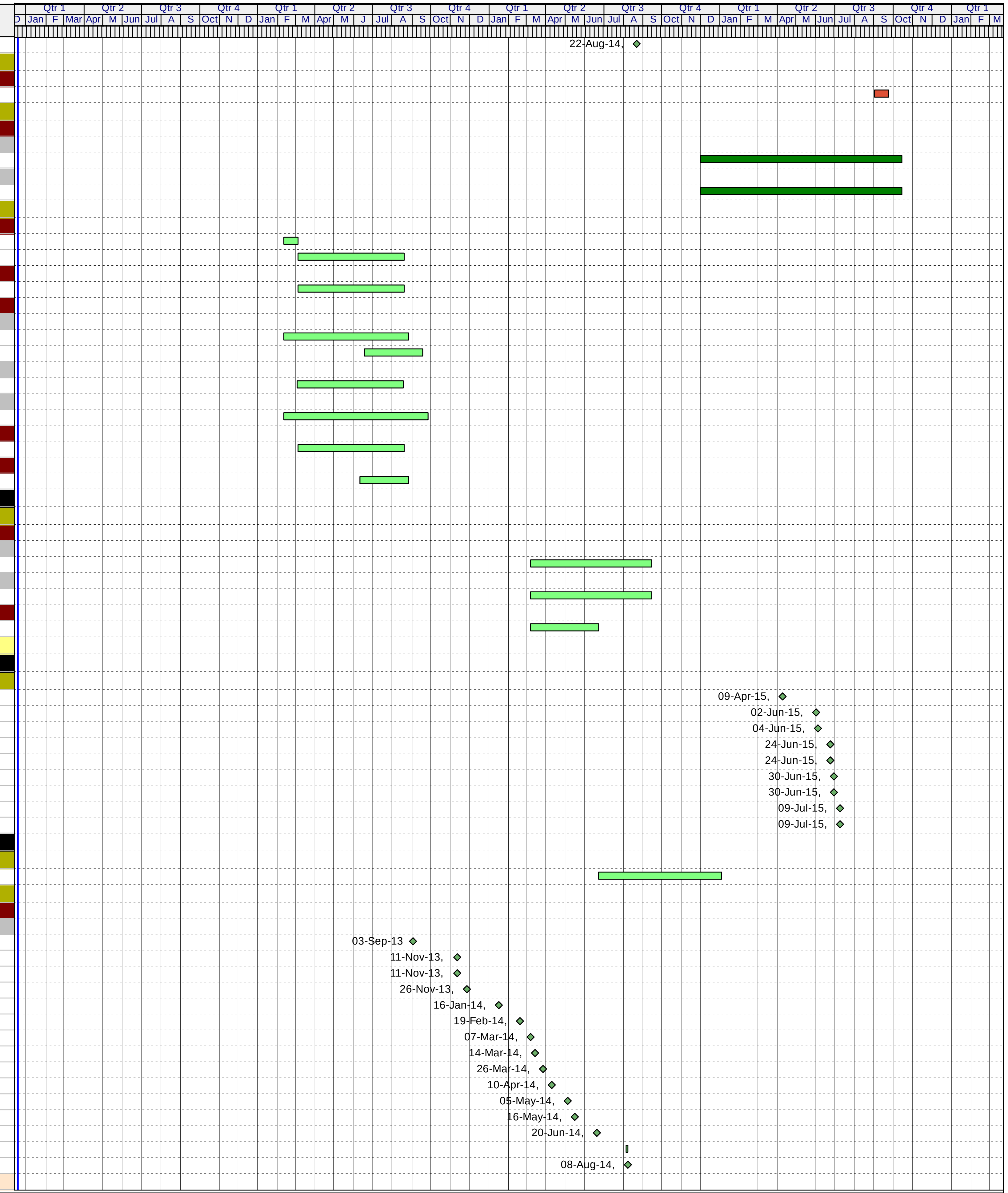


Activity ID	Activity Name	Original Duration	Start	Finish
PLE-07-6590	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10032013.12	WR039 Permits - Enbridge Pipelines Inc.	66.0d	03-Jun-14	30-Sep-14
PLE-07-4420	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-4430	Summary - WR039 - Enb. Pipelines Crossing	66.0d	03-Jun-14	30-Sep-14
PLE-07-5760	Review of Application by Enb. Pl	45.0d	13-Jun-14	04-Sep-14
PLE-07-6710	Receive Docs by Land Dpt, sign/return	5.0d	04-Sep-14	12-Sep-14
PLE-07-6800	Final Review by Enb. Pl.	10.0d	12-Sep-14	30-Sep-14
PLE-07-7320	GTA executed Docs	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10032013.13	WR039 Permits - TransCanada Pipelines	66.0d	03-Jun-14	30-Sep-14
PLE-07-4440	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-4450	Summary - WR039 - TransCanada Pipelines Crossing	66.0d	03-Jun-14	30-Sep-14
PLE-07-5770	Review of Application by TransCanada. Pl	45.0d	13-Jun-14	04-Sep-14
PLE-07-6720	Receive Docs by Land Dpt, sign/return	5.0d	04-Sep-14	12-Sep-14
PLE-07-6810	Final Review by TransCanada Pl.	10.0d	12-Sep-14	30-Sep-14
PLE-07-7330	GTA executed Docs	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10032013.22	WR039 Permits - CVCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-4120	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-4130	Summary - WR039 - CVCA	66.0d	03-Jun-14	30-Sep-14
PLE-07-5710	Review of Application by CVCA	60.0d	13-Jun-14	30-Sep-14
PLE-07-7280	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10032046	Permit WR040	66.0d	03-Jun-14	30-Sep-14
PLE-07-3230	Receive WR040 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-3240	Receive WR040 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-3250	Receive WR040 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
PLE-07-3260	Receive WR040 Surface Water Report from ESP	0.0d	03-Jun-14	
PLE-07-4840	Receive WR040 Restoration Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10032046.23	WR040 Permits - Conservation Halton	66.0d	03-Jun-14	30-Sep-14
PLE-07-3640	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3650	Summary - WR040 - CH	66.0d	03-Jun-14	30-Sep-14
PLE-07-5570	Review of Application by CH	60.0d	13-Jun-14	30-Sep-14
PLE-07-7170	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10032046.10	WR040 Permits - Halton Hills	45.2d	03-Jun-14	25-Aug-14
PLE-07-4460	EGD Permitting Submit to Town of Halton & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-4470	Summary - WR040 - Town of Halton Hills	45.2d	03-Jun-14	25-Aug-14
PLE-07-5240	Review by Halton - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6650	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10032046.05	WR040 Permits - City of Mississauga	22.6d	03-Jun-14	14-Jul-14
PLE-07-4280	EGD Permitting Submit to Mississauga& Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-4290	Summary - WR040 - City of Mississauga	22.6d	03-Jun-14	14-Jul-14
PLE-07-5180	Review by York Rg - EGD Receive Permit	40.0d	04-Jun-14	14-Jul-14
PLE-07-6030	GTA Receive Permit	0.0d		14-Jul-14
GTA.Schedule-2.GTA.2.S3.P.10032046.02	WR040 Permits - Peel Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-4340	EGD Permitting Submit to Peel Rg & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-4350	Summary - WR040 - Peel Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-5210	Review by Peel Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6630	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10032046.08	WR040 Permits - City of Brampton	45.2d	03-Jun-14	25-Aug-14
PLE-07-4260	EGD Permitting Submit to Brampton & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-4270	Summary - WR040 - City of Brampton	45.2d	03-Jun-14	25-Aug-14
PLE-07-5170	Review by Brampton - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6600	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10032046.20	WR040 Permits - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-3720	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3730	Summary - WR040 - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-5610	Review of Application by MTO	60.0d	13-Jun-14	30-Sep-14
PLE-07-7210	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10032069	Permit WR042	66.0d	03-Jun-14	30-Sep-14
PLE-07-3270	Receive WR042 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-3280	Receive WR042 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-3290	Receive WR042 Restoration Plan from ESP	0.0d	03-Jun-14	
PLE-07-3300	Receive WR042 Surface Water Report from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10032069.23	WR042 Permits - Conservation Halton	66.0d	03-Jun-14	30-Sep-14
PLE-07-4140	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-4150	Summary - WR042 - CH	66.0d	03-Jun-14	30-Sep-14
PLE-07-5720	Review of Application by CH	60.0d	13-Jun-14	30-Sep-14
PLE-07-7290	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10032069.05	WR042 Permits - City of Mississauga	22.6d	03-Jun-14	14-Jul-14
PLE-07-4360	EGD Permitting Submit to Mississauga & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-4370	Summary - WR042 - City of Mississauga	22.6d	03-Jun-14	14-Jul-14
PLE-07-5220	Review by Mississauga - EGD Receive Permit	40.0d	04-Jun-14	14-Jul-14
PLE-07-6040	GTA Receive Permit	0.0d		14-Jul-14
GTA.Schedule-2.GTA.2.S3.P.10032083	Permit WR043	66.0d	03-Jun-14	30-Sep-14

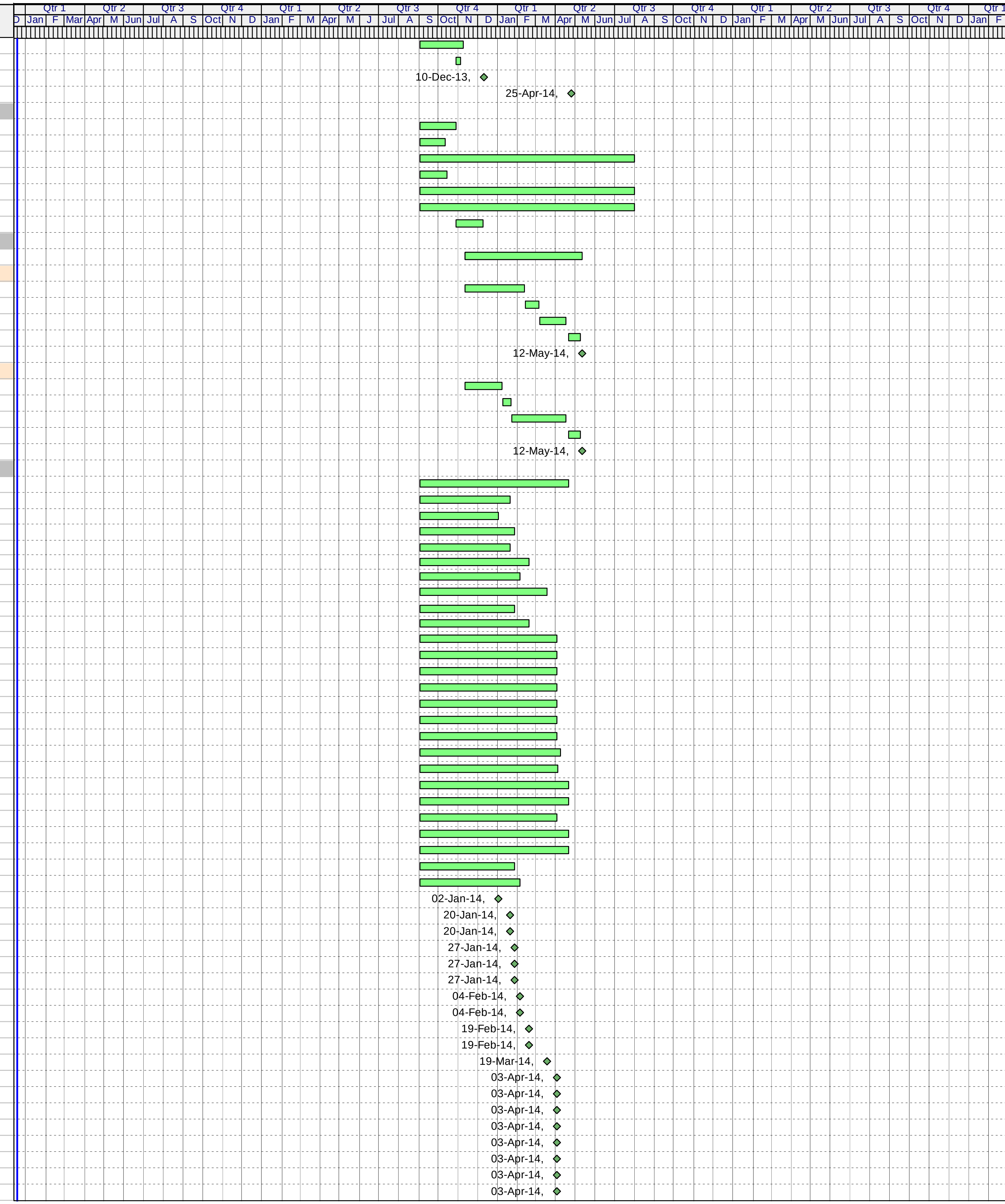


Activity ID	Activity Name	Original Duration	Start	Finish
PLE-07-3310	Receive WR043 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-3320	Receive WR043 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-3330	Receive WR043 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10032083.20 WR043 Permits - MTO		66.0d	03-Jun-14	30-Sep-14
PLE-07-3740	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3750	Summary - WR043 - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-5620	Review of Application by MTO	60.0d	13-Jun-14	30-Sep-14
PLE-07-7220	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10033989 Permit WR044		66.0d	03-Jun-14	30-Sep-14
PLE-07-3340	Receive WR044 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-3350	Receive WR044 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-3360	Receive WR044 Restoration Plan from ESP	0.0d	03-Jun-14	
PLE-07-3370	Receive WR044 Surface Water Report from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10033989.17 WR044 Permits - Metrolinx		44.6d	03-Jun-14	22-Aug-14
PLE-07-4480	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-4490	Summary - WR044 - Metrolinx	44.6d	03-Jun-14	22-Aug-14
PLE-07-4710	Receive Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-4720	Receive Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-4730	Receive Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
PLE-07-5780	Review of Application by CP Rail	23.6d	13-Jun-14	25-Jul-14
PLE-07-6130	Receive Docs by Land Dpt, sign/return	5.0d	25-Jul-14	05-Aug-14
PLE-07-6310	Final Review by CP	10.0d	05-Aug-14	22-Aug-14
PLE-07-6390	GTA Receive executed Docs	0.0d		22-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10033989.23 WR044 Permits - Conservation Halton		66.0d	03-Jun-14	30-Sep-14
PLE-07-4160	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-4170	Summary - WR044 - CH	66.0d	03-Jun-14	30-Sep-14
PLE-07-5730	Review of Application by CH	60.0d	13-Jun-14	30-Sep-14
PLE-07-7300	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10034108 Permit WR045		66.0d	03-Jun-14	30-Sep-14
PLE-07-3380	Receive WR045 Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-3390	Receive WR045 Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-3400	Receive WR045 Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
PLE-07-3410	Receive WR045 Surface Water Report from ESP	0.0d	03-Jun-14	
PLE-07-4850	Receive WR045 Restoration Plan from ESP	0.0d	03-Jun-14	
GTA.Schedule-2.GTA.2.S3.P.10034108.20 WR045 Permits - MTO		66.0d	03-Jun-14	30-Sep-14
PLE-07-3760	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-3770	Summary - WR045 - MTO	66.0d	03-Jun-14	30-Sep-14
PLE-07-5630	Review of Application by MTO	60.0d	13-Jun-14	30-Sep-14
PLE-07-7230	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10034108.23 WR045 Permits - Conservation Halton		66.0d	03-Jun-14	30-Sep-14
PLE-07-4180	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-4190	Summary - WR045 - CH	66.0d	03-Jun-14	30-Sep-14
PLE-07-5740	Review of Application by CH	60.0d	13-Jun-14	30-Sep-14
PLE-07-7310	GTA Receive Permit	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10034108.04 WR045 Permits - Halton Region		45.2d	03-Jun-14	25-Aug-14
PLE-07-4380	EGD Permitting Submit to Halton Rg & Utilities	1.0d	03-Jun-14	04-Jun-14
PLE-07-4390	Summary - WR045 - Halton Region	45.2d	03-Jun-14	25-Aug-14
PLE-07-5230	Review by Halton Rg - EGD Receive Permit	80.0d	04-Jun-14	23-Aug-14
PLE-07-6640	GTA Receive Permit	0.0d		25-Aug-14
GTA.Schedule-2.GTA.2.S3.P.10034108.11 WR045 Permits - Union Gas		66.0d	03-Jun-14	30-Sep-14
PLE-07-4520	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-4530	Summary - WR045 - Union Gas	66.0d	03-Jun-14	30-Sep-14
PLE-07-5800	Review of Application by Union Gas	45.0d	13-Jun-14	04-Sep-14
PLE-07-6740	Receive Docs by Land Dpt, sign/return	5.0d	04-Sep-14	12-Sep-14
PLE-07-6830	Final Review by Union Gas	10.0d	12-Sep-14	30-Sep-14
PLE-07-7350	GTA executed Docs	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10034108.13 WR045 Permits - TransCanada Pipeline		66.0d	03-Jun-14	30-Sep-14
PLE-07-4500	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-4510	Summary - WR045 - TransCanada Pipelines Crossing	66.0d	03-Jun-14	30-Sep-14
PLE-07-5790	Review of Application by TCPL	45.0d	13-Jun-14	04-Sep-14
PLE-07-6730	Receive Docs by Land Dpt, sign/return	5.0d	04-Sep-14	12-Sep-14
PLE-07-6820	Final Review by TCPL	10.0d	12-Sep-14	30-Sep-14
PLE-07-7340	GTA executed Docs	0.0d		30-Sep-14
GTA.Schedule-2.GTA.2.S3.P.10034108.16 WR045 Permits - HONI		44.6d	03-Jun-14	22-Aug-14
PLE-07-4540	Review Input Package, Fill application & submit	6.0d	03-Jun-14	12-Jun-14
PLE-07-4550	Summary - WR045 - CN Rails	44.6d	03-Jun-14	22-Aug-14
PLE-07-4680	Receive Dwgs from ESP	0.0d	03-Jun-14	
PLE-07-4690	Receive Geotech Report from ESP	0.0d	03-Jun-14	
PLE-07-4700	Receive Settlement Monitoring Plan from ESP	0.0d	03-Jun-14	
PLE-07-5810	Review of Application by CP Rails	23.6d	13-Jun-14	25-Jul-14
PLE-07-6140	Receive Docs by Land Dpt, sign/return	5.0d	25-Jul-14	05-Aug-14
PLE-07-6320	Final Review by CP Rails	10.0d	05-Aug-14	22-Aug-14

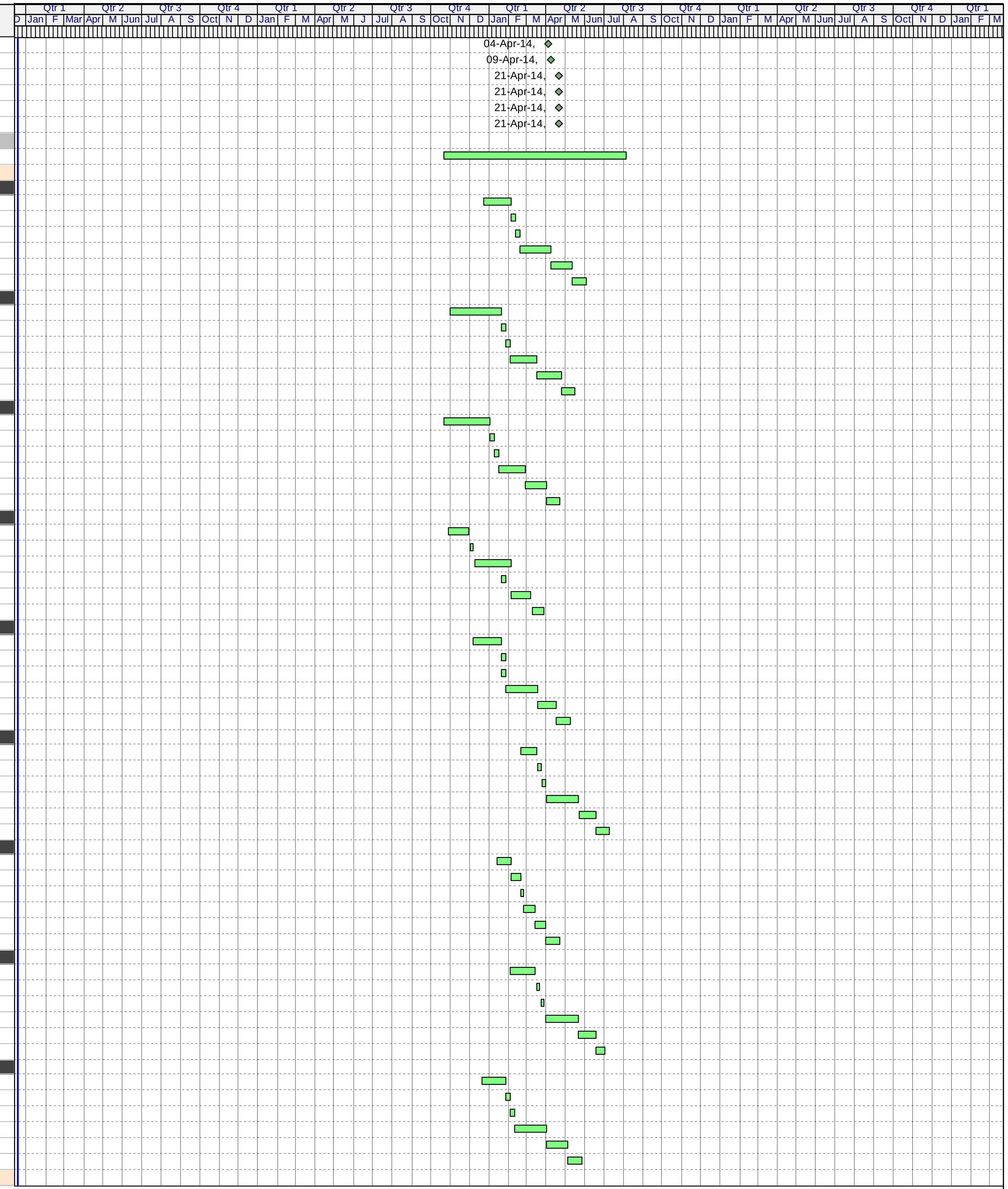
Activity ID	Activity Name	Original Duration	Start	Finish
PLE-07-6400	GTA Receive executed Docs	0.0d		22-Aug-14
GTA.Schedule-2.GTA.2.S3.O Commissioning - Spread 3		12.0d	02-Sep-15	23-Sep-15
GTA.Schedule-2.GTA.2.S3.O.001 Commissioning, Spread 3 - Commissioning, Pipeline Section A-1.2.1		12.0d	02-Sep-15	23-Sep-15
POE322012	PP - Mainline Commissioning - Spread 3	12.0d	02-Sep-15	23-Sep-15
GTA.Schedule-2.GTA.2.S3.V Enbridge Management Construction - Spread 3		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.2.S3.V.CRS Construction Management Team - Spread 3, Construction Managem		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.2.S3.V.CRS.01 Construction Management Team - Spread 3, Construction Mana		174.8d	01-Dec-14	15-Oct-15
A13560	PP - Construction Manager	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.2.S3.V.CRS.05 Construction Management Team - Spread 3, Environment Inspe		174.8d	01-Dec-14	15-Oct-15
A13650	PP - Environmental Inspection	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.2.S3.R Engineering - Spread 3		125.6d	11-Feb-13	26-Sep-13
GTA.Schedule-2.GTA.2.S3.R.GEO Engineering - Spread 3, Geotechnical		104.8d	11-Feb-13	20-Aug-13
PRT-1080	SP3 Field Work Prep.	12.0d	11-Feb-13	05-Mar-13
PRT-1150	Geotechnical Investigations	92.8d	05-Mar-13	20-Aug-13
GTA.Schedule-2.GTA.2.S3.R.LOC Engineering - Spread 3, Locates		92.8d	05-Mar-13	20-Aug-13
PRT-1170	Subsurface Utility Engineering	92.8d	05-Mar-13	20-Aug-13
GTA.Schedule-2.GTA.2.S3.R.RBB Unknown		125.6d	11-Feb-13	26-Sep-13
GTA.Schedule-2.GTA.2.S3.R.RBB.04 Engineering - Spread 3, Detailed Design Engineering - Detailed		121.2d	11-Feb-13	18-Sep-13
PRT-1090	Metrolinx 1 90% Design	108.0d	11-Feb-13	26-Aug-13
PRT-1270	SP3 PFE HDD DED (IFB)	50.4d	18-Jun-13	18-Sep-13
GTA.Schedule-2.GTA.2.S3.R.RBB.05 Engineering - Spread 3, Detailed Design Engineering - 3rd Part		92.8d	04-Mar-13	19-Aug-13
PRT-1140	SP3 PFE DED (IFD)	92.8d	04-Mar-13	19-Aug-13
GTA.Schedule-2.GTA.2.S3.R.RBB.01 Engineering - Spread 3, Detailed Design Engineering - Project I		125.6d	11-Feb-13	26-Sep-13
PRT-1050	SP3 PFE Project Management	125.6d	11-Feb-13	26-Sep-13
GTA.Schedule-2.GTA.2.S3.R.SUR Engineering - Spread 3, Survey		92.8d	05-Mar-13	20-Aug-13
PRT-1160	Topographic Survey	92.8d	05-Mar-13	20-Aug-13
GTA.Schedule-2.GTA.2.S3.R.HDD Engineering - Spread 3, HDD		42.4d	10-Jun-13	26-Aug-13
PRT-1260	SP3 PFE HDD 90% DED (IFR)	42.4d	10-Jun-13	26-Aug-13
GTA.Schedule-2.GTA.2.S4 Spread 4 - Parkway West to Parkway Cons		105.6d	07-Mar-14	15-Sep-14
GTA.Schedule-2.GTA.2.S4.M Material Procurement - Spread 4		105.6d	07-Mar-14	15-Sep-14
GTA.Schedule-2.GTA.2.S4.M.P001 Pipe - Evraz		105.6d	07-Mar-14	15-Sep-14
GTA.Schedule-2.GTA.2.S4.M.P001.01 Spread 4 - 36 Inches ML Pipe		105.6d	07-Mar-14	15-Sep-14
PME16360	Fab & Deliver NPS 36X17.5mm Pipes ML SP4	105.6d	07-Mar-14	15-Sep-14
GTA.Schedule-2.GTA.2.S4.M.P001.02 Spread 4 - 36 Inches Track Bore Pipe		105.6d	07-Mar-14	15-Sep-14
PME16370	Fab & Deliver NPS 36X17.5mm Pipes TB SP4	105.6d	07-Mar-14	15-Sep-14
GTA.Schedule-2.GTA.2.S4.M.X003 Spread 4 - Shop Inspection		60.0d	07-Mar-14	23-Jun-14
PME15030	SP4 - Shop Inspection	60.0d	07-Mar-14	23-Jun-14
GTA.Schedule-2.GTA.4 STATIONS		606.5d	11-Feb-13	02-Mar-16
GTA.Schedule-2.GTA.4.00 Stations Milestones		94.1d	09-Apr-15	09-Jul-15
GTA.Schedule-2.GTA.4.00.2 Finish Milestones		94.1d	09-Apr-15	09-Jul-15
SWO252300	Parkway Cons Bypass Station - Construction Complete	0.0d		09-Apr-15
SWO252370	Buttonville Meter Station - Construction Complete	0.0d		02-Jun-15
SWO252400	Parkway West Gate - Construction Complete	0.0d		04-Jun-15
SWO252410	Albion Road Station - Construction Complete	0.0d		24-Jun-15
SWO252420	Spread 3 - Facilities Construction Complete	0.0d		24-Jun-15
SWO252430	Spread 2 - Facilities Construction Complete	0.0d		30-Jun-15
SWO252440	Keele-CNR Feeder Station - Construction Complete	0.0d		30-Jun-15
SWO252450	Spread 1 - Facilities Construction Complete	0.0d		09-Jul-15
SWO252460	Jonesville Eglington Meter Station - Construction Complete	0.0d		09-Jul-15
GTA.Schedule-2.GTA.4.P0 Station 0		511.8d	31-Jul-13	02-Mar-16
GTA.Schedule-2.GTA.4.P0.P Permits - Station 0		106.4d	23-Jun-14	02-Jan-15
SLE2301	PP Summary - Permits Stations	106.4d	23-Jun-14	02-Jan-15
GTA.Schedule-2.GTA.4.P0.R Engineering - All Stations		184.4d	03-Sep-13	08-Aug-14
GTA.Schedule-2.GTA.4.P0.R.RBB Detailed Design Engineering - All Stations		184.4d	03-Sep-13	08-Aug-14
GTA.Schedule-2.GTA.4.P0.R.RBB.000 Facilities DED Key Milestones		184.4d	03-Sep-13	08-Aug-14
KM1000	Project Kick Off	0.0d	03-Sep-13	
KM1010	30% Design Review Package Issued	0.0d		11-Nov-13
KM1130	Issue DBM Rev (B)	0.0d		11-Nov-13
KM1020	30% Design Review Meeting	0.0d		26-Nov-13
KM1080	Client 30% Audit	0.0d		16-Jan-14
KM1030	60% Design Review Package Issued	0.0d		19-Feb-14
KM1110	60% Design Review Meeting	0.0d		07-Mar-14
KM1040	HAZOP Review Meeting	0.0d		14-Mar-14
KM1050	90% Design Review Package Issued	0.0d		26-Mar-14
KM1120	90% Design Review Meeting	0.0d		10-Apr-14
KM1140	Client 90% Audit	0.0d		05-May-14
KM1060	IFB Package Issued	0.0d		16-May-14
KM1070	IFC Package Issued	0.0d		20-Jun-14
JVFC100	Turn Over Package	2.4d	05-Aug-14	08-Aug-14
KM1100	Turn Over Package	0.0d		08-Aug-14
GTA.Schedule-2.GTA.4.P0.R.RBB.000.2 Enbridge Activities		127.2d	03-Sep-13	25-Apr-14



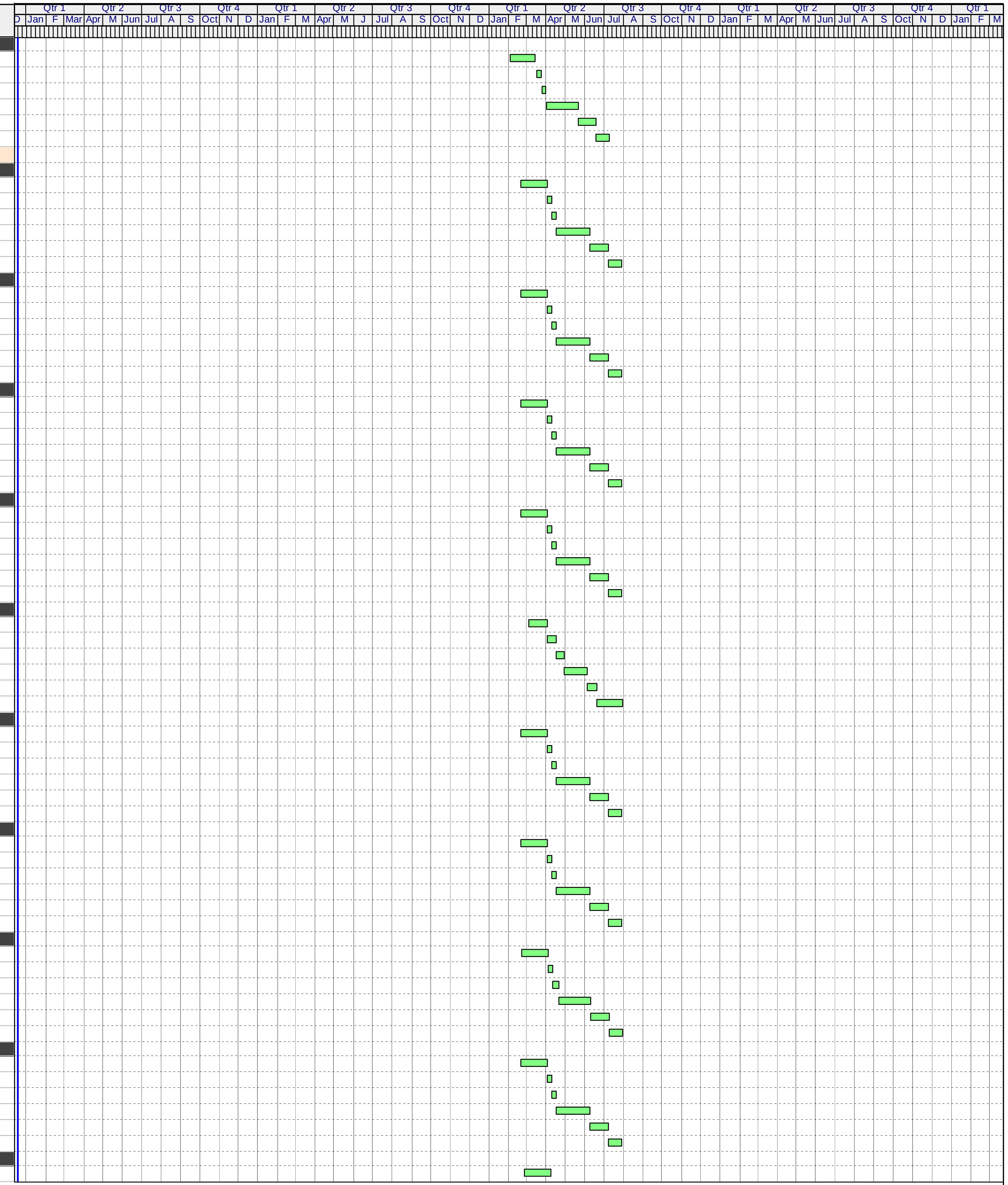
Activity ID	Activity Name	Original Duration	Start	Finish
CA1000	Technical Specifications Review (Design & Construction)	38.4d	03-Sep-13	08-Nov-13
CA1100	DBM Approval	4.0d	29-Oct-13	04-Nov-13
CA1010	30% Client Audit	0.0d		10-Dec-13
CA1210	90% Client Audit	0.0d		25-Apr-14
GTA.Schedule-2.GTA.4.P0.R.RBB.001 Station 0 - Project Overhead		181.6d	03-Sep-13	01-Aug-14
PM1010	Finalize DBM Document	31.2d	03-Sep-13	28-Oct-13
PM1000	Finalize PEP Document	23.2d	03-Sep-13	11-Oct-13
WBS450	Facility - Project Overhead	181.6d	03-Sep-13	01-Aug-14
PM1030	Review and Update FEED Package	24.0d	03-Sep-13	15-Oct-13
WBS455	Facility - Project Overhead - 140	181.6d	03-Sep-13	01-Aug-14
PM1040	Project Overhead	181.6d	03-Sep-13	01-Aug-14
PM1020	Finalize Engineering Manhour Estimate	24.0d	29-Oct-13	09-Dec-13
GTA.Schedule-2.GTA.4.P0.R.RBB.002 Station 0 - Scope of Work Documents (SOW)/Design Basis Me		96.8d	12-Nov-13	12-May-14
WBS100	Facilities - Scope of Work Documents (SOW)/Design Basis Memorandum (DBM)	96.8d	12-Nov-13	12-May-14
GTA.Schedule-2.GTA.4.P0.R.RBB.002.6 Contract Bid/Eval/Award		96.8d	12-Nov-13	12-May-14
JVCC120	Prepare Facilities SOW Package	48.0d	12-Nov-13	12-Feb-14
JVCC130	Facilities SOW Client Review	12.0d	13-Feb-14	06-Mar-14
JVCC160	Prepare Construction Bid Dwg Package	24.0d	07-Mar-14	17-Apr-14
JVCC180	RFP Client Review	12.0d	21-Apr-14	09-May-14
JVCC190	Construction Contract Award	0.0d		12-May-14
GTA.Schedule-2.GTA.4.P0.R.RBB.002.2 Facilities Pre-Fab Contract Bid/Eval/Award		96.8d	12-Nov-13	12-May-14
JVCC100	Prepare Fab Work SOW Package	28.0d	12-Nov-13	08-Jan-14
JVCC110	Fab Work SOW Client Review	8.0d	09-Jan-14	22-Jan-14
JVCC170	Prepare Pre-Fab Bid Dwg Package	48.0d	23-Jan-14	17-Apr-14
JVCC210	RFP Client Review	12.0d	21-Apr-14	09-May-14
JVCC220	Pre-Fab Award	0.0d		12-May-14
GTA.Schedule-2.GTA.4.P0.R.RBB.003 Station 0 - Technical Specifications		123.6d	03-Sep-13	21-Apr-14
WBS110	Facilities - Technical Specifications	123.6d	03-Sep-13	21-Apr-14
TS1-A1	Plug Valves c/w Actuators Specifications	73.2d	03-Sep-13	20-Jan-14
TS1-A10	Ball Valves c/w Actuators Specifications	63.6d	03-Sep-13	02-Jan-14
TS1-A30	Heat Exchangers Specifications	77.2d	03-Sep-13	27-Jan-14
TS1-A40	Odourant Package Specifications	73.2d	03-Sep-13	20-Jan-14
TS1-A60	Auxiliary Valves Specifications	90.0d	03-Sep-13	19-Feb-14
TS1-A70	Flanges & Fittings Specifications	82.0d	03-Sep-13	04-Feb-14
TS1-A80	HVAC Specifications	106.0d	03-Sep-13	19-Mar-14
TS1-A90	PRV & Actuators Specifications	77.2d	03-Sep-13	27-Jan-14
TS1-A100	Precast Concrete Building Specifications	90.0d	03-Sep-13	19-Feb-14
TS1-A110	MCC Specifications	114.8d	03-Sep-13	03-Apr-14
TS1-A120	UPS Specifications	114.8d	03-Sep-13	03-Apr-14
TS1-A130	Transformers Specifications	114.8d	03-Sep-13	03-Apr-14
TS1-A140	Contactor Panels Specifications	114.8d	03-Sep-13	03-Apr-14
TS1-A150	RTU Specifications	114.8d	03-Sep-13	03-Apr-14
TS1-A160	MCC Specifications	114.8d	03-Sep-13	03-Apr-14
TS1-A170	TEG Specifications	114.8d	03-Sep-13	03-Apr-14
TS1-A180	Emergency Generator Specifications	118.0d	03-Sep-13	09-Apr-14
TS1-A190	Concrete Trench Specifications	115.6d	03-Sep-13	04-Apr-14
TS1-A200	Annubar Specifications	123.6d	03-Sep-13	21-Apr-14
TS1-A210	Transmitters Specifications	123.6d	03-Sep-13	21-Apr-14
TS1-A220	Flow Computer Specifications	114.8d	03-Sep-13	03-Apr-14
TS1-A230	Gas Detection Specifications	123.6d	03-Sep-13	21-Apr-14
TS1-A240	Fire Detection Specifications	123.6d	03-Sep-13	21-Apr-14
TS1-A250	Ultrasonic Meters with Flow Conditioners Specifications	77.2d	03-Sep-13	27-Jan-14
TS1-A260	Boiler Package Specifications	82.0d	03-Sep-13	04-Feb-14
TS110	Ball Valves c/w Actuators Specifications	0.0d		02-Jan-14
TS100	Plug Valves c/w Actuators Specifications	0.0d		20-Jan-14
TS140	Odourant Package Specifications	0.0d		20-Jan-14
TS130	Heat Exchangers Specifications	0.0d		27-Jan-14
TS290	PRV & Actuators Specifications	0.0d		27-Jan-14
TS370	Ultrasonic Meters with Flow Conditioners Specifications	0.0d		27-Jan-14
TS180	Flanges & Fittings Specifications	0.0d		04-Feb-14
TS470	Boiler Package Specifications	0.0d		04-Feb-14
TS160	Auxiliary Valves Specifications	0.0d		19-Feb-14
TS210	Precast Concrete Building Specifications	0.0d		19-Feb-14
TS200	HVAC Specifications	0.0d		19-Mar-14
TS250	MCC Specifications	0.0d		03-Apr-14
TS260	UPS Specifications	0.0d		03-Apr-14
TS270	Transformers Specifications	0.0d		03-Apr-14
TS450	Contactor Panels Specifications	0.0d		03-Apr-14
TS430	RTU Specifications	0.0d		03-Apr-14
TS410	MCC Specifications	0.0d		03-Apr-14
TS420	TEG Specifications	0.0d		03-Apr-14
TS340	Flow Computer Specifications	0.0d		03-Apr-14



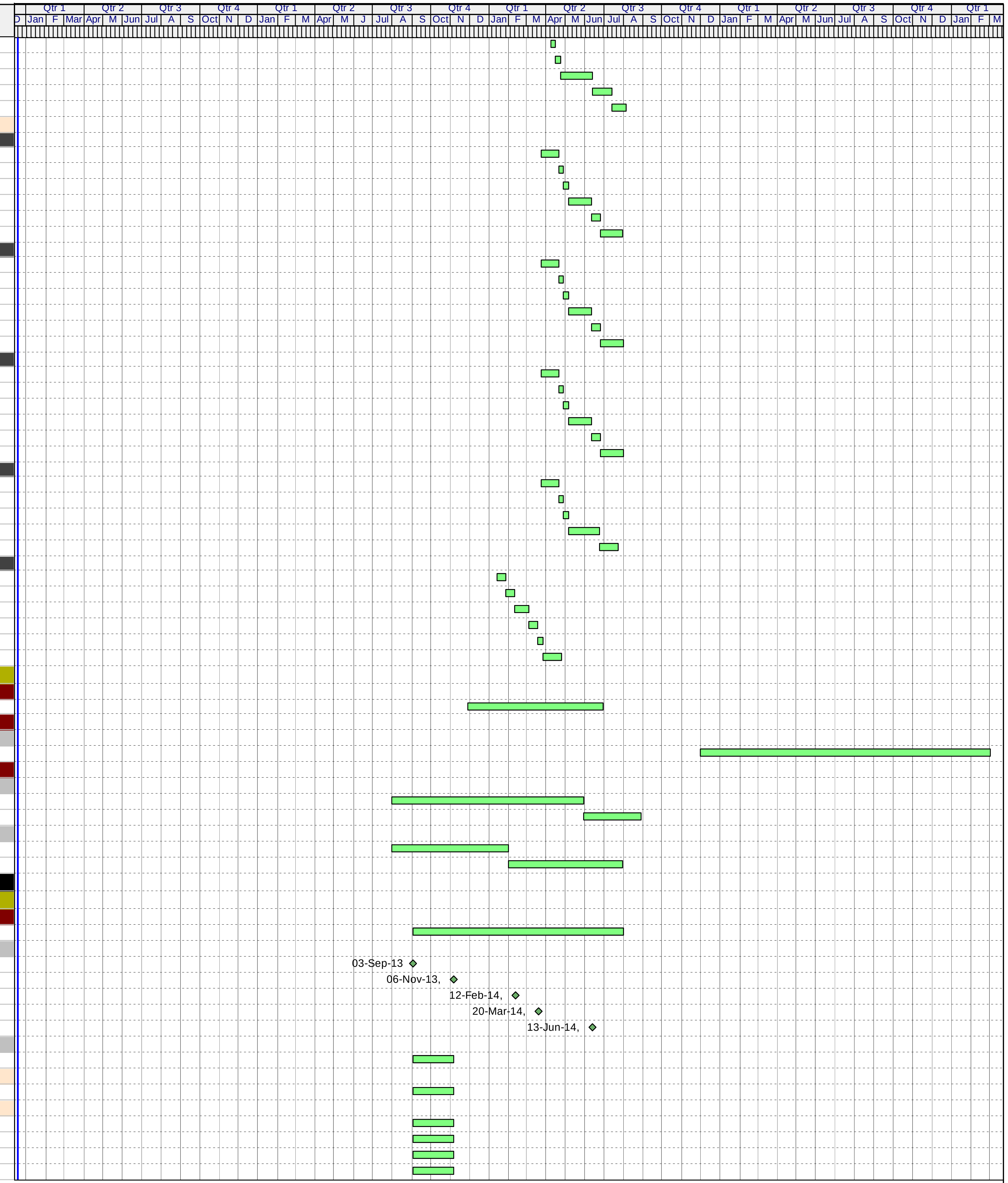
Activity ID	Activity Name	Original Duration	Start	Finish
TS460	Concrete Trench Specifications	0.0d		04-Apr-14
TS440	Emergency Generator Specifications	0.0d		09-Apr-14
TS320	Annubar Specifications	0.0d		21-Apr-14
TS330	Transmitters Specifications	0.0d		21-Apr-14
TS350	Gas Detection Specifications	0.0d		21-Apr-14
TS360	Fire Detection Specifications	0.0d		21-Apr-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012 Station 0 - Material Requisitions		154.8d	22-Oct-13	05-Aug-14
WBS440	Facilities - Procurement MRs	154.8d	22-Oct-13	05-Aug-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.1 Mechanical Equipment		141.6d	22-Oct-13	10-Jul-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.1.4 Boiler Package		84.8d	23-Dec-13	03-Jun-14
PMEC22	MR Prep and IFR	19.2d	23-Dec-13	04-Feb-14
PMEC22	MR Client Review	4.0d	04-Feb-14	11-Feb-14
PMEC22	Incorp Comments and IFQ	4.0d	11-Feb-14	19-Feb-14
PMEC22	Enbridge RFQ Issued - Bid Closing	28.0d	19-Feb-14	09-Apr-14
PMEC23	TBE issued to Enbridge	17.6d	09-Apr-14	12-May-14
PMEC23	MR Issued to Enbridge for Award(IFA)	12.0d	12-May-14	03-Jun-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.1.2 Plug Valves c/w Actuators		106.0d	31-Oct-13	16-May-14
PMEC15	MR Prep and IFR	40.4d	31-Oct-13	20-Jan-14
PMEC15	MR Client Review	4.0d	20-Jan-14	27-Jan-14
PMEC15	Incorp Comments and IFQ	4.0d	27-Jan-14	03-Feb-14
PMEC15	Enbridge RFQ Issued - Bid Closing	23.2d	03-Feb-14	17-Mar-14
PMEC15	TBE issued to Enbridge	22.4d	17-Mar-14	25-Apr-14
PMEC15	MR Issued to Enbridge for Award(IFA)	12.0d	25-Apr-14	16-May-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.1.1 Ball Valves c/w Actuators		98.0d	22-Oct-13	23-Apr-14
PMEC14	MR Prep and IFR	36.4d	22-Oct-13	02-Jan-14
PMEC14	MR Client Review	4.0d	02-Jan-14	09-Jan-14
PMEC15	Incorp Comments and IFQ	4.0d	09-Jan-14	16-Jan-14
PMEC15	Enbridge RFQ Issued - Bid Closing	23.2d	16-Jan-14	27-Feb-14
PMEC15	TBE issued to Enbridge	18.4d	27-Feb-14	01-Apr-14
PMEC15	MR Issued to Enbridge for Award(IFA)	12.0d	01-Apr-14	23-Apr-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.1.14 Heat Exchanger		80.8d	29-Oct-13	28-Mar-14
PMEC22	MR Prep and IFR	19.2d	29-Oct-13	29-Nov-13
PMEC22	Incorp Comments and IFQ	4.0d	02-Dec-13	06-Dec-13
PMEC22	Enbridge RFQ Issued - Bid Closing	28.0d	09-Dec-13	04-Feb-14
PMEC22	MR Client Review	4.0d	20-Jan-14	27-Jan-14
PMEC22	TBE issued to Enbridge	17.6d	05-Feb-14	07-Mar-14
PMEC22	MR Issued to Enbridge for Award(IFA)	12.0d	10-Mar-14	28-Mar-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.1.15 Odourant Package		80.8d	06-Dec-13	09-May-14
PMEC17	MR Prep and IFR	19.2d	06-Dec-13	20-Jan-14
PMEC17	MR Client Review	4.0d	20-Jan-14	27-Jan-14
PMEC18	Incorp Comments and IFQ	4.0d	20-Jan-14	27-Jan-14
PMEC18	Enbridge RFQ Issued - Bid Closing	28.0d	27-Jan-14	18-Mar-14
PMEC18	TBE issued to Enbridge	17.6d	18-Mar-14	17-Apr-14
PMEC18	MR Issued to Enbridge for Award(IFA)	12.0d	17-Apr-14	09-May-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.1.5 Auxiliary Valves		78.4d	20-Feb-14	10-Jul-14
PMEC20	MR Prep and IFR	14.4d	20-Feb-14	17-Mar-14
PMEC20	MR Client Review	4.0d	18-Mar-14	24-Mar-14
PMEC20	Incorp Comments and IFQ	4.0d	25-Mar-14	31-Mar-14
PMEC20	Enbridge RFQ Issued - Bid Closing	28.8d	01-Apr-14	22-May-14
PMEC20	TBE issued to Enbridge	15.2d	23-May-14	18-Jun-14
PMEC20	MR Issued to Enbridge for Award(IFA)	12.0d	19-Jun-14	10-Jul-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.1.10 Pipe, Fittings, and Flanges - Long Leads (Required for Fabr		55.2d	13-Jan-14	22-Apr-14
PMEC19	MR Prep and IFR	12.8d	13-Jan-14	04-Feb-14
PMEC19	MR Client Review	8.8d	04-Feb-14	20-Feb-14
PMEC19	Incorp Comments and IFQ	1.6d	20-Feb-14	24-Feb-14
PMEC19	Enbridge RFQ Issued - Bid Closing	11.2d	24-Feb-14	14-Mar-14
PMEC20	TBE issued to Enbridge	8.8d	14-Mar-14	31-Mar-14
PMEC20	MR Issued to Enbridge for Award(IFA)	12.0d	31-Mar-14	22-Apr-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.1.16 HVAC		84.0d	03-Feb-14	03-Jul-14
PMEC21	MR Prep and IFR	23.2d	03-Feb-14	14-Mar-14
PMEC21	MR Client Review	4.0d	17-Mar-14	21-Mar-14
PMEC21	Incorp Comments and IFQ	4.0d	24-Mar-14	28-Mar-14
PMEC21	Enbridge RFQ Issued - Bid Closing	28.8d	31-Mar-14	21-May-14
PMEC21	TBE issued to Enbridge	16.0d	22-May-14	18-Jun-14
PMEC21	MR Issued to Enbridge for Award(IFA)	8.0d	19-Jun-14	03-Jul-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.1.3 PRV & Actuators		81.6d	20-Dec-13	27-May-14
PE&I1600	MR Prep and IFR	15.2d	20-Dec-13	27-Jan-14
PE&I1610	MR Client Review	4.0d	27-Jan-14	03-Feb-14
PE&I1620	Incorp Comments and IFQ	4.0d	03-Feb-14	10-Feb-14
PE&I1630	Enbridge RFQ Issued - Bid Closing	28.8d	10-Feb-14	02-Apr-14
PE&I1640	TBE issued to Enbridge	17.6d	02-Apr-14	05-May-14
PE&I1650	MR Issued to Enbridge for Award(IFA)	12.0d	05-May-14	27-May-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.2 Civil Equipment / Building		88.0d	03-Feb-14	10-Jul-14



Activity ID	Activity Name	Original Duration	Start	Finish
GTA.Schedule-2.GTA.4.P0.R.RBB.012.2.1 Precast Concrete Building		88.0d	03-Feb-14	10-Jul-14
PCIV1000	MR Prep and IFR	23.2d	03-Feb-14*	14-Mar-14
PCIV1010	MR Client Review	4.8d	17-Mar-14	24-Mar-14
PCIV1020	Incorp Comments and IFQ	4.0d	25-Mar-14	31-Mar-14
PCIV1030	Enbridge RFQ Issued - Bid Closing	28.0d	01-Apr-14	21-May-14
PCIV1040	TBE issued to Enbridge	16.0d	22-May-14	18-Jun-14
PCIV1050	MR Issued to Enbridge for Award(IFA)	12.0d	19-Jun-14	10-Jul-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.3 Electrical Equipment		91.2d	20-Feb-14	05-Aug-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.3.8 MCCs		88.0d	20-Feb-14	29-Jul-14
PE&I1180	MR Prep and IFR	24.0d	20-Feb-14	03-Apr-14
PE&I1190	MR Client Review	4.0d	03-Apr-14	10-Apr-14
PE&I1200	Incorp Comments and IFQ	4.0d	10-Apr-14	17-Apr-14
PE&I1210	Enbridge RFQ Issued - Bid Closing	28.0d	17-Apr-14	09-Jun-14
PE&I1220	TBE issued to Enbridge	16.0d	09-Jun-14	08-Jul-14
PE&I1230	MR Issued to Enbridge for Award (IFA)	12.0d	08-Jul-14	29-Jul-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.3.2 ATS		88.0d	20-Feb-14	29-Jul-14
PE&I2610	MR Prep and IFR	24.0d	20-Feb-14	03-Apr-14
PE&I2620	MR Client Review	4.0d	03-Apr-14	10-Apr-14
PE&I2630	Incorp Comments and IFQ	4.0d	10-Apr-14	17-Apr-14
PE&I2640	Enbridge RFQ Issued - Bid Closing	28.0d	17-Apr-14	09-Jun-14
PE&I2650	TBE issued to Enbridge	16.0d	09-Jun-14	08-Jul-14
PE&I2660	MR Issued to Enbridge for Award(IFA)	12.0d	08-Jul-14	29-Jul-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.3.13 UPS		88.0d	20-Feb-14	29-Jul-14
PE&I1240	MR Prep and IFR	24.0d	20-Feb-14	03-Apr-14
PE&I1250	MR Client Review	4.0d	03-Apr-14	10-Apr-14
PE&I1260	Incorp Comments and IFQ	4.0d	10-Apr-14	17-Apr-14
PE&I1270	Enbridge RFQ Issued - Bid Closing	28.0d	17-Apr-14	09-Jun-14
PE&I1280	TBE issued to Enbridge	16.0d	09-Jun-14	08-Jul-14
PE&I290	MR Issued to Enbridge for Award(IFA)	12.0d	08-Jul-14	29-Jul-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.3.4 Transformers		88.0d	20-Feb-14	29-Jul-14
PE&I2670	MR Prep and IFR	24.0d	20-Feb-14	03-Apr-14
PE&I2680	MR Client Review	4.0d	03-Apr-14	10-Apr-14
PE&I2690	Incorp Comments and IFQ	4.0d	10-Apr-14	17-Apr-14
PE&I2700	Enbridge RFQ Issued - Bid Closing	28.0d	17-Apr-14	09-Jun-14
PE&I2710	TBE issued to Enbridge	16.0d	09-Jun-14	08-Jul-14
PE&I2720	MR Issued to Enbridge for Award(IFA)	12.0d	08-Jul-14	29-Jul-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.3.7 Flow Computer		81.6d	05-Mar-14	30-Jul-14
PE&I2320	MR Prep and IFR	16.8d	05-Mar-14	03-Apr-14
PE&I2330	MR Client Review	8.0d	03-Apr-14	17-Apr-14
PE&I2340	Incorp Comments and IFQ	6.4d	17-Apr-14	30-Apr-14
PE&I2350	Enbridge RFQ Issued - Bid Closing	20.0d	30-Apr-14	05-Jun-14
PE&I2360	TBE issued to Enbridge	8.8d	05-Jun-14	20-Jun-14
PE&I2370	MR Issued to Enbridge for Award(IFA)	21.6d	20-Jun-14	30-Jul-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.3.3 TEG Unit		88.0d	20-Feb-14	29-Jul-14
PE&I2730	MR Prep and IFR	24.0d	20-Feb-14	03-Apr-14
PE&I2740	MR Client Review	4.0d	03-Apr-14	10-Apr-14
PE&I2750	Incorp Comments and IFQ	4.0d	10-Apr-14	17-Apr-14
PE&I2760	Enbridge RFQ Issued - Bid Closing	28.0d	17-Apr-14	09-Jun-14
PE&I2770	TBE issued to Enbridge	16.0d	09-Jun-14	08-Jul-14
PE&I2780	MR Issued to Enbridge for Award(IFA)	12.0d	08-Jul-14	29-Jul-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.3.11 Contactor Panel		88.0d	20-Feb-14	29-Jul-14
PE&I2910	MR Prep and IFR	24.0d	20-Feb-14	03-Apr-14
PE&I2920	MR Client Review	4.0d	03-Apr-14	10-Apr-14
PE&I2930	Incorp Comments and IFQ	4.0d	10-Apr-14	17-Apr-14
PE&I2940	Enbridge RFQ Issued - Bid Closing	28.0d	17-Apr-14	09-Jun-14
PE&I2950	TBE issued to Enbridge	16.0d	09-Jun-14	08-Jul-14
PE&I2960	MR Issued to Enbridge for Award(IFA)	12.0d	08-Jul-14	29-Jul-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.3.6 Concrete Trench		88.0d	21-Feb-14	30-Jul-14
PE&I2970	MR Prep and IFR	24.0d	21-Feb-14	04-Apr-14
PE&I2980	MR Client Review	4.0d	04-Apr-14	11-Apr-14
PE&I2990	Incorp Comments and IFQ	4.0d	11-Apr-14	21-Apr-14
PE&I3000	Enbridge RFQ Issued - Bid Closing	28.0d	21-Apr-14	10-Jun-14
PE&I3010	TBE issued to Enbridge	16.0d	10-Jun-14	09-Jul-14
PE&I3020	MR Issued to Enbridge for Award(IFA)	12.0d	09-Jul-14	30-Jul-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.3.1 RTU Panels		88.0d	20-Feb-14	29-Jul-14
PE&I2790	MR Prep and IFR	24.0d	20-Feb-14	03-Apr-14
PE&I2800	MR Client Review	4.0d	03-Apr-14	10-Apr-14
PE&I2810	Incorp Comments and IFQ	4.0d	10-Apr-14	17-Apr-14
PE&I2820	Enbridge RFQ Issued - Bid Closing	28.0d	17-Apr-14	09-Jun-14
PE&I2830	TBE issued to Enbridge	16.0d	09-Jun-14	08-Jul-14
PE&I2840	MR Issued to Enbridge for Award(IFA)	12.0d	08-Jul-14	29-Jul-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.3.5 Emergency Generator		88.0d	26-Feb-14	05-Aug-14
PE&I2850	MR Prep and IFR	24.0d	26-Feb-14	09-Apr-14

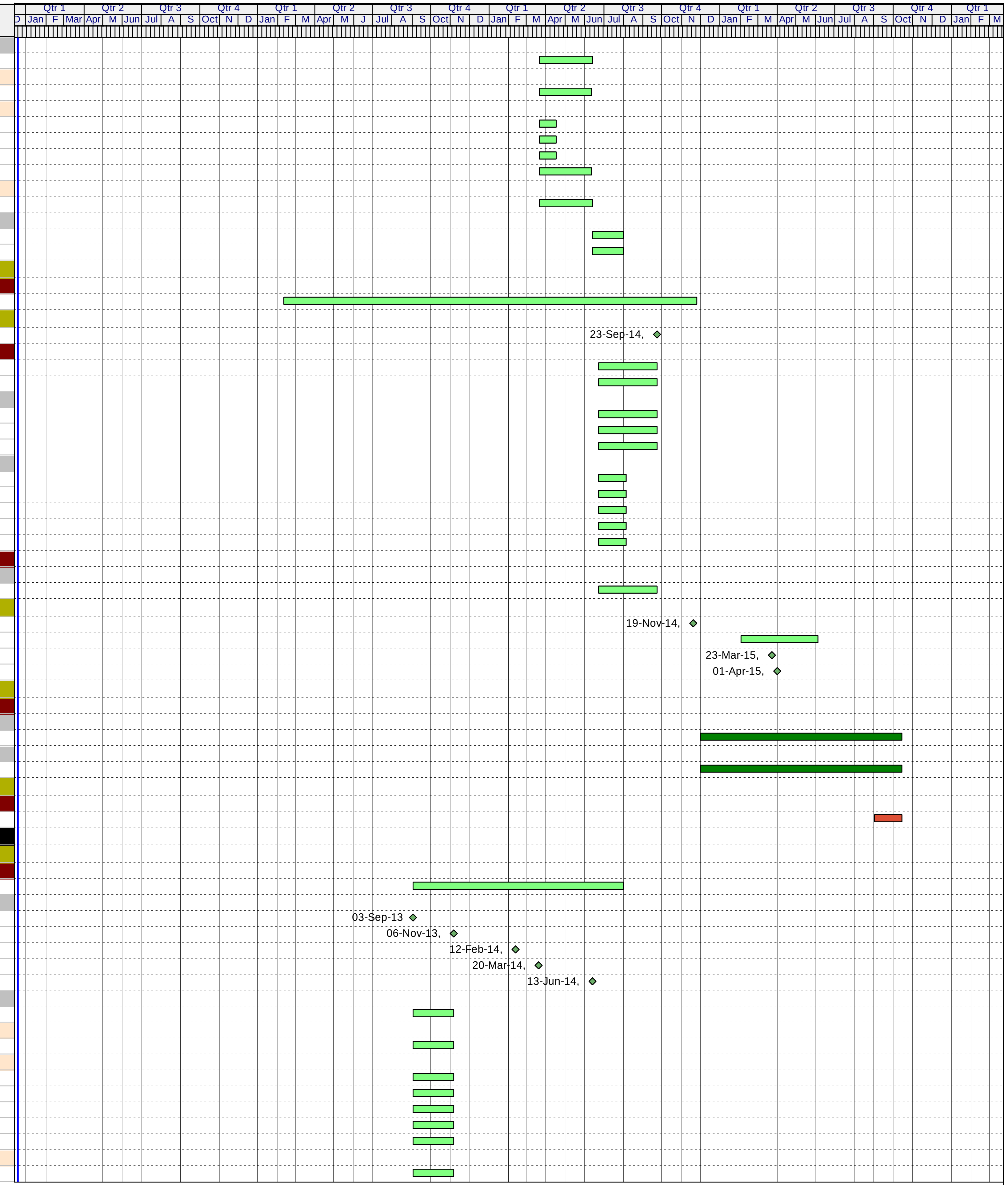


Activity ID	Activity Name	Original Duration	Start	Finish
PE&I2860	MR Client Review	4.0d	09-Apr-14	16-Apr-14
PE&I2870	Incorp Comments and IFQ	4.0d	16-Apr-14	24-Apr-14
PE&I2880	Enbridge RFQ Issued - Bid Closing	28.0d	24-Apr-14	13-Jun-14
PE&I2890	TBE issued to Enbridge	16.0d	13-Jun-14	14-Jul-14
PE&I2900	MR Issued to Enbridge for Award(IFA)	12.0d	14-Jul-14	05-Aug-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.4 Instrumentation & Control Equipment		112.0d	13-Jan-14	01-Aug-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.4.6 Annubar Meters		72.0d	24-Mar-14	31-Jul-14
PE&I2380	MR Prep and IFR	15.2d	24-Mar-14	21-Apr-14
PE&I2390	MR Client Review	4.0d	21-Apr-14	28-Apr-14
PE&I2400	Incorp Comments and IFQ	4.8d	28-Apr-14	06-May-14
PE&I2410	Enbridge RFQ Issued - Bid Closing	20.0d	06-May-14	11-Jun-14
PE&I2420	TBE issued to Enbridge	8.0d	11-Jun-14	25-Jun-14
PE&I2430	MR Issued to Enbridge for Award(IFA)	20.0d	25-Jun-14	31-Jul-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.4.3 Transmitters (PDIT, PIT, TIT/TE/TW)		72.8d	24-Mar-14	01-Aug-14
PE&I2440	MR Prep and IFR	15.2d	24-Mar-14	21-Apr-14
PE&I2450	MR Client Review	4.0d	21-Apr-14	28-Apr-14
PE&I2460	Incorp Comments and IFQ	5.6d	28-Apr-14	07-May-14
PE&I2470	Enbridge RFQ Issued - Bid Closing	20.0d	07-May-14	12-Jun-14
PE&I2480	TBE issued to Enbridge	8.0d	12-Jun-14	26-Jun-14
PE&I2490	MR Issued to Enbridge for Award(IFA)	20.0d	26-Jun-14	01-Aug-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.4.7 Gas Detection		72.8d	24-Mar-14	01-Aug-14
PE&I2500	MR Prep and IFR	15.2d	24-Mar-14	21-Apr-14
PE&I2510	MR Client Review	4.0d	21-Apr-14	28-Apr-14
PE&I520	Incorp Comments and IFQ	5.6d	28-Apr-14	07-May-14
PE&I2530	Enbridge RFQ Issued - Bid Closing	20.0d	07-May-14	12-Jun-14
PE&I2540	TBE issued to Enbridge	8.0d	12-Jun-14	26-Jun-14
PE&I2550	MR Issued to Enbridge for Award(IFA)	20.0d	26-Jun-14	01-Aug-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.4.5 Fire Detection		67.2d	24-Mar-14	23-Jul-14
PE&I2560	MR Prep and IFR	15.2d	24-Mar-14	21-Apr-14
PE&I2570	MR Client Review	4.0d	21-Apr-14	28-Apr-14
PE&I2580	Incorp Comments and IFQ	5.6d	28-Apr-14	07-May-14
PE&I2590	Enbridge RFQ Issued - Bid Closing	26.4d	07-May-14	24-Jun-14
PE&I2600	TBE issued to Enbridge	16.0d	24-Jun-14	23-Jul-14
GTA.Schedule-2.GTA.4.P0.R.RBB.012.4.4 Ultrasonic Meters with Flow Conditioners		57.6d	13-Jan-14	25-Apr-14
PE&I2200	MR Prep and IFR	8.0d	13-Jan-14	27-Jan-14
PE&I2210	MR Client Review	8.0d	27-Jan-14	10-Feb-14
PE&I2220	Incorp Comments and IFQ	12.0d	10-Feb-14	04-Mar-14
PE&I2230	Enbridge RFQ Issued - Bid Closing	8.0d	04-Mar-14	18-Mar-14
PE&I2240	TBE issued to Enbridge	5.6d	18-Mar-14	27-Mar-14
PE&I2250	MR Issued to Enbridge for Award(IFA)	16.0d	27-Mar-14	25-Apr-14
GTA.Schedule-2.GTA.4.P0.L Station 0, Land		511.8d	31-Jul-13	02-Mar-16
GTA.Schedule-2.GTA.4.P0.L.LCO Stations, Land, Consultants		114.2d	28-Nov-13	30-Jun-14
A13760	Lands Consultancy	114.2d	28-Nov-13	30-Jun-14
GTA.Schedule-2.GTA.4.P0.L.LDA Stations, Land, Damages		247.2d	01-Dec-14	02-Mar-16
GTA.Schedule-2.GTA.4.P0.L.LDA.001 Stations, Land, Damages - Inconvenience		247.2d	01-Dec-14	02-Mar-16
A13830	Land Damages	247.2d	01-Dec-14	02-Mar-16
GTA.Schedule-2.GTA.4.P0.L.LCT Stations, Land, Compensation		213.6d	31-Jul-13	29-Aug-14
GTA.Schedule-2.GTA.4.P0.L.LCT.002 Stations, Land, Compensation - Easements		213.6d	31-Jul-13	29-Aug-14
A13820	SVT - Lands	163.2d	31-Jul-13	30-May-14
A13790	Station Easement	50.4d	30-May-14	29-Aug-14
GTA.Schedule-2.GTA.4.P0.L.LCT.006 Stations, Land, Compensation - Ancillary Acquisitions		196.8d	31-Jul-13	30-Jul-14
A13810	SVT - Lands	97.6d	31-Jul-13	31-Jan-14
A13800	Ancillaries	99.2d	31-Jan-14	30-Jul-14
GTA.Schedule-2.GTA.4.P1 Station 1 - Parkway West Station		534.1d	11-Feb-13	15-Oct-15
GTA.Schedule-2.GTA.4.P1.R Station 1, Engineering		181.6d	03-Sep-13	01-Aug-14
GTA.Schedule-2.GTA.4.P1.R.RBB Station 1 - Detailed Design Engineering		181.6d	03-Sep-13	01-Aug-14
WBS-A12670	Summary - Parkway West DED	181.6d	03-Sep-13	01-Aug-14
GTA.Schedule-2.GTA.4.P1.R.RBB.000 Station Milestones		154.4d	03-Sep-13	13-Jun-14
PWSM100	Station Kick Off	0.0d	03-Sep-13	
PWSM110	30% Design Review Package Ready for Issue	0.0d		06-Nov-13
PWSM120	60% Design Review Package Ready for Issue	0.0d		12-Feb-14
PWSM130	90% Design Review Package Ready for Issue	0.0d		20-Mar-14
PWSM140	IFC Package Ready for Issue	0.0d		13-Jun-14
GTA.Schedule-2.GTA.4.P1.R.RBB.004 Station 1 - 30 % Review: IFR		36.8d	03-Sep-13	06-Nov-13
WBS2100	30% Review - PW	36.8d	03-Sep-13	06-Nov-13
GTA.Schedule-2.GTA.4.P1.R.RBB.004.1 Civil & Structural 30% Package		36.0d	03-Sep-13	05-Nov-13
CS1260	Site Grading Plan	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P1.R.RBB.004.2 Mechanical 30% Package		36.0d	03-Sep-13	05-Nov-13
ME1400	PFDs	36.0d	03-Sep-13	05-Nov-13
ME1410	Plot Plans	36.0d	03-Sep-13	05-Nov-13
ME1420	Building Layout Drawings	36.0d	03-Sep-13	05-Nov-13
ME1430	Mechanical SOW Drawing	36.0d	03-Sep-13	05-Nov-13



Activity ID	Activity Name	Original Duration	Start	Finish
EE1810	P&IDs	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P1.R.RBB.004.3	Electrical 30% Package	36.8d	03-Sep-13	06-Nov-13
EE1800	SOW Drawing	36.8d	03-Sep-13	06-Nov-13
EE1820	Single Line Diagrams	36.0d	03-Sep-13	05-Nov-13
EE1830	Area Classification Drawings	36.0d	03-Sep-13	05-Nov-13
EE1840	Control System Network Topology Diagram	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P1.R.RBB.005	Station 1 - 60 % Review	50.4d	07-Nov-13	12-Feb-14
WBS2110	60% Review - PW	50.4d	07-Nov-13	12-Feb-14
GTA.Schedule-2.GTA.4.P1.R.RBB.005.2	Civil & Structural 60% Package	49.6d	07-Nov-13	11-Feb-14
CS1270	Review and Update SOW Drawing	49.6d	07-Nov-13	11-Feb-14
CS1280	Fencing, Site Grading, and Foundation Plans	49.6d	07-Nov-13	11-Feb-14
CS1290	Access Platform Plans/Sections	49.6d	07-Nov-13	11-Feb-14
CS1300	Pipe and Cable Tray Support Plans/Elevations	49.6d	07-Nov-13	11-Feb-14
CS1380	Foundation Details and Sections	49.6d	07-Nov-13	11-Feb-14
GTA.Schedule-2.GTA.4.P1.R.RBB.005.1	Mechanical 60% Package	49.6d	07-Nov-13	11-Feb-14
ME1440	Review and Update Mechanical SOW Drawing	49.6d	07-Nov-13	11-Feb-14
ME1450	Review and Update PFDs	49.6d	07-Nov-13	11-Feb-14
ME1460	Plot Plan	49.6d	07-Nov-13	11-Feb-14
ME1470	Review and Update Building Layout Drawings	49.6d	07-Nov-13	11-Feb-14
ME1480	Piping Plans/Sections	49.6d	07-Nov-13	11-Feb-14
ME1490	HVAC Layouts and Airflow Schematics	49.6d	07-Nov-13	11-Feb-14
EE1860	Review and Update P&IDs	49.6d	07-Nov-13	11-Feb-14
GTA.Schedule-2.GTA.4.P1.R.RBB.005.3	Electrical 60% Package	50.4d	07-Nov-13	12-Feb-14
EE1850	Review and Update SOW Drawing	50.4d	07-Nov-13	12-Feb-14
EE1870	Review and Update Single Line Diagrams	49.6d	07-Nov-13	11-Feb-14
EE1880	MCC Elevation Drawings	49.6d	07-Nov-13	11-Feb-14
EE1890	Cable, Cable Tray, and Grounding Layout Diagrams	49.6d	07-Nov-13	11-Feb-14
EE1900	Layout Plans and Sections	49.6d	07-Nov-13	11-Feb-14
EE1910	Building Layout and Sections	49.6d	07-Nov-13	11-Feb-14
EE1920	Lighting Layouts and Sections	49.6d	07-Nov-13	11-Feb-14
EE1930	Control System Network Topology Diagram	49.6d	07-Nov-13	11-Feb-14
EE1940	Control System Communication/Fibre Schematics	49.6d	07-Nov-13	11-Feb-14
EE1950	Control System Network Topology Diagram	49.6d	07-Nov-13	11-Feb-14
EE1960	Control System PLC Layouts and Details	49.6d	07-Nov-13	11-Feb-14
EE2150	Control System Communication and Chassis Layouts	49.6d	07-Nov-13	11-Feb-14
EE2170	Shutdown Key	49.6d	07-Nov-13	11-Feb-14
GTA.Schedule-2.GTA.4.P1.R.RBB.006	Station 1 - 90 % Review: IFB	20.0d	13-Feb-14	20-Mar-14
WBS2120	90% Review - PW	20.0d	13-Feb-14	20-Mar-14
GTA.Schedule-2.GTA.4.P1.R.RBB.006.3	Civil & Structural 90% Package	19.2d	13-Feb-14	19-Mar-14
CS1310	Review and Update SOW Drawing	19.2d	13-Feb-14	19-Mar-14
CS1320	Review and Update Fencing, Site Grading, and Foundation Plans	19.2d	13-Feb-14	19-Mar-14
CS1330	Review and Update Access Platform Plans/Sections (or 3D Model Review)	19.2d	13-Feb-14	19-Mar-14
CS1340	Review and Update Pipe and Cable Tray Support Plans/Elevations	19.2d	13-Feb-14	19-Mar-14
CS1350	Civil and Structural Standard Details	19.2d	13-Feb-14	19-Mar-14
CS1370	Review and Update Foundation Details and Sections	19.2d	13-Feb-14	19-Mar-14
GTA.Schedule-2.GTA.4.P1.R.RBB.006.1	Mechanical 90% Package	19.2d	13-Feb-14	19-Mar-14
ME1500	Review and Update PFDs	19.2d	13-Feb-14	19-Mar-14
ME1510	Review and Update Mech SOW Drawing	19.2d	13-Feb-14	19-Mar-14
ME1520	Review and Update Plot Plan	19.2d	13-Feb-14	19-Mar-14
ME1530	Review and Update Building Layout Drawings	19.2d	13-Feb-14	19-Mar-14
EE1980	Review and Update P&IDs	19.2d	13-Feb-14	19-Mar-14
ME1580	Review and Update Piping Plans/Sections	19.2d	13-Feb-14	19-Mar-14
ME1590	Review and Update Pipe Support Deatails	19.2d	13-Feb-14	19-Mar-14
GTA.Schedule-2.GTA.4.P1.R.RBB.006.2	Electrical 90% Package	20.0d	13-Feb-14	20-Mar-14
EE1970	Review and Update SOW Drawing	19.2d	13-Feb-14	19-Mar-14
EE1990	Review and Update Single Line Diagrams	19.2d	13-Feb-14	19-Mar-14
EE2000	Schematic Drawings	19.2d	13-Feb-14	19-Mar-14
EE2010	Panel Schedules	19.2d	13-Feb-14	19-Mar-14
EE2020	Review and Update Cable, Cable Tray, and Grounding Layout Diagrams	19.2d	13-Feb-14	19-Mar-14
EE2030	Review and Update Layout Plans and Sections	19.2d	13-Feb-14	19-Mar-14
EE2040	Review and Update Building Layout and Sections	19.2d	13-Feb-14	19-Mar-14
EE2050	Review and Update Lighting Layouts and Sections	19.2d	13-Feb-14	19-Mar-14
EE2060	Cable and Conduit Schedules	19.2d	13-Feb-14	19-Mar-14
EE2070	Heat Tracing Diagrams	19.2d	13-Feb-14	19-Mar-14
EE2080	Standard Details	19.2d	13-Feb-14	19-Mar-14
EE2090	Review and Update Control System Network Topology Diagram	19.2d	13-Feb-14	19-Mar-14
EE2100	Review and Update Control System Communication and Chassis Layouts	19.2d	13-Feb-14	19-Mar-14
EE2110	Review and Update Control System Communication/Fibre Schematics	19.2d	13-Feb-14	19-Mar-14
EE2120	Review and Update Control System PLC Layouts and Details	19.2d	13-Feb-14	19-Mar-14
EE2130	Control System PLC Interconnection Diagrams	19.2d	13-Feb-14	19-Mar-14
EE2140	Instrumentation Standard Details	20.0d	13-Feb-14	20-Mar-14
EE2180	Review and Update Shutdown Key	19.2d	13-Feb-14	19-Mar-14

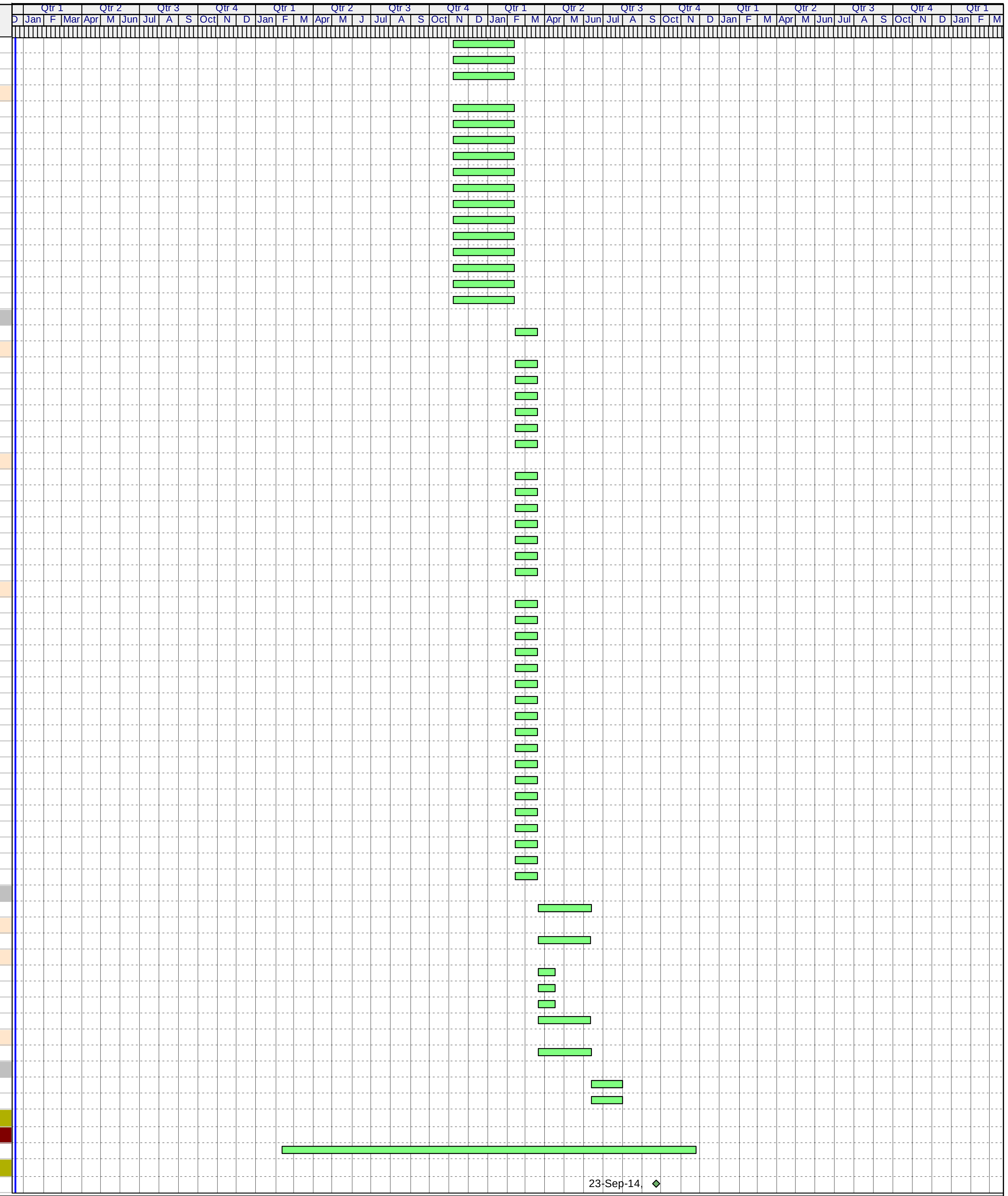
Activity ID	Activity Name	Original Duration	Start	Finish
GTA.Schedule-2.GTA.4.P1.R.RBB.007 Station 1 - IFC		47.2d	21-Mar-14	13-Jun-14
WBS2130	IFC - PW	47.2d	21-Mar-14	13-Jun-14
GTA.Schedule-2.GTA.4.P1.R.RBB.007.4 Civil & Structural Final IFC Package		46.4d	21-Mar-14	12-Jun-14
CS1360	Review and Incorporate Comments for Final IFC Issue	46.4d	21-Mar-14	12-Jun-14
GTA.Schedule-2.GTA.4.P1.R.RBB.007.1 Mechanical Final IFC Package		46.4d	21-Mar-14	12-Jun-14
ME1550	Quality: Material Tracking Isometrics	16.0d	21-Mar-14	17-Apr-14
ME1560	Quality: Weld Mapping Isometrics	16.0d	21-Mar-14	17-Apr-14
ME1570	Quality: Hydrotesting Isometrics	16.0d	21-Mar-14	17-Apr-14
ME1540	Review and Incorporate Comments for Final IFC Issue	46.4d	21-Mar-14	12-Jun-14
GTA.Schedule-2.GTA.4.P1.R.RBB.007.2 Electrical Final IFC Package		47.2d	21-Mar-14	13-Jun-14
EE2160	Review and Incorporate Comments for Final IFC Issue	47.2d	21-Mar-14	13-Jun-14
GTA.Schedule-2.GTA.4.P1.R.RBB.008 Station 1 - Final Turnover Package		28.0d	13-Jun-14	01-Aug-14
WBS2140	Final Turnover Package - PW	28.0d	13-Jun-14	01-Aug-14
A9400	Final Turnover Package	28.0d	13-Jun-14	01-Aug-14
GTA.Schedule-2.GTA.4.P1.E Station 1, Environment		355.7d	11-Feb-13	24-Nov-14
GTA.Schedule-2.GTA.4.P1.E.001 Station 1, Environmental - Environmental Survey & Studies		355.7d	11-Feb-13	24-Nov-14
A14010	Env. Survey & Studies	355.7d	11-Feb-13	24-Nov-14
GTA.Schedule-2.GTA.4.P1.P Station 1, Permits		51.0d	23-Jun-14	23-Sep-14
SLE1210	Parkway West Permits in Hand	0.0d		23-Sep-14
GTA.Schedule-2.GTA.4.P1.P.MUN Municipal		51.0d	23-Jun-14	23-Sep-14
SLE1070	Enclosure Permit	51.0d	23-Jun-14	23-Sep-14
SLE1080	Communication Tower Permit (150ft)	51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P1.P.MUN.1 Credit Valley Conservation Authority		51.0d	23-Jun-14	23-Sep-14
SLE1090	Site Grade Alteration	51.0d	23-Jun-14	23-Sep-14
SLE1100	Water Course/Shoreline Alterations	51.0d	23-Jun-14	23-Sep-14
SLE1110	Wetland Alterations	51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P1.P.MUN.2 Utilities		24.0d	23-Jun-14	05-Aug-14
SLE1140	Bell	24.0d	23-Jun-14	05-Aug-14
SLE1150	HydroOne Brampton	24.0d	23-Jun-14	05-Aug-14
SLE1160	Mississauga Hydro (Enersource)	24.0d	23-Jun-14	05-Aug-14
SLE1170	Rogers	24.0d	23-Jun-14	05-Aug-14
SLE1180	Toronto Hydro	24.0d	23-Jun-14	05-Aug-14
GTA.Schedule-2.GTA.4.P1.P.PRO Provincial		51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P1.P.PRO.1 Ministry of Environment		51.0d	23-Jun-14	23-Sep-14
SLE2010	Environmental Compliance Approval (Noise & Air) - ECA	51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P1.W Station 1, Construction		196.9d	19-Nov-14	04-Jun-15
SWO252200	Receive EGD Supplied Odourization System	0.0d		19-Nov-14
SWO252010	PP - Parkway West Gate Construction	125.9d	03-Feb-15	04-Jun-15
SWO252190	EGD Equipment Supplied	0.0d		23-Mar-15
SWO252120	Receive EGD Shop Fabrication Spools	0.0d		01-Apr-15
GTA.Schedule-2.GTA.4.P1.V Station 1, Enbridge Management Construction		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P1.V.CRS Station 1, Field Indirects, Construction Management Team		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P1.V.CRS.01 Construction Management Team - Station 1, Construction Mana		174.8d	01-Dec-14	15-Oct-15
A13570	PP - Construction Manager	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P1.V.CRS.05 Construction Management Team - Station 1, Environment Inspe		174.8d	01-Dec-14	15-Oct-15
A13660	PP - Environmental Inspection	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P1.O Station 1, Commissioning		24.0d	02-Sep-15	15-Oct-15
GTA.Schedule-2.GTA.4.P1.O.002 Station 1, Commissioning, Facility		24.0d	02-Sep-15	15-Oct-15
SOE312100	PP - Commissioning Station 1 - Parkway West Meter Station	24.0d	02-Sep-15	15-Oct-15
GTA.Schedule-2.GTA.4.P3 Station 3 - Parkway Cons Reg Station		422.4d	03-Sep-13	15-Oct-15
GTA.Schedule-2.GTA.4.P3.R Station 3, Engineering		181.6d	03-Sep-13	01-Aug-14
GTA.Schedule-2.GTA.4.P3.R.RBB Station 3 - Detailed Design Engineering		181.6d	03-Sep-13	01-Aug-14
A12680	Summary - Parkway Cons DED	181.6d	03-Sep-13	01-Aug-14
GTA.Schedule-2.GTA.4.P3.R.RBB.000 Station Milestones		154.4d	03-Sep-13	13-Jun-14
PCSM100	Station Kick Off	0.0d	03-Sep-13	
PCSM110	30% Design Review Package Ready for Issue	0.0d		06-Nov-13
PCSM120	60% Design Review Package Ready for Issue	0.0d		12-Feb-14
PCSM130	90% Design Review Package Ready for Issue	0.0d		20-Mar-14
PCSM140	IFC Package Ready for Issue	0.0d		13-Jun-14
GTA.Schedule-2.GTA.4.P3.R.RBB.004 Station 3 - 30 % Review: IFR		36.8d	03-Sep-13	06-Nov-13
WBS2250	30% Review - PC	36.8d	03-Sep-13	06-Nov-13
GTA.Schedule-2.GTA.4.P3.R.RBB.004.1 Civil & Structural 30% Package		36.0d	03-Sep-13	05-Nov-13
CS1650	Site Grading Plan	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P3.R.RBB.004.2 Mechanical 30% Package		36.0d	03-Sep-13	05-Nov-13
ME2000	PFDs	36.0d	03-Sep-13	05-Nov-13
ME2010	Plot Plans	36.0d	03-Sep-13	05-Nov-13
ME2020	Building Layout Drawings	36.0d	03-Sep-13	05-Nov-13
ME2030	Mechanical SOW Drawing	36.0d	03-Sep-13	05-Nov-13
EE2980	P&IDs	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P3.R.RBB.004.3 Electrical 30% Package		36.8d	03-Sep-13	06-Nov-13
EE2970	SOW Drawing	36.8d	03-Sep-13	06-Nov-13



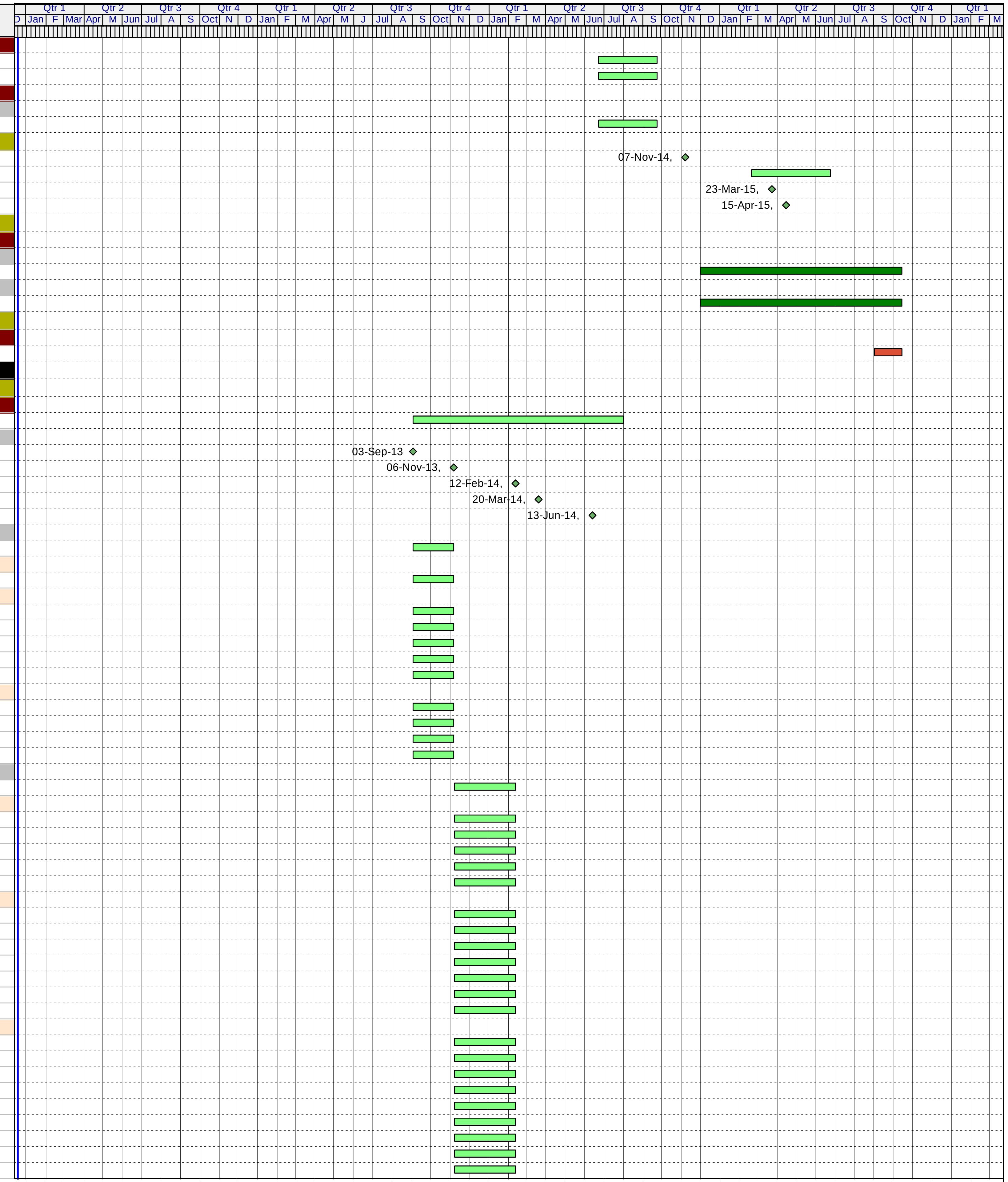
Activity ID	Activity Name	Original Duration	Start	Finish
EE2990	Single Line Diagrams	36.0d	03-Sep-13	05-Nov-13
EE3000	Area Classification Drawings	36.0d	03-Sep-13	05-Nov-13
EE3010	Control System Network Topology Diagram	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P3.R.RBB.005 Station 3 - 60 % Review		50.4d	07-Nov-13	12-Feb-14
WBS2260	60% Review - PC	50.4d	07-Nov-13	12-Feb-14
GTA.Schedule-2.GTA.4.P3.R.RBB.005.2 Civil & Structural 60% Package		49.6d	07-Nov-13	11-Feb-14
CS1660	Review and Update SOW Drawing	49.6d	07-Nov-13	11-Feb-14
CS1670	Fencing, Site Grading, and Foundation Plans	49.6d	07-Nov-13	11-Feb-14
CS1680	Access Platform Plans/Sections	49.6d	07-Nov-13	11-Feb-14
CS1690	Pipe and Cable Tray Support Plans/Elevations	49.6d	07-Nov-13	11-Feb-14
CS1770	Foundation Details and Sections	49.6d	07-Nov-13	11-Feb-14
GTA.Schedule-2.GTA.4.P3.R.RBB.005.1 Mechanical 60% Package		49.6d	07-Nov-13	11-Feb-14
ME2040	Review and Update Mechanical SOW Drawing	49.6d	07-Nov-13	11-Feb-14
ME2050	Review and Update PFDs	49.6d	07-Nov-13	11-Feb-14
ME2060	Plot Plan	49.6d	07-Nov-13	11-Feb-14
ME2070	Review and Update Building Layout Drawings	49.6d	07-Nov-13	11-Feb-14
ME2080	Piping Plans/Sections	49.6d	07-Nov-13	11-Feb-14
ME2090	HVAC Layouts and Airflow Schematics	49.6d	07-Nov-13	11-Feb-14
EE3030	Review and Update P&IDs	49.6d	07-Nov-13	11-Feb-14
GTA.Schedule-2.GTA.4.P3.R.RBB.005.3 Electrical 60% Package		50.4d	07-Nov-13	12-Feb-14
EE3020	Review and Update SOW Drawing	50.4d	07-Nov-13	12-Feb-14
EE3040	Review and Update Single Line Diagrams	49.6d	07-Nov-13	11-Feb-14
EE3050	MCC Elevation Drawings	49.6d	07-Nov-13	11-Feb-14
EE3060	Cable, Cable Tray, and Grounding Layout Diagrams	49.6d	07-Nov-13	11-Feb-14
EE3070	Layout Plans and Sections	49.6d	07-Nov-13	11-Feb-14
EE3080	Building Layout and Sections	49.6d	07-Nov-13	11-Feb-14
EE3090	Lighting Layouts and Sections	49.6d	07-Nov-13	11-Feb-14
EE3100	Control System Network Topology Diagram	49.6d	07-Nov-13	11-Feb-14
EE3110	Control System Communication/Fibre Schematics	49.6d	07-Nov-13	11-Feb-14
EE3120	Control System Network Topology Diagram	49.6d	07-Nov-13	11-Feb-14
EE3130	Control System PLC Layouts and Details	49.6d	07-Nov-13	11-Feb-14
EE3320	Control System Communication and Chassis Layouts	49.6d	07-Nov-13	11-Feb-14
EE3340	Shutdown Key	49.6d	07-Nov-13	11-Feb-14
GTA.Schedule-2.GTA.4.P3.R.RBB.006 Station 3 - 90 % Review: IFB		20.0d	13-Feb-14	20-Mar-14
WBS2270	90% Review - PC	20.0d	13-Feb-14	20-Mar-14
GTA.Schedule-2.GTA.4.P3.R.RBB.006.3 Civil & Structural 90% Package		19.2d	13-Feb-14	19-Mar-14
CS1700	Review and Update SOW Drawing	19.2d	13-Feb-14	19-Mar-14
CS1710	Review and Update Fencing, Site Grading, and Foundation Plans	19.2d	13-Feb-14	19-Mar-14
CS1720	Review and Update Access Platform Plans/Sections (or 3D Model Review)	19.2d	13-Feb-14	19-Mar-14
CS1730	Review and Update Pipe and Cable Tray Support Plans/Elevations	19.2d	13-Feb-14	19-Mar-14
CS1740	Civil and Structural Standard Details	19.2d	13-Feb-14	19-Mar-14
CS1760	Review and Update Foundation Details and Sections	19.2d	13-Feb-14	19-Mar-14
GTA.Schedule-2.GTA.4.P3.R.RBB.006.1 Mechanical 90% Package		19.2d	13-Feb-14	19-Mar-14
ME2100	Review and Update PFDs	19.2d	13-Feb-14	19-Mar-14
ME2110	Review and Update Mech SOW Drawing	19.2d	13-Feb-14	19-Mar-14
ME2120	Review and Update Plot Plan	19.2d	13-Feb-14	19-Mar-14
ME2130	Review and Update Building Layout Drawings	19.2d	13-Feb-14	19-Mar-14
EE3150	Review and Update P&IDs	19.2d	13-Feb-14	19-Mar-14
ME2180	Review and Update Piping Plans/Sections	19.2d	13-Feb-14	19-Mar-14
ME2190	Review and Update Pipe Support Deatails	19.2d	13-Feb-14	19-Mar-14
GTA.Schedule-2.GTA.4.P3.R.RBB.006.2 Electrical 90% Package		20.0d	13-Feb-14	20-Mar-14
EE3140	Review and Update SOW Drawing	19.2d	13-Feb-14	19-Mar-14
EE3160	Review and Update Single Line Diagrams	19.2d	13-Feb-14	19-Mar-14
EE3170	Schematic Drawings	19.2d	13-Feb-14	19-Mar-14
EE3180	Panel Schedules	19.2d	13-Feb-14	19-Mar-14
EE3190	Review and Update Cable, Cable Tray, and Grounding Layout Diagrams	19.2d	13-Feb-14	19-Mar-14
EE3200	Review and Update Layout Plans and Sections	19.2d	13-Feb-14	19-Mar-14
EE3210	Review and Update Building Layout and Sections	19.2d	13-Feb-14	19-Mar-14
EE3220	Review and Update Lighting Layouts and Sections	19.2d	13-Feb-14	19-Mar-14
EE3230	Cable and Conduit Schedules	19.2d	13-Feb-14	19-Mar-14
EE3240	Heat Tracing Diagrams	19.2d	13-Feb-14	19-Mar-14
EE3250	Standard Details	19.2d	13-Feb-14	19-Mar-14
EE3260	Review and Update Control System Network Topology Diagram	19.2d	13-Feb-14	19-Mar-14
EE3270	Review and Update Control System Communication and Chassis Layouts	19.2d	13-Feb-14	19-Mar-14
EE3280	Review and Update Control System Communication/Fibre Schematics	19.2d	13-Feb-14	19-Mar-14
EE3290	Review and Update Control System PLC Layouts and Details	19.2d	13-Feb-14	19-Mar-14
EE3300	Control System PLC Interconnection Diagrams	19.2d	13-Feb-14	19-Mar-14
EE3310	Instrumentation Standard Details	20.0d	13-Feb-14	20-Mar-14
EE3350	Review and Update Shutdown Key	19.2d	13-Feb-14	19-Mar-14
GTA.Schedule-2.GTA.4.P3.R.RBB.007 Station 3 - IFC		47.2d	21-Mar-14	13-Jun-14
WBS2280	IFC - PC	47.2d	21-Mar-14	13-Jun-14
GTA.Schedule-2.GTA.4.P3.R.RBB.007.4 Civil & Structural Final IFC Package		46.4d	21-Mar-14	12-Jun-14

Activity ID	Activity Name	Original Duration	Start	Finish
CS1750	Review and Incorporate Comments for Final IFC Issue	46.4d	21-Mar-14	12-Jun-14
GTA.Schedule-2.GTA.4.P3.R.RBB.007.1 Mechanical Final IFC Package		46.4d	21-Mar-14	12-Jun-14
ME2150	Quality: Material Tracking Isometrics	16.0d	21-Mar-14	17-Apr-14
ME2160	Quality: Weld Mapping Isometrics	16.0d	21-Mar-14	17-Apr-14
ME2170	Quality: Hydrotesting Isometrics	16.0d	21-Mar-14	17-Apr-14
ME2140	Review and Incorporate Comments for Final IFC Issue	46.4d	21-Mar-14	12-Jun-14
GTA.Schedule-2.GTA.4.P3.R.RBB.007.2 Electrical Final IFC Package		47.2d	21-Mar-14	13-Jun-14
EE3330	Review and Incorporate Comments for Final IFC Issue	47.2d	21-Mar-14	13-Jun-14
GTA.Schedule-2.GTA.4.P3.R.RBB.008 Station 3 - Final Turnover Package		28.0d	13-Jun-14	01-Aug-14
WBS2290	Final Turnover Package - PC	28.0d	13-Jun-14	01-Aug-14
A9430	Final Turnover Package	28.0d	13-Jun-14	01-Aug-14
GTA.Schedule-2.GTA.4.P3.P Station 3, Permits		51.0d	23-Jun-14	23-Sep-14
SLE1200	Parkway Cons Permits in Hand	0.0d		23-Sep-14
GTA.Schedule-2.GTA.4.P3.P.MUN Municipal		51.0d	23-Jun-14	23-Sep-14
SLE1370	Enclosure Permit	51.0d	23-Jun-14	23-Sep-14
SLE1040	Communication Tower Permit (150ft)	51.0d	23-Jun-14	23-Sep-14
SLE1050	Communication Tower Permit (90ft)	51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P3.P.PRO Provincial		51.0d	23-Jun-14	23-Sep-14
SLE1060	Environmental Compliance Approval (Noise & Air) - ECA	51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P3.W Station 3, Construction		150.3d	07-Nov-14	09-Apr-15
SWO252050	Receive Hot Tap Fittings	0.0d		07-Nov-14
SWO252020	Receive EGD Shop Fabrication Spools	0.0d		12-Jan-15
SWO252000	PP - Parkway Bypass Construction	68.3d	02-Feb-15	09-Apr-15
SWO252040	Receive EGD Supplied PRVs	0.0d		04-Feb-15
GTA.Schedule-2.GTA.4.P3.V Station 3, Enbridge Management Construction		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P3.V.CRS Station 3, Field Indirects, Construction Management Team		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P3.V.CRS.01 Construction Management Team - Station 3, Construction Mana		174.8d	01-Dec-14	15-Oct-15
A13580	PP - Construction Manager	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P3.V.CRS.05 Construction Management Team - Station 3, Environment Inspe		174.8d	01-Dec-14	15-Oct-15
A13670	PP - Environmental Inspection	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P3.O Station 3, Commissioning		12.0d	10-Apr-15	30-Apr-15
GTA.Schedule-2.GTA.4.P3.O.002 Station 3, Commissioning, Facility		12.0d	10-Apr-15	30-Apr-15
SOE312130	PP - Commissioning Station 3 - Parkway Cons Bypass Regulator	12.0d	10-Apr-15	30-Apr-15
GTA.Schedule-2.GTA.4.P4 Station 4 - Albion Gate Station		534.1d	11-Feb-13	15-Oct-15
GTA.Schedule-2.GTA.4.P4.R Station 4, Engineering		181.6d	03-Sep-13	01-Aug-14
GTA.Schedule-2.GTA.4.P4.R.RBB Station 4, Detailed Design Engineering		181.6d	03-Sep-13	01-Aug-14
A12690	Summary - Albion DED	181.6d	03-Sep-13	01-Aug-14
GTA.Schedule-2.GTA.4.P4.R.RBB.000 Station Milestones		154.4d	03-Sep-13	13-Jun-14
ALSM100	Station Kick Off	0.0d	03-Sep-13	
ALSM110	30% Design Review Package Ready for Issue	0.0d		06-Nov-13
ALSM120	60% Design Review Package Ready for Issue	0.0d		12-Feb-14
ALSM130	90% Design Review Package Ready for Issue	0.0d		20-Mar-14
ALSM140	IFC Package Ready for Issue	0.0d		13-Jun-14
GTA.Schedule-2.GTA.4.P4.R.RBB.004 Station 4, 30 % Review: IFR		36.8d	03-Sep-13	06-Nov-13
WBS2150	30% Review - AL	36.8d	03-Sep-13	06-Nov-13
GTA.Schedule-2.GTA.4.P4.R.RBB.004.1 Civil & Structural 30% Package		36.0d	03-Sep-13	05-Nov-13
CS1390	Site Grading Plan	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P4.R.RBB.004.2 Mechanical 30% Package		36.0d	03-Sep-13	05-Nov-13
ME1600	PFDs	36.0d	03-Sep-13	05-Nov-13
ME1610	Plot Plans	36.0d	03-Sep-13	05-Nov-13
ME1620	Building Layout Drawings	36.0d	03-Sep-13	05-Nov-13
ME1630	Mechanical SOW Drawing	36.0d	03-Sep-13	05-Nov-13
EE2200	P&IDs	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P4.R.RBB.004.3 Electrical 30% Package		36.8d	03-Sep-13	06-Nov-13
EE2190	SOW Drawing	36.8d	03-Sep-13	06-Nov-13
EE2210	Single Line Diagrams	36.0d	03-Sep-13	05-Nov-13
EE2220	Area Classification Drawings	36.0d	03-Sep-13	05-Nov-13
EE2230	Control System Network Topology Diagram	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P4.R.RBB.005 Station 4, 60 % Review		50.4d	07-Nov-13	12-Feb-14
WBS2160	60% Review - AL	50.4d	07-Nov-13	12-Feb-14
GTA.Schedule-2.GTA.4.P4.R.RBB.005.2 Civil & Structural 60% Package		49.6d	07-Nov-13	11-Feb-14
CS1400	Review and Update SOW Drawing	49.6d	07-Nov-13	11-Feb-14
CS1410	Fencing, Site Grading, and Foundation Plans	49.6d	07-Nov-13	11-Feb-14
CS1420	Access Platform Plans/Sections	49.6d	07-Nov-13	11-Feb-14
CS1430	Pipe and Cable Tray Support Plans/Elevations	49.6d	07-Nov-13	11-Feb-14
CS1510	Foundation Details and Sections	49.6d	07-Nov-13	11-Feb-14
GTA.Schedule-2.GTA.4.P4.R.RBB.005.1 Mechanical 60% Package		49.6d	07-Nov-13	11-Feb-14
ME1640	Review and Update Mechanical SOW Drawing	49.6d	07-Nov-13	11-Feb-14
ME1650	Review and Update PFDs	49.6d	07-Nov-13	11-Feb-14
ME1660	Plot Plan	49.6d	07-Nov-13	11-Feb-14
ME1670	Review and Update Building Layout Drawings	49.6d	07-Nov-13	11-Feb-14

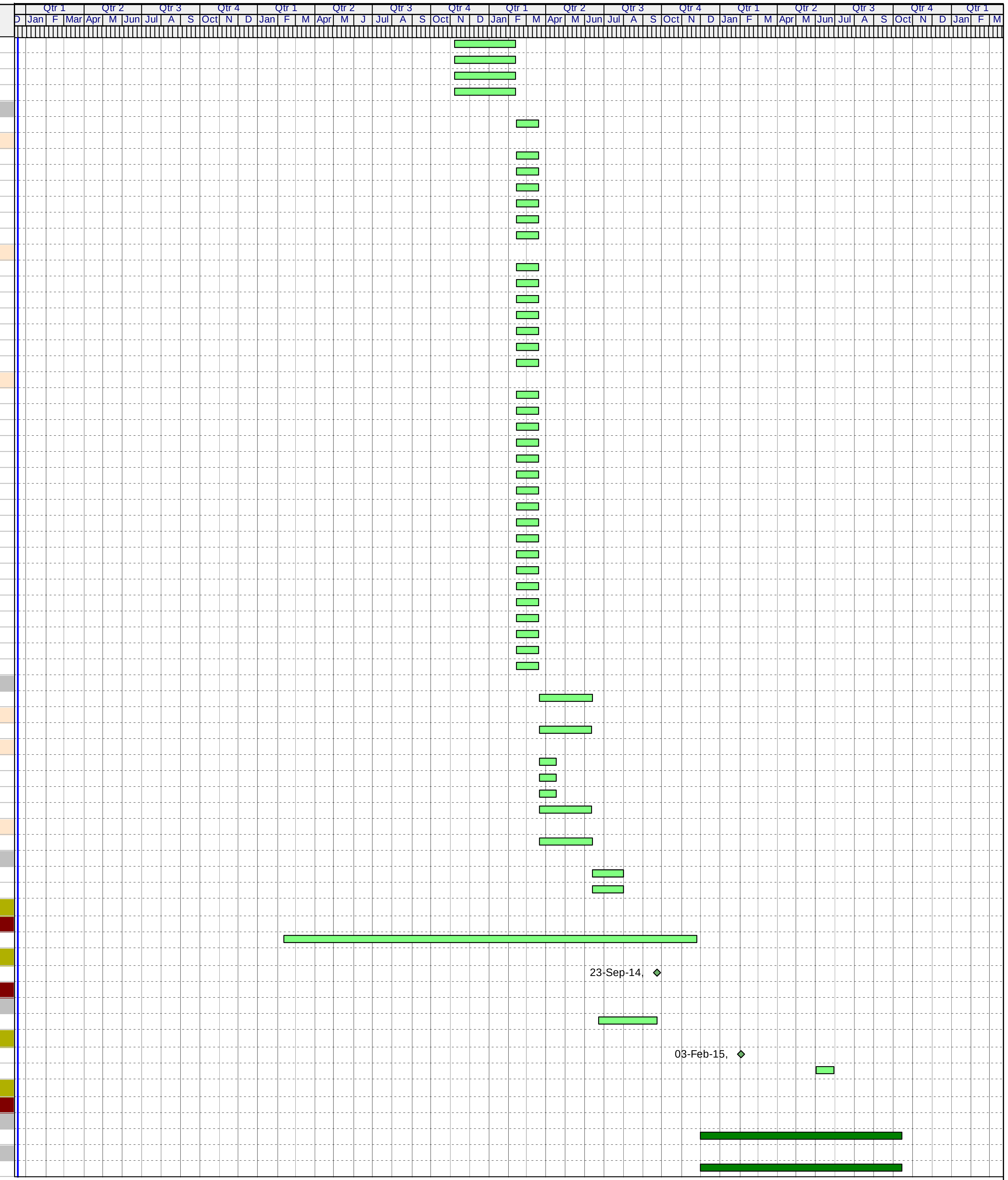
Activity ID	Activity Name	Original Duration	Start	Finish
ME1680	Piping Plans/Sections	49.6d	07-Nov-13	11-Feb-14
ME1690	HVAC Layouts and Airflow Schematics	49.6d	07-Nov-13	11-Feb-14
EE2250	Review and Update P&IDs	49.6d	07-Nov-13	11-Feb-14
GTA.Schedule-2.GTA.4.P4.R.RBB.005.3 Electrical 60% Package		50.4d	07-Nov-13	12-Feb-14
EE2240	Review and Update SOW Drawing	50.4d	07-Nov-13	12-Feb-14
EE2260	Review and Update Single Line Diagrams	49.6d	07-Nov-13	11-Feb-14
EE2270	MCC Elevation Drawings	49.6d	07-Nov-13	11-Feb-14
EE2280	Cable, Cable Tray, and Grounding Layout Diagrams	49.6d	07-Nov-13	11-Feb-14
EE2290	Layout Plans and Sections	49.6d	07-Nov-13	11-Feb-14
EE2300	Building Layout and Sections	49.6d	07-Nov-13	11-Feb-14
EE2310	Lighting Layouts and Sections	49.6d	07-Nov-13	11-Feb-14
EE2320	Control System Network Topology Diagram	49.6d	07-Nov-13	11-Feb-14
EE2330	Control System Communication/Fibre Schematics	49.6d	07-Nov-13	11-Feb-14
EE2340	Control System Network Topology Diagram	49.6d	07-Nov-13	11-Feb-14
EE2350	Control System PLC Layouts and Details	49.6d	07-Nov-13	11-Feb-14
EE2540	Control System Communication and Chassis Layouts	49.6d	07-Nov-13	11-Feb-14
EE2560	Shutdown Key	49.6d	07-Nov-13	11-Feb-14
GTA.Schedule-2.GTA.4.P4.R.RBB.006 Station 4, 90 % Review: IFB		20.0d	13-Feb-14	20-Mar-14
WBS2170	90% Review - AL	20.0d	13-Feb-14	20-Mar-14
GTA.Schedule-2.GTA.4.P4.R.RBB.006.3 Civil & Structural 90% Package		19.2d	13-Feb-14	19-Mar-14
CS1440	Review and Update SOW Drawing	19.2d	13-Feb-14	19-Mar-14
CS1450	Review and Update Fencing, Site Grading, and Foundation Plans	19.2d	13-Feb-14	19-Mar-14
CS1460	Review and Update Access Platform Plans/Sections (or 3D Model Review)	19.2d	13-Feb-14	19-Mar-14
CS1470	Review and Update Pipe and Cable Tray Support Plans/Elevations	19.2d	13-Feb-14	19-Mar-14
CS1480	Civil and Structural Standard Details	19.2d	13-Feb-14	19-Mar-14
CS1500	Review and Update Foundation Details and Sections	19.2d	13-Feb-14	19-Mar-14
GTA.Schedule-2.GTA.4.P4.R.RBB.006.1 Mechanical 90% Package		19.2d	13-Feb-14	19-Mar-14
ME1700	Review and Update PFDs	19.2d	13-Feb-14	19-Mar-14
ME1710	Review and Update Mech SOW Drawing	19.2d	13-Feb-14	19-Mar-14
ME1720	Review and Update Plot Plan	19.2d	13-Feb-14	19-Mar-14
ME1730	Review and Update Building Layout Drawings	19.2d	13-Feb-14	19-Mar-14
EE2370	Review and Update P&IDs	19.2d	13-Feb-14	19-Mar-14
ME1780	Review and Update Piping Plans/Sections	19.2d	13-Feb-14	19-Mar-14
ME1790	Review and Update Pipe Support Deatails	19.2d	13-Feb-14	19-Mar-14
GTA.Schedule-2.GTA.4.P4.R.RBB.006.2 Electrical 90% Package		20.0d	13-Feb-14	20-Mar-14
EE2360	Review and Update SOW Drawing	19.2d	13-Feb-14	19-Mar-14
EE2380	Review and Update Single Line Diagrams	19.2d	13-Feb-14	19-Mar-14
EE2390	Schematic Drawings	19.2d	13-Feb-14	19-Mar-14
EE2400	Panel Schedules	19.2d	13-Feb-14	19-Mar-14
EE2410	Review and Update Cable, Cable Tray, and Grounding Layout Diagrams	19.2d	13-Feb-14	19-Mar-14
EE2420	Review and Update Layout Plans and Sections	19.2d	13-Feb-14	19-Mar-14
EE2430	Review and Update Building Layout and Sections	19.2d	13-Feb-14	19-Mar-14
EE2440	Review and Update Lighting Layouts and Sections	19.2d	13-Feb-14	19-Mar-14
EE2450	Cable and Conduit Schedules	19.2d	13-Feb-14	19-Mar-14
EE2460	Heat Tracing Diagrams	19.2d	13-Feb-14	19-Mar-14
EE2470	Standard Details	19.2d	13-Feb-14	19-Mar-14
EE2480	Review and Update Control System Network Topology Diagram	19.2d	13-Feb-14	19-Mar-14
EE2490	Review and Update Control System Communication and Chassis Layouts	19.2d	13-Feb-14	19-Mar-14
EE2500	Review and Update Control System Communication/Fibre Schematics	19.2d	13-Feb-14	19-Mar-14
EE2510	Review and Update Control System PLC Layouts and Details	19.2d	13-Feb-14	19-Mar-14
EE2520	Control System PLC Interconnection Diagrams	19.2d	13-Feb-14	19-Mar-14
EE2530	Instrumentation Standard Details	20.0d	13-Feb-14	20-Mar-14
EE2570	Review and Update Shutdown Key	19.2d	13-Feb-14	19-Mar-14
GTA.Schedule-2.GTA.4.P4.R.RBB.007 Station 4, IFC		47.2d	21-Mar-14	13-Jun-14
WBS2180	IFC - AL	47.2d	21-Mar-14	13-Jun-14
GTA.Schedule-2.GTA.4.P4.R.RBB.007.4 Civil & Structural Final IFC Package		46.4d	21-Mar-14	12-Jun-14
CS1490	Review and Incorporate Comments for Final IFC Issue	46.4d	21-Mar-14	12-Jun-14
GTA.Schedule-2.GTA.4.P4.R.RBB.007.1 Mechanical Final IFC Package		46.4d	21-Mar-14	12-Jun-14
ME1750	Quality: Material Tracking Isometrics	16.0d	21-Mar-14	17-Apr-14
ME1760	Quality: Weld Mapping Isometrics	16.0d	21-Mar-14	17-Apr-14
ME1770	Quality: Hydrotesting Isometrics	16.0d	21-Mar-14	17-Apr-14
ME1740	Review and Incorporate Comments for Final IFC Issue	46.4d	21-Mar-14	12-Jun-14
GTA.Schedule-2.GTA.4.P4.R.RBB.007.2 Electrical Final IFC Package		47.2d	21-Mar-14	13-Jun-14
EE2550	Review and Incorporate Comments for Final IFC Issue	47.2d	21-Mar-14	13-Jun-14
GTA.Schedule-2.GTA.4.P4.R.RBB.008 Station 4, Final Turnover Package		28.0d	13-Jun-14	01-Aug-14
WBS2190	Final Turnover Package - AL	28.0d	13-Jun-14	01-Aug-14
A9410	Final Turnover Package	28.0d	13-Jun-14	01-Aug-14
GTA.Schedule-2.GTA.4.P4.E Station 4, Environment		355.7d	11-Feb-13	24-Nov-14
GTA.Schedule-2.GTA.4.P4.E.001 Station 4, Environmental - Environmental Survey & Studies		355.7d	11-Feb-13	24-Nov-14
A14020	Env. Survey & Studies	355.7d	11-Feb-13	24-Nov-14
GTA.Schedule-2.GTA.4.P4.P Station 4, Permits		51.0d	23-Jun-14	23-Sep-14
SLE1190	Albion Permits in Hand	0.0d		23-Sep-14



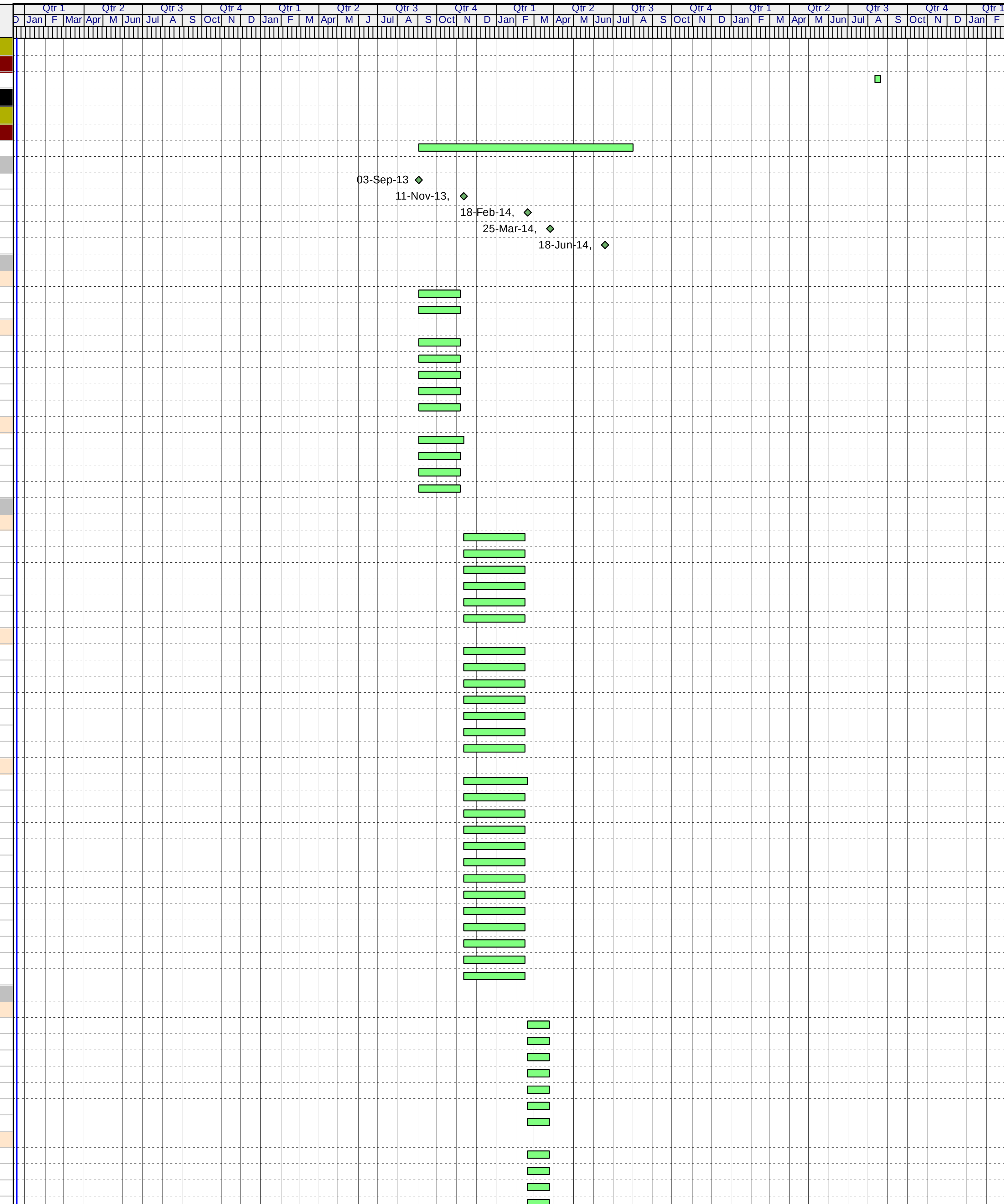
Activity ID	Activity Name	Original Duration	Start	Finish
GTA.Schedule-2.GTA.4.P4.P.MUN Municipal		51.0d	23-Jun-14	23-Sep-14
SLE1340	Enclosure Permit	51.0d	23-Jun-14	23-Sep-14
SLE1350	Communication Tower Permit (150ft)	51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P4.P.PRO Provincial		51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P4.P.PRO.1 Ministry of Environment		51.0d	23-Jun-14	23-Sep-14
SLE1360	Environmental Compliance Approval (Noise & Air) - ECA	51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P4.W Station 4, Construction		229.4d	07-Nov-14	24-Jun-15
SWO252230	Receive Hot Tap Fittings	0.0d		07-Nov-14
SWO252060	PP - Albion Construction	128.6d	20-Feb-15	24-Jun-15
SWO252270	EGD Equipment Supplied	0.0d		23-Mar-15
SWO252140	Receive EGD Shop Fabrication Spools	0.0d		15-Apr-15
GTA.Schedule-2.GTA.4.P4.V Station 4, Enbridge Management Construction		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P4.V.CRS Station 4, Field Indirects, Construction Management Team		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P4.V.CRS.01 Construction Management Team - Station 4, Construction Mana		174.8d	01-Dec-14	15-Oct-15
A13590	PP - Construction Manager	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P4.V.CRS.05 Construction Management Team - Station 4, Environment Inspe		174.8d	01-Dec-14	15-Oct-15
A13680	PP - Environmental Inspection	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P4.O Station 4, Commissioning		24.0d	02-Sep-15	15-Oct-15
GTA.Schedule-2.GTA.4.P4.O.002 Station 4, Commissioning, Facility		24.0d	02-Sep-15	15-Oct-15
SOE312110	PP - Commissioning Station 4 - Albion Station	24.0d	02-Sep-15	15-Oct-15
GTA.Schedule-2.GTA.4.P5 Station 5 - Keele/CNR Station		534.1d	11-Feb-13	15-Oct-15
GTA.Schedule-2.GTA.4.P5.R Station 5, Engineering		181.6d	03-Sep-13	01-Aug-14
GTA.Schedule-2.GTA.4.P5.R.RBB Station 5, Detailed Design Engineering		181.6d	03-Sep-13	01-Aug-14
A12700	Summary - Keele/CNR DED	181.6d	03-Sep-13	01-Aug-14
GTA.Schedule-2.GTA.4.P5.R.RBB.000 Station Milestones		154.4d	03-Sep-13	13-Jun-14
KLSM100	Station Kick Off	0.0d	03-Sep-13	
KLSM110	30% Design Review Package Ready for Issue	0.0d		06-Nov-13
KLSM120	60% Design Review Package Ready for Issue	0.0d		12-Feb-14
KLSM130	90% Design Review Package Ready for Issue	0.0d		20-Mar-14
KLSM140	IFC Package Ready for Issue	0.0d		13-Jun-14
GTA.Schedule-2.GTA.4.P5.R.RBB.004 Station 5, 30 % Review: IFR		36.8d	03-Sep-13	06-Nov-13
WBS2200	30% Review - KL	36.8d	03-Sep-13	06-Nov-13
GTA.Schedule-2.GTA.4.P5.R.RBB.004.1 Civil & Structural 30% Package		36.0d	03-Sep-13	05-Nov-13
CS1520	Site Grading Plan	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P5.R.RBB.004.2 Mechanical 30% Package		36.0d	03-Sep-13	05-Nov-13
ME1800	PFDs	36.0d	03-Sep-13	05-Nov-13
ME1810	Plot Plans	36.0d	03-Sep-13	05-Nov-13
ME1820	Building Layout Drawings	36.0d	03-Sep-13	05-Nov-13
ME1830	Mechanical SOW Drawing	36.0d	03-Sep-13	05-Nov-13
EE2590	P&IDs	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P5.R.RBB.004.3 Electrical 30% Package		36.8d	03-Sep-13	06-Nov-13
EE2580	SOW Drawing	36.8d	03-Sep-13	06-Nov-13
EE2600	Single Line Diagrams	36.0d	03-Sep-13	05-Nov-13
EE2610	Area Classification Drawings	36.0d	03-Sep-13	05-Nov-13
EE2620	Control System Network Topology Diagram	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P5.R.RBB.005 Station 5, 60 % Review		50.4d	07-Nov-13	12-Feb-14
WBS2210	60% Review - KL	50.4d	07-Nov-13	12-Feb-14
GTA.Schedule-2.GTA.4.P5.R.RBB.005.2 Civil & Structural 60% Package		49.6d	07-Nov-13	11-Feb-14
CS1530	Review and Update SOW Drawing	49.6d	07-Nov-13	11-Feb-14
CS1540	Fencing, Site Grading, and Foundation Plans	49.6d	07-Nov-13	11-Feb-14
CS1550	Access Platform Plans/Sections	49.6d	07-Nov-13	11-Feb-14
CS1560	Pipe and Cable Tray Support Plans/Elevations	49.6d	07-Nov-13	11-Feb-14
CS1640	Foundation Details and Sections	49.6d	07-Nov-13	11-Feb-14
GTA.Schedule-2.GTA.4.P5.R.RBB.005.1 Mechanical 60% Package		49.6d	07-Nov-13	11-Feb-14
ME1840	Review and Update Mechanical SOW Drawing	49.6d	07-Nov-13	11-Feb-14
ME1850	Review and Update PFDs	49.6d	07-Nov-13	11-Feb-14
ME1860	Plot Plan	49.6d	07-Nov-13	11-Feb-14
ME1870	Review and Update Building Layout Drawings	49.6d	07-Nov-13	11-Feb-14
ME1880	Piping Plans/Sections	49.6d	07-Nov-13	11-Feb-14
ME1890	HVAC Layouts and Airflow Schematics	49.6d	07-Nov-13	11-Feb-14
EE2640	Review and Update P&IDs	49.6d	07-Nov-13	11-Feb-14
GTA.Schedule-2.GTA.4.P5.R.RBB.005.3 Electrical 60% Package		50.4d	07-Nov-13	12-Feb-14
EE2630	Review and Update SOW Drawing	50.4d	07-Nov-13	12-Feb-14
EE2650	Review and Update Single Line Diagrams	49.6d	07-Nov-13	11-Feb-14
EE2660	MCC Elevation Drawings	49.6d	07-Nov-13	11-Feb-14
EE2670	Cable, Cable Tray, and Grounding Layout Diagrams	49.6d	07-Nov-13	11-Feb-14
EE2680	Layout Plans and Sections	49.6d	07-Nov-13	11-Feb-14
EE2690	Building Layout and Sections	49.6d	07-Nov-13	11-Feb-14
EE2700	Lighting Layouts and Sections	49.6d	07-Nov-13	11-Feb-14
EE2710	Control System Network Topology Diagram	49.6d	07-Nov-13	11-Feb-14
EE2720	Control System Communication/Fibre Schematics	49.6d	07-Nov-13	11-Feb-14



Activity ID	Activity Name	Original Duration	Start	Finish
EE2730	Control System Network Topology Diagram	49.6d	07-Nov-13	11-Feb-14
EE2740	Control System PLC Layouts and Details	49.6d	07-Nov-13	11-Feb-14
EE2930	Control System Communication and Chassis Layouts	49.6d	07-Nov-13	11-Feb-14
EE2950	Shutdown Key	49.6d	07-Nov-13	11-Feb-14
GTA.Schedule-2.GTA.4.P5.R.RBB.006 Station 5, 90 % Review: IFB		20.0d	13-Feb-14	20-Mar-14
WBS2220	90% Review - KL	20.0d	13-Feb-14	20-Mar-14
GTA.Schedule-2.GTA.4.P5.R.RBB.006.3 Civil & Structural 90% Package		19.2d	13-Feb-14	19-Mar-14
CS1570	Review and Update SOW Drawing	19.2d	13-Feb-14	19-Mar-14
CS1580	Review and Update Fencing, Site Grading, and Foundation Plans	19.2d	13-Feb-14	19-Mar-14
CS1590	Review and Update Access Platform Plans/Sections (or 3D Model Review)	19.2d	13-Feb-14	19-Mar-14
CS1600	Review and Update Pipe and Cable Tray Support Plans/Elevations	19.2d	13-Feb-14	19-Mar-14
CS1610	Civil and Structural Standard Details	19.2d	13-Feb-14	19-Mar-14
CS1630	Review and Update Foundation Details and Sections	19.2d	13-Feb-14	19-Mar-14
GTA.Schedule-2.GTA.4.P5.R.RBB.006.1 Mechanical 90% Package		19.2d	13-Feb-14	19-Mar-14
ME1900	Review and Update PFDs	19.2d	13-Feb-14	19-Mar-14
ME1910	Review and Update Mech SOW Drawing	19.2d	13-Feb-14	19-Mar-14
ME1920	Review and Update Plot Plan	19.2d	13-Feb-14	19-Mar-14
ME1930	Review and Update Building Layout Drawings	19.2d	13-Feb-14	19-Mar-14
EE2760	Review and Update P&IDs	19.2d	13-Feb-14	19-Mar-14
ME1980	Review and Update Piping Plans/Sections	19.2d	13-Feb-14	19-Mar-14
ME1990	Review and Update Pipe Support Deatails	19.2d	13-Feb-14	19-Mar-14
GTA.Schedule-2.GTA.4.P5.R.RBB.006.2 Electrical 90% Package		20.0d	13-Feb-14	20-Mar-14
EE2750	Review and Update SOW Drawing	19.2d	13-Feb-14	19-Mar-14
EE2770	Review and Update Single Line Diagrams	19.2d	13-Feb-14	19-Mar-14
EE2780	Schematic Drawings	19.2d	13-Feb-14	19-Mar-14
EE2790	Panel Schedules	19.2d	13-Feb-14	19-Mar-14
EE2800	Review and Update Cable, Cable Tray, and Grounding Layout Diagrams	19.2d	13-Feb-14	19-Mar-14
EE2810	Review and Update Layout Plans and Sections	19.2d	13-Feb-14	19-Mar-14
EE2820	Review and Update Building Layout and Sections	19.2d	13-Feb-14	19-Mar-14
EE2830	Review and Update Lighting Layouts and Sections	19.2d	13-Feb-14	19-Mar-14
EE2840	Cable and Conduit Schedules	19.2d	13-Feb-14	19-Mar-14
EE2850	Heat Tracing Diagrams	19.2d	13-Feb-14	19-Mar-14
EE2860	Standard Details	19.2d	13-Feb-14	19-Mar-14
EE2870	Review and Update Control System Network Topology Diagram	19.2d	13-Feb-14	19-Mar-14
EE2880	Review and Update Control System Communication and Chassis Layouts	19.2d	13-Feb-14	19-Mar-14
EE2890	Review and Update Control System Communication/Fibre Schematics	19.2d	13-Feb-14	19-Mar-14
EE2900	Review and Update Control System PLC Layouts and Details	19.2d	13-Feb-14	19-Mar-14
EE2910	Control System PLC Interconnection Diagrams	19.2d	13-Feb-14	19-Mar-14
EE2920	Instrumentation Standard Details	20.0d	13-Feb-14	20-Mar-14
EE2960	Review and Update Shutdown Key	19.2d	13-Feb-14	19-Mar-14
GTA.Schedule-2.GTA.4.P5.R.RBB.007 Station 5, IFC		47.2d	21-Mar-14	13-Jun-14
WBS2230	IFC - KL	47.2d	21-Mar-14	13-Jun-14
GTA.Schedule-2.GTA.4.P5.R.RBB.007.4 Civil & Structural Final IFC Package		46.4d	21-Mar-14	12-Jun-14
CS1620	Review and Incorporate Comments for Final IFC Issue	46.4d	21-Mar-14	12-Jun-14
GTA.Schedule-2.GTA.4.P5.R.RBB.007.1 Mechanical Final IFC Package		46.4d	21-Mar-14	12-Jun-14
ME1950	Quality: Material Tracking Isometrics	16.0d	21-Mar-14	17-Apr-14
ME1960	Quality: Weld Mapping Isometrics	16.0d	21-Mar-14	17-Apr-14
ME1970	Quality: Hydrotesting Isometrics	16.0d	21-Mar-14	17-Apr-14
ME1940	Review and Incorporate Comments for Final IFC Issue	46.4d	21-Mar-14	12-Jun-14
GTA.Schedule-2.GTA.4.P5.R.RBB.007.2 Electrical Final IFC Package		47.2d	21-Mar-14	13-Jun-14
EE2940	Review and Incorporate Comments for Final IFC Issue	47.2d	21-Mar-14	13-Jun-14
GTA.Schedule-2.GTA.4.P5.R.RBB.008 Station 5, Final Turnover Package		28.0d	13-Jun-14	01-Aug-14
WBS2240	Final Turnover Package - KL	28.0d	13-Jun-14	01-Aug-14
A9420	Final Turnover Package	28.0d	13-Jun-14	01-Aug-14
GTA.Schedule-2.GTA.4.P5.E Station 5, Environment		355.7d	11-Feb-13	24-Nov-14
GTA.Schedule-2.GTA.4.P5.E.001 Station 5, Environmental - Environmental Survey & Studies		355.7d	11-Feb-13	24-Nov-14
A14030	Env. Survey & Studies	355.7d	11-Feb-13	24-Nov-14
GTA.Schedule-2.GTA.4.P5.P Station 5, Permits		51.0d	23-Jun-14	23-Sep-14
SLE1310	Keels/CNR Permits in Hand	0.0d		23-Sep-14
GTA.Schedule-2.GTA.4.P5.P.PRO Provincial		51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P5.P.PRO.1 Ministry of Environment		51.0d	23-Jun-14	23-Sep-14
SLE1130	Environmental Compliance Approval (Noise & Air) - ECA	51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P5.W Station 5, Construction		151.6d	03-Feb-15	30-Jun-15
SWO252390	Receive EGD Shop Fabrication Spools & Hot Tap Fittings	0.0d		03-Feb-15
SWO252380	PP - Keele/CNR Construction	30.0d	02-Jun-15	30-Jun-15
GTA.Schedule-2.GTA.4.P5.V Station 5, Enbridge Management Construction		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P5.V.CRS Station 5, Field Indirects, Construction Management Team		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P5.V.CRS.01 Construction Management Team - Station 5, Construction Mana		174.8d	01-Dec-14	15-Oct-15
A13600	PP - Construction Manager	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P5.V.CRS.05 Construction Management Team - Station 5, Environment Inspe		174.8d	01-Dec-14	15-Oct-15
A13690	PP - Environmental Inspection	174.8d	01-Dec-14	15-Oct-15

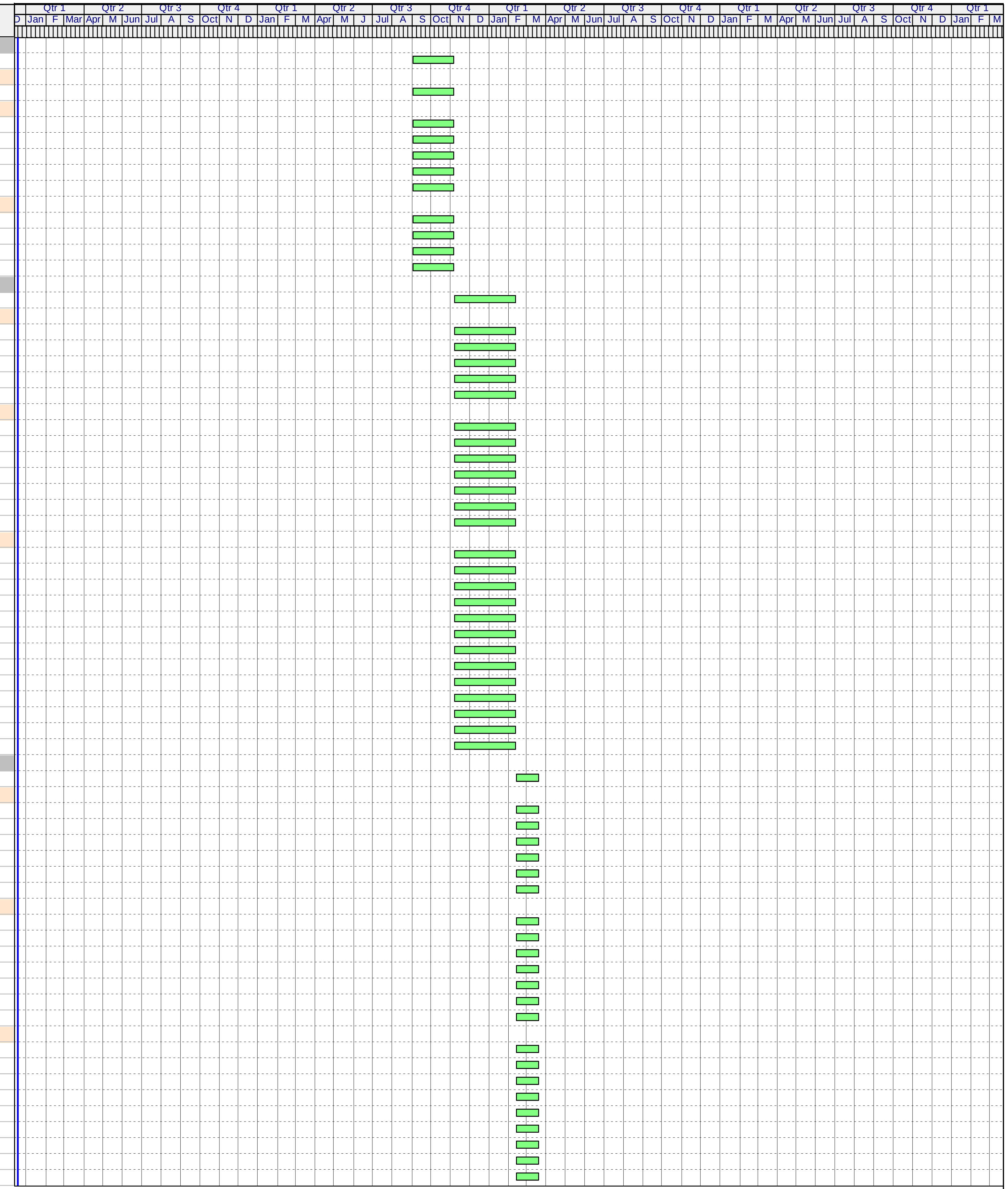


Activity ID	Activity Name	Original Duration	Start	Finish
GTA.Schedule-2.GTA.4.P5.O Station 5, Commissioning		5.6d	12-Aug-15	20-Aug-15
GTA.Schedule-2.GTA.4.P5.O.002 Station 5, Commissioning, Facility		5.6d	12-Aug-15	20-Aug-15
SOE312090	PP - Commissioning Station 5 - Keele / CNR	5.6d	12-Aug-15	20-Aug-15
GTA.Schedule-2.GTA.4.P6 Station 6- Buttonville Station		534.1d	11-Feb-13	15-Oct-15
GTA.Schedule-2.GTA.4.P6.R Station 6, Engineering		181.6d	03-Sep-13	01-Aug-14
GTA.Schedule-2.GTA.4.P6.R.RBB Station 6, Detailed Design Engineering		181.6d	03-Sep-13	01-Aug-14
A12710	Summary - Buttonville DED	181.6d	03-Sep-13	01-Aug-14
GTA.Schedule-2.GTA.4.P6.R.RBB.000 Station Milestones		156.8d	03-Sep-13	18-Jun-14
BVSM100	Station Kick Off	0.0d	03-Sep-13	
BVSM110	30% Design Review Package Ready for Issue	0.0d		11-Nov-13
BVSM120	60% Design Review Package Ready for Issue	0.0d		18-Feb-14
BVSM130	90% Design Review Package Ready for Issue	0.0d		25-Mar-14
BVSM140	IFC Package Ready for Issue	0.0d		18-Jun-14
GTA.Schedule-2.GTA.4.P6.R.RBB.004 Station 6, 30 % Review: IFR		39.2d	03-Sep-13	11-Nov-13
GTA.Schedule-2.GTA.4.P6.R.RBB.004.1 Civil & Structural 30% Package		36.0d	03-Sep-13	05-Nov-13
WBS2050	30% Review - BV	36.0d	03-Sep-13	05-Nov-13
CS1130	Site Grading Plan	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P6.R.RBB.004.2 Mechanical 30% Package		36.0d	03-Sep-13	05-Nov-13
ME1200	PFDs	36.0d	03-Sep-13	05-Nov-13
ME1210	Plot Plans	36.0d	03-Sep-13	05-Nov-13
ME1220	Building Layout Drawings	36.0d	03-Sep-13	05-Nov-13
ME1230	Mechanical SOW Drawing	36.0d	03-Sep-13	05-Nov-13
EE1420	P&IDs	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P6.R.RBB.004.3 Electrical 30% Package		39.2d	03-Sep-13	11-Nov-13
EE1410	SOW Drawing	39.2d	03-Sep-13	11-Nov-13
EE1430	Single Line Diagrams	36.0d	03-Sep-13	05-Nov-13
EE1440	Area Classification Drawings	36.0d	03-Sep-13	05-Nov-13
EE1450	Control System Network Topology Diagram	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P6.R.RBB.005 Station 6, 60 % Review		50.4d	12-Nov-13	18-Feb-14
GTA.Schedule-2.GTA.4.P6.R.RBB.005.2 Civil & Structural 60% Package		49.6d	12-Nov-13	14-Feb-14
WBS2060	60% Review - BV	49.6d	12-Nov-13	14-Feb-14
CS1140	Review and Update SOW Drawing	49.6d	12-Nov-13	14-Feb-14
CS1150	Fencing, Site Grading, and Foundation Plans	49.6d	12-Nov-13	14-Feb-14
CS1160	Access Platform Plans/Sections	49.6d	12-Nov-13	14-Feb-14
CS1170	Pipe and Cable Tray Support Plans/Elevations	49.6d	12-Nov-13	14-Feb-14
CS1250	Foundation Details and Sections	49.6d	12-Nov-13	14-Feb-14
GTA.Schedule-2.GTA.4.P6.R.RBB.005.1 Mechanical 60% Package		49.6d	12-Nov-13	14-Feb-14
ME1240	Review and Update Mechanical SOW Drawing	49.6d	12-Nov-13	14-Feb-14
ME1250	Review and Update PFDs	49.6d	12-Nov-13	14-Feb-14
ME1260	Plot Plan	49.6d	12-Nov-13	14-Feb-14
ME1270	Review and Update Building Layout Drawings	49.6d	12-Nov-13	14-Feb-14
ME1280	Piping Plans/Sections	49.6d	12-Nov-13	14-Feb-14
ME1290	HVAC Layouts and Airflow Schematics	49.6d	12-Nov-13	14-Feb-14
EE1470	Review and Update P&IDs	49.6d	12-Nov-13	14-Feb-14
GTA.Schedule-2.GTA.4.P6.R.RBB.005.3 Electrical 60% Package		50.4d	12-Nov-13	18-Feb-14
EE1460	Review and Update SOW Drawing	50.4d	12-Nov-13	18-Feb-14
EE1480	Review and Update Single Line Diagrams	49.6d	12-Nov-13	14-Feb-14
EE1490	MCC Elevation Drawings	49.6d	12-Nov-13	14-Feb-14
EE1500	Cable, Cable Tray, and Grounding Layout Diagrams	49.6d	12-Nov-13	14-Feb-14
EE1510	Layout Plans and Sections	49.6d	12-Nov-13	14-Feb-14
EE1520	Building Layout and Sections	49.6d	12-Nov-13	14-Feb-14
EE1530	Lighting Layouts and Sections	49.6d	12-Nov-13	14-Feb-14
EE1540	Control System Network Topology Diagram	49.6d	12-Nov-13	14-Feb-14
EE1550	Control System Communication/Fibre Schematics	49.6d	12-Nov-13	14-Feb-14
EE1560	Control System Network Topology Diagram	49.6d	12-Nov-13	14-Feb-14
EE1570	Control System PLC Layouts and Details	49.6d	12-Nov-13	14-Feb-14
EE1760	Control System Communication and Chassis Layouts	49.6d	12-Nov-13	14-Feb-14
EE1780	Shutdown Key	49.6d	12-Nov-13	14-Feb-14
GTA.Schedule-2.GTA.4.P6.R.RBB.006 Station 6, 90 % Review: IFB		20.0d	19-Feb-14	25-Mar-14
GTA.Schedule-2.GTA.4.P6.R.RBB.006.3 Civil & Structural 90% Package		19.2d	19-Feb-14	24-Mar-14
WBS2070	90% Review - BV	19.2d	19-Feb-14	24-Mar-14
CS1180	Review and Update SOW Drawing	19.2d	19-Feb-14	24-Mar-14
CS1190	Review and Update Fencing, Site Grading, and Foundation Plans	19.2d	19-Feb-14	24-Mar-14
CS1200	Review and Update Access Platform Plans/Sections (or 3D Model Review)	19.2d	19-Feb-14	24-Mar-14
CS1210	Review and Update Pipe and Cable Tray Support Plans/Elevations	19.2d	19-Feb-14	24-Mar-14
CS1220	Civil and Structural Standard Details	19.2d	19-Feb-14	24-Mar-14
CS1240	Review and Update Foundation Details and Sections	19.2d	19-Feb-14	24-Mar-14
GTA.Schedule-2.GTA.4.P6.R.RBB.006.1 Mechanical 90% Package		19.2d	19-Feb-14	24-Mar-14
ME1300	Review and Update PFDs	19.2d	19-Feb-14	24-Mar-14
ME1310	Review and Update Mech SOW Drawing	19.2d	19-Feb-14	24-Mar-14
ME1320	Review and Update Plot Plan	19.2d	19-Feb-14	24-Mar-14
ME1330	Review and Update Building Layout Drawings	19.2d	19-Feb-14	24-Mar-14



Activity ID	Activity Name	Original Duration	Start	Finish
EE1590	Review and Update P&IDs	19.2d	19-Feb-14	24-Mar-14
ME1380	Review and Update Piping Plans/Sections	19.2d	19-Feb-14	24-Mar-14
ME1390	Review and Update Pipe Support Details	19.2d	19-Feb-14	24-Mar-14
GTA.Schedule-2.GTA.4.P6.R.RBB.006.2 Electrical 90% Package		20.0d	19-Feb-14	25-Mar-14
EE1580	Review and Update SOW Drawing	19.2d	19-Feb-14	24-Mar-14
EE1600	Review and Update Single Line Diagrams	19.2d	19-Feb-14	24-Mar-14
EE1610	Schematic Drawings	19.2d	19-Feb-14	24-Mar-14
EE1620	Panel Schedules	19.2d	19-Feb-14	24-Mar-14
EE1630	Review and Update Cable, Cable Tray, and Grounding Layout Diagrams	19.2d	19-Feb-14	24-Mar-14
EE1640	Review and Update Layout Plans and Sections	19.2d	19-Feb-14	24-Mar-14
EE1650	Review and Update Building Layout and Sections	19.2d	19-Feb-14	24-Mar-14
EE1660	Review and Update Lighting Layouts and Sections	19.2d	19-Feb-14	24-Mar-14
EE1670	Cable and Conduit Schedules	19.2d	19-Feb-14	24-Mar-14
EE1680	Heat Tracing Diagrams	19.2d	19-Feb-14	24-Mar-14
EE1690	Standard Details	19.2d	19-Feb-14	24-Mar-14
EE1700	Review and Update Control System Network Topology Diagram	19.2d	19-Feb-14	24-Mar-14
EE1710	Review and Update Control System Communication and Chassis Layouts	19.2d	19-Feb-14	24-Mar-14
EE1720	Review and Update Control System Communication/Fibre Schematics	19.2d	19-Feb-14	24-Mar-14
EE1730	Review and Update Control System PLC Layouts and Details	19.2d	19-Feb-14	24-Mar-14
EE1740	Control System PLC Interconnection Diagrams	19.2d	19-Feb-14	24-Mar-14
EE1750	Instrumentation Standard Details	20.0d	19-Feb-14	25-Mar-14
EE1790	Review and Update Shutdown Key	19.2d	19-Feb-14	24-Mar-14
GTA.Schedule-2.GTA.4.P6.R.RBB.007 Station 6, IFC		47.2d	26-Mar-14	18-Jun-14
GTA.Schedule-2.GTA.4.P6.R.RBB.007.4 Civil & Structural Final IFC Package		46.4d	26-Mar-14	17-Jun-14
WBS2080	IFC - BV	46.4d	26-Mar-14	17-Jun-14
CS1230	Review and Incorporate Comments for Final IFC Issue	46.4d	26-Mar-14	17-Jun-14
GTA.Schedule-2.GTA.4.P6.R.RBB.007.1 Mechanical Final IFC Package		46.4d	26-Mar-14	17-Jun-14
ME1350	Quality: Material Tracking Isometrics	16.0d	26-Mar-14	23-Apr-14
ME1360	Quality: Weld Mapping Isometrics	16.0d	26-Mar-14	23-Apr-14
ME1370	Quality: Hydrotesting Isometrics	16.0d	26-Mar-14	23-Apr-14
ME1340	Review and Incorporate Comments for Final IFC Issue	46.4d	26-Mar-14	17-Jun-14
GTA.Schedule-2.GTA.4.P6.R.RBB.007.2 Electrical Final IFC Package		47.2d	26-Mar-14	18-Jun-14
EE1770	Review and Incorporate Comments for Final IFC Issue	47.2d	26-Mar-14	18-Jun-14
GTA.Schedule-2.GTA.4.P6.R.RBB.008 Station 6, Final Turnover Package		25.6d	18-Jun-14	01-Aug-14
WBS2090	Final Turnover Package - BV	25.6d	18-Jun-14	01-Aug-14
A9390	Final Turnover Package	25.6d	18-Jun-14	01-Aug-14
GTA.Schedule-2.GTA.4.P6.E Station 6, Environment		355.7d	11-Feb-13	24-Nov-14
GTA.Schedule-2.GTA.4.P6.E.001 Station 6, Environmental - Environmental Survey & Studies		355.7d	11-Feb-13	24-Nov-14
A14040	Env. Survey & Studies	355.7d	11-Feb-13	24-Nov-14
GTA.Schedule-2.GTA.4.P6.P Station 6, Permits		51.0d	23-Jun-14	23-Sep-14
SLE1330	Buttonville Permits in Hand	0.0d		23-Sep-14
GTA.Schedule-2.GTA.4.P6.P.MUN Municipal		51.0d	23-Jun-14	23-Sep-14
SLE1280	Enclosure Permit	51.0d	23-Jun-14	23-Sep-14
SLE1290	Communication Tower Permit (90ft)	51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P6.P.PRO Provincial		51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P6.P.PRO.1 Ministry of Environment		51.0d	23-Jun-14	23-Sep-14
SLE1300	Environmental Compliance Approval (Noise & Air) - ECA	51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P6.W Station 6, Construction		112.3d	07-Nov-14	02-Jun-15
SWO252035	Receive Hot Tap Fittings	0.0d		07-Nov-14
SWO252070	Receive EGD Shop Fabrication Spools	0.0d		26-Jan-15
SWO252030	PP - Buttonville Construction	119.6d	05-Feb-15	02-Jun-15
SWO252110	EGD Equipment Supplied	0.0d		23-Mar-15
GTA.Schedule-2.GTA.4.P6.V Station 6, Enbridge Management Construction		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P6.V.CRS Station 6, Field Indirects, Construction Management Team		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P6.V.CRS.01 Construction Management Team - Station 6, Construction Mana		174.8d	01-Dec-14	15-Oct-15
A13610	PP - Construction Manager	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P6.V.CRS.05 Construction Management Team - Station 6, Environment Inspe		174.8d	01-Dec-14	15-Oct-15
A13700	PP - Environmental Inspection	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P6.O Station 6, Commissioning		24.0d	21-Jul-15	02-Sep-15
GTA.Schedule-2.GTA.4.P6.O.002 Station 6, Commissioning, Facility		24.0d	21-Jul-15	02-Sep-15
SOE312080	PP - Commissioning Station 6 - Buttonville Regulator Station	24.0d	21-Jul-15	02-Sep-15
GTA.Schedule-2.GTA.4.P7 Station 7 - Jonesville Station		534.1d	11-Feb-13	15-Oct-15
GTA.Schedule-2.GTA.4.P7.R Station 7, Engineering		181.6d	03-Sep-13	01-Aug-14
GTA.Schedule-2.GTA.4.P7.R.RBB Station 7, Detailed Design Engineering		181.6d	03-Sep-13	01-Aug-14
A12720	Summary - Jonesville DED	181.6d	03-Sep-13	01-Aug-14
GTA.Schedule-2.GTA.4.P7.R.RBB.000 Station Milestones		154.4d	03-Sep-13	13-Jun-14
JVSM100	Station Kick Off	0.0d	03-Sep-13	
JVSM110	30% Design Review Package Ready for Issue	0.0d		06-Nov-13
JVSM120	60% Design Review Package Ready for Issue	0.0d		12-Feb-14
JVSM130	90% Design Review Package Ready for Issue	0.0d		20-Mar-14
JVSM140	IFC Package Ready for Issue	0.0d		13-Jun-14

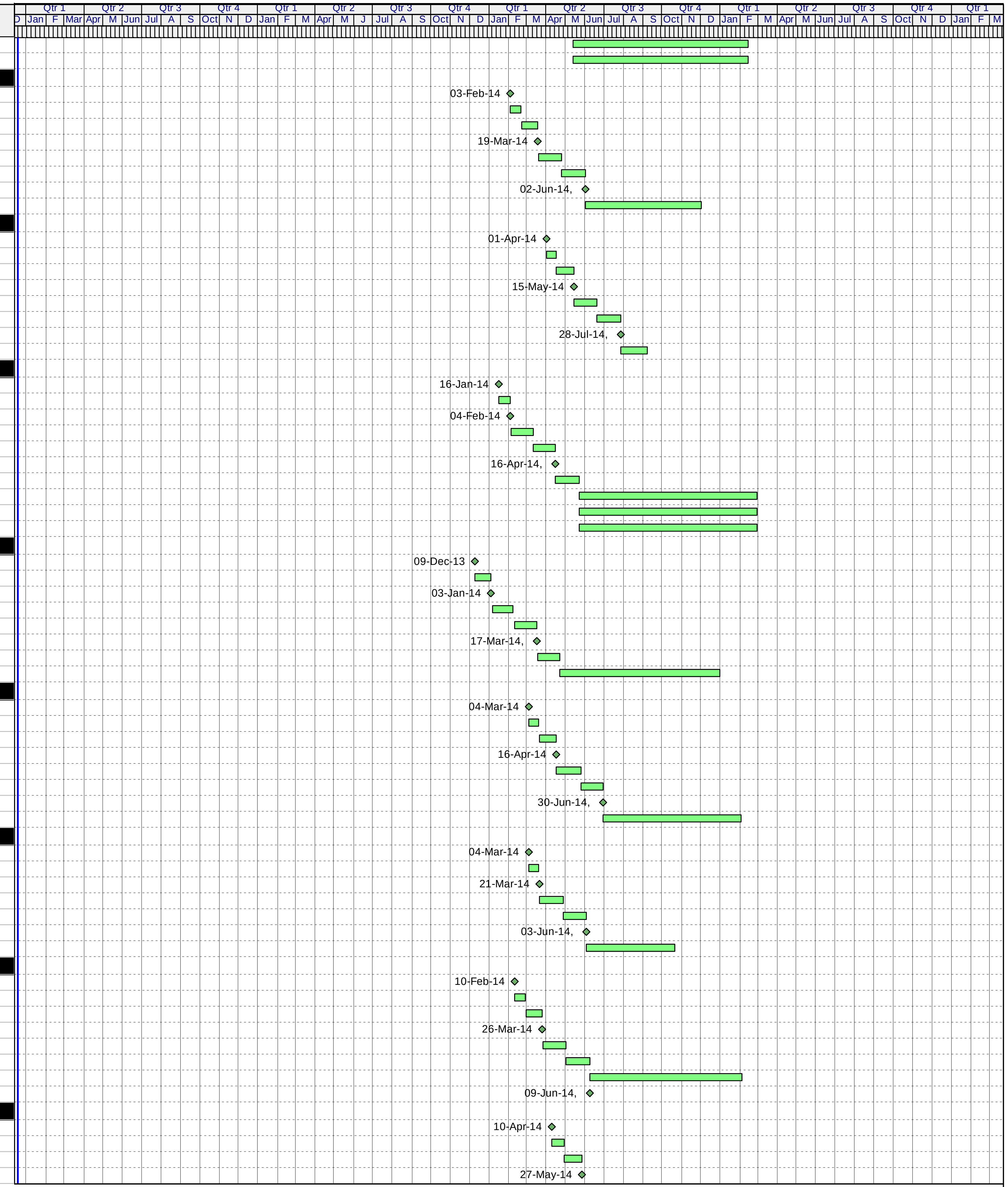
Activity ID	Activity Name	Original Duration	Start	Finish
GTA.Schedule-2.GTA.4.P7.R.RBB.004 Station 7, 30% Review: IFR		36.8d	03-Sep-13	06-Nov-13
WBS2000	30% Review - JV	36.8d	03-Sep-13	06-Nov-13
GTA.Schedule-2.GTA.4.P7.R.RBB.004.3 Civil & Structural 30% Package		36.0d	03-Sep-13	05-Nov-13
CS1000	Site Grading Plan	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P7.R.RBB.004.2 Mechanical 30% Package		36.0d	03-Sep-13	05-Nov-13
ME1000	PFDs	36.0d	03-Sep-13	05-Nov-13
ME1010	Plot Plans	36.0d	03-Sep-13	05-Nov-13
ME1020	Building Layout Drawings	36.0d	03-Sep-13	05-Nov-13
ME1030	Mechanical SOW Drawing	36.0d	03-Sep-13	05-Nov-13
EE1010	P&IDs	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P7.R.RBB.004.1 Electrical 30% Package		36.8d	03-Sep-13	06-Nov-13
EE1000	SOW Drawing	36.8d	03-Sep-13	06-Nov-13
EE1020	Single Line Diagrams	36.0d	03-Sep-13	05-Nov-13
EE1030	Area Classification Drawings	36.0d	03-Sep-13	05-Nov-13
EE1040	Control System Network Topology Diagram	36.0d	03-Sep-13	05-Nov-13
GTA.Schedule-2.GTA.4.P7.R.RBB.005 Station 7, 60%% Review		50.4d	07-Nov-13	12-Feb-14
WBS2010	60% Review - JV	50.4d	07-Nov-13	12-Feb-14
GTA.Schedule-2.GTA.4.P7.R.RBB.005.2 Civil & Structural 60% Package		49.6d	07-Nov-13	11-Feb-14
CS1010	Review and Update SOW Drawing	49.6d	07-Nov-13	11-Feb-14
CS1020	Fencing, Site Grading, and Foundation Plans	49.6d	07-Nov-13	11-Feb-14
CS1030	Access Platform Plans/Sections	49.6d	07-Nov-13	11-Feb-14
CS1040	Pipe and Cable Tray Support Plans/Elevations	49.6d	07-Nov-13	11-Feb-14
CS1120	Foundation Details and Sections	49.6d	07-Nov-13	11-Feb-14
GTA.Schedule-2.GTA.4.P7.R.RBB.005.1 Mechanical 60% Package		49.6d	07-Nov-13	11-Feb-14
ME1040	Review and Update Mechanical SOW Drawing	49.6d	07-Nov-13	11-Feb-14
ME1050	Review and Update PFDs	49.6d	07-Nov-13	11-Feb-14
ME1060	Plot Plan	49.6d	07-Nov-13	11-Feb-14
ME1070	Review and Update Building Layout Drawings	49.6d	07-Nov-13	11-Feb-14
ME1080	Piping Plans/Sections	49.6d	07-Nov-13	11-Feb-14
ME1090	HVAC Layouts and Airflow Schematics	49.6d	07-Nov-13	11-Feb-14
EE1060	Review and Update P&IDs	49.6d	07-Nov-13	11-Feb-14
GTA.Schedule-2.GTA.4.P7.R.RBB.005.3 Electrical 60% Package		50.4d	07-Nov-13	12-Feb-14
EE1050	Review and Update SOW Drawing	50.4d	07-Nov-13	12-Feb-14
EE1070	Review and Update Single Line Diagrams	49.6d	07-Nov-13	11-Feb-14
EE1080	MCC Elevation Drawings	49.6d	07-Nov-13	11-Feb-14
EE1090	Cable, Cable Tray, and Grounding Layout Diagrams	49.6d	07-Nov-13	11-Feb-14
EE1100	Layout Plans and Sections	49.6d	07-Nov-13	11-Feb-14
EE1110	Building Layout and Sections	49.6d	07-Nov-13	11-Feb-14
EE1120	Lighting Layouts and Sections	49.6d	07-Nov-13	11-Feb-14
EE1130	Control System Network Topology Diagram	49.6d	07-Nov-13	11-Feb-14
EE1140	Control System Communication/Fibre Schematics	49.6d	07-Nov-13	11-Feb-14
EE1150	Control System Network Topology Diagram	49.6d	07-Nov-13	11-Feb-14
EE1160	Control System PLC Layouts and Details	49.6d	07-Nov-13	11-Feb-14
EE1370	Control System Communication and Chassis Layouts	49.6d	07-Nov-13	11-Feb-14
EE1390	Shutdown Key	49.6d	07-Nov-13	11-Feb-14
GTA.Schedule-2.GTA.4.P7.R.RBB.006 Station 7, 90% Review: IFB		20.0d	13-Feb-14	20-Mar-14
WBS2020	90% Review - JV	20.0d	13-Feb-14	20-Mar-14
GTA.Schedule-2.GTA.4.P7.R.RBB.006.3 Civil & Structural 90% Package		19.2d	13-Feb-14	19-Mar-14
CS1050	Review and Update SOW Drawing	19.2d	13-Feb-14	19-Mar-14
CS1060	Review and Update Fencing, Site Grading, and Foundation Plans	19.2d	13-Feb-14	19-Mar-14
CS1070	Review and Update Access Platform Plans/Sections (or 3D Model Review)	19.2d	13-Feb-14	19-Mar-14
CS1080	Review and Update Pipe and Cable Tray Support Plans/Elevations	19.2d	13-Feb-14	19-Mar-14
CS1090	Civil and Structural Standard Details	19.2d	13-Feb-14	19-Mar-14
CS1110	Review and Update Foundation Details and Sections	19.2d	13-Feb-14	19-Mar-14
GTA.Schedule-2.GTA.4.P7.R.RBB.006.1 Mechanical 90% Package		19.2d	13-Feb-14	19-Mar-14
ME1100	Review and Update PFDs	19.2d	13-Feb-14	19-Mar-14
ME1110	Review and Update Mech SOW Drawing	19.2d	13-Feb-14	19-Mar-14
ME1120	Review and Update Plot Plan	19.2d	13-Feb-14	19-Mar-14
ME1130	Review and Update Building Layout Drawings	19.2d	13-Feb-14	19-Mar-14
EE1180	Review and Update P&IDs	19.2d	13-Feb-14	19-Mar-14
ME1180	Review and Update Piping Plans/Sections	19.2d	13-Feb-14	19-Mar-14
ME1190	Review and Update Pipe Support Deatails	19.2d	13-Feb-14	19-Mar-14
GTA.Schedule-2.GTA.4.P7.R.RBB.006.2 Electrical 90% Package		20.0d	13-Feb-14	20-Mar-14
EE1170	Review and Update SOW Drawing	19.2d	13-Feb-14	19-Mar-14
EE1190	Review and Update Single Line Diagrams	19.2d	13-Feb-14	19-Mar-14
EE1200	Schematic Drawings	19.2d	13-Feb-14	19-Mar-14
EE1210	Panel Schedules	19.2d	13-Feb-14	19-Mar-14
EE1220	Review and Update Cable, Cable Tray, and Grounding Layout Diagrams	19.2d	13-Feb-14	19-Mar-14
EE1230	Review and Update Layout Plans and Sections	19.2d	13-Feb-14	19-Mar-14
EE1240	Review and Update Building Layout and Sections	19.2d	13-Feb-14	19-Mar-14
EE1250	Review and Update Lighting Layouts and Sections	19.2d	13-Feb-14	19-Mar-14
EE1260	Cable and Conduit Schedules	19.2d	13-Feb-14	19-Mar-14



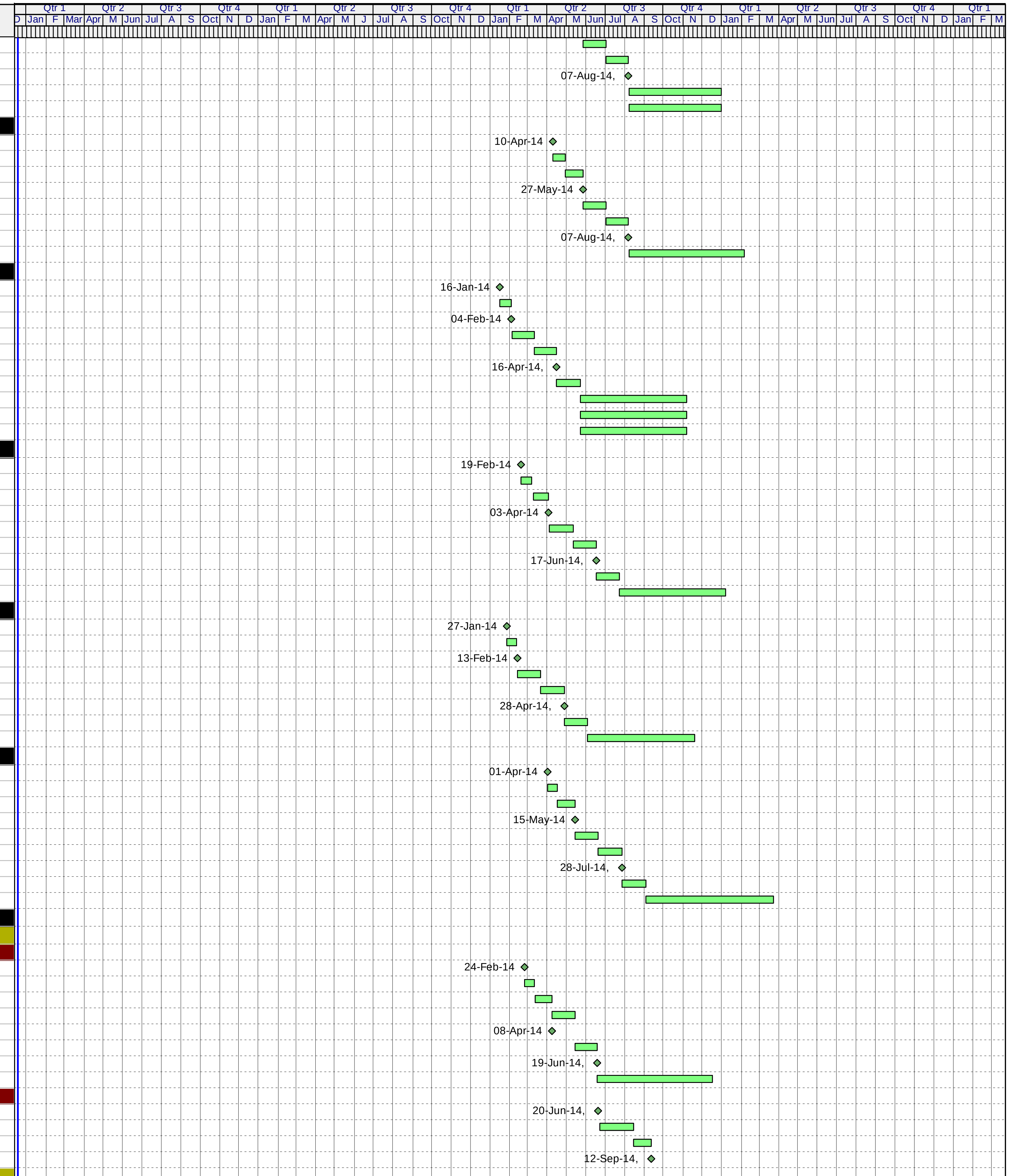
Activity ID	Activity Name	Original Duration	Start	Finish
EE1270	Heat Tracing Diagrams	19.2d	13-Feb-14	19-Mar-14
EE1280	Standard Details	19.2d	13-Feb-14	19-Mar-14
EE1290	Review and Update Control System Network Topology Diagram	19.2d	13-Feb-14	19-Mar-14
EE1300	Review and Update Control System Communication and Chassis Layouts	19.2d	13-Feb-14	19-Mar-14
EE1310	Review and Update Control System Communication/Fibre Schematics	19.2d	13-Feb-14	19-Mar-14
EE1320	Review and Update Control System PLC Layouts and Details	19.2d	13-Feb-14	19-Mar-14
EE1330	Control System PLC Interconnection Diagrams	19.2d	13-Feb-14	19-Mar-14
EE1340	Instrumentation Standard Details	20.0d	13-Feb-14	20-Mar-14
EE1400	Review and Update Shutdown Key	19.2d	13-Feb-14	19-Mar-14
GTA.Schedule-2.GTA.4.P7.R.RBB.007 Station 7, IFC		47.2d	21-Mar-14	13-Jun-14
WBS2030	IFC - JV	47.2d	21-Mar-14	13-Jun-14
GTA.Schedule-2.GTA.4.P7.R.RBB.007.2 Civil & Structural Final IFC Package		46.4d	21-Mar-14	12-Jun-14
CS1100	Review and Incorporate Comments for Final IFC Issue	46.4d	21-Mar-14	12-Jun-14
GTA.Schedule-2.GTA.4.P7.R.RBB.007.4 Mechanical Final IFC Package		46.4d	21-Mar-14	12-Jun-14
ME1140	Review and Incorporate Comments for Final IFC Issue	46.4d	21-Mar-14	12-Jun-14
ME1150	Quality: Material Tracking Isometrics	16.0d	21-Mar-14	17-Apr-14
ME1160	Quality: Weld Mapping Isometrics	16.0d	21-Mar-14	17-Apr-14
ME1170	Quality: Hydrotesting Isometrics	16.0d	21-Mar-14	17-Apr-14
GTA.Schedule-2.GTA.4.P7.R.RBB.007.1 Electrical Final IFC Package		47.2d	21-Mar-14	13-Jun-14
EE1380	Review and Incorporate Comments for Final IFC Issue	47.2d	21-Mar-14	13-Jun-14
GTA.Schedule-2.GTA.4.P7.R.RBB.008 Station 7, Final Turnover Package		28.0d	13-Jun-14	01-Aug-14
A9380	Final Turnover Package	28.0d	13-Jun-14	01-Aug-14
WBS2040	Final Turnover Package - JV	28.0d	13-Jun-14	01-Aug-14
GTA.Schedule-2.GTA.4.P7.E Station 7, Environment		355.7d	11-Feb-13	24-Nov-14
GTA.Schedule-2.GTA.4.P7.E.001 Station 7, Environmental - Environmental Survey & Studies		355.7d	11-Feb-13	24-Nov-14
A14050	Env. Survey & Studies	355.7d	11-Feb-13	24-Nov-14
GTA.Schedule-2.GTA.4.P7.P Station 7, Permits		51.0d	23-Jun-14	23-Sep-14
SLE1320	Jonesville Permits in Hand	0.0d		23-Sep-14
GTA.Schedule-2.GTA.4.P7.P.MUN Municipal		51.0d	23-Jun-14	23-Sep-14
SLE1220	Enclosure Permit	51.0d	23-Jun-14	23-Sep-14
SLE1230	Communication Tower Permit (90ft)	51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P7.P.PRO Provincial		51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P7.P.PRO.1 Ministry of Environment		51.0d	23-Jun-14	23-Sep-14
SLE1240	Site Grade Alteration	51.0d	23-Jun-14	23-Sep-14
SLE1250	Water Course/Shoreline Alterations	51.0d	23-Jun-14	23-Sep-14
SLE1260	Wetland Alterations	51.0d	23-Jun-14	23-Sep-14
SLE1270	Environmental Compliance Approval (Noise & Air) - ECA	51.0d	23-Jun-14	23-Sep-14
GTA.Schedule-2.GTA.4.P7.W Station 7, Construction		145.4d	18-Feb-15	09-Jul-15
SWO252320	Receive EGD Shop Fabrication Spools	0.0d		18-Feb-15
SWO252360	EGD Equipment Supplied	0.0d		23-Mar-15
SWO252310	PP - Jonesville Construction	94.1d	09-Apr-15	09-Jul-15
GTA.Schedule-2.GTA.4.P7.V Station 7, Enbridge Management Construction		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P7.V.CRS Station 7, Field Indirects, Construction Management Team		174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P7.V.CRS.01 Construction Management Team - Station 7, Construction Mana		174.8d	01-Dec-14	15-Oct-15
A13620	PP - Construction Manager	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P7.V.CRS.05 Construction Management Team - Station 7, Environment Inspe		174.8d	01-Dec-14	15-Oct-15
A13710	PP - Environmental Inspection	174.8d	01-Dec-14	15-Oct-15
GTA.Schedule-2.GTA.4.P7.O Station 7, Commissioning		24.0d	21-Jul-15	02-Sep-15
GTA.Schedule-2.GTA.4.P7.O.002 Station 7, Commissioning, Facility		24.0d	21-Jul-15	02-Sep-15
SOE312070	PP - Commissioning Station 7 - Jonesville Station	24.0d	21-Jul-15	02-Sep-15
GTA.Schedule-2.GTA IMS PROC Procurement & Contract Administration		273.6d	02-Dec-13	21-Apr-15
GTA.Schedule-2.GTA IMS PROC.MAT Material Procurement		273.6d	02-Dec-13	21-Apr-15
PME127110	SVT - Time between OEB LTC until approval to issue POs	20.0d	30-Jan-14*	06-Mar-14
SME16000	PP - Station 1 - Material Procurement	203.8d	18-Mar-14	23-Mar-15
SME16010	PP - Station 3 - Material Procurement	203.8d	18-Mar-14	23-Mar-15
SME16020	PP - Station 4 - Material Procurement	203.8d	18-Mar-14	23-Mar-15
SME16030	PP - Station 5 - Material Procurement	203.8d	18-Mar-14	23-Mar-15
SME16040	PP - Station 6 - Material Procurement	203.8d	18-Mar-14	23-Mar-15
SME16050	PP - Station 7 - Material Procurement	203.8d	18-Mar-14	23-Mar-15
GTA.Schedule-2.GTA IMS PROC.MAT.2 Stations Procurement Milestones		79.2d	18-Mar-14	08-Aug-14
SME16060	PO - Heat Exchanger	0.0d	18-Mar-14	
SME16070	PO - Odourant Package	0.0d	28-Apr-14	
SME16080	PO - Plug Valves	0.0d	02-Jun-14	
SME16090	PO - Annubar Meters	0.0d	03-Jun-14	
SME16100	PO - PRVs	0.0d	09-Jun-14	
SME16110	PO - Boilers	0.0d	17-Jun-14	
SME16120	PO - Pipes for Stations' Yard Piping (for fab)	0.0d	19-Jun-14	
SME16130	PO - USMs	0.0d	30-Jun-14	
SME16140	PO - Auxiliary Valves	0.0d	28-Jul-14	
SME16150	PO - Prefab Buildings	0.0d	28-Jul-14	
SME16160	PO - Pipes & Fittings	0.0d	08-Aug-14	

Activity ID	Activity Name	Original Duration	Start	Finish
GTA.Schedule-2.GTA IMS PROC.MAT.7	Procurement of Pipes	165.4d	02-Dec-13	06-Oct-14
PME12775	rec'd MRs for Pipes (36"&42" HDD & Mainline)	0.0d	02-Dec-13	
PME12850	Procurement Complete - Ready to Deliver Pipes for Mainline Construction - (SP3)	0.0d		15-Sep-14
PME12860	Procurement Complete - Ready to Deliver Pipes for Mainline Construction - (SP1)	0.0d		15-Sep-14
PME12780	Procurement Complete - Ready to Deliver Pipes to Site for HDD - Spread 1	0.0d		15-Sep-14
PME12890	Procurement Complete - Ready to Deliver Pipes for Mainline Construction - (SP2)	0.0d		15-Sep-14
PME12800	Procurement Complete - Ready to Deliver Pipes to Site for HDD - Spread 2	0.0d		15-Sep-14
PME12790	Procurement Complete - Ready to Deliver Pipes to Site for HDD - Spread 3	0.0d		06-Oct-14
GTA.Schedule-2.GTA IMS PROC.MAT.000	Induction Bends	192.8d	20-Jan-14	06-Jan-15
PME16110	Rec'd MR from ESP - SP1&2 36" pipes for Bending	0.0d	20-Jan-14	
PME16120	Rec'd MR from ESP - SP3 42" pipes for Bending	0.0d	20-Jan-14	
PME16530	Procurement Finish - SP1&2 Induction Bends for Mainline Construction	0.0d		06-Jan-15
PME16540	Procurement Finish - SP3 Induction Bends for Mainline Construction	0.0d		06-Jan-15
GTA.Schedule-2.GTA IMS PROC.MAT.000.1	Procurement of Induction Bends - Material	165.4d	20-Jan-14	14-Nov-14
GTA.Schedule-2.GTA IMS PROC.MAT.000.1.7	36" Pipes for SP1&2 Induction Bends	165.4d	20-Jan-14	14-Nov-14
PME16090	Rec'd MR from ESP	0.0d	20-Jan-14	
PME16140	Final review/approval by EGD/GTA	10.0d	20-Jan-14	05-Feb-14
PME16210	CDP review/approval	15.0d	06-Feb-14	05-Mar-14
PME16250	Issue RFQ	0.0d	05-Mar-14	
PME16270	Bid & Evaluation Process (4w)	20.0d	06-Mar-14	10-Apr-14
PME16410	CAR review/approval	20.0d	10-Apr-14	16-May-14
PME16440	PO Issue	0.0d		16-May-14
PME16450	Fab & Deliver NPS 36X19.1mm Pipes for Bending SP1	100.0d	16-May-14	14-Nov-14
PME16460	Fab & Deliver NPS 36X19.1mm Pipes for Bending SP2	100.0d	16-May-14	14-Nov-14
PME16470	Fab & Deliver NPS 36X19.1mm Pipes for Bending SP4	100.0d	16-May-14	14-Nov-14
GTA.Schedule-2.GTA IMS PROC.MAT.000.1.8	42" Pipes for SP3 Induction Bends	165.0d	20-Jan-14	13-Nov-14
PME16100	Rec'd MR from ESP	0.0d	20-Jan-14	
PME16130	Final review/approval by EGD/GTA	10.0d	20-Jan-14	05-Feb-14
PME16220	CDP review/approval	15.0d	06-Feb-14	05-Mar-14
PME16240	Bid & Evaluation Process (4w)	20.0d	05-Mar-14	09-Apr-14
PME16260	Issue RFQ	0.0d	05-Mar-14	
PME16400	CAR review/approval	20.0d	09-Apr-14	15-May-14
PME16420	PO Issue	0.0d		15-May-14
PME16430	Fab & Deliver NPS 42X25.4 Pipes for Bending	100.0d	15-May-14	13-Nov-14
GTA.Schedule-2.GTA IMS PROC.MAT.000.2	Procurement of Induction Bends - Labor & Coating	97.4d	10-Jul-14	06-Jan-15
PME16480	Contract - Induction Bending Shop	60.0d	10-Jul-14	28-Oct-14
GTA.Schedule-2.GTA IMS PROC.MAT.000.2.20	SP1&2 Bending (after pipe delivery - labor & coating)	27.4d	14-Nov-14	06-Jan-15
PME16500	Bend/Coat & Deliver - SP1	27.4d	14-Nov-14	06-Jan-15
PME16510	Bend/Coat & Deliver - SP2	27.4d	14-Nov-14	06-Jan-15
PME16520	Bend/Coat & Deliver - SP4	27.4d	14-Nov-14	06-Jan-15
GTA.Schedule-2.GTA IMS PROC.MAT.000.2.21	SP3 Bending (after pipe delivery - labor & coating)	27.8d	13-Nov-14	06-Jan-15
PME16490	Bend/Coat & Deliver - SP3	27.8d	13-Nov-14	06-Jan-15
GTA.Schedule-2.GTA IMS PROC.MAT.25	Test Heads	186.2d	16-Jan-14	18-Dec-14
SME14070	rec'd MR from ESP	0.0d	16-Jan-14	
SME14080	Final review/approval by EGD/GTA	10.0d	16-Jan-14	03-Feb-14
SME14150	CDP review/approval	15.0d	04-Feb-14	03-Mar-14
SME14330	Issue RFQ	0.0d	03-Mar-14	
SME14340	Bid & Evaluation Process (4w)	20.0d	04-Mar-14	08-Apr-14
SME14610	CAR review/approval	20.0d	08-Apr-14	14-May-14
SME14860	PO Issue	0.0d		14-May-14
SME14870	Shop Fabrication Drawings Pre/Review/Approval	20.0d	14-May-14	19-Jun-14
SME15200	Fab & Delivery of Test Heads	100.8d	19-Jun-14	18-Dec-14
GTA.Schedule-2.GTA IMS PROC.MAT.9	Isolation Joints	185.4d	20-May-14	21-Apr-15
SME14970	rec'd MR from ESP	0.0d	20-May-14	
SME14980	Final review/approval by EGD/GTA	10.0d	20-May-14	05-Jun-14
SME15150	CDP review/approval	15.0d	05-Jun-14	03-Jul-14
SME15310	Issue RFQ	0.0d	03-Jul-14	
SME15320	Bid & Evaluation Process (4w)	20.0d	03-Jul-14	08-Aug-14
SME15430	CAR review/approval	20.0d	08-Aug-14	15-Sep-14
SME15470	PO Issue	0.0d		15-Sep-14
SME15480	Shop Fabrication Drawings Pre/Review/Approval	20.0d	15-Sep-14	21-Oct-14
SME15490	Fab & Delivery of Isolation Joints	100.0d	21-Oct-14	21-Apr-15
GTA.Schedule-2.GTA IMS PROC.MAT.10	Ball Valves with Actuators	217.2d	16-Jan-14	13-Feb-15
SME14100	rec'd MR from ESP	0.0d	16-Jan-14	
SME14110	Final review/approval by EGD/GTA	10.0d	16-Jan-14	03-Feb-14
SME14190	CDP review/approval	15.0d	04-Feb-14	03-Mar-14
SME14350	Issue RFQ	0.0d	03-Mar-14	
SME14360	Bid & Evaluation Process (4w) - inc material approval	20.0d	04-Mar-14	08-Apr-14
SME14620	CAR review/approval	20.0d	08-Apr-14	14-May-14
SME14880	PO Issue	0.0d		14-May-14
SME14890	Fab & Delivery of Actuated Ball Valves (42" Block Valves - SP3)	151.8d	14-May-14	13-Feb-15

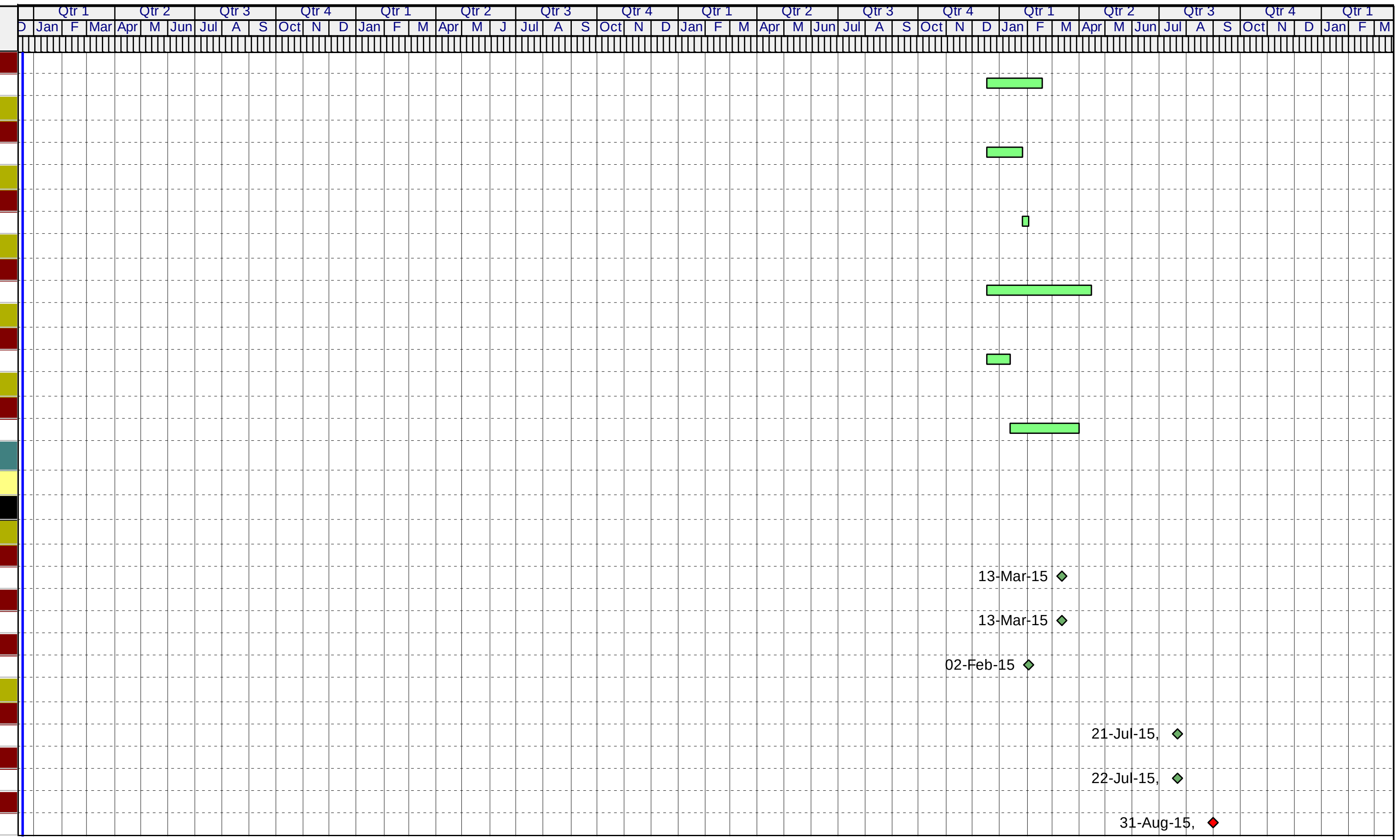
Activity ID	Activity Name	Original Duration	Start	Finish
SME14900	Fab & Delivery of Actuated Ball Valves (36" Block Valves - SP2)	151.8d	14-May-14	13-Feb-15
SME14910	Fab & Delivery of Actuated Ball Valves (36" Block Valves - SP1)	151.8d	14-May-14	13-Feb-15
GTA.Schedule-2.GTA IMS PROC.MAT.3 Plug valves with Actuators		166.8d	03-Feb-14	01-Dec-14
SME14140	rec'd MR from ESP	0.0d	03-Feb-14	
SME14160	Final review/approval by EGD/GTA	10.0d	03-Feb-14	20-Feb-14
SME14290	CDP review/approval	15.0d	21-Feb-14	19-Mar-14
SME14470	Issue RFQ	0.0d	19-Mar-14	
SME14480	Bid & Evaluation Process (4w) - inc material approval	20.0d	20-Mar-14	25-Apr-14
SME14780	CAR review/approval	20.0d	25-Apr-14	02-Jun-14
SME15100	PO Issue	0.0d		02-Jun-14
SME15110	Fab & Delivery of Actuated Plug Valves	101.4d	02-Jun-14	01-Dec-14
GTA.Schedule-2.GTA IMS PROC.MAT.4 Auxiliray Valves		88.0d	01-Apr-14	08-Sep-14
SME14560	rec'd MR from ESP	0.0d	01-Apr-14	
SME14570	Final review/approval by EGD/GTA	10.0d	01-Apr-14	17-Apr-14
SME14750	CDP review/approval	15.0d	17-Apr-14	15-May-14
SME14930	Issue RFQ	0.0d	15-May-14	
SME14950	Bid & Evaluation Process (4w) - inc material approval	20.0d	15-May-14	20-Jun-14
SME15230	CAR review/approval	20.0d	20-Jun-14	28-Jul-14
SME15350	PO Issue	0.0d		28-Jul-14
SME15360	Fab & Delivery of Auxiliary Valves	22.6d	28-Jul-14	08-Sep-14
GTA.Schedule-2.GTA IMS PROC.MAT.11 Pig Trap - Pig Barrel Fittings		224.2d	16-Jan-14	27-Feb-15
SME14040	rec'd MR from ESP	0.0d	16-Jan-14	
SME14090	Final review/approval by EGD/GTA	10.0d	16-Jan-14	03-Feb-14
SME14180	Issue RFQ	0.0d	04-Feb-14	
SME14210	Bid & Evaluation Process (4w)	20.0d	04-Feb-14	12-Mar-14
SME14430	CAR review/approval	20.0d	12-Mar-14	16-Apr-14
SME14690	PO Issue	0.0d		16-Apr-14
SME14720	Shop Fabrication Drawings Pre/Review/Approval	20.0d	16-Apr-14	23-May-14
SME14990	Fab & Delivery of Pig Trap (Albion)	153.8d	23-May-14	27-Feb-15
SME15010	Fab & Delivery of Pig Trap (Jonesville)	153.8d	23-May-14	27-Feb-15
SME15020	Fab & Delivery of Pig Trap (SP2)	153.8d	23-May-14	27-Feb-15
GTA.Schedule-2.GTA IMS PROC.MAT.12 Heat Exchangers		209.0d	09-Dec-13	31-Dec-14
SME14000	rec'd MR from ESP	0.0d	09-Dec-13	
SME14010	Final review/approval by EGD/GTA	10.0d	09-Dec-13	03-Jan-14
SME14020	Issue RFQ	0.0d	03-Jan-14	
SME14030	Bid & Evaluation Process (4w)	20.0d	06-Jan-14	07-Feb-14
SME14220	CAR review/approval	20.0d	10-Feb-14	17-Mar-14
SME14450	PO Issue	0.0d		17-Mar-14
SME14460	Shop Fabrication Drawings Pre/Review/Approval	20.0d	18-Mar-14	22-Apr-14
SME14770	Fab & Delivery of Heat Exchangers	138.6d	23-Apr-14	31-Dec-14
GTA.Schedule-2.GTA IMS PROC.MAT.13 Ultrasonic Meters		185.2d	04-Mar-14	03-Feb-15
SME14370	rec'd MR from ESP	0.0d	04-Mar-14	
SME14380	Final review/approval by EGD/GTA	10.0d	04-Mar-14	20-Mar-14
SME14490	CDP review/approval	15.0d	21-Mar-14	16-Apr-14
SME14730	Issue RFQ	0.0d	16-Apr-14	
SME14740	Bid & Evaluation Process (4w) - inc material approval	20.0d	17-Apr-14	26-May-14
SME15050	CAR review/approval	20.0d	26-May-14	30-Jun-14
SME15270	PO Issue	0.0d		30-Jun-14
SME15280	Fab & Delivery of Ultrasonic Meters	119.7d	30-Jun-14	03-Feb-15
GTA.Schedule-2.GTA IMS PROC.MAT.6 Annubar Meters		127.0d	04-Mar-14	21-Oct-14
SME14390	rec'd MR from ESP	0.0d	04-Mar-14	
SME14400	Final review/approval by EGD/GTA	10.0d	04-Mar-14	20-Mar-14
SME14500	Issue RFQ	0.0d	21-Mar-14	
SME14520	Bid & Evaluation Process (4w) - inc material approval	20.0d	21-Mar-14	28-Apr-14
SME14810	CAR review/approval	20.0d	28-Apr-14	03-Jun-14
SME15130	PO Issue	0.0d		03-Jun-14
SME15140	Fab & Delivery of Annubar Meters	76.5d	03-Jun-14	21-Oct-14
GTA.Schedule-2.GTA IMS PROC.MAT.14 PRVs (Regulators)		198.0d	10-Feb-14	04-Feb-15
SME14230	rec'd MR from ESP	0.0d	10-Feb-14	
SME14240	Final review/approval by EGD/GTA	10.0d	10-Feb-14	27-Feb-14
SME14320	CDP review/approval	15.0d	28-Feb-14	26-Mar-14
SME14530	Issue RFQ	0.0d	26-Mar-14	
SME14540	Bid & Evaluation Process (4w) - inc material approval	20.0d	27-Mar-14	02-May-14
SME14840	CAR review/approval	20.0d	02-May-14	09-Jun-14
SME15160	Fab & Deliver of PRVs	132.6d	09-Jun-14	04-Feb-15
SME15170	PO Issue	0.0d		09-Jun-14
GTA.Schedule-2.GTA IMS PROC.MAT.15 Fittings, Flanges, Gaskets, Pups, IKs & HW pipe (short le		145.4d	10-Apr-14	31-Dec-14
SME14670	rec'd MR from ESP	0.0d	10-Apr-14	
SME14680	Final review/approval by EGD/GTA	10.0d	10-Apr-14	29-Apr-14
SME14830	CDP review/approval	15.0d	29-Apr-14	27-May-14
SME15070	Issue RFQ	0.0d	27-May-14	



Activity ID	Activity Name	Original Duration	Start	Finish
SME15090	Bid & Evaluation Process (4w) - inc material approval	20.0d	28-May-14	02-Jul-14
SME15300	CAR review/approval	20.0d	03-Jul-14	07-Aug-14
SME15410	PO Issue	0.0d		07-Aug-14
SME15400	Fab & Delivery of Pipes, Fittings & Flanges (short lead - for Fab)	80.0d	08-Aug-14	31-Dec-14
SME15420	Fab & Delivery of Pipes, Fittings & Flanges (short lead - for Fab)	80.0d	08-Aug-14	31-Dec-14
GTA.Schedule-2.GTA IMS PROC.MAT.5 Pipes, Fittings & Flanges (long lead)		165.4d	10-Apr-14	05-Feb-15
SME14650	rec'd MR from ESP	0.0d	10-Apr-14	
SME14660	Final review/approval by EGD/GTA	10.0d	10-Apr-14	29-Apr-14
SME14820	CDP review/approval	15.0d	29-Apr-14	27-May-14
SME15060	Issue RFQ	0.0d	27-May-14	
SME15080	Bid & Evaluation Process (4w) - inc material approval	20.0d	28-May-14	02-Jul-14
SME15290	CAR review/approval	20.0d	03-Jul-14	07-Aug-14
SME15390	PO Issue	0.0d		07-Aug-14
SME15380	Fab & Delivery of Pipes, Fittings & Flanges (long lead - for Fab)	100.0d	08-Aug-14	05-Feb-15
GTA.Schedule-2.GTA IMS PROC.MAT.16 Hot Tap/Stopple Fittings		163.4d	16-Jan-14	07-Nov-14
SME14050	rec'd MR from ESP	0.0d	16-Jan-14	
SME14060	Final review/approval by EGD/GTA	10.0d	16-Jan-14	03-Feb-14
SME14170	Issue RFQ	0.0d	04-Feb-14	
SME14200	Bid & Evaluation Process (4w)	20.0d	04-Feb-14	12-Mar-14
SME14420	CAR review/approval	20.0d	12-Mar-14	16-Apr-14
SME14700	PO Issue	0.0d		16-Apr-14
SME14710	Shop Fabrication Drawings Pre/Review/Approve	20.0d	16-Apr-14	23-May-14
SME15000	Fab & Delivery of Hot Tap Fittings - SP1	93.0d	23-May-14	07-Nov-14
SME15030	Fab & Delivery of Hot Tap Fittings - SP2	93.0d	23-May-14	07-Nov-14
SME15040	Fab & Delivery of Hot Tap Fittings - SP3	93.0d	23-May-14	07-Nov-14
GTA.Schedule-2.GTA IMS PROC.MAT.17 Boilers		177.2d	19-Feb-14	07-Jan-15
SME14270	rec'd MR from ESP	0.0d	19-Feb-14	
SME14280	Final review/approval by EGD/GTA	10.0d	19-Feb-14	07-Mar-14
SME14410	CDP review/approval	15.0d	10-Mar-14	03-Apr-14
SME14590	Issue RFQ	0.0d	03-Apr-14	
SME14600	Bid & Evaluation Process (4w)	20.0d	04-Apr-14	12-May-14
SME14850	CAR review/approval	20.0d	12-May-14	17-Jun-14
SME15180	PO Issue	0.0d		17-Jun-14
SME15190	Shop Fabrication Drawings Pre/Review/Approval	20.0d	17-Jun-14	23-Jul-14
SME15330	Fab & Delivery of Boilers	91.8d	23-Jul-14	07-Jan-15
GTA.Schedule-2.GTA IMS PROC.MAT.18 Odourant Package		163.8d	27-Jan-14	19-Nov-14
SME14120	rec'd MR from ESP	0.0d	27-Jan-14	
SME14130	Final review/approval by EGD/GTA	10.0d	27-Jan-14	12-Feb-14
SME14250	Issue RFQ	0.0d	13-Feb-14	
SME14260	Bid & Evaluation Process (4w)	20.0d	13-Feb-14	21-Mar-14
SME14510	CAR review/approval	20.0d	21-Mar-14	28-Apr-14
SME14790	PO Issue	0.0d		28-Apr-14
SME14800	Shop Fabrication Drawings Pre/Review/Approval	20.0d	28-Apr-14	03-Jun-14
SME15120	Fab & Delivery of Odourant	93.4d	03-Jun-14	19-Nov-14
GTA.Schedule-2.GTA IMS PROC.MAT.19 Pre-Fabricated Buildings		195.8d	01-Apr-14	23-Mar-15
SME14550	rec'd MR from ESP	0.0d	01-Apr-14	
SME14580	Final review/approval by EGD/GTA	10.0d	01-Apr-14	17-Apr-14
SME14760	CDP review/approval	15.0d	17-Apr-14	15-May-14
SME14940	Issue RFQ	0.0d	15-May-14	
SME14960	Bid & Evaluation Process (4w)	20.0d	15-May-14	20-Jun-14
SME15240	CAR review/approval	20.0d	20-Jun-14	28-Jul-14
SME15340	PO Issue	0.0d		28-Jul-14
SME15370	Shop Fabrication Drawings Pre/Review/Approval	20.0d	28-Jul-14	03-Sep-14
SME15450	Fab & Delivery of Prefab Building Units (inc. built-in utilities)	110.4d	03-Sep-14	23-Mar-15
GTA.Schedule-2.GTA IMS PROC.MAT.23 Stations' Spool Pieces		229.0d	24-Feb-14	15-Apr-15
GTA.Schedule-2.GTA IMS PROC.MAT.23.P0 Stations Spools Procurement		165.0d	24-Feb-14	17-Dec-14
GTA.Schedule-2.GTA IMS PROC.MAT.23.P0.2 Procurement of Pipes, Fittings, Flanges etc for Yard Pipir		165.0d	24-Feb-14	17-Dec-14
SME14300	rec'd MR from ESP	0.0d	24-Feb-14	
SME14310	Final review/approval by EGD/GTA	10.0d	24-Feb-14	12-Mar-14
SME14440	CDP review/approval	15.0d	13-Mar-14	08-Apr-14
SME14630	Bid & Evaluation Process (4w)	20.0d	08-Apr-14	14-May-14
SME14640	Issue RFQ	0.0d	08-Apr-14	
SME14920	CAR review/approval	20.0d	14-May-14	19-Jun-14
SME15210	PO Issue	0.0d		19-Jun-14
SME15220	Fab & Delivery of Pipes & Fittings for Stations	100.0d	19-Jun-14	17-Dec-14
GTA.Schedule-2.GTA IMS PROC.MAT.23.P0.1 Spool Fabrication Contract Process		45.0d	20-Jun-14	12-Sep-14
SME15250	rec'd station pipework Dwgs from ESP	0.0d		20-Jun-14
SME15260	Contractor Prepare & Submit shop drawings	30.0d	23-Jun-14	15-Aug-14
SME15440	Shop drawings review/approval	15.0d	15-Aug-14	12-Sep-14
SME15460	Shop drawings approved - Issue for Fabrication	0.0d		12-Sep-14
GTA.Schedule-2.GTA IMS PROC.MAT.23.P7 Jonesville-Eglinton Meter/Regulator Stations		33.0d	17-Dec-14	18-Feb-15

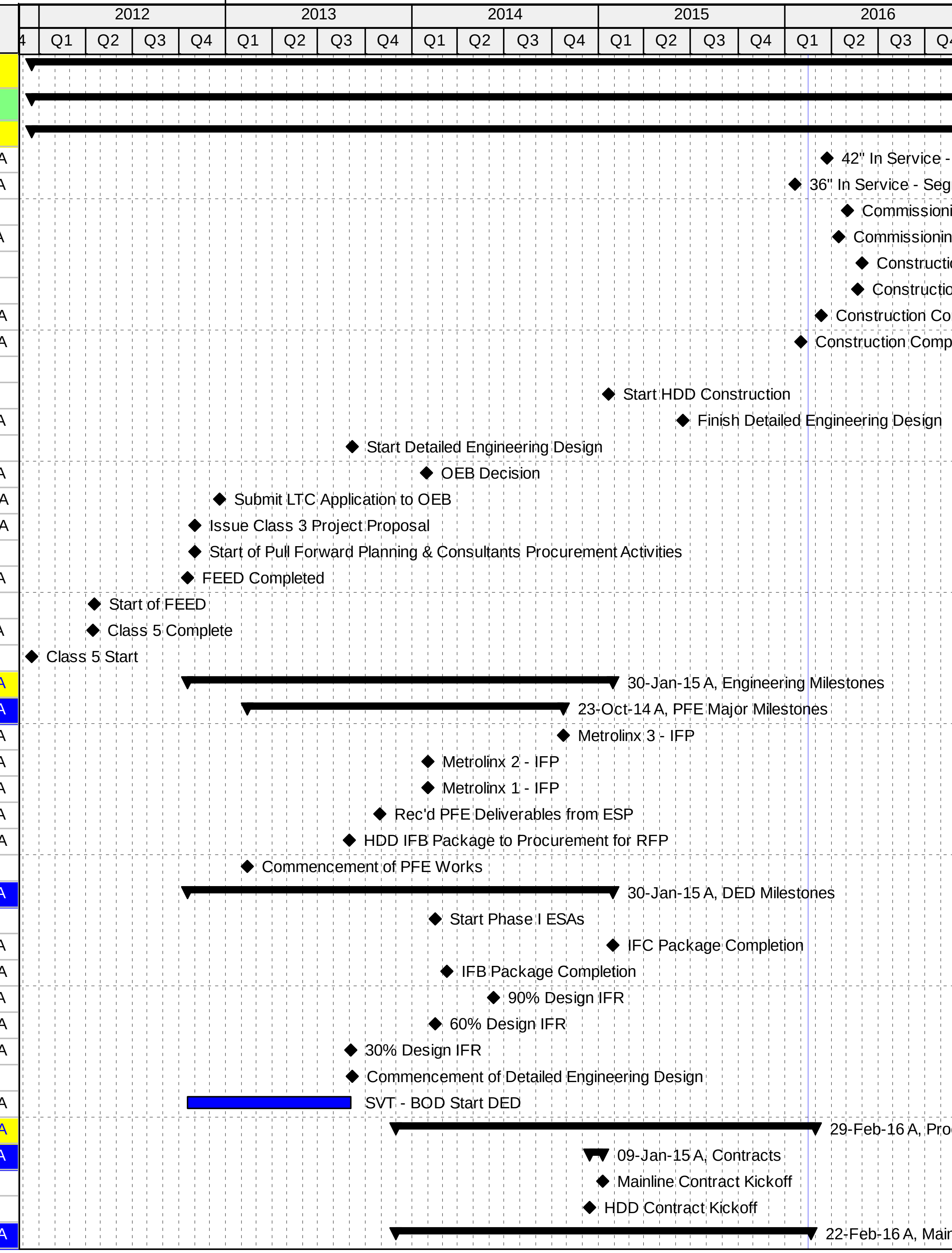


Activity ID	Activity Name	Original Duration	Start	Finish
GTA.Schedule-2.GTA IMS PROC.MAT.23.P7.1 Station Spools Procurement/Fabrication		33.0d	17-Dec-14	18-Feb-15
SME15500	Spool Fabrication (fab. shop #3)	33.0d	17-Dec-14	18-Feb-15
GTA.Schedule-2.GTA IMS PROC.MAT.23.P6 Buttonville Meter/Regulator Stations		20.0d	17-Dec-14	26-Jan-15
GTA.Schedule-2.GTA IMS PROC.MAT.23.P6.1 Station Spools Procurement/Fabrication		20.0d	17-Dec-14	26-Jan-15
SME15510	Spool Fabrication (fab. shop #1-A)	20.0d	17-Dec-14	26-Jan-15
GTA.Schedule-2.GTA IMS PROC.MAT.23.P5 Keele/CNR Gate Station		5.0d	26-Jan-15	03-Feb-15
GTA.Schedule-2.GTA IMS PROC.MAT.23.P5.1 Station Spools Procurement/Fabrication		5.0d	26-Jan-15	03-Feb-15
SME15550	Spool Fabrication (fab. shop #1-B)	5.0d	26-Jan-15	03-Feb-15
GTA.Schedule-2.GTA IMS PROC.MAT.23.P4 Albion Gate Station		64.0d	17-Dec-14	15-Apr-15
GTA.Schedule-2.GTA IMS PROC.MAT.23.P4.1 Station Spools Procurement/Fabrication		64.0d	17-Dec-14	15-Apr-15
SME15520	Spool Fabrication (fab. shop #2)	64.0d	17-Dec-14	15-Apr-15
GTA.Schedule-2.GTA IMS PROC.MAT.23.P1 Parkway Cons Bypass Station		12.0d	17-Dec-14	12-Jan-15
GTA.Schedule-2.GTA IMS PROC.MAT.23.P1.1 Station Spools Procurement/Fabrication		12.0d	17-Dec-14	12-Jan-15
SME15530	Spool Fabrication (fab. shop #3)	12.0d	17-Dec-14	12-Jan-15
GTA.Schedule-2.GTA IMS PROC.MAT.23.P3 Parkway West Gate Station		45.0d	12-Jan-15	01-Apr-15
GTA.Schedule-2.GTA IMS PROC.MAT.23.P3.1 Station Spools Procurement/Fabrication		45.0d	12-Jan-15	01-Apr-15
SME15540	Spool Fabrication (fab. shop #3)	45.0d	12-Jan-15	01-Apr-15
GTA.Schedule-2.GTA IMS CONST Construction		217.8d	02-Feb-15	31-Aug-15
GTA.Schedule-2.GTA IMS CONST.2 MAINLINE		217.8d	02-Feb-15	31-Aug-15
GTA.Schedule-2.GTA IMS CONST.2.0 Mainline Construction Key-Milestones		217.8d	02-Feb-15	31-Aug-15
GTA.Schedule-2.GTA IMS CONST.2.0.1 Start Milestones		41.3d	02-Feb-15	13-Mar-15
GTA.Schedule-2.GTA IMS CONST.2.0.1.1 SP 1		0.0d	13-Mar-15	13-Mar-15
PWO252590	SP1 - Mob. & Start Mainline Construction	0.0d	13-Mar-15	
GTA.Schedule-2.GTA IMS CONST.2.0.1.2 SP 2		0.0d	13-Mar-15	13-Mar-15
PWO252600	SP2 - Mob. & Start Mainline Construction	0.0d	13-Mar-15	
GTA.Schedule-2.GTA IMS CONST.2.0.1.3 SP 3		0.0d	02-Feb-15	02-Feb-15
PWO252290	SP3 - Mob. & Start Mainline Construction	0.0d	02-Feb-15	
GTA.Schedule-2.GTA IMS CONST.2.0.2 Finish Milestones		42.3d	21-Jul-15	31-Aug-15
GTA.Schedule-2.GTA IMS CONST.2.0.2.1 SP 1		0.0d	21-Jul-15	21-Jul-15
PWO253190	SP1 - Finish Mainline Construction	0.0d		21-Jul-15
GTA.Schedule-2.GTA IMS CONST.2.0.2.2 SP 2		0.0d	22-Jul-15	22-Jul-15
PWO253200	SP2 - Finish Mainline Construction	0.0d		22-Jul-15
GTA.Schedule-2.GTA IMS CONST.2.0.2.3 SP 3		0.0d	31-Aug-15	31-Aug-15
PWO253230	SP3 - Finish Mainline Construction	0.0d		31-Aug-15



GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:06

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1	**GTA - Master Schedule**		144.8	99.22%	98.13%	19-Dec-11 A	09-Jan-17
2	**MILESTONES**		135.7	0%	0%	19-Dec-11 A	09-Jan-17
3	**GTA Major Milestones**		135.7	0%	0%	19-Dec-11 A	09-Jan-17
4	MS_ISD42	42" In Service - Segment A - Spread 3&4	0.0	0%	100%		23-Mar-16 A
5	MS_ISD36	36" In Service - Segment B - Spread 1&2	0.0	0%	100%		20-Jan-16 A
6	MS2980	Commissioning Complete - Spread 3&4	0.0	0%	0%		03-May-16
7	MS2970	Commissioning Complete - Spread 1&2	0.0	0%	100%		16-Apr-16 A
8	MS2960	Construction Complete - Facilities - Spread 3&4	0.0	0%	0%		31-May-16
9	MS2950	Construction Complete - Facilities - Spread 1&2	0.0	0%	0%		23-May-16
10	MS2940	Construction Complete - Mainline - Spread 3&4	0.0	0%	100%		12-Mar-16 A
11	MS2930	Construction Complete - Mainline - Spread 1&2	0.0	0%	100%		02-Feb-16 A
12	MS2040	Project Complete	0.0	0%	0%		09-Jan-17
13	MS1490	Start HDD Construction	0.0	100%	100%	20-Jan-15 A	
14	MS1420	Finish Detailed Engineering Design	0.0	100%	100%		15-Jun-15 A
15	MS1190	Start Detailed Engineering Design	0.0	100%	100%	05-Sep-13 A	
16	MS1185	OEB Decision	0.0	100%	100%		30-Jan-14 A
17	MS1085	Submit LTC Application to OEB	0.0	100%	100%		20-Dec-12 A
18	MS1075	Issue Class 3 Project Proposal	0.0	100%	100%		02-Nov-12 A
19	MS1065	Start of Pull Forward Planning & Consultants Procurement /	0.0	100%	100%	02-Nov-12 A	
20	MS1050	FEED Completed	0.0	100%	100%		18-Oct-12 A
21	MS1035	Start of FEED	0.0	100%	100%	18-Apr-12 A	
22	MS1025	Class 5 Complete	0.0	100%	100%		17-Apr-12 A
23	MS1000	Class 5 Start	0.0	100%	100%	19-Dec-11 A	
24	**Engineering Milestones**		0.0	0%	0%	18-Oct-12 A	30-Jan-15 A
25	**PFE Major Milestones**		0.0	0%	0%	12-Feb-13 A	23-Oct-14 A
26	PRT-1300	Metrolinx 3 - IFP	0.0	100%	100%		23-Oct-14 A
27	PRT-1290	Metrolinx 2 - IFP	0.0	100%	100%		31-Jan-14 A
28	PRT-1280	Metrolinx 1 - IFP	0.0	100%	100%		31-Jan-14 A
29	MS1160	Rec'd PFE Deliverables from ESP	0.0	100%	100%		31-Oct-13 A
30	MS1150	HDD IFB Package to Procurement for RFP	0.0	100%	100%		30-Aug-13 A
31	MS1095	Commencement of PFE Works	0.0	100%	100%	12-Feb-13 A	
32	**DED Milestones**		0.0	0%	0%	18-Oct-12 A	30-Jan-15 A
33	MS2900	Start Phase I ESAs	0.0	100%	100%	14-Feb-14 A	
34	MS1450	IFC Package Completion	0.0	100%	100%		30-Jan-15 A
35	MS1370	IFB Package Completion	0.0	100%	100%		10-Mar-14 A
36	MS1350	90% Design IFR	0.0	100%	100%		09-Jun-14 A
37	MS1290	60% Design IFR	0.0	100%	100%		14-Feb-14 A
38	MS1220	30% Design IFR	0.0	100%	100%		04-Sep-13 A
39	MS1200	Commencement of Detailed Engineering Design	0.0	100%	100%	05-Sep-13 A	
40	A14060	SVT - BOD Start DED	0.0	100%	100%	18-Oct-12 A	04-Sep-13 A
41	**Procurement Milestones**		0.0	0%	0%	29-Nov-13 A	29-Feb-16 A
42	**Contracts**		0.0	0%	0%	16-Dec-14 A	09-Jan-15 A
43	MS1560	Mainline Contract Kickoff	0.0	100%	100%	09-Jan-15 A	
44	MS1510	HDD Contract Kickoff	0.0	100%	100%	16-Dec-14 A	
45	**Mainline**		0.0	0%	0%	29-Nov-13 A	22-Feb-16 A

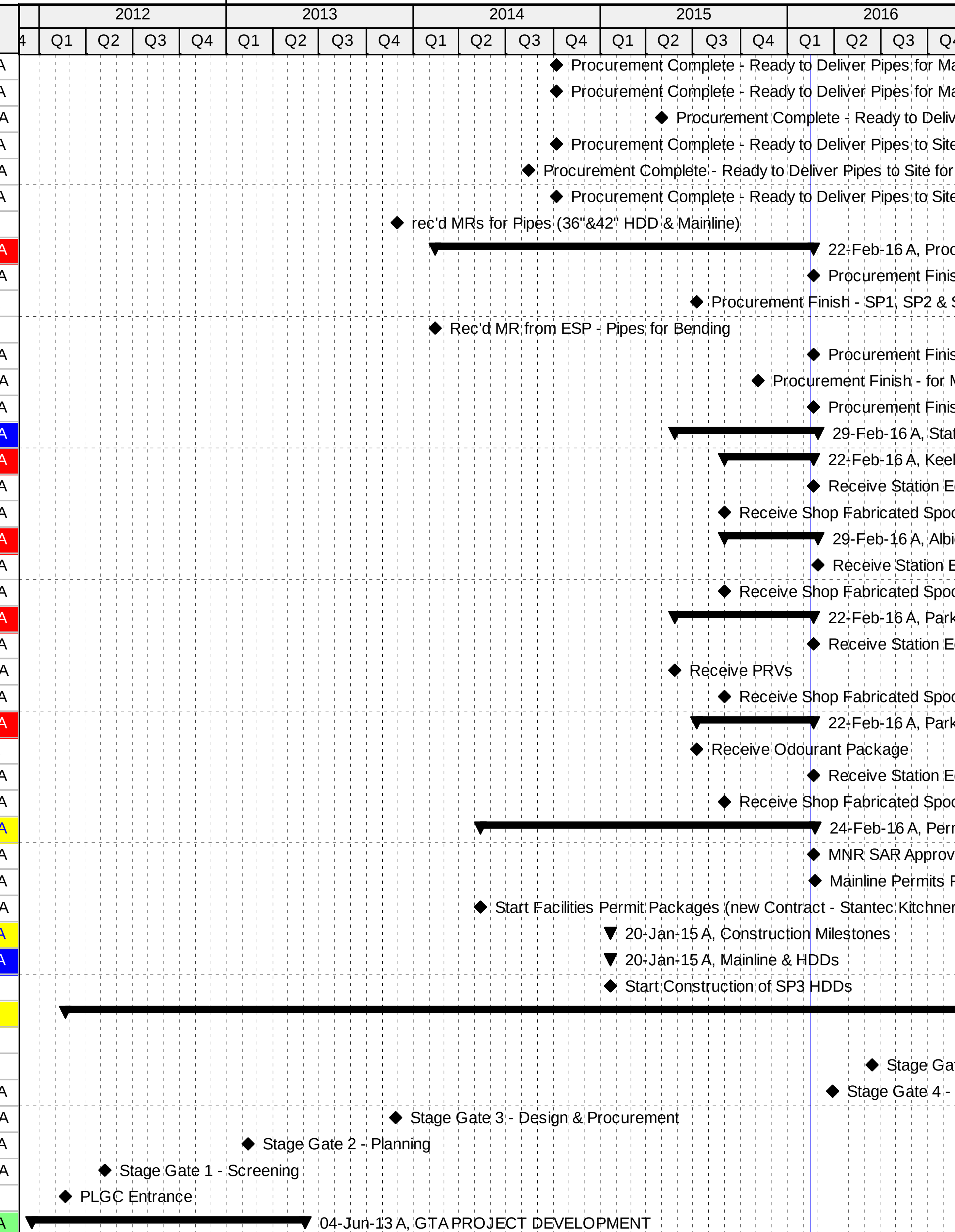


Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule...	Classic Schedule Layout	03-Nov-16 16:06

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
46	PME12890	Procurement Complete - Ready to Deliver Pipes for Mainlin	0.0	100%	100%		08-Oct-14 A
47	PME12860	Procurement Complete - Ready to Deliver Pipes for Mainlin	0.0	100%	100%		08-Oct-14 A
48	PME12850	Procurement Complete - Ready to Deliver Pipes for Mainlin	0.0	100%	100%		01-May-15 A
49	PME12800	Procurement Complete - Ready to Deliver Pipes to Site for I	0.0	100%	100%		08-Oct-14 A
50	PME12790	Procurement Complete - Ready to Deliver Pipes to Site for I	0.0	100%	100%		15-Aug-14 A
51	PME12780	Procurement Complete - Ready to Deliver Pipes to Site for I	0.0	100%	100%		08-Oct-14 A
52	PME12775	rec'd MRs for Pipes (36"&42" HDD & Mainline)	0.0	100%	100%	29-Nov-13 A	
53	**Procurement Readiness - Material Delivery**		0.0	0%	0%	13-Feb-14 A	22-Feb-16 A
54	PME16540	Procurement Finish - for Mainline Construction (SP3)	0.0	100%	0%		22-Feb-16 A
55	PME16530	Procurement Finish - SP1, SP2 & SP3 Induction Bends for I	0.0	100%	100%		10-Jul-15 A
56	PME16110	Rec'd MR from ESP - Pipes for Bending	0.0	100%	100%	13-Feb-14 A	
57	PME12714	Procurement Finish - for Mainline Construction (SP4)	0.0	100%	0%		22-Feb-16 A
58	PME12713	Procurement Finish - for Mainline Construction (SP1)	0.0	100%	100%		05-Nov-15 A
59	PME12712	Procurement Finish - for Mainline Construction (SP2)	0.0	100%	100%		22-Feb-16 A
60	**Stations**		0.0	0%	0%	28-May-15 A	29-Feb-16 A
61	**Keele**		0.0	0%	0%	01-Sep-15 A	22-Feb-16 A
62	MS2920	Receive Station Equipment & Prefab Buidlings	0.0	100%	100%		22-Feb-16 A
63	MS1870	Receive Shop Fabricated Spools	0.0	100%	100%		01-Sep-15 A
64	**Albion**		0.0	0%	0%	01-Sep-15 A	29-Feb-16 A
65	MS1750	Receive Station Equipment & Prefab Buidlings	0.0	100%	0%		29-Feb-16 A
66	MS1720	Receive Shop Fabricated Spools	0.0	100%	100%		01-Sep-15 A
67	**Parkway Cons Bybass**		0.0	0%	0%	28-May-15 A	22-Feb-16 A
68	MS2910	Receive Station Equipment & Prefab Buidlings	0.0	100%	100%		22-Feb-16 A
69	MS1640	Receive PRVs	0.0	100%	100%		28-May-15 A
70	MS1620	Receive Shop Fabricated Spools	0.0	100%	100%		01-Sep-15 A
71	**Parkway West Gate**		0.0	0%	0%	08-Jul-15 A	22-Feb-16 A
72	MS1715	Receive Odourant Package	0.0	100%	100%		08-Jul-15 A
73	MS1710	Receive Station Equipment & Prefab Buidlings	0.0	100%	0%		22-Feb-16 A
74	MS1680	Receive Shop Fabricated Spools	0.0	100%	100%		01-Sep-15 A
75	**Permits Major Milestones**		0.0	0%	0%	13-May-14 A	24-Feb-16 A
76	PLE-07-7420	MNR SAR Approval in Hand	0.0	100%	0%		22-Feb-16 A
77	PLE-07-7360	Mainline Permits Rec'd	0.0	100%	100%		24-Feb-16 A
78	PLE-07-5820	Start Facilities Permit Packages (new Contract - Stantec Ki	0.0	100%	100%		13-May-14 A
79	**Construction Milestones**		0.0	0%	0%	20-Jan-15 A	20-Jan-15 A
80	**Mainline & HDDs**		0.0	0%	0%	20-Jan-15 A	20-Jan-15 A
81	MS1500	Start Construction of SP3 HDDs	0.0	100%	100%	20-Jan-15 A	
82	**PLGC Gates**		208.1	0%	0%	23-Feb-12 A	09-Jan-17
83	MS2030	Stage Gate 6 - Close-Out	0.0	0%	0%		09-Jan-17
84	MS2020	Stage Gate 5 - Start Up	0.0	100%	0%		15-Jun-16
85	MS1460	Stage Gate 4 - Construction	0.0	100%	100%		31-Mar-16 A
86	MS1230	Stage Gate 3 - Design & Procurement	0.0	100%	100%		28-Nov-13 A
87	MS1100	Stage Gate 2 - Planning	0.0	100%	100%		13-Feb-13 A
88	MS1040	Stage Gate 1 - Screening	0.0	100%	100%		09-May-12 A
89	MS1015	PLGC Entrance	0.0	100%	100%	23-Feb-12 A	
90	**GTA PROJECT DEVELOPMENT**		0.0	100%	98.8%	19-Dec-11 A	04-Jun-13 A

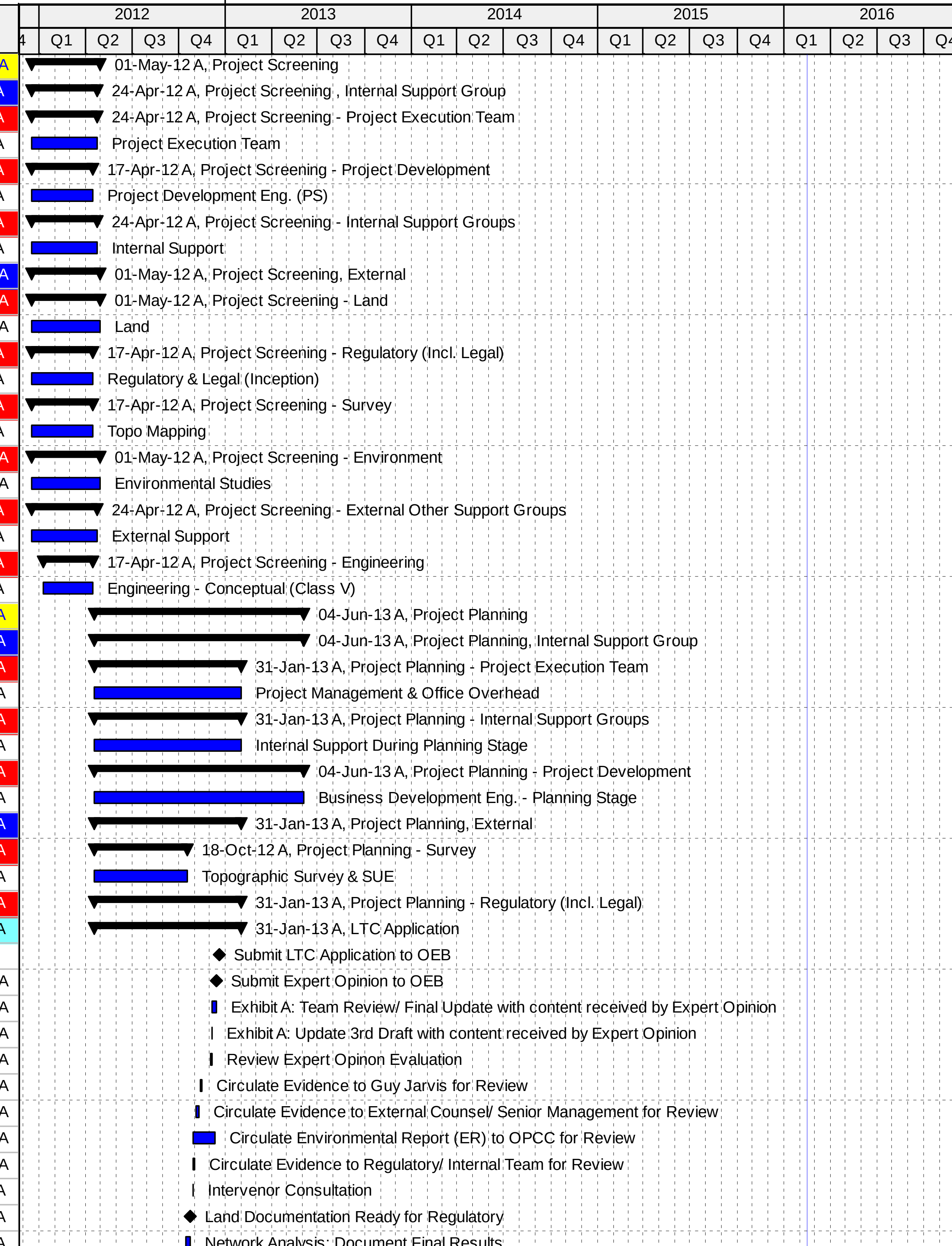


Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:06

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
91		**Project Screening**	0.0	100%	100%	19-Dec-11 A	01-May-12 A
92		**Project Screening , Internal Support Group**	0.0	100%	100%	19-Dec-11 A	24-Apr-12 A
93		**Project Screening - Project Execution Team**	0.0	100%	100%	19-Dec-11 A	24-Apr-12 A
94	MF1030	Project Execution Team	0.0	100%	100%	19-Dec-11 A	24-Apr-12 A
95		**Project Screening - Project Development**	0.0	100%	100%	19-Dec-11 A	17-Apr-12 A
96	MF1000	Project Development Eng. (PS)	0.0	100%	100%	19-Dec-11 A	17-Apr-12 A
97		**Project Screening - Internal Support Groups**	0.0	100%	100%	19-Dec-11 A	24-Apr-12 A
98	MF1020	Internal Support	0.0	100%	100%	19-Dec-11 A	24-Apr-12 A
99		**Project Screening, External**	0.0	100%	100%	19-Dec-11 A	01-May-12 A
100		**Project Screening - Land**	0.0	100%	100%	19-Dec-11 A	01-May-12 A
101	PLE3890	Land	0.0	100%	100%	19-Dec-11 A	01-May-12 A
102		**Project Screening - Regulatory (Incl. Legal)**	0.0	100%	100%	19-Dec-11 A	17-Apr-12 A
103	MZE-16140	Regulatory & Legal (Inception)	0.0	100%	100%	19-Dec-11 A	17-Apr-12 A
104		**Project Screening - Survey**	0.0	100%	100%	19-Dec-11 A	17-Apr-12 A
105	PFC1010	Topo Mapping	0.0	100%	100%	19-Dec-11 A	17-Apr-12 A
106		**Project Screening - Environment**	0.0	100%	100%	19-Dec-11 A	01-May-12 A
107	PEO1040	Environmental Studies	0.0	100%	100%	19-Dec-11 A	01-May-12 A
108		**Project Screening - External Other Support Groups**	0.0	100%	100%	19-Dec-11 A	24-Apr-12 A
109	MFO1010	External Support	0.0	100%	100%	19-Dec-11 A	24-Apr-12 A
110		**Project Screening - Engineering**	0.0	100%	100%	10-Jan-12 A	17-Apr-12 A
111	PFC1000	Engineering - Conceptual (Class V)	0.0	100%	100%	10-Jan-12 A	17-Apr-12 A
112		**Project Planning**	0.0	100%	98.46%	18-Apr-12 A	04-Jun-13 A
113		**Project Planning, Internal Support Group**	0.0	100%	100%	18-Apr-12 A	04-Jun-13 A
114		**Project Planning - Project Execution Team**	0.0	100%	100%	18-Apr-12 A	31-Jan-13 A
115	MF1070	Project Management & Office Overhead	0.0	100%	100%	18-Apr-12 A	31-Jan-13 A
116		**Project Planning - Internal Support Groups**	0.0	100%	100%	18-Apr-12 A	31-Jan-13 A
117	MF1060	Internal Support During Planning Stage	0.0	100%	100%	18-Apr-12 A	31-Jan-13 A
118		**Project Planning - Project Development**	0.0	100%	100%	18-Apr-12 A	04-Jun-13 A
119	MF1040	Business Development Eng. - Planning Stage	0.0	100%	100%	18-Apr-12 A	04-Jun-13 A
120		**Project Planning, External**	0.0	100%	97.61%	18-Apr-12 A	31-Jan-13 A
121		**Project Planning - Survey**	0.0	100%	100%	18-Apr-12 A	18-Oct-12 A
122	PFC1050	Topographic Survey & SUE	0.0	100%	100%	18-Apr-12 A	18-Oct-12 A
123		**Project Planning - Regulatory (Incl. Legal)**	0.0	100%	46.56%	18-Apr-12 A	31-Jan-13 A
124		**LTC Application**	0.0	100%	46.56%	18-Apr-12 A	31-Jan-13 A
125	MZE-16	Submit LTC Application to OEB	0.0	100%	100%	20-Dec-12 A	
126	MZE-16	Submit Expert Opinion to OEB	0.0	100%	100%		13-Dec-12 A
127	MZE-16	Exhibit A: Team Review/ Final Update with content received	0.0	100%	100%	07-Dec-12 A	13-Dec-12 A
128	MZE-16	Exhibit A: Update 3rd Draft with content received by Expert	0.0	100%	100%	06-Dec-12 A	06-Dec-12 A
129	MZE-16	Review Expert Opinon Evaluation	0.0	100%	100%	04-Dec-12 A	05-Dec-12 A
130	MZE-16	Circulate Evidence to Guy Jarvis for Review	0.0	100%	100%	12-Nov-12 A	16-Nov-12 A
131	MZE-16	Circulate Evidence to External Counsel/ Senior Managemer	0.0	100%	100%	05-Nov-12 A	09-Nov-12 A
132	MZE-16	Circulate Environmental Report (ER) to OPCC for Review	0.0	100%	100%	30-Oct-12 A	11-Dec-12 A
133	MZE-16	Circulate Evidence to Regulatory/ Internal Team for Review	0.0	100%	100%	30-Oct-12 A	02-Nov-12 A
134	MZE-16	Intervenor Consultation	0.0	100%	100%	29-Oct-12 A	29-Oct-12 A
135	MZE-16	Land Documentation Ready for Regulatory	0.0	100%	100%		23-Oct-12 A
136	MZE-16	Network Analysis: Document Final Results	0.0	100%	100%	15-Oct-12 A	23-Oct-12 A



Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:06

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
137	MZE-16	Exhibits A-F: Prepare 3rd Draft Evidence (Compile 2nd Dra	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
138	MZE-16	Exhibit A-F: Team Meeting with External Counsel	0.0	100%	100%	09-Oct-12 A	09-Oct-12 A
139	MZE-16	External Review: Expert Opinion Evaluation	0.0	100%	100%	01-Oct-12 A	03-Dec-12 A
140	MZE-16	Exhibit A-F: Distribute 2nd Draft Evidence for Review	0.0	100%	100%	28-Sep-12 A	04-Oct-12 A
141	MZE-16	Exhibit A: 2nd Draft Complete	0.0	100%	100%		27-Sep-12 A
142	MZE-16	Exhibits B-F 2nd Draft Complete	0.0	100%	100%		20-Sep-12 A
143	MZE-16	Exhibit A: Prepare 2nd Draft Evidence	0.0	100%	100%	14-Sep-12 A	27-Sep-12 A
144	MZE-16	Exhibit A: Team Meeting Review - Review 1st Draft Evidenc	0.0	100%	100%	13-Sep-12 A	13-Sep-12 A
145	MZE-16	Exhibit A: Distribute 1st Draft Evidence	0.0	100%	100%	11-Sep-12 A	12-Sep-12 A
146	MZE-16	Exhibits B-F: Prepare 2nd Draft Evidence	0.0	100%	100%	07-Sep-12 A	20-Sep-12 A
147	MZE-16	Exhibits B-F: Review 1st Draft Evidence with Internal Contri	0.0	100%	100%	23-Aug-12 A	06-Sep-12 A
148	MZE-16	Exhibits B-F: Prepare 1st Draft Evidence	0.0	100%	100%	02-Aug-12 A	22-Aug-12 A
149	MZE-16	Exhibit A: Prepare 1st Draft Evidence	0.0	100%	100%	02-Aug-12 A	10-Sep-12 A
150	MZE-16	Summary - Reg. Evidence Prep (Pre Submital for LTC)	0.0	100%	100%	18-Apr-12 A	31-Jan-13 A
151	MF1050	External Support Groups	0.0	100%	0%	18-Apr-12 A	31-Jan-13 A
152		**Exhibits A-F Final Updates**	0.0	0%	0%	18-Oct-12 A	20-Dec-12 A
153	MZE	Preparation for Filing	0.0	100%	100%	26-Nov-12 A	20-Dec-12 A
154	MZE	Exhibits A-F: Final Edits	0.0	100%	100%	19-Nov-12 A	23-Nov-12 A
155	MZE	Exhibit D: Update with Land Documentation	0.0	100%	100%	24-Oct-12 A	25-Oct-12 A
156	MZE	Exhibit A: Update to include Network Analysis information	0.0	100%	100%	24-Oct-12 A	25-Oct-12 A
157	MZE	Exhibit E: Update Economic Analysis with Revised Project C	0.0	100%	100%	18-Oct-12 A	23-Oct-12 A
158		**Exhibit A - Prepare Preliminary Draft Evidence**	0.0	0%	0%	18-Apr-12 A	01-Aug-12 A
159	MZE	Review Project Scope (incl. Exhibit A) w/ External Counsel	0.0	100%	100%	01-Aug-12 A	01-Aug-12 A
160	MZE	Prepare Project Scope Document for External Counsel	0.0	100%	100%	11-Jul-12 A	31-Jul-12 A
161	MZE	Exhibit A: Team Meeting Review - Preliminary Draft Evidenc	0.0	100%	100%	10-Jul-12 A	10-Jul-12 A
162	MZE	Exhibit A: Distribute Preliminary Draft Evidence for Review	0.0	100%	100%	06-Jul-12 A	09-Jul-12 A
163	MZE	Cost Benefit Summary - Preliminary Draft	0.0	100%	100%	18-Apr-12 A	05-Jul-12 A
164	MZE	Timing - Preliminary Draft	0.0	100%	100%	18-Apr-12 A	05-Jul-12 A
165	MZE	Operations of Proposed Facilities - Preliminary Draft	0.0	100%	100%	18-Apr-12 A	05-Jul-12 A
166	MZE	Alternatives - Preliminary Draft	0.0	100%	100%	18-Apr-12 A	05-Jul-12 A
167	MZE	Limitations of Existing Facilities - Preliminary Draft	0.0	100%	100%	18-Apr-12 A	05-Jul-12 A
168	MZE	Issues with Current Operation - Preliminary Draft	0.0	100%	100%	18-Apr-12 A	05-Jul-12 A
169	MZE	Market Growth (Customer Additions Forecast) - Preliminary	0.0	100%	100%	18-Apr-12 A	05-Jul-12 A
170	MZE	Gas Demand and Supply - Preliminary Draft	0.0	100%	100%	18-Apr-12 A	05-Jul-12 A
171	MZE	Current Operation - Preliminary Draft	0.0	100%	100%	18-Apr-12 A	05-Jul-12 A
172	MZE	History of Natural Gas Supply in the GTA - Preliminary Draft	0.0	100%	100%	18-Apr-12 A	05-Jul-12 A
173	MZE	Project Summary - Preliminary Draft	0.0	100%	100%	18-Apr-12 A	05-Jul-12 A
174		**Exhibit A: Prepare 2nd Draft Evidence**	0.0	0%	0%	14-Sep-12 A	27-Sep-12 A
175	MZE	Cost Benefit Summary - 2nd Draft	0.0	100%	100%	14-Sep-12 A	27-Sep-12 A
176	MZE	Timing - 2nd Draft	0.0	100%	100%	14-Sep-12 A	27-Sep-12 A
177	MZE	Operations of Proposed Facilities - 2nd Draft	0.0	100%	100%	14-Sep-12 A	27-Sep-12 A
178	MZE	Alternatives - 2nd Draft	0.0	100%	100%	14-Sep-12 A	27-Sep-12 A
179	MZE	Limitations of Existing Facilities - 2nd Draft	0.0	100%	100%	14-Sep-12 A	27-Sep-12 A
180	MZE	Issues with Current Operation - 2nd Draft	0.0	100%	100%	14-Sep-12 A	27-Sep-12 A
181	MZE	Market Growth (Customer Additions Forecast) - 2nd Draft	0.0	100%	100%	14-Sep-12 A	27-Sep-12 A
182	MZE	Gas Demand and Supply - 2nd Draft	0.0	100%	100%	14-Sep-12 A	27-Sep-12 A

Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:06

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
183	MZE	Current Operation - 2nd Draft	0.0	100%	100%	14-Sep-12 A	27-Sep-12 A
184	MZE	History of Natural Gas Supply in the GTA - 2nd Draft	0.0	100%	100%	14-Sep-12 A	27-Sep-12 A
185	MZE	Project Summary - 2nd Draft	0.0	100%	100%	14-Sep-12 A	27-Sep-12 A
186		**Exhibits B-F: Prepare 1st Draft Evidence**	0.0	0%	0%	02-Aug-12 A	22-Aug-12 A
187	MZE	Preferred Route Description - 1st Draft	0.0	100%	100%	02-Aug-12 A	22-Aug-12 A
188	MZE	Alternative Route Description - 1st Draft	0.0	100%	100%	02-Aug-12 A	22-Aug-12 A
189	MZE	Aboriginal Consultation - 1st Draft	0.0	100%	100%	02-Aug-12 A	22-Aug-12 A
190	MZE	Affidavit Search of Title - 1st Draft	0.0	100%	100%	02-Aug-12 A	22-Aug-12 A
191	MZE	Negotiations to Date - 1st Draft	0.0	100%	100%	02-Aug-12 A	22-Aug-12 A
192	MZE	Permits Required - 1st Draft	0.0	100%	100%	02-Aug-12 A	22-Aug-12 A
193	MZE	Land Requirements - 1st Draft	0.0	100%	100%	02-Aug-12 A	22-Aug-12 A
194	MZE	Proposed Construction Schedule - 1st Draft	0.0	100%	100%	02-Aug-12 A	22-Aug-12 A
195	MZE	Total Estimated Project Costs - 1st Draft	0.0	100%	100%	02-Aug-12 A	22-Aug-12 A
196	MZE	Hydrostatic Test Procedures - 1st Draft	0.0	100%	100%	02-Aug-12 A	22-Aug-12 A
197	MZE	Design Specifications - 1st Draft	0.0	100%	100%	02-Aug-12 A	22-Aug-12 A
198	MZE	Environmental Implementation Plan - 1st Draft	0.0	100%	100%	02-Aug-12 A	22-Aug-12 A
199	MZE	Tree Inventory and Condition Assessment - 1st Draft	0.0	100%	100%	02-Aug-12 A	22-Aug-12 A
200		**Exhibits B-F: Prepare 2nd Draft Evidence**	0.0	0%	0%	07-Sep-12 A	20-Sep-12 A
201	MZE	Aboriginal Consultation - 2nd Draft	0.0	100%	100%	07-Sep-12 A	20-Sep-12 A
202	MZE	Affidavit Search of Title - 2nd Draft	0.0	100%	100%	07-Sep-12 A	20-Sep-12 A
203	MZE	Negotiations to Date - 2nd Draft	0.0	100%	100%	07-Sep-12 A	20-Sep-12 A
204	MZE	Permits Required - 2nd Draft	0.0	100%	100%	07-Sep-12 A	20-Sep-12 A
205	MZE	Land Requirements - 2nd Draft	0.0	100%	100%	07-Sep-12 A	20-Sep-12 A
206	MZE	Proposed Construction Schedule - 2nd Draft	0.0	100%	100%	07-Sep-12 A	20-Sep-12 A
207	MZE	Total Estimated Project Costs - 2nd Draft	0.0	100%	100%	07-Sep-12 A	20-Sep-12 A
208	MZE	Hydrostatic Test Procedures - 2nd Draft	0.0	100%	100%	07-Sep-12 A	20-Sep-12 A
209	MZE	Design Specifications - 2nd Draft	0.0	100%	100%	07-Sep-12 A	20-Sep-12 A
210	MZE	Environmental Implementation Plan - 2nd Draft	0.0	100%	100%	07-Sep-12 A	20-Sep-12 A
211	MZE	Tree Inventory and Condition Assessment - 2nd Draft	0.0	100%	100%	07-Sep-12 A	20-Sep-12 A
212	MZE	Alternative Route Description - 2nd Draft	0.0	100%	100%	07-Sep-12 A	20-Sep-12 A
213	MZE	Preferred Route Description - 2nd Draft	0.0	100%	100%	07-Sep-12 A	20-Sep-12 A
214		**Exhibits A-F: Prepare 3rd Draft Evidence (Compile 2nd Draft Evi**	0.0	0%	0%	10-Oct-12 A	29-Oct-12 A
215	MZE	Aboriginal Consultation - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
216	MZE	Economic Feasibility of Alternative Means of Supply	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
217	MZE	Stage 1 Analysis	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
218	MZE	Economic Feasibility	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
219	MZE	Affidavit Search of Title - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
220	MZE	Negotiations to Date - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
221	MZE	Permits Required - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
222	MZE	Land Requirements - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
223	MZE	Proposed Construction Schedule - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
224	MZE	Total Estimated Project Costs - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
225	MZE	Hydrostatic Test Procedures - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
226	MZE	Design Specifications - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
227	MZE	Environmental Implementation Plan - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
228	MZE	Tree Inventory and Condition Assessment - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A

Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:06

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
229	MZE	Archeological Assessment	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
230	MZE	Environmental Report (ER)	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
231	MZE	Maps: Alternate and Final Route for Section A and Section B	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
232	MZE	Alternative Route Description - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
233	MZE	Preferred Route Description - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
234	MZE	Cost Benefit Summary - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
235	MZE	Timing - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
236	MZE	Operations of Proposed Facilities - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
237	MZE	Alternatives - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
238	MZE	Limitations of Existing Facilities - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
239	MZE	Issues with Current Operation - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
240	MZE	Market Growth (Customer Additions Forecast) - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
241	MZE	Gas Demand and Supply - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
242	MZE	Current Operation - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
243	MZE	History of Natural Gas Supply in the GTA - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
244	MZE	Project Summary - 3rd Draft	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
245	MZE	Confirm List of Interested Parties Completion	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
246	MZE	Confirm OPCC Distribution List	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
247	MZE	Exhibit List Completion	0.0	100%	100%	10-Oct-12 A	29-Oct-12 A
248	**Required Supporting Studies/Documents**		0.0	0%	0%	14-Aug-12 A	12-Oct-12 A
249	MZE	Network Analysis: Identify and Complete Other Required An	0.0	100%	100%	13-Sep-12 A	12-Oct-12 A
250	MZE	Network Analysis: Complete Analysis - Confirm Timing and I	0.0	100%	100%	13-Sep-12 A	12-Oct-12 A
251	MZE	Network Analysis: Complete PISA Analysis	0.0	100%	100%	13-Sep-12 A	12-Oct-12 A
252	MZE	Network Analysis: Verify Daily Flows	0.0	100%	100%	13-Sep-12 A	12-Oct-12 A
253	MZE	Network Analysis: Confirm Current and Future Loads (wrt.	0.0	100%	100%	13-Sep-12 A	12-Oct-12 A
254	MZE	Network Analysis: Create Load Files	0.0	100%	100%	22-Aug-12 A	12-Sep-12 A
255	MZE	Network Analysis: Compile Customer Growth Information	0.0	100%	100%	22-Aug-12 A	12-Sep-12 A
256	MZE	Network Analysis: Confirm DSM Factor - Harmonize Gas S	0.0	100%	100%	16-Aug-12 A	31-Aug-12 A
257	MZE	Network Analysis: Finalize and Approve Customer Forecast	0.0	100%	100%	16-Aug-12 A	31-Aug-12 A
258	MZE	Finalize Environmental Report (ER)	0.0	100%	100%	14-Aug-12 A	10-Oct-12 A
259	**Other Matters**		0.0	0%	0%	11-Oct-12 A	29-Oct-12 A
260	MZE	Mail Environmental Report to OPCC	0.0	100%	100%	23-Oct-12 A	29-Oct-12 A
261	MZE	Review and Prepare Package for submission to OPCC	0.0	100%	100%	11-Oct-12 A	22-Oct-12 A
262	**Project Planning - Land**		0.0	100%	100%	18-Apr-12 A	23-Oct-12 A
263	**Pre LTC Submission**		0.0	100%	100%	18-Apr-12 A	23-Oct-12 A
264	PLE3900	Summary - Land Acquisition & Easements Negotiations	0.0	100%	100%	18-Apr-12 A	23-Oct-12 A
265	**Spread 1**		0.0	0%	0%	18-Apr-12 A	22-Oct-12 A
266	PLE:	Have Land in hand	0.0	100%	100%		22-Oct-12 A
267	PLE:	Negotiate Options for Easements with Infrastructure Ontari	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
268	**Spread 2**		0.0	0%	0%	18-Apr-12 A	22-Oct-12 A
269	PLE:	Have Land in hand	0.0	100%	100%		22-Oct-12 A
270	PLE:	5 Ruggless Ave. Development Inc. (Condor Development)	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
271	PLE:	Negotiate Options for Easements with Infrastructure Ontari	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
272	PLE:	Albert Schingal	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
273	PLE:	John Fontana	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
274	PLE:	Tony Ucci	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A

Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:06

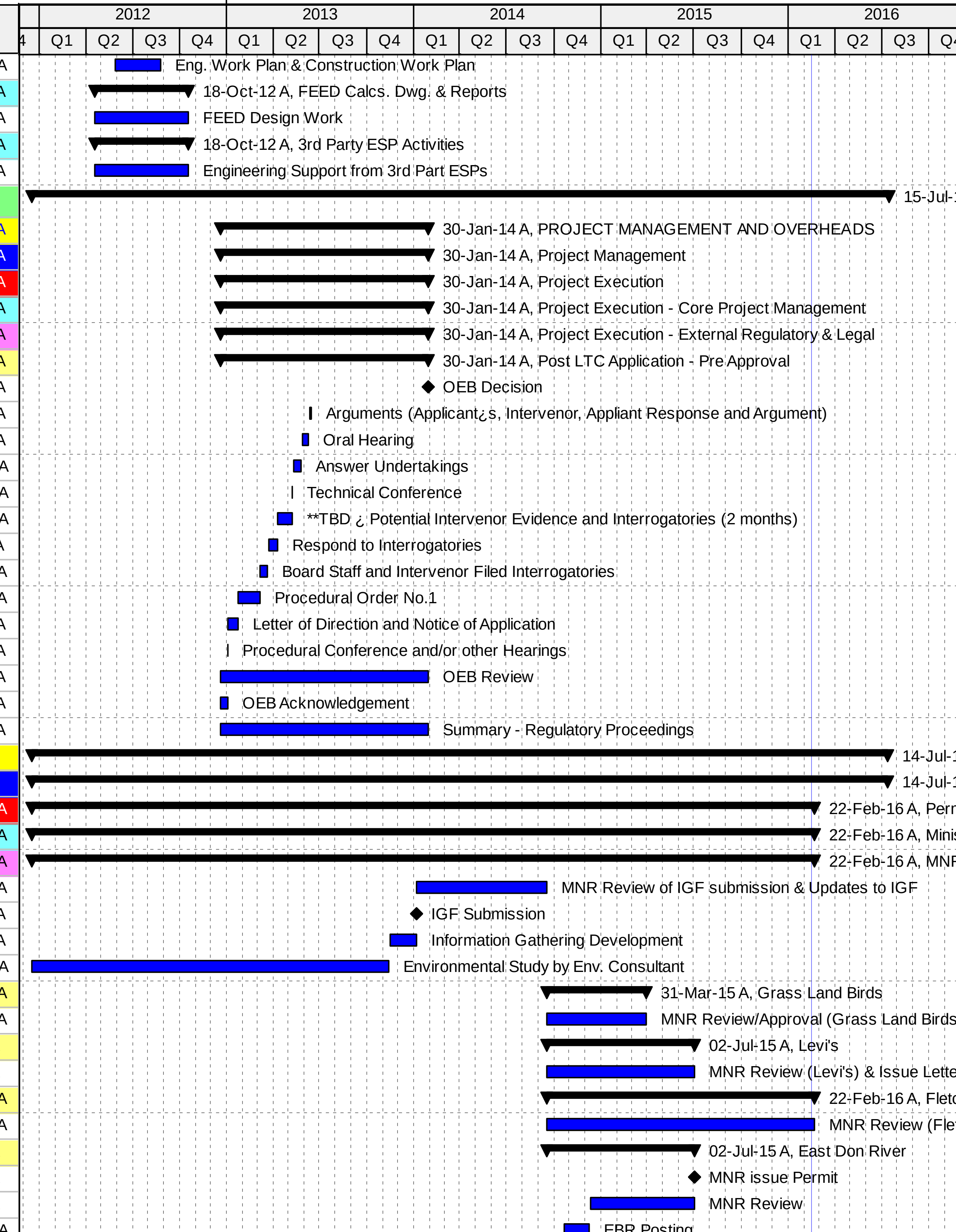
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
275	PLE:	A.G.S. Consultant (Angus & Glen Development)	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
276	PLE:	M.A.N Enterprises (Angus & Glen Development)	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
277	PLE:	Contango Holding (Angus & Glen Development)	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
278	PLE:	9 Landstaff Rd East Development (Condor Development)	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
279	PLE:	5 Landstaff Rd East Development (Condor Development)	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
280	PLE:	10 Ruggless Ave. Development (Condor Development)	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
281	**Spread 3**		0.0	0%	0%	18-Apr-12 A	22-Oct-12 A
282	PLE:	Have Land in hand	0.0	100%	100%		22-Oct-12 A
283	PLE:	Negotiate with Private Owner (Cherie Barbara Davidson)	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
284	PLE:	Negotiate with Private Owner (Clara Ball)	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
285	PLE:	Negotiate with Private Owner (2074070 Ontario Inc.)	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
286	PLE:	Negotiate with Private Owner (Airport 407 Business Campu	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
287	PLE:	Negotiate with Metrolinx	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
288	PLE:	Negotiate with Private Owner (1083131 Ontario Inc.)	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
289	PLE:	Toronto Region Conservation Authorities	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
290	PLE:	Negotiate Options for Easements with Infrastructure Ontari	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
291	**Stations**		0.0	0%	0%	18-Apr-12 A	23-Oct-12 A
292	SLE:	Jonesville Negotiations with Hydro One and Infrastructure (	0.0	100%	100%	20-Jun-12 A	23-Oct-12 A
293	SLE:	Buttonville - Purchase / Negotiate with City of Markham	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
294	SLE:	Albion Road - Documentation Checking	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
295	SLE:	Parkway West - Purchase / Negotiation with Union Gas	0.0	100%	100%	18-Apr-12 A	22-Oct-12 A
296	**Project Planning - Environment**		0.0	100%	100%	02-May-12 A	20-Sep-12 A
297	PEO2000	Submit ER to Enbridge	0.0	100%	100%		20-Sep-12 A
298	PEO1420	Review/Finalize ER	0.0	100%	100%	14-Aug-12 A	20-Sep-12 A
299	PEO1410	Final Draft ER Submitted to Enb	0.0	100%	100%		13-Aug-12 A
300	PEO1400	WBS - Environmental Studies	0.0	100%	100%	02-May-12 A	20-Sep-12 A
301	PEO1390	Environmental Studies	0.0	100%	100%	02-May-12 A	13-Aug-12 A
302	**Project Planning - Geotechnical**		0.0	100%	100%	18-Apr-12 A	18-Jul-12 A
303	PFC1040	Geotechnical Investigations	0.0	100%	100%	18-Apr-12 A	18-Jul-12 A
304	**Project Planning - Engineering**		0.0	100%	100%	18-Apr-12 A	18-Oct-12 A
305	PFC1030	Summary - Front End Engineering Design	0.0	100%	100%	18-Apr-12 A	18-Oct-12 A
306	**FEED Milestones**		0.0	0%	0%	18-Apr-12 A	18-Oct-12 A
307	PFC118	FEED Package Submitted to Enbridge	0.0	100%	100%		18-Oct-12 A
308	PFC117	BoE & Class III Estimate to Enbridge	0.0	100%	100%		18-Oct-12 A
309	PFC116	FEED Completed	0.0	100%	100%		18-Oct-12 A
310	PFC115	EWP & CEP to Enbridge	0.0	100%	100%		24-Aug-12 A
311	PFC114	DBM submitted to Enbridge	0.0	100%	100%		30-Jul-12 A
312	PFC10(	Start of FEED	0.0	100%	100%	18-Apr-12 A	
313	**PM & Support Activities**		0.0	0%	0%	18-Apr-12 A	18-Oct-12 A
314	PFC10	PM & Support	0.0	100%	100%	18-Apr-12 A	18-Oct-12 A
315	**Design Basis Memorandum**		0.0	0%	0%	29-Jun-12 A	30-Jul-12 A
316	PFC113	DBM	0.0	100%	100%	29-Jun-12 A	30-Jul-12 A
317	**BoE & Class III Estimate**		0.0	0%	0%	18-Apr-12 A	18-Oct-12 A
318	PFC109	Class III Estimate	0.0	100%	100%	18-Apr-12 A	18-Oct-12 A
319	PFC108	Basis of Estimate	0.0	100%	100%	18-Apr-12 A	18-Oct-12 A
320	**EWP & CEP**		0.0	0%	0%	28-May-12 A	24-Aug-12 A

Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:06

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
321	PFC11:	Eng. Work Plan & Construction Work Plan	0.0	100%	100%	28-May-12 A	24-Aug-12 A
322		**FEED Calcs. Dwg. & Reports**	0.0	0%	0%	18-Apr-12 A	18-Oct-12 A
323	PFC11(	FEED Design Work	0.0	100%	100%	18-Apr-12 A	18-Oct-12 A
324		**3rd Party ESP Activities**	0.0	0%	0%	18-Apr-12 A	18-Oct-12 A
325	PFC111	Engineering Support from 3rd Part ESPs	0.0	100%	100%	18-Apr-12 A	18-Oct-12 A
326		**GTA PROJECT EXECUTION**	50.4	99.46%	98.62%	19-Dec-11 A	15-Jul-16
327		**PROJECT MANAGEMENT AND OVERHEADS**	0.0	100%	100%	21-Dec-12 A	30-Jan-14 A
328		**Project Management**	0.0	100%	100%	21-Dec-12 A	30-Jan-14 A
329		**Project Execution**	0.0	100%	100%	21-Dec-12 A	30-Jan-14 A
330		**Project Execution - Core Project Management**	0.0	100%	100%	21-Dec-12 A	30-Jan-14 A
331		**Project Execution - External Regulatory & Legal**	0.0	100%	100%	21-Dec-12 A	30-Jan-14 A
332		**Post LTC Application - Pre Approval**	0.0	100%	100%	21-Dec-12 A	30-Jan-14 A
333	M	OEB Decision	0.0	100%	100%		30-Jan-14 A
334	M	Arguments (Applicant¿s, Intervenor, Appliant Response an	0.0	100%	100%	11-Jun-13 A	14-Jun-13 A
335	M	Oral Hearing	0.0	100%	100%	28-May-13 A	10-Jun-13 A
336	M	Answer Undertakings	0.0	100%	100%	13-May-13 A	27-May-13 A
337	M	Technical Conference	0.0	100%	100%	09-May-13 A	10-May-13 A
338	M	**TBD ¿ Potential Intervenor Evidence and Interrogatories (	0.0	100%	100%	10-Apr-13 A	08-May-13 A
339	M	Respond to Interrogatories	0.0	100%	100%	25-Mar-13 A	09-Apr-13 A
340	M	Board Staff and Intervenor Filed Interrogatories	0.0	100%	100%	08-Mar-13 A	22-Mar-13 A
341	M	Procedural Order No.1	0.0	100%	100%	24-Jan-13 A	07-Mar-13 A
342	M	Letter of Direction and Notice of Application	0.0	100%	100%	02-Jan-13 A	24-Jan-13 A
343	M	Procedural Conference and/or other Hearings	0.0	100%	100%	02-Jan-13 A	02-Jan-13 A
344	M	OEB Review	0.0	100%	100%	21-Dec-12 A	30-Jan-14 A
345	M	OEB Acknowledgement	0.0	100%	100%	21-Dec-12 A	02-Jan-13 A
346	M	Summary - Regulatory Proceedings	0.0	100%	100%	21-Dec-12 A	30-Jan-14 A
347		**MAINLINE**	49.6	99.48%	99.3%	19-Dec-11 A	14-Jul-16
348		**Spread 0**	49.6	99.16%	99.01%	19-Dec-11 A	14-Jul-16
349		**Permits**	0.0	0%	0%	19-Dec-11 A	22-Feb-16 A
350		**Ministry of Natural Resources**	0.0	0%	0%	19-Dec-11 A	22-Feb-16 A
351		**MNR - Species at Risk (Letter of Advice)**	0.0	0%	0%	19-Dec-11 A	22-Feb-16 A
352	PLE-	MNR Review of IGF submission & Updates to IGF	0.0	100%	100%	07-Jan-14 A	16-Sep-14 A
353	PLE-	IGF Submission	0.0	100%	100%		06-Jan-14 A
354	PLE-	Information Gathering Development	0.0	100%	100%	15-Nov-13 A	06-Jan-14 A
355	PLE-	Environmental Study by Env. Consultant	0.0	100%	100%	19-Dec-11 A	14-Nov-13 A
356		**Grass Land Birds**	0.0	0%	0%	17-Sep-14 A	31-Mar-15 A
357	P	MNR Review/Approval (Grass Land Birds)	0.0	100%	100%	17-Sep-14 A	31-Mar-15 A
358		**Levi's**	0.0	0%	0%	17-Sep-14 A	02-Jul-15 A
359	P	MNR Review (Levi's) & Issue Letter of Advice (Approval)	0.0	100%	100%	17-Sep-14 A	02-Jul-15 A
360		**Fletcher's**	0.0	0%	0%	17-Sep-14 A	22-Feb-16 A
361	P	MNR Review (Fletcher's) & Issue Letter of Advice (Approval)	0.0	100%	100%	17-Sep-14 A	22-Feb-16 A
362		**East Don River**	0.0	0%	0%	17-Sep-14 A	02-Jul-15 A
363	A	MNR issue Permit	0.0	100%	100%		02-Jul-15 A
364	A	MNR Review	0.0	100%	100%	11-Dec-14 A	02-Jul-15 A
365	A	EBR Posting	0.0	100%	100%	23-Oct-14 A	10-Dec-14 A

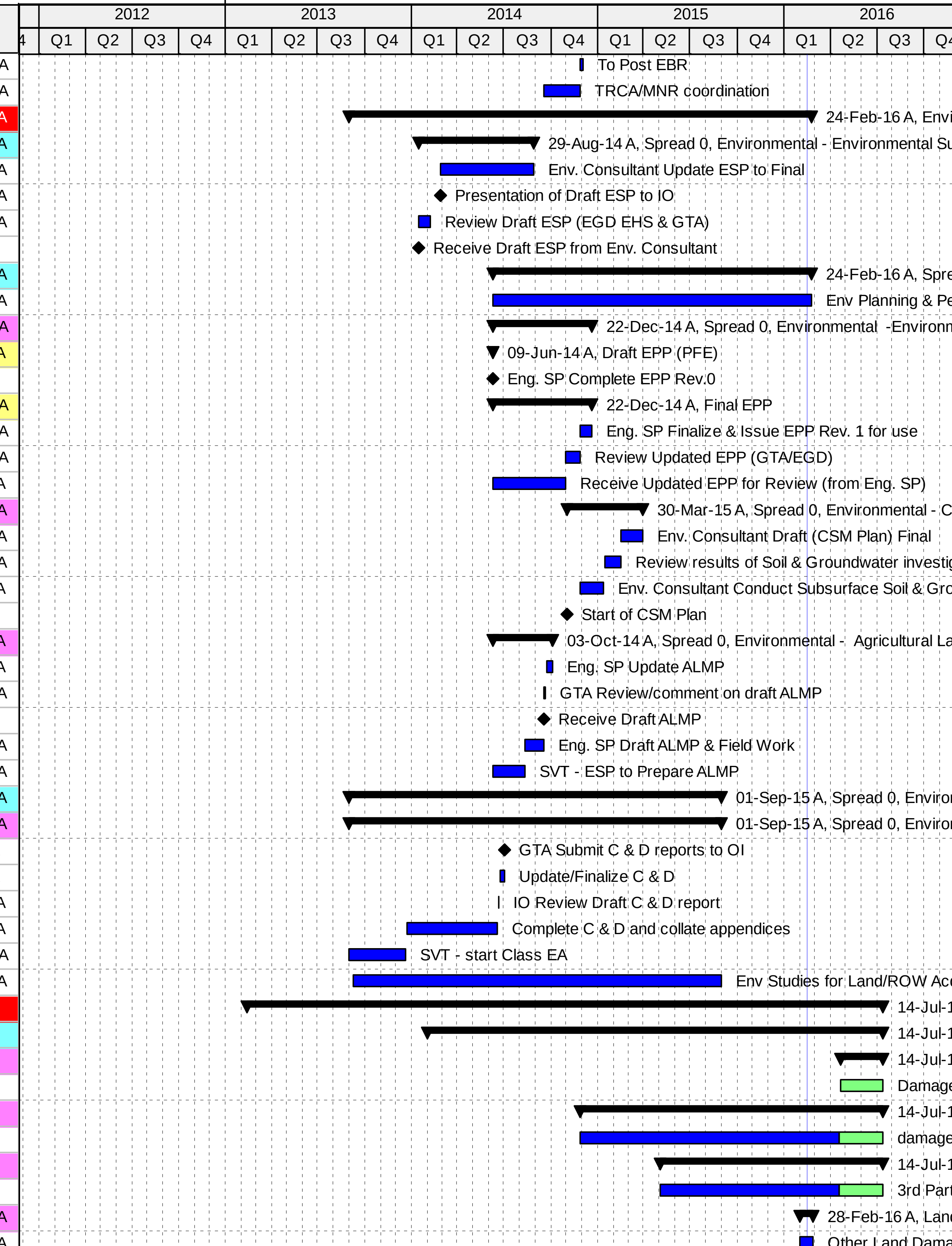


Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule...	Classic Schedule Layout	03-Nov-16 16:06

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
366	A	To Post EBR	0.0	100%	100%	28-Nov-14 A	04-Dec-14 A
367	A	TRCA/MNR coordination	0.0	100%	100%	17-Sep-14 A	28-Nov-14 A
368		**Environment - Spread 0**	0.0	100%	100%	30-Aug-13 A	24-Feb-16 A
369		**Spread 0, Environmental - Environmental Survey & Studies**	0.0	0%	0%	15-Jan-14 A	29-Aug-14 A
370	PEO20	Env. Consultant Update ESP to Final	0.0	100%	100%	28-Feb-14 A	29-Aug-14 A
371	PEO20	Presentation of Draft ESP to IO	0.0	100%	100%		28-Feb-14 A
372	PEO20	Review Draft ESP (EGD EHS & GTA)	0.0	100%	100%	15-Jan-14 A	06-Feb-14 A
373	PEO20	Receive Draft ESP from Env. Consultant	0.0	100%	100%	15-Jan-14 A	
374		**Spread 0, Environmental - Environmental Planning and Permitting**	0.0	100%	100%	09-Jun-14 A	24-Feb-16 A
375	WBS-1	Env Planning & Permitting	0.0	100%	100%	09-Jun-14 A	24-Feb-16 A
376		**Spread 0, Environmental -Environmental Protection Plan (EPP)**	0.0	0%	0%	09-Jun-14 A	22-Dec-14 A
377		**Draft EPP (PFE)**	0.0	0%	0%	09-Jun-14 A	09-Jun-14 A
378	P	Eng. SP Complete EPP Rev.0	0.0	100%	100%	09-Jun-14 A	
379		**Final EPP**	0.0	0%	0%	10-Jun-14 A	22-Dec-14 A
380	P	Eng. SP Finalize & Issue EPP Rev. 1 for use	0.0	100%	100%	28-Nov-14 A	22-Dec-14 A
381	P	Review Updated EPP (GTA/EGD)	0.0	100%	100%	29-Oct-14 A	28-Nov-14 A
382	P	Receive Updated EPP for Review (from Eng. SP)	0.0	100%	100%	10-Jun-14 A	29-Oct-14 A
383		**Spread 0, Environmental - Contaminated Soil Management Plan**	0.0	0%	0%	03-Nov-14 A	30-Mar-15 A
384	PEO	Env. Consultant Draft (CSM Plan) Final	0.0	100%	100%	17-Feb-15 A	30-Mar-15 A
385	PEO	Review results of Soil & Groundwater investigation and dete	0.0	100%	100%	14-Jan-15 A	17-Feb-15 A
386	PEO	Env. Consultant Conduct Subsurface Soil & Groundwater in	0.0	100%	100%	28-Nov-14 A	13-Jan-15 A
387	PEO	Start of CSM Plan	0.0	100%	100%	03-Nov-14 A	
388		**Spread 0, Environmental - Agricultural Land Management Plan**	0.0	0%	0%	10-Jun-14 A	03-Oct-14 A
389	PEO	Eng. SP Update ALMP	0.0	100%	100%	22-Sep-14 A	03-Oct-14 A
390	PEO	GTA Review/comment on draft ALMP	0.0	100%	100%	17-Sep-14 A	19-Sep-14 A
391	PEO	Receive Draft ALMP	0.0	100%	100%	17-Sep-14 A	
392	PEO	Eng. SP Draft ALMP & Field Work	0.0	100%	100%	12-Aug-14 A	17-Sep-14 A
393	PEO	SVT - ESP to Prepare ALMP	0.0	100%	100%	10-Jun-14 A	12-Aug-14 A
394		**Spread 0, Environmental - Environmental Studies for Land/ROW a**	0.0	100%	100%	30-Aug-13 A	01-Sep-15 A
395		**Spread 0, Environmental - Class EA**	0.0	100%	100%	30-Aug-13 A	01-Sep-15 A
396	PEO	GTA Submit C & D reports to OI	0.0	100%	100%		02-Jul-14 A
397	PEO	Update/Finalize C & D	0.0	100%	100%	23-Jun-14 A	02-Jul-14 A
398	PEO	IO Review Draft C & D report	0.0	100%	100%	20-Jun-14 A	20-Jun-14 A
399	PEO	Complete C & D and collate appendices	0.0	100%	100%	23-Dec-13 A	19-Jun-14 A
400	PEO	SVT - start Class EA	0.0	100%	100%	30-Aug-13 A	20-Dec-13 A
401	PEO	Env Studies for Land/ROW Acquisitions	0.0	100%	100%	09-Sep-13 A	01-Sep-15 A
402		**Land - Mainline**	49.6	98.93%	98.75%	12-Feb-13 A	14-Jul-16
403		**Land - Mainline, Damages**	49.6	76.48%	72.41%	31-Jan-14 A	14-Jul-16
404		**Land - Mainline, Damages - Inconvenience**	46.4	0%	0%	22-Apr-16	14-Jul-16
405	A13	Damages	46.4	81.9%	0%	22-Apr-16	14-Jul-16
406		**Land - Mainline, Damages - Agricultural Losses**	49.6	0%	0%	28-Nov-14 A	14-Jul-16
407	A13	damages to Agricultural Lands	49.6	84.67%	65%	28-Nov-14 A	14-Jul-16
408		**Land - Mainline, Damages - Landowner/3rd Party Costs**	49.6	71.16%	65%	04-May-15 A	14-Jul-16
409	A13	3rd Party Costs	49.6	71.16%	65%	04-May-15 A	14-Jul-16
410		**Land - Mainline, Damages - Other Damages**	0.0	71.16%	100%	01-Feb-16 A	28-Feb-16 A
411	A13	Other Land Damages	0.0	71.16%	100%	01-Feb-16 A	28-Feb-16 A

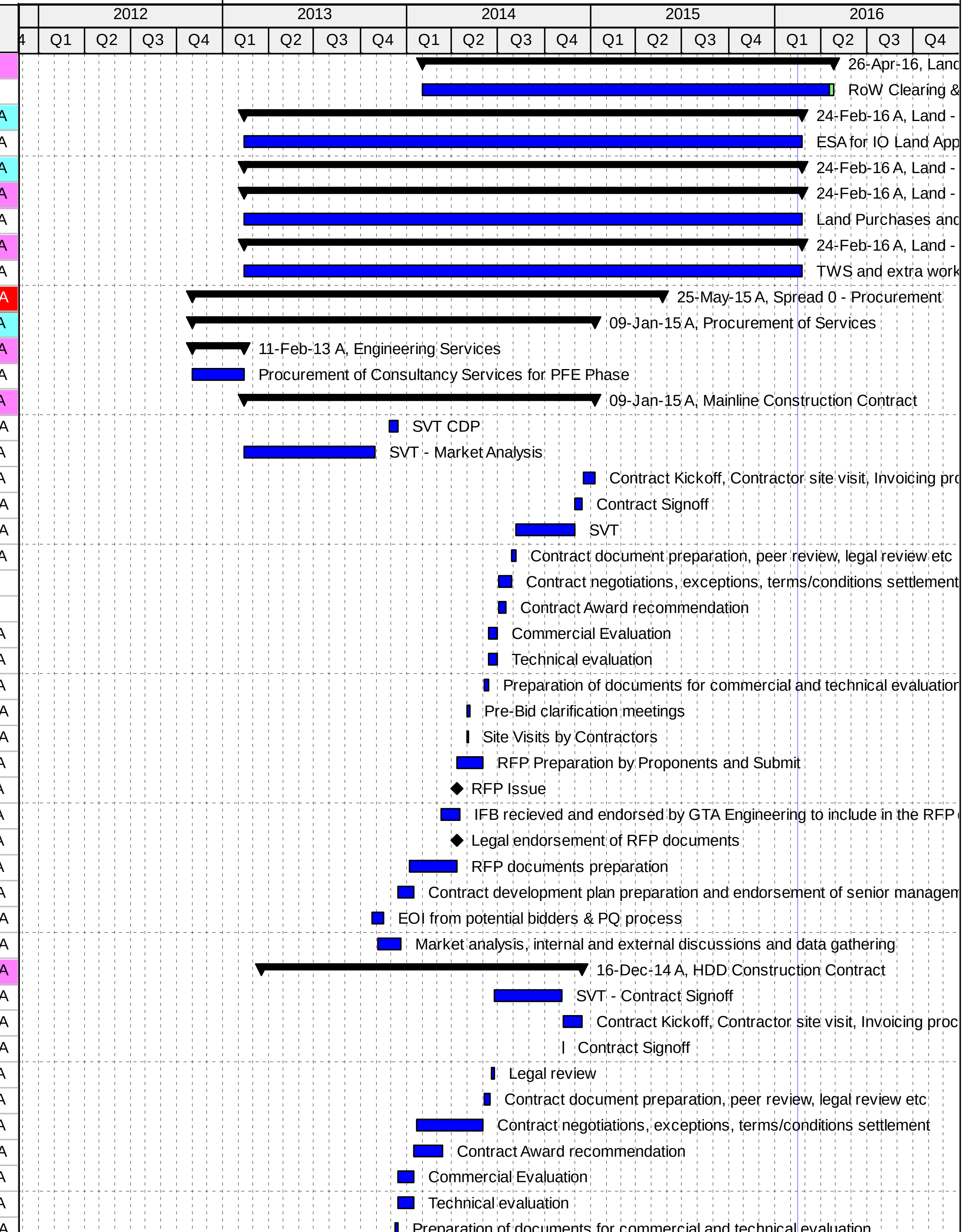


Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:06

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
412		**Land - ROW Clearing**	5.0	100%	99%	31-Jan-14 A	26-Apr-16
413	A138	RoW Clearing & Grabing	5.0	100%	99%	31-Jan-14 A	26-Apr-16
414		**Land - Mainline, Consultants**	0.0	100%	100%	12-Feb-13 A	24-Feb-16 A
415	PLE3920	ESA for IO Land Application	0.0	100%	100%	12-Feb-13 A	24-Feb-16 A
416		**Land - Mainline, Compensation**	0.0	100%	100%	13-Feb-13 A	24-Feb-16 A
417		**Land - Mainline, Compensation Easements**	0.0	100%	100%	13-Feb-13 A	24-Feb-16 A
418	A137	Land Purchases and Easements	0.0	100%	100%	13-Feb-13 A	24-Feb-16 A
419		**Land - Mainline, Compensation - Temp & Extra Temp Work Space**	0.0	100%	100%	13-Feb-13 A	24-Feb-16 A
420	A137	TWS and extra work space	0.0	100%	100%	13-Feb-13 A	24-Feb-16 A
421		**Spread 0 - Procurement**	0.0	0%	0%	02-Nov-12 A	25-May-15 A
422		**Procurement of Services**	0.0	0%	0%	02-Nov-12 A	09-Jan-15 A
423		**Engineering Services**	0.0	0%	0%	02-Nov-12 A	11-Feb-13 A
424	PME	Procurement of Consultancy Services for PFE Phase	0.0	100%	100%	02-Nov-12 A	11-Feb-13 A
425		**Mainline Construction Contract**	0.0	0%	0%	13-Feb-13 A	09-Jan-15 A
426	PME	SVT CDP	0.0	100%	100%	28-Nov-13 A	13-Dec-13 A
427	PME	SVT - Market Analysis	0.0	100%	100%	13-Feb-13 A	31-Oct-13 A
428	PME	Contract Kickoff, Contractor site visit, Invoicing process se	0.0	100%	100%	17-Dec-14 A	09-Jan-15 A
429	PME	Contract Signoff	0.0	100%	100%	02-Dec-14 A	16-Dec-14 A
430	PME	SVT	0.0	100%	100%	06-Aug-14 A	01-Dec-14 A
431	PME	Contract document preparation, peer review, legal review e	0.0	100%	100%	28-Jul-14 A	05-Aug-14 A
432	PME	Contract negotiations, exceptions, terms/conditions settlem	0.0	100%	100%	02-Jul-14 A	28-Jul-14 A
433	PME	Contract Award recommendation	0.0	100%	100%	02-Jul-14 A	15-Jul-14 A
434	PME	Commercial Evaluation	0.0	100%	100%	11-Jun-14 A	30-Jun-14 A
435	PME	Technical evaluation	0.0	100%	100%	11-Jun-14 A	30-Jun-14 A
436	PME	Preparation of documents for commercial and technical eva	0.0	100%	100%	03-Jun-14 A	11-Jun-14 A
437	PME	Pre-Bid clarification meetings	0.0	100%	100%	01-May-14 A	05-May-14 A
438	PME	Site Visits by Contractors	0.0	100%	100%	30-Apr-14 A	02-May-14 A
439	PME	RFP Preparation by Proponents and Submit	0.0	100%	100%	10-Apr-14 A	02-Jun-14 A
440	PME	RFP Issue	0.0	100%	100%		09-Apr-14 A
441	PME	IFB recieved and endorsed by GTA Engineering to include i	0.0	100%	100%	10-Mar-14 A	17-Apr-14 A
442	PME	Legal endorsement of RFP documents	0.0	100%	100%		09-Apr-14 A
443	PME	RFP documents preparation	0.0	100%	100%	06-Jan-14 A	09-Apr-14 A
444	PME	Contract development plan preparation and endorsement o	0.0	100%	100%	16-Dec-13 A	16-Jan-14 A
445	PME	EOI from potential bidders & PQ process	0.0	100%	100%	24-Oct-13 A	15-Nov-13 A
446	PME	Market analysis, internal and external discussions and data	0.0	100%	100%	04-Nov-13 A	20-Dec-13 A
447		**HDD Construction Contract**	0.0	0%	0%	20-Mar-13 A	16-Dec-14 A
448	PME	SVT - Contract Signoff	0.0	100%	100%	24-Jun-14 A	06-Nov-14 A
449	PME	Contract Kickoff, Contractor site visit, Invoicing process se	0.0	100%	100%	07-Nov-14 A	16-Dec-14 A
450	PME	Contract Signoff	0.0	100%	100%	07-Nov-14 A	07-Nov-14 A
451	PME	Legal review	0.0	100%	100%	17-Jun-14 A	23-Jun-14 A
452	PME	Contract document preparation, peer review, legal review e	0.0	100%	100%	03-Jun-14 A	16-Jun-14 A
453	PME	Contract negotiations, exceptions, terms/conditions settlem	0.0	100%	100%	22-Jan-14 A	02-Jun-14 A
454	PME	Contract Award recommendation	0.0	100%	100%	15-Jan-14 A	14-Mar-14 A
455	PME	Commercial Evaluation	0.0	100%	100%	16-Dec-13 A	14-Jan-14 A
456	PME	Technical evaluation	0.0	100%	100%	16-Dec-13 A	14-Jan-14 A
457	PME	Preparation of documents for commercial and technical eva	0.0	100%	100%	09-Dec-13 A	13-Dec-13 A



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TASK filter: All Activities

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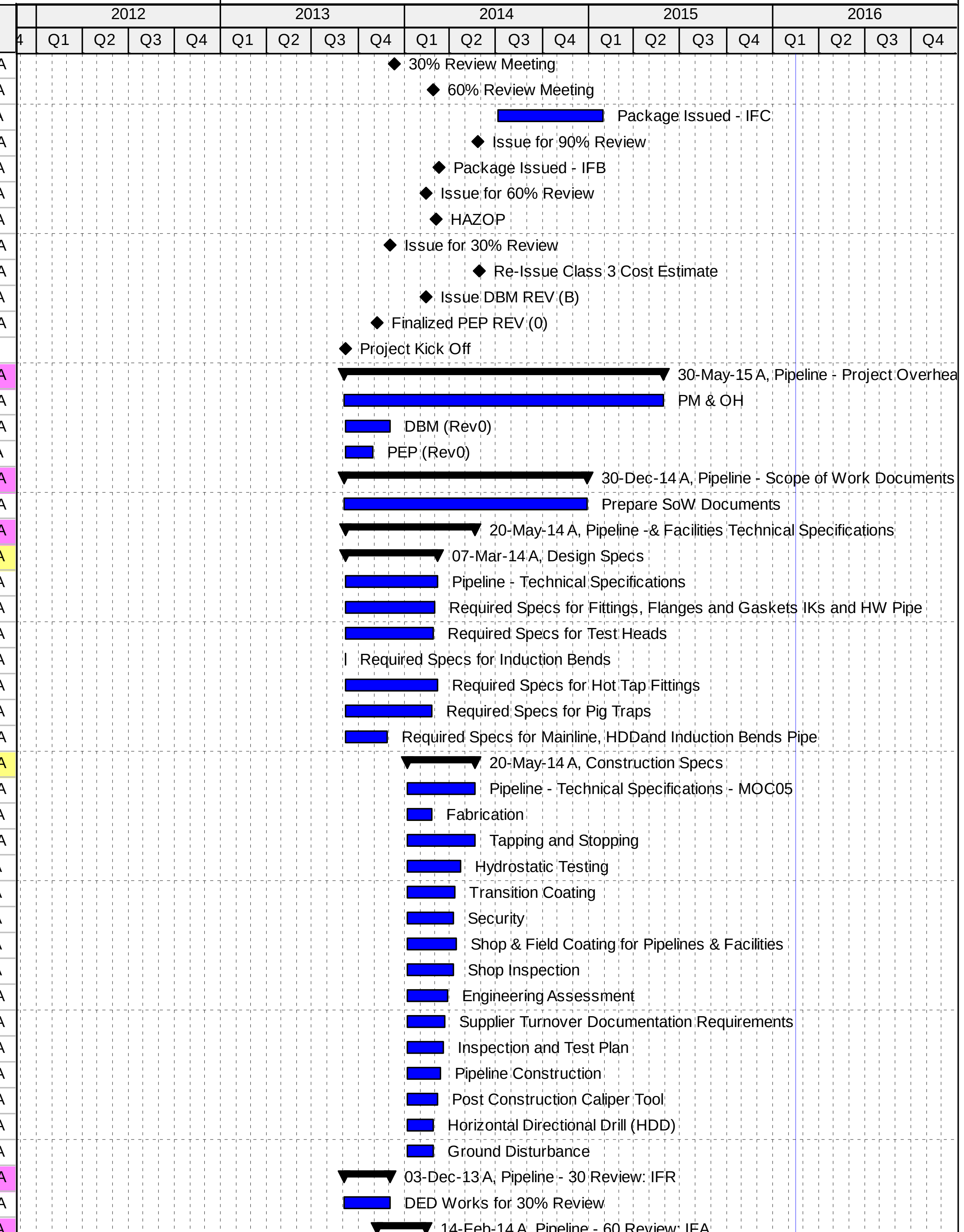
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
458	PME	Pre-Bid clarification meetings	0.0	100%	100%	02-Dec-13 A	03-Dec-13 A
459	PME	Site Visits by Contractors	0.0	100%	100%	02-Dec-13 A	03-Dec-13 A
460	PME	RFP Preparation by Proponents and Submit	0.0	100%	100%	11-Nov-13 A	06-Dec-13 A
461	PME	RFP Issue	0.0	100%	100%		08-Nov-13 A
462	PME	IFB recieved and endorsed by GTA Engineering to include i	0.0	100%	100%	30-Aug-13 A	06-Sep-13 A
463	PME	Legal review/endorsement of RFP documents	0.0	100%	100%	21-Oct-13 A	08-Nov-13 A
464	PME	RFP documents preparation	0.0	100%	100%	23-Jul-13 A	18-Oct-13 A
465	PME	EOI from potential bidders & PQ process	0.0	100%	100%	27-May-13 A	23-Jul-13 A
466	PME	Market analysis, internal and external discussions and data	0.0	100%	100%	20-Mar-13 A	27-May-13 A
467		**Material Procurement**	0.0	0%	0%	28-Nov-13 A	25-May-15 A
468		**Pipe - Evraz**	0.0	0%	0%	29-Nov-13 A	11-Mar-14 A
469	PME	PO Issue	0.0	100%	100%		11-Mar-14 A
470	PME	Bid & Evaluation Process (4w)	0.0	100%	100%	23-Jan-14 A	28-Feb-14 A
471	PME	Issue RFQ	0.0	100%	100%	23-Jan-14 A	
472	PME	CDP review/approval	0.0	100%	100%	18-Dec-13 A	22-Jan-14 A
473	PME	Final review/approval by EGD/GTA	0.0	100%	100%	29-Nov-13 A	18-Dec-13 A
474	PME	rec'd MR from ESP	0.0	100%	100%	29-Nov-13 A	
475		**Spread 0 - Berg - (NPS 36 & 42) Induction Bend Pipes & SP3 HDI**	0.0	0%	0%	28-Nov-13 A	10-Mar-14 A
476		**Spread 0 - Pipes for Bending**	0.0	0%	0%	13-Feb-14 A	10-Mar-14 A
477	Pl	PO Issue	0.0	100%	100%		10-Mar-14 A
478	Pl	CAR review/approval	0.0	100%	100%	13-Feb-14 A	10-Mar-14 A
479	Pl	Rec'd MR from ESP	0.0	100%	100%	13-Feb-14 A	
480		**NPS 42 HW SP3 HDD**	0.0	0%	0%	28-Nov-13 A	10-Mar-14 A
481	Pl	PO Issue	0.0	100%	100%		10-Mar-14 A
482	Pl	CAR review/approval	0.0	100%	100%	28-Nov-13 A	10-Mar-14 A
483	Pl	rec'd MR from ESP	0.0	100%	100%	29-Nov-13 A	
484		**Spread 0 - Ball Valves**	0.0	0%	0%	31-Jan-14 A	23-Jul-14 A
485	SME	PO Issue	0.0	100%	100%		23-Jul-14 A
486	SME	CAR review/approval	0.0	100%	100%	01-Apr-14 A	23-Jul-14 A
487	SME	Bid & Evaluation Process (4w) - inc material approval	0.0	100%	100%	03-Mar-14 A	26-Mar-14 A
488	SME	Issue RFQ	0.0	100%	100%	28-Feb-14 A	
489	SME	CDP review/approval	0.0	100%	100%	03-Feb-14 A	28-Feb-14 A
490	SME	rec'd MR from ESP	0.0	100%	100%	31-Jan-14 A	
491		**Spread 0 - Test Heads**	0.0	0%	0%	13-May-14 A	26-Sep-14 A
492	SME	PO Issue	0.0	100%	100%		26-Sep-14 A
493	SME	RFQ & PO	0.0	100%	100%	13-May-14 A	26-Sep-14 A
494	SME	rec'd MR from ESP	0.0	100%	100%	13-May-14 A	
495		**Spread 0 - Cathodic Protection/ Grounding Materials**	0.0	0%	0%	27-Feb-15 A	25-May-15 A
496	A17	RFQ & PO	0.0	100%	100%	27-Feb-15 A	25-May-15 A
497	A17	PO Issue	0.0	100%	100%		27-Feb-15 A
498		**Engineering - Non-Spread-specific**	0.0	100%	100%	04-Sep-13 A	24-Feb-16 A
499		**Detailed Design Engineering - All Spreads**	0.0	100%	100%	04-Sep-13 A	24-Feb-16 A
500		**Mainline DED Key Milestones**	0.0	0%	0%	05-Sep-13 A	30-Jan-15 A
501	PKM	Client 90% Audit	0.0	100%	100%		27-May-14 A
502	PKM	Client 30% Audit	0.0	100%	100%		16-Jan-14 A
503	PKM	90% Review Meeting	0.0	100%	100%		27-May-14 A

Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:06

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
504	PKM	30% Review Meeting	0.0	100%	100%		11-Dec-13 A
505	PKM	60% Review Meeting	0.0	100%	100%		28-Feb-14 A
506	PKM	Package Issued - IFC	0.0	100%	100%	04-Jul-14 A	30-Jan-15 A
507	PKM	Issue for 90% Review	0.0	100%	100%		27-May-14 A
508	PKM	Package Issued - IFB	0.0	100%	100%		10-Mar-14 A
509	PKM	Issue for 60% Review	0.0	100%	100%		14-Feb-14 A
510	PKM	HAZOP	0.0	100%	100%		05-Mar-14 A
511	PKM	Issue for 30% Review	0.0	100%	100%		03-Dec-13 A
512	PKM	Re-Issue Class 3 Cost Estimate	0.0	100%	100%		30-May-14 A
513	PKM	Issue DBM REV (B)	0.0	100%	100%		14-Feb-14 A
514	PKM	Finalized PEP REV (0)	0.0	100%	100%		08-Nov-13 A
515	PKM	Project Kick Off	0.0	100%	100%	05-Sep-13 A	
516	**Pipeline - Project Overhead**		0.0	100%	100%	04-Sep-13 A	30-May-15 A
517	WBS	PM & OH	0.0	100%	100%	04-Sep-13 A	30-May-15 A
518	PPM	DBM (Rev0)	0.0	100%	100%	05-Sep-13 A	03-Dec-13 A
519	PPM	PEP (Rev0)	0.0	100%	100%	05-Sep-13 A	30-Oct-13 A
520	**Pipeline - Scope of Work Documents**		0.0	100%	100%	04-Sep-13 A	30-Dec-14 A
521	PRT	Prepare SoW Documents	0.0	100%	100%	04-Sep-13 A	30-Dec-14 A
522	**Pipeline -& Facilities Technical Specifications**		0.0	100%	100%	05-Sep-13 A	20-May-14 A
523	**Design Specs**		0.0	0%	0%	05-Sep-13 A	07-Mar-14 A
524	W	Pipeline - Technical Specifications	0.0	100%	100%	05-Sep-13 A	07-Mar-14 A
525	P	Required Specs for Fittings, Flanges and Gaskets IKs and	0.0	100%	100%	05-Sep-13 A	03-Mar-14 A
526	P	Required Specs for Test Heads	0.0	100%	100%	05-Sep-13 A	26-Feb-14 A
527	P	Required Specs for Induction Bends	0.0	100%	100%	05-Sep-13 A	05-Sep-13 A
528	P	Required Specs for Hot Tap Fittings	0.0	100%	100%	05-Sep-13 A	07-Mar-14 A
529	P	Required Specs for Pig Traps	0.0	100%	100%	05-Sep-13 A	25-Feb-14 A
530	P	Required Specs for Mainline, HDDand Induction Bends Pipe	0.0	100%	100%	05-Sep-13 A	27-Nov-13 A
531	**Construction Specs**		0.0	100%	100%	06-Jan-14 A	20-May-14 A
532	W	Pipeline - Technical Specifications - MOC05	0.0	100%	100%	06-Jan-14 A	20-May-14 A
533	P	Fabrication	0.0	100%	100%	06-Jan-14 A	24-Feb-14 A
534	C	Tapping and Stopping	0.0	100%	100%	06-Jan-14 A	20-May-14 A
535	C	Hydrostatic Testing	0.0	100%	100%	06-Jan-14 A	23-Apr-14 A
536	C	Transition Coating	0.0	100%	100%	06-Jan-14 A	10-Apr-14 A
537	C	Security	0.0	100%	100%	06-Jan-14 A	09-Apr-14 A
538	C	Shop & Field Coating for Pipelines & Facilities	0.0	100%	100%	06-Jan-14 A	14-Apr-14 A
539	C	Shop Inspection	0.0	100%	100%	06-Jan-14 A	09-Apr-14 A
540	C	Engineering Assessment	0.0	100%	100%	06-Jan-14 A	28-Mar-14 A
541	C	Supplier Turnover Documentation Requirements	0.0	100%	100%	06-Jan-14 A	21-Mar-14 A
542	C	Inspection and Test Plan	0.0	100%	100%	06-Jan-14 A	20-Mar-14 A
543	C	Pipeline Construction	0.0	100%	100%	06-Jan-14 A	14-Mar-14 A
544	C	Post Construction Caliper Tool	0.0	100%	100%	06-Jan-14 A	07-Mar-14 A
545	C	Horizontal Directional Drill (HDD)	0.0	100%	100%	06-Jan-14 A	28-Feb-14 A
546	C	Ground Disturbance	0.0	100%	100%	06-Jan-14 A	28-Feb-14 A
547	**Pipeline - 30 Review: IFR**		0.0	100%	100%	04-Sep-13 A	03-Dec-13 A
548	PRT	DED Works for 30% Review	0.0	100%	100%	04-Sep-13 A	03-Dec-13 A
549	**Pipeline - 60 Review: IFA**		0.0	100%	100%	08-Nov-13 A	14-Feb-14 A



Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

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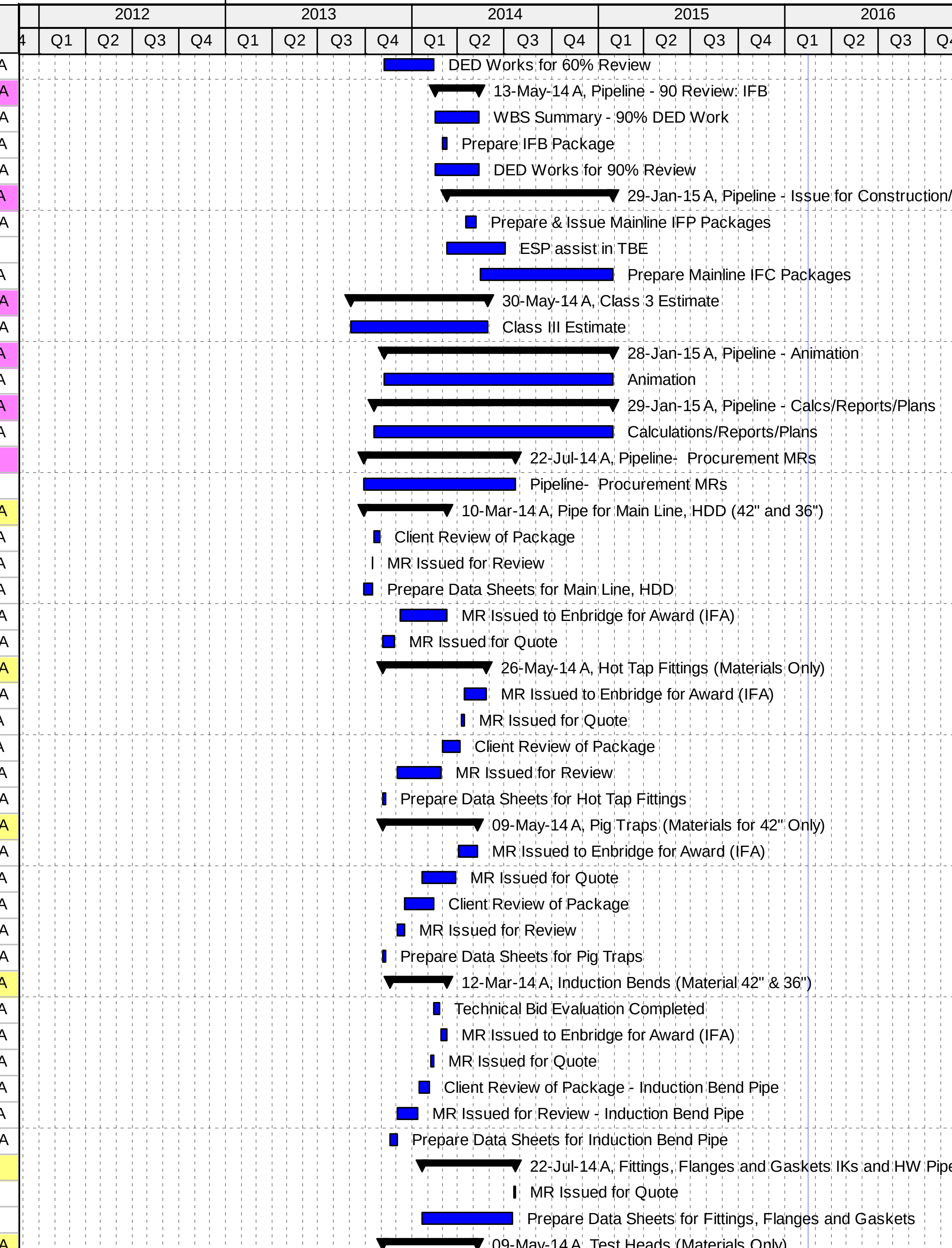
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
550	PRT	DED Works for 60% Review	0.0	100%	100%	08-Nov-13 A	14-Feb-14 A
551		**Pipeline - 90 Review: IFB**	0.0	100%	100%	14-Feb-14 A	13-May-14 A
552	WBS	WBS Summary - 90% DED Work	0.0	100%	100%	14-Feb-14 A	13-May-14 A
553	PRT	Prepare IFB Package	0.0	100%	100%	03-Mar-14 A	10-Mar-14 A
554	PRT	DED Works for 90% Review	0.0	100%	100%	14-Feb-14 A	13-May-14 A
555		**Pipeline - Issue for Construction/Permit (IFC/IFP)**	0.0	100%	100%	11-Mar-14 A	29-Jan-15 A
556	PRT	Prepare & Issue Mainline IFP Packages	0.0	100%	100%	17-Apr-14 A	07-May-14 A
557	PRT	ESP assist in TBE	0.0	100%	100%	11-Mar-14 A	03-Jul-14 A
558	PRT	Prepare Mainline IFC Packages	0.0	100%	100%	14-May-14 A	29-Jan-15 A
559		**Class 3 Estimate**	0.0	100%	100%	04-Sep-13 A	30-May-14 A
560	PRT	Class III Estimate	0.0	100%	100%	04-Sep-13 A	30-May-14 A
561		**Pipeline - Animation**	0.0	100%	100%	07-Nov-13 A	28-Jan-15 A
562	PRT	Animation	0.0	100%	100%	07-Nov-13 A	28-Jan-15 A
563		**Pipeline - Calcs/Reports/Plans**	0.0	100%	100%	18-Oct-13 A	29-Jan-15 A
564	PRT	Calculations/Reports/Plans	0.0	100%	100%	18-Oct-13 A	29-Jan-15 A
565		**Pipeline- Procurement MRs**	0.0	100%	100%	30-Sep-13 A	22-Jul-14 A
566	WBS	Pipeline- Procurement MRs	0.0	100%	100%	30-Sep-13 A	22-Jul-14 A
567		**Pipe for Main Line, HDD (42" and 36")**	0.0	0%	0%	30-Sep-13 A	10-Mar-14 A
568	P	Client Review of Package	0.0	100%	100%	18-Oct-13 A	31-Oct-13 A
569	P	MR Issued for Review	0.0	100%	100%	16-Oct-13 A	17-Oct-13 A
570	P	Prepare Data Sheets for Main Line, HDD	0.0	100%	100%	30-Sep-13 A	15-Oct-13 A
571	P	MR Issued to Enbridge for Award (IFA)	0.0	100%	100%	10-Dec-13 A	10-Mar-14 A
572	P	MR Issued for Quote	0.0	100%	100%	06-Nov-13 A	27-Nov-13 A
573		**Hot Tap Fittings (Materials Only)**	0.0	0%	0%	04-Nov-13 A	26-May-14 A
574	P	MR Issued to Enbridge for Award (IFA)	0.0	100%	100%	15-Apr-14 A	26-May-14 A
575	P	MR Issued for Quote	0.0	100%	100%	08-Apr-14 A	14-Apr-14 A
576	P	Client Review of Package	0.0	100%	100%	03-Mar-14 A	04-Apr-14 A
577	P	MR Issued for Review	0.0	100%	100%	05-Dec-13 A	26-Feb-14 A
578	P	Prepare Data Sheets for Hot Tap Fittings	0.0	100%	100%	04-Nov-13 A	11-Nov-13 A
579		**Pig Traps (Materials for 42" Only)**	0.0	0%	0%	04-Nov-13 A	09-May-14 A
580	P	MR Issued to Enbridge for Award (IFA)	0.0	100%	100%	01-Apr-14 A	09-May-14 A
581	P	MR Issued for Quote	0.0	100%	100%	22-Jan-14 A	28-Mar-14 A
582	P	Client Review of Package	0.0	100%	100%	19-Dec-13 A	11-Feb-14 A
583	P	MR Issued for Review	0.0	100%	100%	05-Dec-13 A	18-Dec-13 A
584	P	Prepare Data Sheets for Pig Traps	0.0	100%	100%	04-Nov-13 A	11-Nov-13 A
585		**Induction Bends (Material 42" & 36")**	0.0	0%	0%	20-Nov-13 A	12-Mar-14 A
586	P	Technical Bid Evaluation Completed	0.0	100%	100%	13-Feb-14 A	25-Feb-14 A
587	P	MR Issued to Enbridge for Award (IFA)	0.0	100%	100%	26-Feb-14 A	12-Mar-14 A
588	P	MR Issued for Quote	0.0	100%	100%	06-Feb-14 A	12-Feb-14 A
589	P	Client Review of Package - Induction Bend Pipe	0.0	100%	100%	15-Jan-14 A	05-Feb-14 A
590	P	MR Issued for Review - Induction Bend Pipe	0.0	100%	100%	04-Dec-13 A	14-Jan-14 A
591	P	Prepare Data Sheets for Induction Bend Pipe	0.0	100%	100%	20-Nov-13 A	03-Dec-13 A
592		**Fittings, Flanges and Gaskets IKs and HW Pipe (Short Leads)**	0.0	0%	0%	20-Jan-14 A	22-Jul-14 A
593	P	MR Issued for Quote	0.0	100%	100%	21-Jul-14 A	22-Jul-14 A
594	P	Prepare Data Sheets for Fittings, Flanges and Gaskets	0.0	100%	100%	20-Jan-14 A	18-Jul-14 A
595		**Test Heads (Materials Only)**	0.0	0%	0%	04-Nov-13 A	09-May-14 A



Actual Work | Critical Remaining Work | Summary
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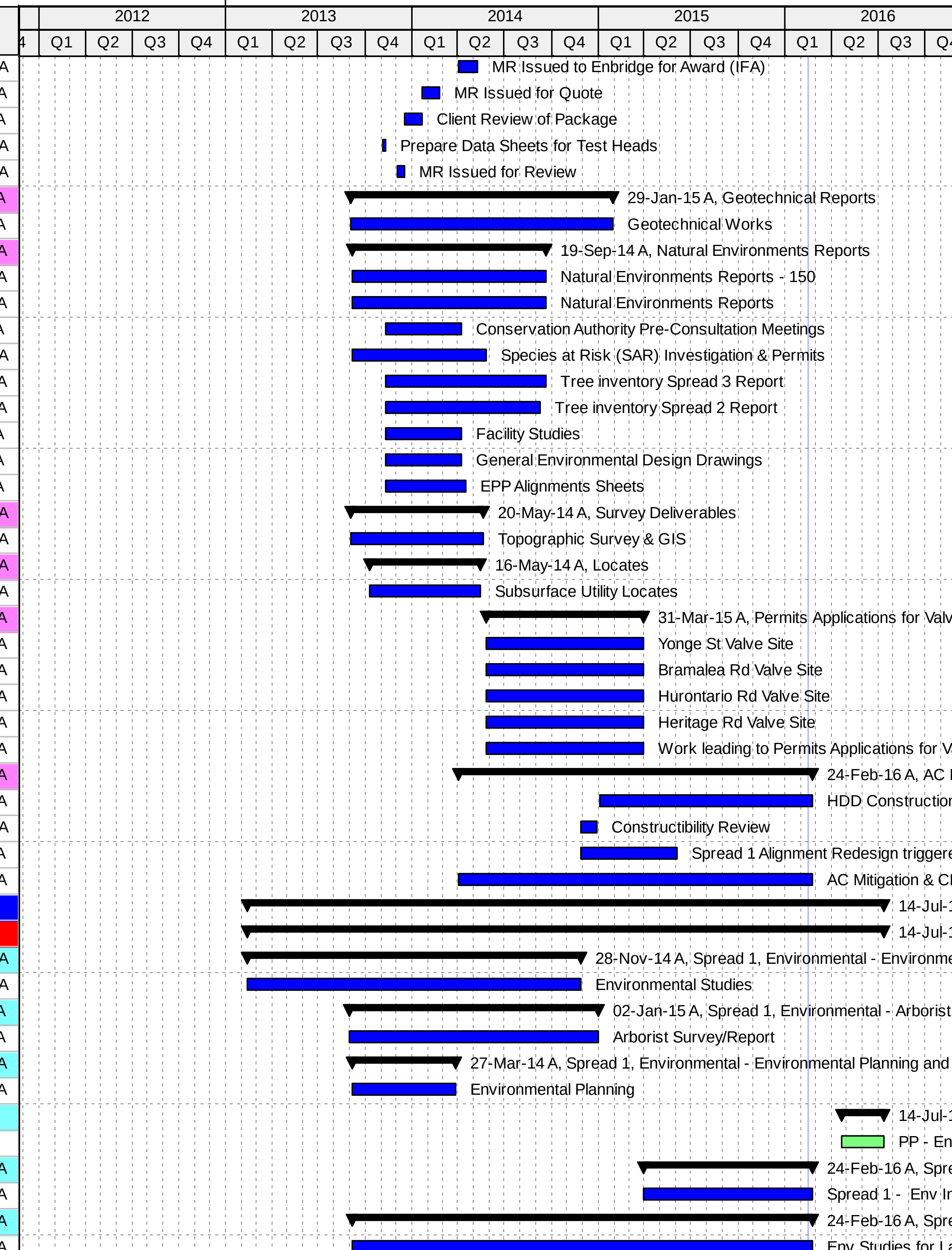
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
596	PI	MR Issued to Enbridge for Award (IFA)	0.0	100%	100%	01-Apr-14 A	09-May-14 A
597	PI	MR Issued for Quote	0.0	100%	100%	20-Jan-14 A	24-Feb-14 A
598	PI	Client Review of Package	0.0	100%	100%	19-Dec-13 A	20-Jan-14 A
599	PI	Prepare Data Sheets for Test Heads	0.0	100%	100%	04-Nov-13 A	11-Nov-13 A
600	PI	MR Issued for Review	0.0	100%	100%	05-Dec-13 A	18-Dec-13 A
601		**Geotechnical Reports**	0.0	100%	100%	04-Sep-13 A	29-Jan-15 A
602	PRT	Geotechnical Works	0.0	100%	100%	04-Sep-13 A	29-Jan-15 A
603		**Natural Environments Reports**	0.0	0%	0%	05-Sep-13 A	19-Sep-14 A
604	WBS	Natural Environments Reports - 150	0.0	100%	100%	05-Sep-13 A	19-Sep-14 A
605	WBS	Natural Environments Reports	0.0	100%	100%	05-Sep-13 A	19-Sep-14 A
606	PDE	Conservation Authority Pre-Consultation Meetings	0.0	100%	100%	11-Nov-13 A	09-Apr-14 A
607	PDE	Species at Risk (SAR) Investigation & Permits	0.0	100%	100%	05-Sep-13 A	27-May-14 A
608	PDE	Tree inventory Spread 3 Report	0.0	100%	100%	11-Nov-13 A	19-Sep-14 A
609	PDE	Tree inventory Spread 2 Report	0.0	100%	100%	11-Nov-13 A	10-Sep-14 A
610	PDE	Facility Studies	0.0	100%	100%	11-Nov-13 A	07-Apr-14 A
611	PDE	General Environmental Design Drawings	0.0	100%	100%	11-Nov-13 A	07-Apr-14 A
612	PDE	EPP Alignments Sheets	0.0	100%	100%	11-Nov-13 A	17-Apr-14 A
613		**Survey Deliverables**	0.0	100%	100%	04-Sep-13 A	20-May-14 A
614	PRT	Topographic Survey & GIS	0.0	100%	100%	04-Sep-13 A	20-May-14 A
615		**Locates**	0.0	100%	100%	09-Oct-13 A	16-May-14 A
616	PRT	Subsurface Utility Locates	0.0	100%	100%	09-Oct-13 A	16-May-14 A
617		**Permits Applications for Valve Sites**	0.0	100%	100%	27-May-14 A	31-Mar-15 A
618	A142	Yonge St Valve Site	0.0	100%	100%	27-May-14 A	31-Mar-15 A
619	A142	Bramalea Rd Valve Site	0.0	100%	100%	27-May-14 A	31-Mar-15 A
620	A142	Hurontario Rd Valve Site	0.0	100%	100%	27-May-14 A	31-Mar-15 A
621	A141	Heritage Rd Valve Site	0.0	100%	100%	27-May-14 A	31-Mar-15 A
622	A141	Work leading to Permits Applications for Valve Sites	0.0	100%	100%	27-May-14 A	31-Mar-15 A
623		**AC Mitigation / CP Design**	0.0	100%	100%	01-Apr-14 A	24-Feb-16 A
624	A177	HDD Construction Engineering Support	0.0	100%	100%	05-Jan-15 A	24-Feb-16 A
625	A174	Constructibility Review	0.0	100%	100%	28-Nov-14 A	30-Dec-14 A
626	A174	Spread 1 Alignment Redesign triggered by HONI	0.0	100%	100%	28-Nov-14 A	04-Jun-15 A
627	A158	AC Mitigation & CP Design	0.0	100%	100%	01-Apr-14 A	24-Feb-16 A
628		**Spread 1 - Don Valley Junction to Sheppard Ave**	46.4	99.67%	99.58%	12-Feb-13 A	14-Jul-16
629		**Environment - Spread 1**	46.4	95.84%	94.58%	12-Feb-13 A	14-Jul-16
630		**Spread 1, Environmental - Environmental Survey & Studies**	0.0	100%	100%	12-Feb-13 A	28-Nov-14 A
631	A13920	Environmental Studies	0.0	100%	100%	12-Feb-13 A	28-Nov-14 A
632		**Spread 1, Environmental - Arborist**	0.0	100%	100%	30-Aug-13 A	02-Jan-15 A
633	A14150	Arborist Survey/Report	0.0	100%	100%	30-Aug-13 A	02-Jan-15 A
634		**Spread 1, Environmental - Environmental Planning and Permitting**	0.0	100%	100%	05-Sep-13 A	27-Mar-14 A
635	A14140	Environmental Planning	0.0	100%	100%	05-Sep-13 A	27-Mar-14 A
636		**Spread 1, Environmental - Post-Construction Monitoring**	46.4	23.17%	0%	22-Apr-16	14-Jul-16
637	A13930	PP - Env Post Construction	46.4	23.17%	0%	22-Apr-16	14-Jul-16
638		**Spread 1, Environmental - Environment Inspection**	0.0	100%	100%	30-Mar-15 A	24-Feb-16 A
639	A13940	Spread 1 - Env Inspections	0.0	100%	100%	30-Mar-15 A	24-Feb-16 A
640		**Spread 1, Environmental - Environmental Studies for Land/ROW a**	0.0	100%	100%	05-Sep-13 A	24-Feb-16 A
641	A14100	Env Studies for Land/ROW SP1	0.0	100%	100%	05-Sep-13 A	24-Feb-16 A



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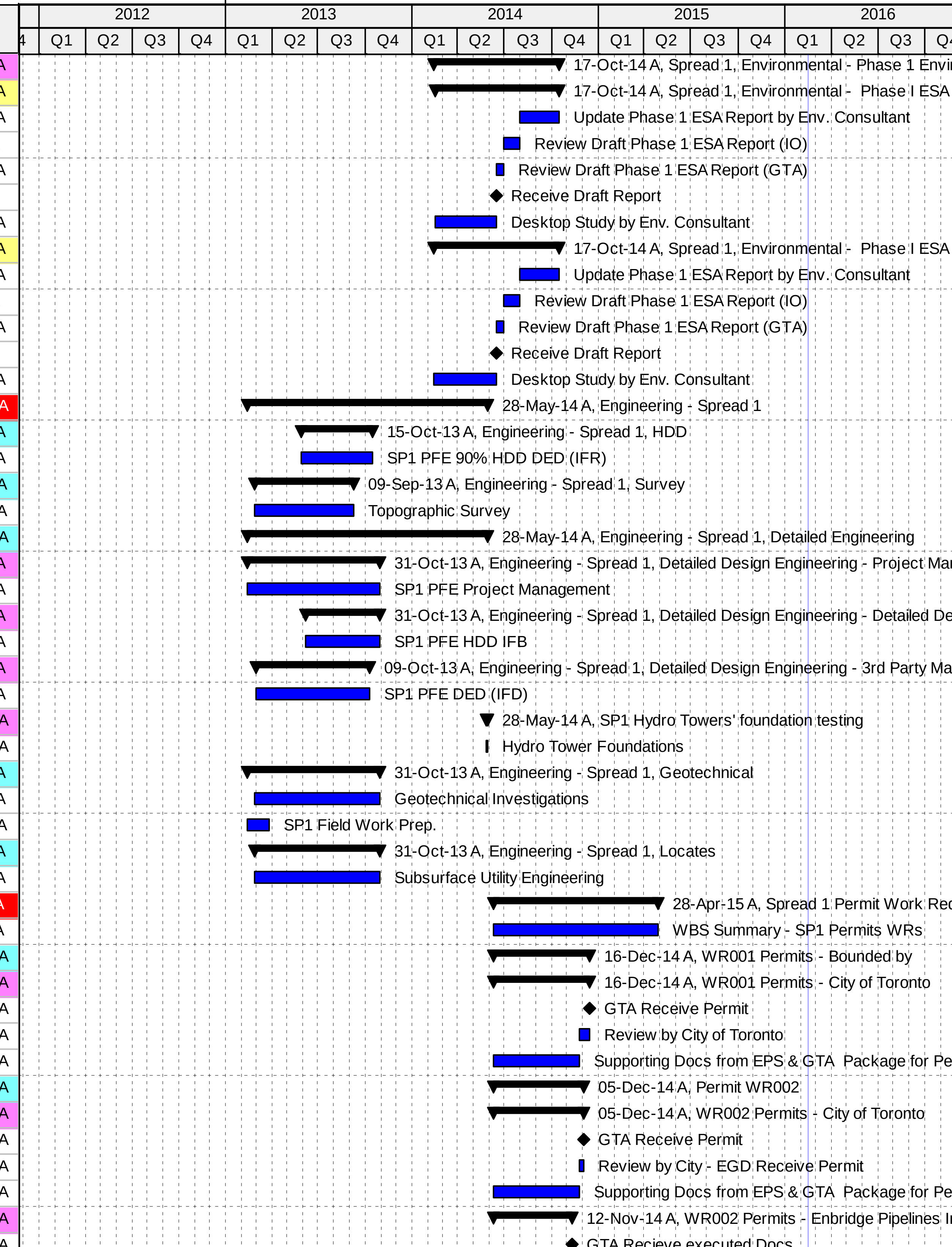
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
642		**Spread 1, Environmental - Phase 1 Environmental Site Assessm**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
643		**Spread 1, Environmental - Phase I ESA - S1E6**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
644	PI	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	01-Aug-14 A	17-Oct-14 A
645	PI	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	01-Jul-14 A	31-Jul-14 A
646	PI	Review Draft Phase 1 ESA Report (GTA)	0.0	100%	100%	17-Jun-14 A	30-Jun-14 A
647	PI	Receive Draft Report	0.0	100%	100%	16-Jun-14 A	
648	PI	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	16-Jun-14 A
649		**Spread 1, Environmental - Phase I ESA - S1E4**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
650	PI	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	01-Aug-14 A	17-Oct-14 A
651	PI	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	01-Jul-14 A	31-Jul-14 A
652	PI	Review Draft Phase 1 ESA Report (GTA)	0.0	100%	100%	17-Jun-14 A	30-Jun-14 A
653	PI	Receive Draft Report	0.0	100%	100%	16-Jun-14 A	
654	PI	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	16-Jun-14 A
655		**Engineering - Spread 1**	0.0	100%	100%	12-Feb-13 A	28-May-14 A
656		**Engineering - Spread 1, HDD**	0.0	100%	100%	29-May-13 A	15-Oct-13 A
657	PRT-12	SP1 PFE 90% HDD DED (IFR)	0.0	100%	100%	29-May-13 A	15-Oct-13 A
658		**Engineering - Spread 1, Survey**	0.0	100%	100%	28-Feb-13 A	09-Sep-13 A
659	PRT-11	Topographic Survey	0.0	100%	100%	28-Feb-13 A	09-Sep-13 A
660		**Engineering - Spread 1, Detailed Engineering**	0.0	100%	100%	12-Feb-13 A	28-May-14 A
661		**Engineering - Spread 1, Detailed Design Engineering - Project M**	0.0	100%	100%	12-Feb-13 A	31-Oct-13 A
662	PRT·	SP1 PFE Project Management	0.0	100%	100%	12-Feb-13 A	31-Oct-13 A
663		**Engineering - Spread 1, Detailed Design Engineering - Detailed I**	0.0	100%	100%	05-Jun-13 A	31-Oct-13 A
664	PRT·	SP1 PFE HDD IFB	0.0	100%	100%	05-Jun-13 A	31-Oct-13 A
665		**Engineering - Spread 1, Detailed Design Engineering - 3rd Party**	0.0	100%	100%	01-Mar-13 A	09-Oct-13 A
666	PRT·	SP1 PFE DED (IFD)	0.0	100%	100%	01-Mar-13 A	09-Oct-13 A
667		**SP1 Hydro Towers' foundation testing**	0.0	100%	100%	27-May-14 A	28-May-14 A
668	A142	Hydro Tower Foundations	0.0	100%	100%	27-May-14 A	28-May-14 A
669		**Engineering - Spread 1, Geotechnical**	0.0	100%	100%	12-Feb-13 A	31-Oct-13 A
670	PRT-11	Geotechnical Investigations	0.0	100%	100%	28-Feb-13 A	31-Oct-13 A
671	PRT-10	SP1 Field Work Prep.	0.0	100%	100%	12-Feb-13 A	28-Mar-13 A
672		**Engineering - Spread 1, Locates**	0.0	100%	100%	28-Feb-13 A	31-Oct-13 A
673	PRT-11	Subsurface Utility Engineering	0.0	100%	100%	28-Feb-13 A	31-Oct-13 A
674		**Spread 1 Permit Work Requests**	0.0	100%	100%	09-Jun-14 A	28-Apr-15 A
675	PLE-07-17	WBS Summary - SP1 Permits WRs	0.0	100%	100%	09-Jun-14 A	28-Apr-15 A
676		**WR001 Permits - Bounded by**	0.0	0%	0%	09-Jun-14 A	16-Dec-14 A
677		**WR001 Permits - City of Toronto**	0.0	0%	0%	09-Jun-14 A	16-Dec-14 A
678	PLE-	GTA Receive Permit	0.0	100%	100%		16-Dec-14 A
679	PLE-	Review by City of Toronto	0.0	100%	100%	25-Nov-14 A	16-Dec-14 A
680	PLE-	Supporting Docs from EPS & GTA Package for Permit.	0.0	100%	100%	09-Jun-14 A	25-Nov-14 A
681		**Permit WR002**	0.0	0%	0%	09-Jun-14 A	05-Dec-14 A
682		**WR002 Permits - City of Toronto**	0.0	0%	0%	09-Jun-14 A	05-Dec-14 A
683	PLE-	GTA Receive Permit	0.0	100%	100%		05-Dec-14 A
684	PLE-	Review by City - EGD Receive Permit	0.0	100%	100%	25-Nov-14 A	05-Dec-14 A
685	PLE-	Supporting Docs from EPS & GTA Package for Permit.	0.0	100%	100%	09-Jun-14 A	25-Nov-14 A
686		**WR002 Permits - Enbridge Pipelines Inc.**	0.0	0%	0%	09-Jun-14 A	12-Nov-14 A
687	PLE-	GTA Recieve executed Docs	0.0	100%	100%		12-Nov-14 A



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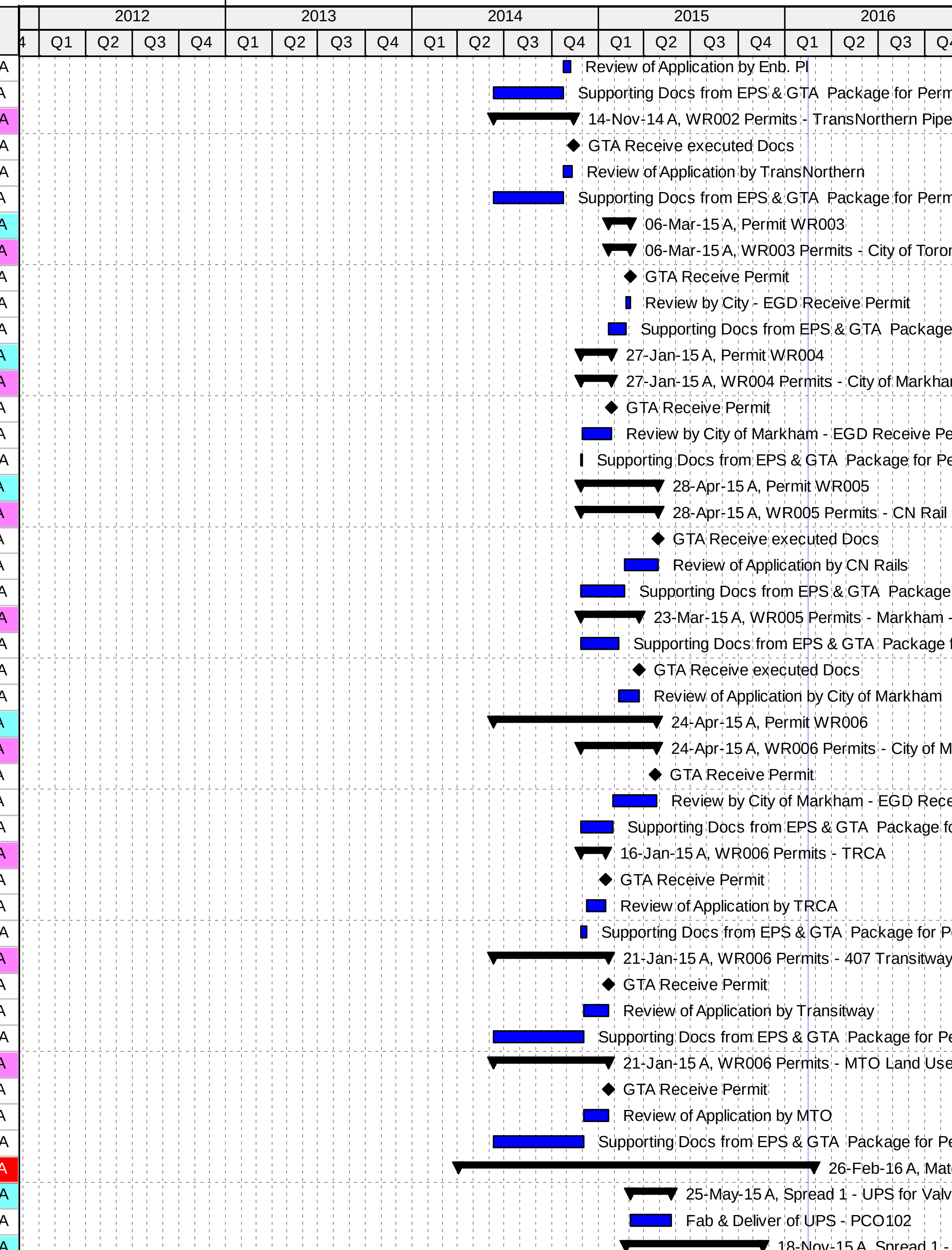
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
688	PLE-	Review of Application by Enb. Pl	0.0	100%	100%	24-Oct-14 A	08-Nov-14 A
689	PLE-	Supporting Docs from EPS & GTA Package for Permit.	0.0	100%	100%	09-Jun-14 A	24-Oct-14 A
690		**WR002 Permits - TransNorthern Pipeline**	0.0	0%	0%	09-Jun-14 A	14-Nov-14 A
691	PLE-	GTA Receive executed Docs	0.0	100%	100%		14-Nov-14 A
692	PLE-	Review of Application by TransNorthern	0.0	100%	100%	24-Oct-14 A	12-Nov-14 A
693	PLE-	Supporting Docs from EPS & GTA Package for Permit.	0.0	100%	100%	09-Jun-14 A	24-Oct-14 A
694		**Permit WR003**	0.0	0%	0%	21-Jan-15 A	06-Mar-15 A
695		**WR003 Permits - City of Toronto**	0.0	0%	0%	21-Jan-15 A	06-Mar-15 A
696	PLE-	GTA Receive Permit	0.0	100%	100%		06-Mar-15 A
697	PLE-	Review by City - EGD Receive Permit	0.0	100%	100%	24-Feb-15 A	06-Mar-15 A
698	PLE-	Supporting Docs from EPS & GTA Package for Permit.	0.0	100%	100%	21-Jan-15 A	24-Feb-15 A
699		**Permit WR004**	0.0	0%	0%	28-Nov-14 A	27-Jan-15 A
700		**WR004 Permits - City of Markham**	0.0	0%	0%	28-Nov-14 A	27-Jan-15 A
701	PLE-	GTA Receive Permit	0.0	100%	100%		27-Jan-15 A
702	PLE-	Review by City of Markham - EGD Receive Permit	0.0	100%	100%	01-Dec-14 A	27-Jan-15 A
703	PLE-	Supporting Docs from EPS & GTA Package for Permit.	0.0	100%	100%	28-Nov-14 A	01-Dec-14 A
704		**Permit WR005**	0.0	0%	0%	28-Nov-14 A	28-Apr-15 A
705		**WR005 Permits - CN Rail**	0.0	0%	0%	28-Nov-14 A	28-Apr-15 A
706	PLE-	GTA Receive executed Docs	0.0	100%	100%		28-Apr-15 A
707	PLE-	Review of Application by CN Rails	0.0	100%	100%	23-Feb-15 A	28-Apr-15 A
708	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	28-Nov-14 A	23-Feb-15 A
709		**WR005 Permits - Markham - Alden Road**	0.0	0%	0%	28-Nov-14 A	23-Mar-15 A
710	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	28-Nov-14 A	09-Feb-15 A
711	PLE-	GTA Receive executed Docs	0.0	100%	100%		23-Mar-15 A
712	PLE-	Review of Application by City of Markham	0.0	100%	100%	09-Feb-15 A	23-Mar-15 A
713		**Permit WR006**	0.0	0%	0%	09-Jun-14 A	24-Apr-15 A
714		**WR006 Permits - City of Markham**	0.0	0%	0%	28-Nov-14 A	24-Apr-15 A
715	PLE-	GTA Receive Permit	0.0	100%	100%		24-Apr-15 A
716	PLE-	Review by City of Markham - EGD Receive Permit	0.0	100%	100%	30-Jan-15 A	24-Apr-15 A
717	PLE-	Supporting Docs from EPS & GTA Package for Permit.	0.0	100%	100%	28-Nov-14 A	30-Jan-15 A
718		**WR006 Permits - TRCA**	0.0	0%	0%	28-Nov-14 A	16-Jan-15 A
719	PLE-	GTA Receive Permit	0.0	100%	100%		16-Jan-15 A
720	PLE-	Review of Application by TRCA	0.0	100%	100%	11-Dec-14 A	16-Jan-15 A
721	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	28-Nov-14 A	11-Dec-14 A
722		**WR006 Permits - 407 Transitway**	0.0	0%	0%	09-Jun-14 A	21-Jan-15 A
723	PLE-	GTA Receive Permit	0.0	100%	100%		21-Jan-15 A
724	PLE-	Review of Application by Transitway	0.0	100%	100%	03-Dec-14 A	21-Jan-15 A
725	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	03-Dec-14 A
726		**WR006 Permits - MTO Land Use**	0.0	0%	0%	09-Jun-14 A	21-Jan-15 A
727	PLE-	GTA Receive Permit	0.0	100%	100%		21-Jan-15 A
728	PLE-	Review of Application by MTO	0.0	100%	100%	05-Dec-14 A	21-Jan-15 A
729	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	05-Dec-14 A
730		**Material Procurement - Spread 1**	0.0	100%	100%	01-Apr-14 A	26-Feb-16 A
731		**Spread 1 - UPS for Valve Sites**	0.0	100%	100%	05-Mar-15 A	25-May-15 A
732	PME12	Fab & Deliver of UPS - PCO102	0.0	100%	100%	05-Mar-15 A	25-May-15 A
733		**Spread 1 - Telecommunications Equipment**	0.0	100%	100%	25-Feb-15 A	18-Nov-15 A

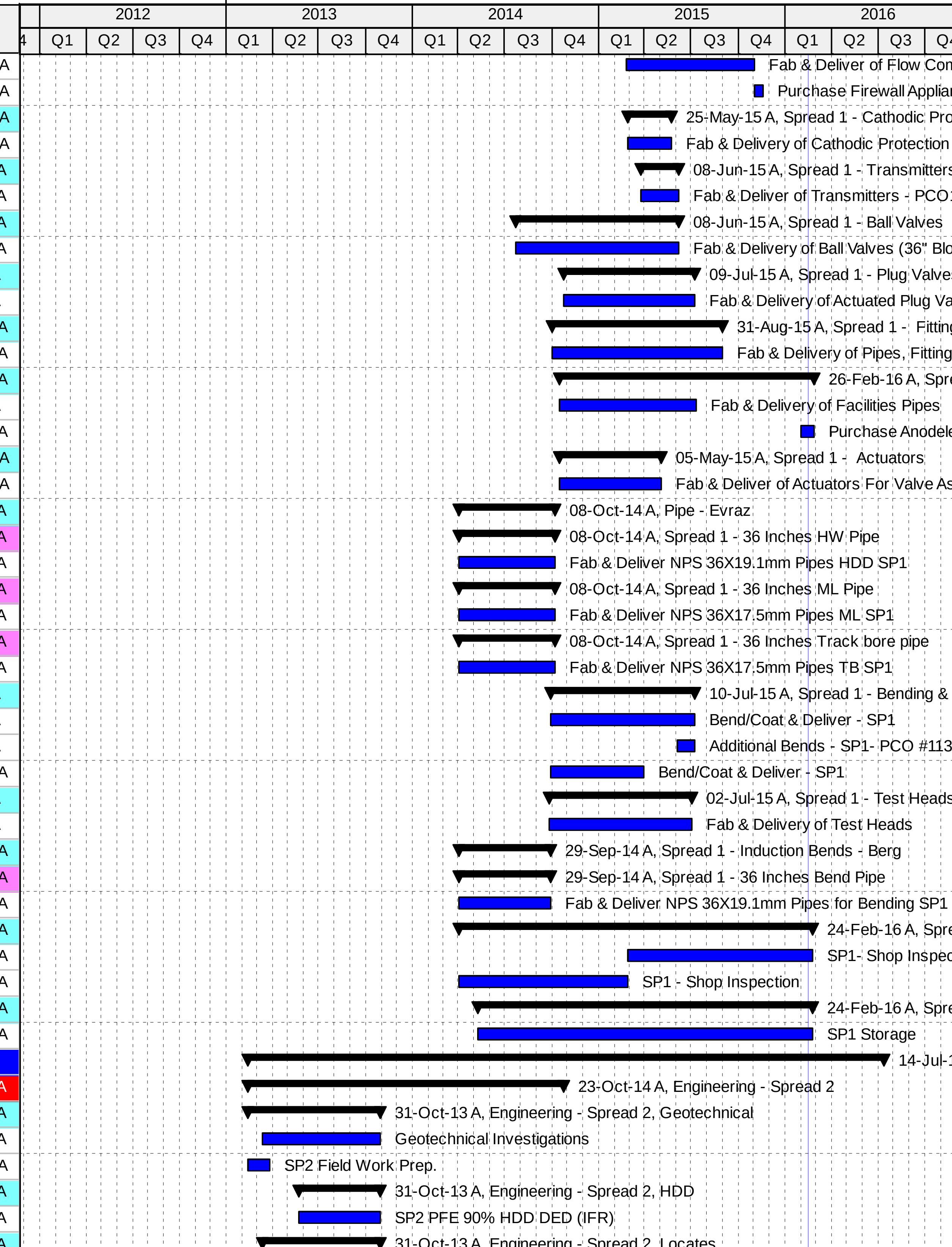


Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:06

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
734	PME12	Fab & Deliver of Flow Computer Panels	0.0	100%	100%	25-Feb-15 A	02-Nov-15 A
735	PME-P(	Purchase Firewall Appliance Standard Warranty	0.0	0%	100%	02-Nov-15 A	18-Nov-15 A
736		**Spread 1 - Cathodic Protection**	0.0	100%	100%	27-Feb-15 A	25-May-15 A
737	SME-17	Fab & Delivery of Cathodic Protection Materials	0.0	100%	100%	27-Feb-15 A	25-May-15 A
738		**Spread 1 - Transmitters**	0.0	100%	100%	25-Mar-15 A	08-Jun-15 A
739	PME12	Fab & Deliver of Transmitters - PCO102	0.0	100%	100%	25-Mar-15 A	08-Jun-15 A
740		**Spread 1 - Ball Valves**	0.0	100%	100%	23-Jul-14 A	08-Jun-15 A
741	SME14	Fab & Delivery of Ball Valves (36" Block Valves - SP1)	0.0	100%	100%	23-Jul-14 A	08-Jun-15 A
742		**Spread 1 - Plug Valves with Actuators**	0.0	100%	100%	24-Oct-14 A	09-Jul-15 A
743	SME-15	Fab & Delivery of Actuated Plug Valves	0.0	100%	100%	24-Oct-14 A	09-Jul-15 A
744		**Spread 1 - Fittings and Flanges,- Long Leads**	0.0	100%	100%	01-Oct-14 A	31-Aug-15 A
745	SME-17	Fab & Delivery of Pipes, Fittings & Flanges l(Long lead - for	0.0	100%	100%	01-Oct-14 A	31-Aug-15 A
746		**Spread 1 - Facilities Pipe//Valve Site Pipe**	0.0	100%	100%	17-Oct-14 A	26-Feb-16 A
747	SME-17	Fab & Delivery of Facilities Pipes	0.0	100%	100%	17-Oct-14 A	10-Jul-15 A
748	PME-P(	Purchase Anodeless Risers	0.0	0%	100%	01-Feb-16 A	26-Feb-16 A
749		**Spread 1 - Actuators**	0.0	100%	100%	17-Oct-14 A	05-May-15 A
750	SME-15	Fab & Deliver of Actuators For Valve Assembly	0.0	100%	100%	17-Oct-14 A	05-May-15 A
751		**Pipe - Evraz**	0.0	100%	100%	01-Apr-14 A	08-Oct-14 A
752		**Spread 1 - 36 Inches HW Pipe**	0.0	100%	100%	01-Apr-14 A	08-Oct-14 A
753	PME	Fab & Deliver NPS 36X19.1mm Pipes HDD SP1	0.0	100%	100%	01-Apr-14 A	08-Oct-14 A
754		**Spread 1 - 36 Inches ML Pipe**	0.0	100%	100%	01-Apr-14 A	08-Oct-14 A
755	PME	Fab & Deliver NPS 36X17.5mm Pipes ML SP1	0.0	100%	100%	01-Apr-14 A	08-Oct-14 A
756		**Spread 1 - 36 Inches Track bore pipe**	0.0	100%	100%	01-Apr-14 A	08-Oct-14 A
757	PME	Fab & Deliver NPS 36X17.5mm Pipes TB SP1	0.0	100%	100%	01-Apr-14 A	08-Oct-14 A
758		**Spread 1 - Bending & Coating**	0.0	100%	100%	30-Sep-14 A	10-Jul-15 A
759	PME16	Bend/Coat & Deliver - SP1	0.0	100%	100%	30-Sep-14 A	10-Jul-15 A
760	PME12	Additional Bends - SP1- PCO #113	0.0	0%	100%	05-Jun-15 A	10-Jul-15 A
761	PME12	Bend/Coat & Deliver - SP1	0.0	0%	100%	30-Sep-14 A	31-Mar-15 A
762		**Spread 1 - Test Heads**	0.0	100%	100%	26-Sep-14 A	02-Jul-15 A
763	SME15	Fab & Delivery of Test Heads	0.0	100%	100%	26-Sep-14 A	02-Jul-15 A
764		**Spread 1 - Induction Bends - Berg**	0.0	100%	100%	01-Apr-14 A	29-Sep-14 A
765		**Spread 1 - 36 Inches Bend Pipe**	0.0	100%	100%	01-Apr-14 A	29-Sep-14 A
766	PME	Fab & Deliver NPS 36X19.1mm Pipes for Bending SP1	0.0	100%	100%	01-Apr-14 A	29-Sep-14 A
767		**Spread 1 - Shop Inspection**	0.0	100%	100%	01-Apr-14 A	24-Feb-16 A
768	A17810	SP1- Shop Inspection	0.0	100%	100%	27-Feb-15 A	24-Feb-16 A
769	A17800	SP1 - Shop Inspection	0.0	100%	100%	01-Apr-14 A	27-Feb-15 A
770		**Spread 1 - Storage**	0.0	100%	100%	08-May-14 A	24-Feb-16 A
771	PME15	SP1 Storage	0.0	100%	100%	08-May-14 A	24-Feb-16 A
772		**Spread 2 - Keele/CNR to Don Valley Junction**	49.6	99.84%	99.65%	12-Feb-13 A	14-Jul-16
773		**Engineering - Spread 2**	0.0	100%	100%	12-Feb-13 A	23-Oct-14 A
774		**Engineering - Spread 2, Geotechnical**	0.0	100%	100%	12-Feb-13 A	31-Oct-13 A
775	PRT-11	Geotechnical Investigations	0.0	100%	100%	13-Mar-13 A	31-Oct-13 A
776	PRT-10	SP2 Field Work Prep.	0.0	100%	100%	12-Feb-13 A	28-Mar-13 A
777		**Engineering - Spread 2, HDD**	0.0	100%	100%	22-May-13 A	31-Oct-13 A
778	PRT-12	SP2 PFE 90% HDD DED (IFR)	0.0	100%	100%	22-May-13 A	31-Oct-13 A
779		**Engineering - Spread 2, Locates**	0.0	100%	100%	13-Mar-13 A	31-Oct-13 A

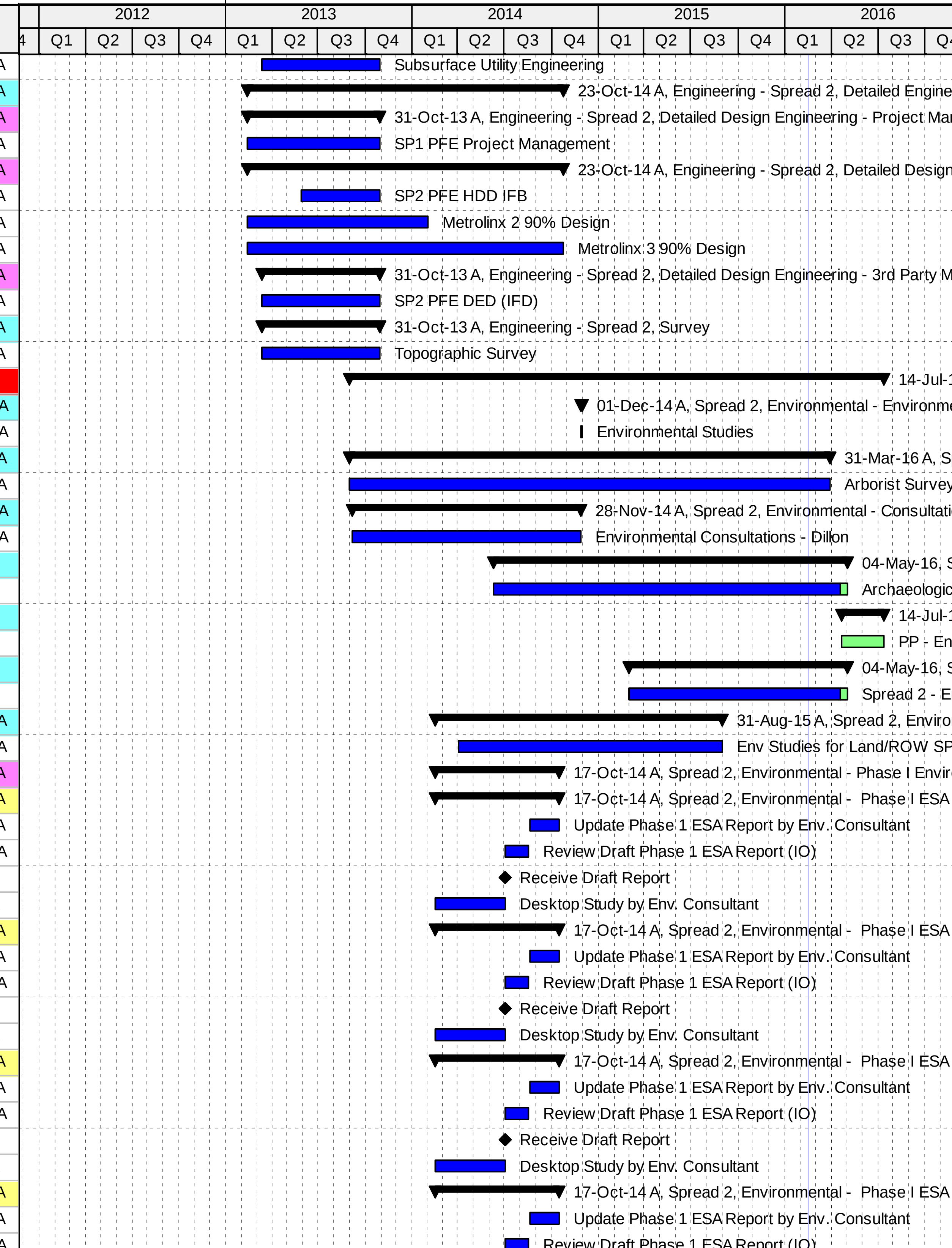


Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:06

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
780	PRT-12	Subsurface Utility Engineering	0.0	100%	100%	13-Mar-13 A	31-Oct-13 A
781		**Engineering - Spread 2, Detailed Engineering**	0.0	100%	100%	12-Feb-13 A	23-Oct-14 A
782		**Engineering - Spread 2, Detailed Design Engineering - Project M**	0.0	100%	100%	12-Feb-13 A	31-Oct-13 A
783	PRT-	SP1 PFE Project Management	0.0	100%	100%	12-Feb-13 A	31-Oct-13 A
784		**Engineering - Spread 2, Detailed Design Engineering - Detailed I**	0.0	100%	100%	12-Feb-13 A	23-Oct-14 A
785	PRT-	SP2 PFE HDD IFB	0.0	100%	100%	30-May-13 A	31-Oct-13 A
786	PRT-	Metrolinx 2 90% Design	0.0	100%	100%	12-Feb-13 A	31-Jan-14 A
787	PRT-	Metrolinx 3 90% Design	0.0	100%	100%	12-Feb-13 A	23-Oct-14 A
788		**Engineering - Spread 2, Detailed Design Engineering - 3rd Party**	0.0	100%	100%	14-Mar-13 A	31-Oct-13 A
789	PRT-	SP2 PFE DED (IFD)	0.0	100%	100%	14-Mar-13 A	31-Oct-13 A
790		**Engineering - Spread 2, Survey**	0.0	100%	100%	13-Mar-13 A	31-Oct-13 A
791	PRT-11	Topographic Survey	0.0	100%	100%	13-Mar-13 A	31-Oct-13 A
792		**Environment - Spread 2**	49.6	98.19%	95.97%	30-Aug-13 A	14-Jul-16
793		**Spread 2, Environmental - Environmental Survey & Studies**	0.0	0%	0%	28-Nov-14 A	01-Dec-14 A
794	A13950	Environmental Studies	0.0	100%	100%	28-Nov-14 A	01-Dec-14 A
795		**Spread 2, Environmental - Arborist**	0.0	100%	100%	30-Aug-13 A	31-Mar-16 A
796	A14160	Arborist Survey/Report	0.0	100%	100%	30-Aug-13 A	31-Mar-16 A
797		**Spread 2, Environmental - Consultation Support**	0.0	100%	100%	05-Sep-13 A	28-Nov-14 A
798	A14120	Environmental Consultations - Dillon	0.0	100%	100%	05-Sep-13 A	28-Nov-14 A
799		**Spread 2, Environmental - Archaeological Assessment**	10.0	100%	95%	09-Jun-14 A	04-May-16
800	A15840	Archaeological investigations	10.0	100%	95%	09-Jun-14 A	04-May-16
801		**Spread 2, Environmental - Post-Construction Monitoring**	46.4	23.17%	0%	22-Apr-16	14-Jul-16
802	A13960	PP - Env Post Construction	46.4	23.17%	0%	22-Apr-16	14-Jul-16
803		**Spread 2, Environmental - Environment Inspection**	10.0	100%	99%	02-Mar-15 A	04-May-16
804	A13970	Spread 2 - Env Inspections	10.0	100%	99%	02-Mar-15 A	04-May-16
805		**Spread 2, Environmental - Environmental Studies for Land/ROW a**	0.0	100%	100%	14-Feb-14 A	31-Aug-15 A
806	A14090	Env Studies for Land/ROW SP2	0.0	100%	100%	01-Apr-14 A	31-Aug-15 A
807		**Spread 2, Environmental - Phase I Environmental Site Assessme**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
808		**Spread 2, Environmental - Phase I ESA - E3**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
809	P	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	19-Aug-14 A	17-Oct-14 A
810	P	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	03-Jul-14 A	18-Aug-14 A
811	P	Receive Draft Report	0.0	100%	100%	03-Jul-14 A	
812	P	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	02-Jul-14 A
813		**Spread 2, Environmental - Phase I ESA - E4**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
814	P	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	19-Aug-14 A	17-Oct-14 A
815	P	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	03-Jul-14 A	18-Aug-14 A
816	P	Receive Draft Report	0.0	100%	100%	03-Jul-14 A	
817	P	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	02-Jul-14 A
818		**Spread 2, Environmental - Phase I ESA - E5**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
819	P	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	19-Aug-14 A	17-Oct-14 A
820	P	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	03-Jul-14 A	18-Aug-14 A
821	P	Receive Draft Report	0.0	100%	100%	03-Jul-14 A	
822	P	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	02-Jul-14 A
823		**Spread 2, Environmental - Phase I ESA - E6**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
824	P	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	19-Aug-14 A	17-Oct-14 A
825	P	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	03-Jul-14 A	18-Aug-14 A

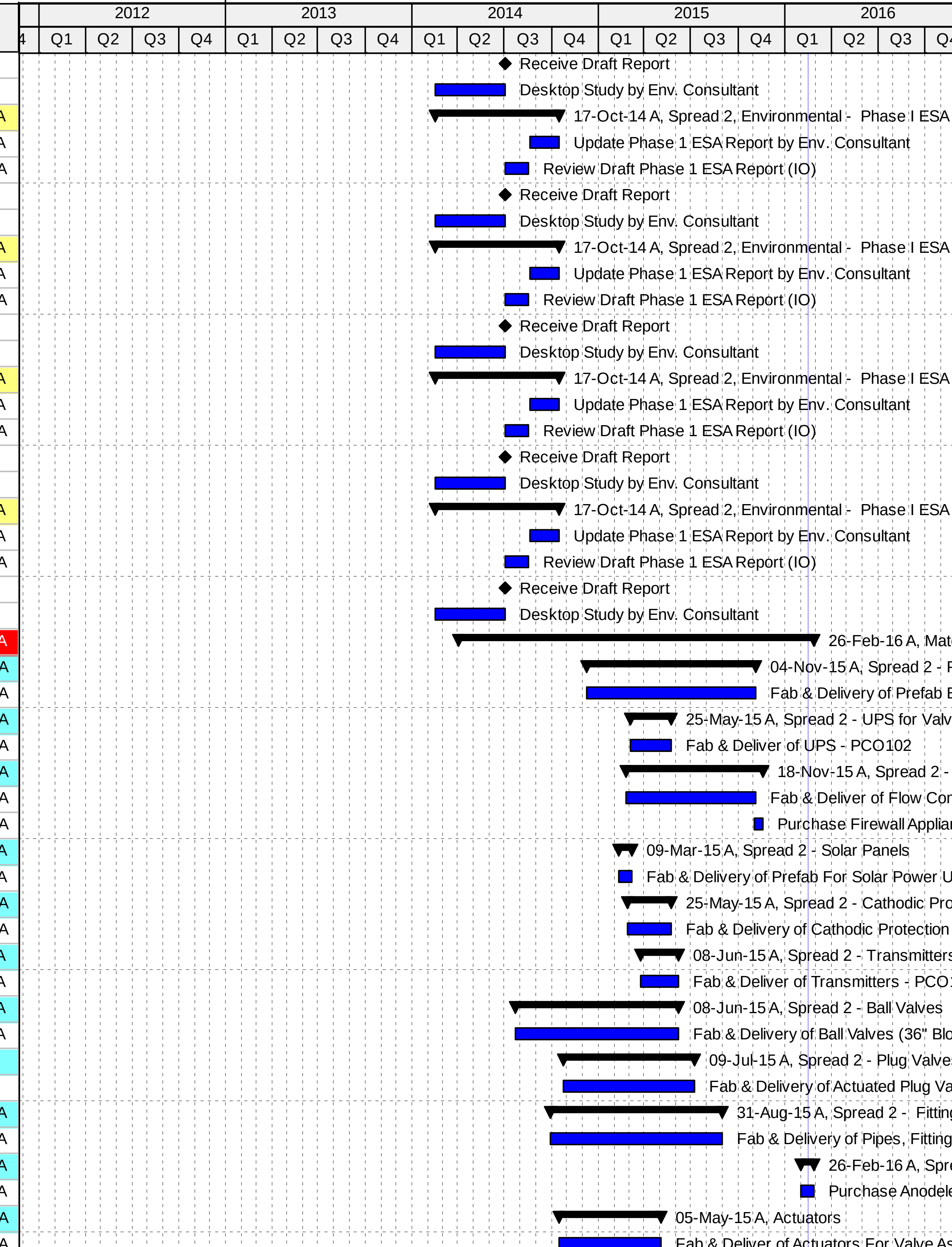


Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
826	P	Receive Draft Report	0.0	100%	100%	03-Jul-14 A	
827	P	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	02-Jul-14 A
828		**Spread 2, Environmental - Phase I ESA - E7**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
829	P	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	19-Aug-14 A	17-Oct-14 A
830	P	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	03-Jul-14 A	18-Aug-14 A
831	P	Receive Draft Report	0.0	100%	100%	03-Jul-14 A	
832	P	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	02-Jul-14 A
833		**Spread 2, Environmental - Phase I ESA - E8**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
834	P	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	19-Aug-14 A	17-Oct-14 A
835	P	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	03-Jul-14 A	18-Aug-14 A
836	P	Receive Draft Report	0.0	100%	100%	03-Jul-14 A	
837	P	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	02-Jul-14 A
838		**Spread 2, Environmental - Phase I ESA - E9**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
839	P	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	19-Aug-14 A	17-Oct-14 A
840	P	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	03-Jul-14 A	18-Aug-14 A
841	P	Receive Draft Report	0.0	100%	100%	03-Jul-14 A	
842	P	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	02-Jul-14 A
843		**Spread 2, Environmental - Phase I ESA - E10**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
844	P	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	19-Aug-14 A	17-Oct-14 A
845	P	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	03-Jul-14 A	18-Aug-14 A
846	P	Receive Draft Report	0.0	100%	100%	03-Jul-14 A	
847	P	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	02-Jul-14 A
848		**Material Procurement - Spread 2**	0.0	100%	100%	01-Apr-14 A	26-Feb-16 A
849		**Spread 2 - Pre-Cast Buildings**	0.0	100%	100%	10-Dec-14 A	04-Nov-15 A
850	SME-17	Fab & Delivery of Prefab Building Units (inc. built-in utilities)	0.0	100%	100%	10-Dec-14 A	04-Nov-15 A
851		**Spread 2 - UPS for Valve Sites**	0.0	100%	100%	05-Mar-15 A	25-May-15 A
852	PME12	Fab & Deliver of UPS - PCO102	0.0	100%	100%	05-Mar-15 A	25-May-15 A
853		**Spread 2 - Flow Computer Panels**	0.0	100%	100%	25-Feb-15 A	18-Nov-15 A
854	PME12	Fab & Deliver of Flow Computer Panels	0.0	100%	100%	25-Feb-15 A	04-Nov-15 A
855	PME-P(	Purchase Firewall Appliance Standard Warranty	0.0	0%	100%	02-Nov-15 A	18-Nov-15 A
856		**Spread 2 - Solar Panels**	0.0	100%	100%	10-Feb-15 A	09-Mar-15 A
857	SME-17	Fab & Delivery of Prefab For Solar Power Units	0.0	100%	100%	10-Feb-15 A	09-Mar-15 A
858		**Spread 2 - Cathodic Protection**	0.0	100%	100%	27-Feb-15 A	25-May-15 A
859	SME-17	Fab & Delivery of Cathodic Protection Materials	0.0	100%	100%	27-Feb-15 A	25-May-15 A
860		**Spread 2 - Transmitters**	0.0	100%	100%	25-Mar-15 A	08-Jun-15 A
861	PME12	Fab & Deliver of Transmitters - PCO102	0.0	100%	100%	25-Mar-15 A	08-Jun-15 A
862		**Spread 2 - Ball Valves**	0.0	100%	100%	23-Jul-14 A	08-Jun-15 A
863	SME14	Fab & Delivery of Ball Valves (36" Block Valves - SP2)	0.0	100%	100%	23-Jul-14 A	08-Jun-15 A
864		**Spread 2 - Plug Valves with Actuators**	0.0	100%	100%	24-Oct-14 A	09-Jul-15 A
865	SME-15	Fab & Delivery of Actuated Plug Valves	0.0	100%	100%	24-Oct-14 A	09-Jul-15 A
866		**Spread 2 - Fittings and Flanges,- Long Leads**	0.0	100%	100%	29-Sep-14 A	31-Aug-15 A
867	SME-17	Fab & Delivery of Pipes, Fittings & Flanges l(Long lead - for	0.0	100%	100%	29-Sep-14 A	31-Aug-15 A
868		**Spread 2 - Facilities Pipe//Valve Site Pipe**	0.0	0%	0%	01-Feb-16 A	26-Feb-16 A
869	PME-P(	Purchase Anodeless Risers	0.0	0%	100%	01-Feb-16 A	26-Feb-16 A
870		**Actuators**	0.0	100%	100%	17-Oct-14 A	05-May-15 A
871	SME-15	Fab & Deliver of Actuators For Valve Assembly	0.0	100%	100%	17-Oct-14 A	05-May-15 A

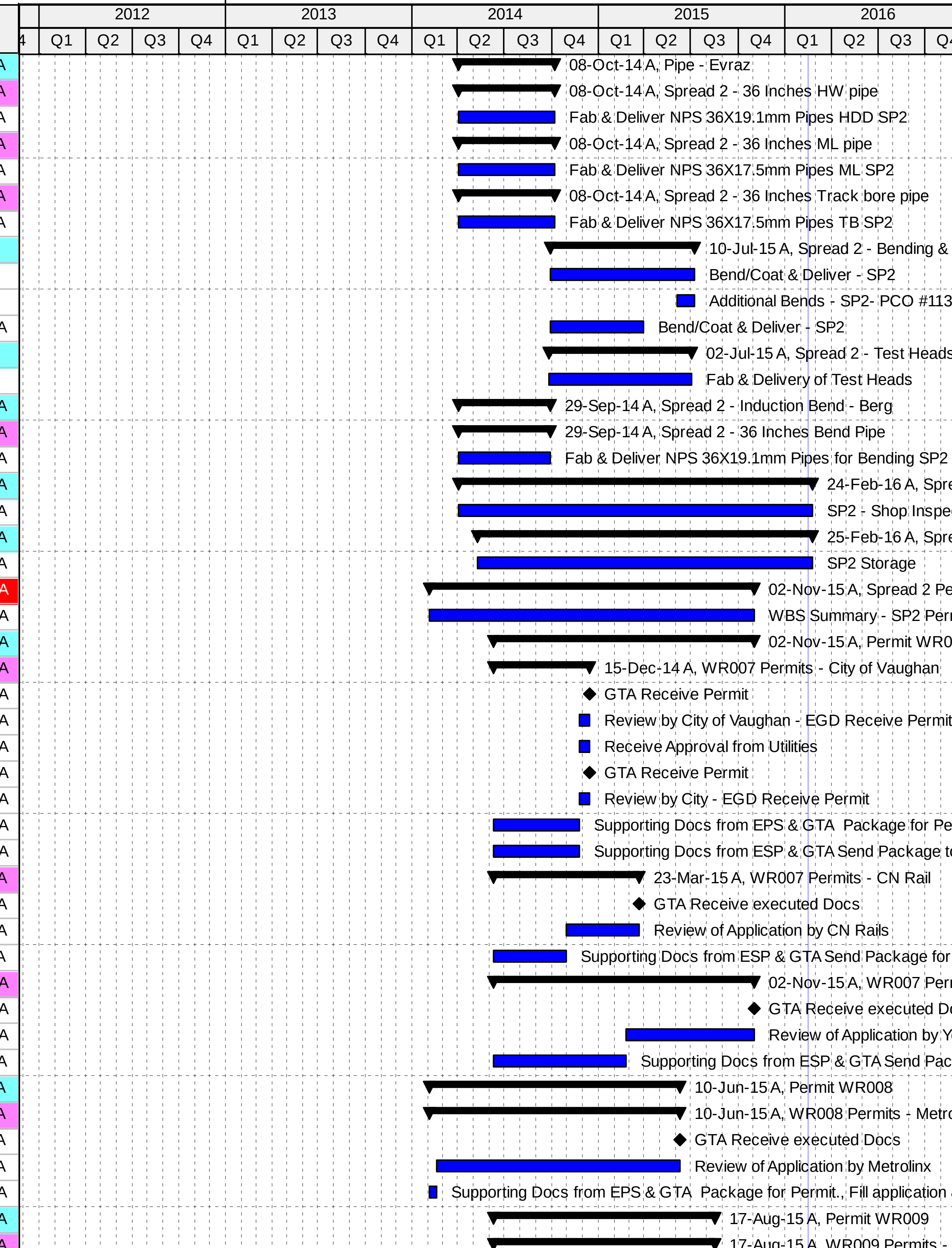


Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
872		**Pipe - Evraz**	0.0	100%	100%	01-Apr-14 A	08-Oct-14 A
873		**Spread 2 - 36 Inches HW pipe**	0.0	100%	100%	01-Apr-14 A	08-Oct-14 A
874	PME	Fab & Deliver NPS 36X19.1mm Pipes HDD SP2	0.0	100%	100%	01-Apr-14 A	08-Oct-14 A
875		**Spread 2 - 36 Inches ML pipe**	0.0	100%	100%	01-Apr-14 A	08-Oct-14 A
876	PME	Fab & Deliver NPS 36X17.5mm Pipes ML SP2	0.0	100%	100%	01-Apr-14 A	08-Oct-14 A
877		**Spread 2 - 36 Inches Track bore pipe**	0.0	100%	100%	01-Apr-14 A	08-Oct-14 A
878	PME	Fab & Deliver NPS 36X17.5mm Pipes TB SP2	0.0	100%	100%	01-Apr-14 A	08-Oct-14 A
879		**Spread 2 - Bending & Coating**	0.0	100%	100%	30-Sep-14 A	10-Jul-15 A
880	PME16	Bend/Coat & Deliver - SP2	0.0	100%	100%	30-Sep-14 A	10-Jul-15 A
881	PME12	Additional Bends - SP2- PCO #113	0.0	0%	100%	05-Jun-15 A	10-Jul-15 A
882	PME12	Bend/Coat & Deliver - SP2	0.0	0%	100%	30-Sep-14 A	31-Mar-15 A
883		**Spread 2 - Test Heads**	0.0	100%	100%	26-Sep-14 A	02-Jul-15 A
884	SME-1	Fab & Delivery of Test Heads	0.0	100%	100%	26-Sep-14 A	02-Jul-15 A
885		**Spread 2 - Induction Bend - Berg**	0.0	100%	100%	01-Apr-14 A	29-Sep-14 A
886		**Spread 2 - 36 Inches Bend Pipe**	0.0	100%	100%	01-Apr-14 A	29-Sep-14 A
887	PME	Fab & Deliver NPS 36X19.1mm Pipes for Bending SP2	0.0	100%	100%	01-Apr-14 A	29-Sep-14 A
888		**Spread 2 - Shop Inspection**	0.0	100%	100%	01-Apr-14 A	24-Feb-16 A
889	PME15	SP2 - Shop Inspection	0.0	100%	100%	01-Apr-14 A	24-Feb-16 A
890		**Spread 2 - Storage**	0.0	100%	100%	08-May-14 A	25-Feb-16 A
891	PME15	SP2 Storage	0.0	100%	100%	08-May-14 A	25-Feb-16 A
892		**Spread 2 Permit Work Requests**	0.0	100%	100%	03-Feb-14 A	02-Nov-15 A
893	PLE-07-11	WBS Summary - SP2 Permits WRs	0.0	100%	100%	03-Feb-14 A	02-Nov-15 A
894		**Permit WR007**	0.0	0%	0%	09-Jun-14 A	02-Nov-15 A
895		**WR007 Permits - City of Vaughan**	0.0	0%	0%	09-Jun-14 A	15-Dec-14 A
896	PLE-	GTA Receive Permit	0.0	100%	100%		15-Dec-14 A
897	PLE-	Review by City of Vaughan - EGD Receive Permit	0.0	100%	100%	25-Nov-14 A	15-Dec-14 A
898	PLE-	Receive Approval from Utilities	0.0	100%	100%	25-Nov-14 A	15-Dec-14 A
899	PLE-	GTA Receive Permit	0.0	100%	100%		15-Dec-14 A
900	PLE-	Review by City - EGD Receive Permit	0.0	100%	100%	26-Nov-14 A	15-Dec-14 A
901	PLE-	Supporting Docs from EPS & GTA Package for Permit.	0.0	0%	100%	09-Jun-14 A	25-Nov-14 A
902	PLE-	Supporting Docs from ESP & GTA Send Package to Utilities	0.0	100%	100%	09-Jun-14 A	25-Nov-14 A
903		**WR007 Permits - CN Rail**	0.0	0%	0%	09-Jun-14 A	23-Mar-15 A
904	PLE-	GTA Receive executed Docs	0.0	100%	100%		23-Mar-15 A
905	PLE-	Review of Application by CN Rails	0.0	100%	100%	31-Oct-14 A	23-Mar-15 A
906	PLE-	Supporting Docs from ESP & GTA Send Package for Permi	0.0	100%	100%	09-Jun-14 A	31-Oct-14 A
907		**WR007 Permits - York Region**	0.0	0%	0%	09-Jun-14 A	02-Nov-15 A
908	PLE-	GTA Receive executed Docs	0.0	100%	100%		02-Nov-15 A
909	PLE-	Review of Application by York Region	0.0	100%	100%	24-Feb-15 A	02-Nov-15 A
910	PLE-	Supporting Docs from ESP & GTA Send Package for Permi	0.0	100%	100%	09-Jun-14 A	24-Feb-15 A
911		**Permit WR008**	0.0	0%	0%	03-Feb-14 A	10-Jun-15 A
912		**WR008 Permits - Metrolinx**	0.0	0%	0%	03-Feb-14 A	10-Jun-15 A
913	PLE-	GTA Receive executed Docs	0.0	100%	100%		10-Jun-15 A
914	PLE-	Review of Application by Metrolinx	0.0	100%	100%	19-Feb-14 A	10-Jun-15 A
915	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	03-Feb-14 A	19-Feb-14 A
916		**Permit WR009**	0.0	0%	0%	09-Jun-14 A	17-Aug-15 A
917		**WR009 Permits - TRCA**	0.0	0%	0%	09-Jun-14 A	17-Aug-15 A

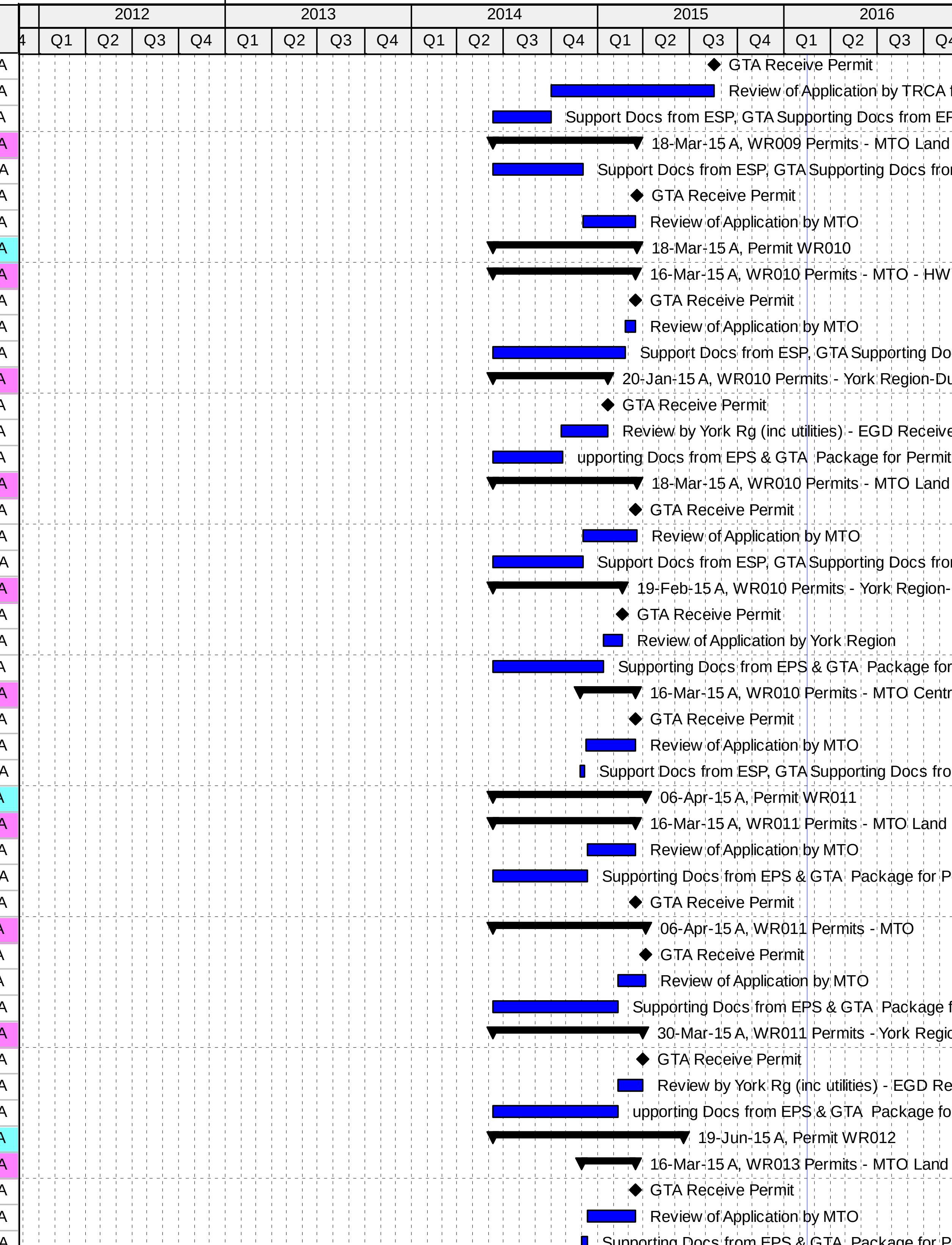


Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
918	PLE-	GTA Receive Permit	0.0	100%	100%		17-Aug-15 A
919	PLE-	Review of Application by TRCA for Don River West Branch	0.0	100%	100%	02-Oct-14 A	17-Aug-15 A
920	PLE-	Support Docs from ESP, GTA Supporting Docs from EPS &	0.0	100%	100%	09-Jun-14 A	02-Oct-14 A
921		**WR009 Permits - MTO Land Use**	0.0	0%	0%	09-Jun-14 A	18-Mar-15 A
922	PLE-	Support Docs from ESP, GTA Supporting Docs from EPS &	0.0	100%	100%	09-Jun-14 A	05-Dec-14 A
923	PLE-	GTA Receive Permit	0.0	100%	100%		18-Mar-15 A
924	PLE-	Review of Application by MTO	0.0	100%	100%	05-Dec-14 A	18-Mar-15 A
925		**Permit WR010**	0.0	0%	0%	09-Jun-14 A	18-Mar-15 A
926		**WR010 Permits - MTO - HWY 7**	0.0	0%	0%	09-Jun-14 A	16-Mar-15 A
927	PLE-	GTA Receive Permit	0.0	100%	100%		16-Mar-15 A
928	PLE-	Review of Application by MTO	0.0	100%	100%	25-Feb-15 A	16-Mar-15 A
929	PLE-	Support Docs from ESP, GTA Supporting Docs from EPS &	0.0	100%	100%	09-Jun-14 A	25-Feb-15 A
930		**WR010 Permits - York Region-Dufferin Street**	0.0	0%	0%	09-Jun-14 A	20-Jan-15 A
931	PLE-	GTA Receive Permit	0.0	100%	100%		20-Jan-15 A
932	PLE-	Review by York Rg (inc utilities) - EGD Receive Permit	0.0	100%	100%	23-Oct-14 A	20-Jan-15 A
933	PLE-	upporting Docs from EPS & GTA Package for Permit., Fill a	0.0	100%	100%	09-Jun-14 A	23-Oct-14 A
934		**WR010 Permits - MTO Land Use**	0.0	0%	0%	09-Jun-14 A	18-Mar-15 A
935	PLE-	GTA Receive Permit	0.0	100%	100%		18-Mar-15 A
936	PLE-	Review of Application by MTO	0.0	100%	100%	05-Dec-14 A	18-Mar-15 A
937	PLE-	Support Docs from ESP, GTA Supporting Docs from EPS &	0.0	100%	100%	09-Jun-14 A	05-Dec-14 A
938		**WR010 Permits - York Region-Centre Street**	0.0	0%	0%	09-Jun-14 A	19-Feb-15 A
939	PLE-	GTA Receive Permit	0.0	100%	100%		19-Feb-15 A
940	PLE-	Review of Application by York Region	0.0	100%	100%	13-Jan-15 A	19-Feb-15 A
941	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	13-Jan-15 A
942		**WR010 Permits - MTO Centre Street**	0.0	0%	0%	28-Nov-14 A	16-Mar-15 A
943	PLE-	GTA Receive Permit	0.0	100%	100%		16-Mar-15 A
944	PLE-	Review of Application by MTO	0.0	100%	100%	09-Dec-14 A	16-Mar-15 A
945	PLE-	Support Docs from ESP, GTA Supporting Docs from EPS &	0.0	100%	100%	28-Nov-14 A	08-Dec-14 A
946		**Permit WR011**	0.0	0%	0%	09-Jun-14 A	06-Apr-15 A
947		**WR011 Permits - MTO Land Use**	0.0	0%	0%	09-Jun-14 A	16-Mar-15 A
948	PLE-	Review of Application by MTO	0.0	100%	100%	12-Dec-14 A	16-Mar-15 A
949	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	12-Dec-14 A
950	PLE-	GTA Receive Permit	0.0	100%	100%		16-Mar-15 A
951		**WR011 Permits - MTO**	0.0	0%	0%	09-Jun-14 A	06-Apr-15 A
952	PLE-	GTA Receive Permit	0.0	100%	100%		06-Apr-15 A
953	PLE-	Review of Application by MTO	0.0	100%	100%	11-Feb-15 A	06-Apr-15 A
954	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	11-Feb-15 A
955		**WR011 Permits - York Region**	0.0	0%	0%	09-Jun-14 A	30-Mar-15 A
956	PLE-	GTA Receive Permit	0.0	100%	100%		30-Mar-15 A
957	PLE-	Review by York Rg (inc utilities) - EGD Receive Permit	0.0	100%	100%	10-Feb-15 A	30-Mar-15 A
958	PLE-	upporting Docs from EPS & GTA Package for Permit., Fill a	0.0	100%	100%	09-Jun-14 A	10-Feb-15 A
959		**Permit WR012**	0.0	0%	0%	09-Jun-14 A	19-Jun-15 A
960		**WR013 Permits - MTO Land Use**	0.0	0%	0%	02-Dec-14 A	16-Mar-15 A
961	PLE-	GTA Receive Permit	0.0	100%	100%		16-Mar-15 A
962	PLE-	Review of Application by MTO	0.0	100%	100%	12-Dec-14 A	16-Mar-15 A
963	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	02-Dec-14 A	12-Dec-14 A

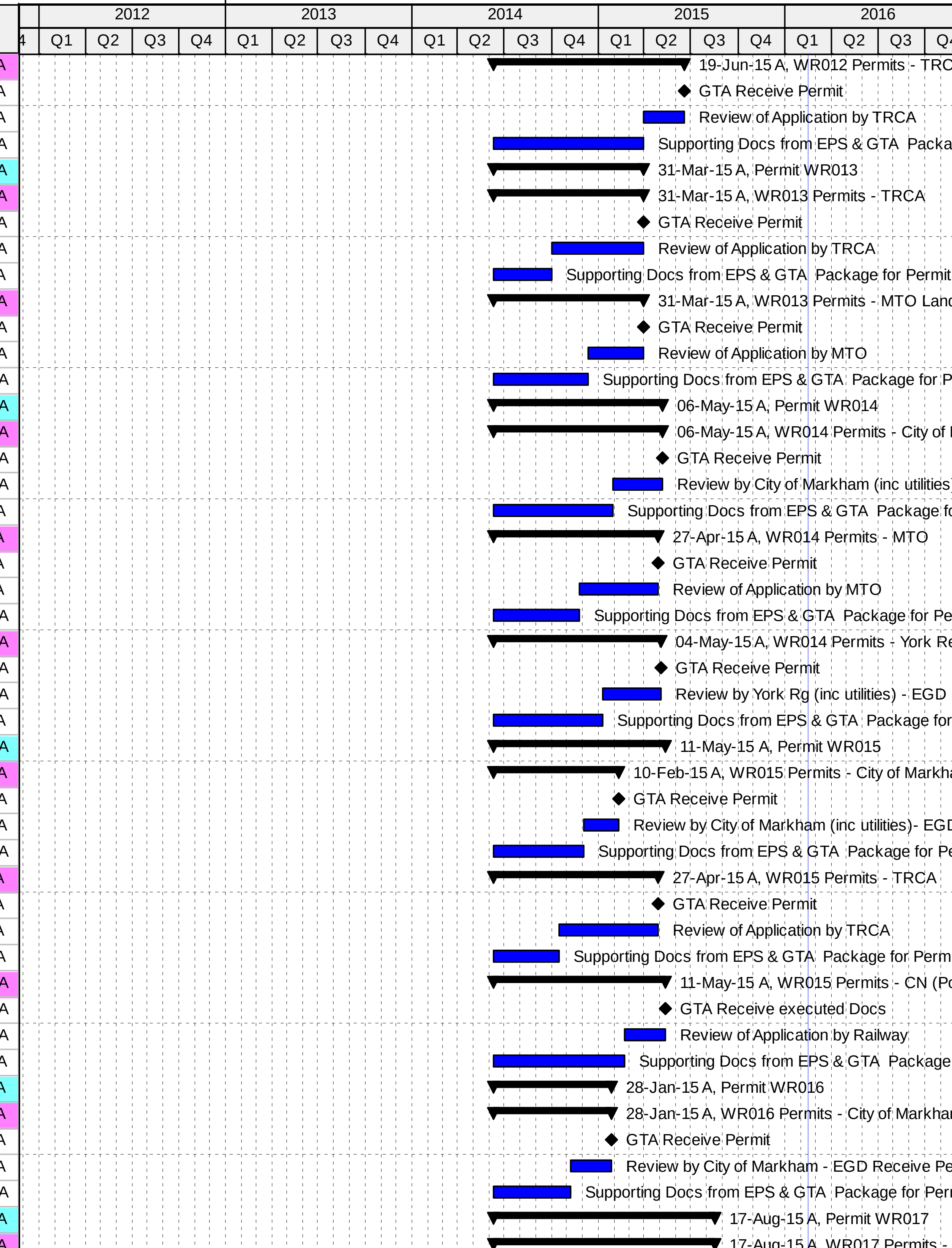


Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
964		**WR012 Permits - TRCA**	0.0	0%	0%	09-Jun-14 A	19-Jun-15 A
965	PLE-	GTA Receive Permit	0.0	100%	100%		19-Jun-15 A
966	PLE-	Review of Application by TRCA	0.0	100%	100%	31-Mar-15 A	19-Jun-15 A
967	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	31-Mar-15 A
968		**Permit WR013**	0.0	0%	0%	09-Jun-14 A	31-Mar-15 A
969		**WR013 Permits - TRCA**	0.0	0%	0%	09-Jun-14 A	31-Mar-15 A
970	PLE-	GTA Receive Permit	0.0	100%	100%		31-Mar-15 A
971	PLE-	Review of Application by TRCA	0.0	100%	100%	02-Oct-14 A	31-Mar-15 A
972	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	02-Oct-14 A
973		**WR013 Permits - MTO Land Use**	0.0	0%	0%	09-Jun-14 A	31-Mar-15 A
974	PLE-	GTA Receive Permit	0.0	100%	100%		31-Mar-15 A
975	PLE-	Review of Application by MTO	0.0	100%	100%	12-Dec-14 A	31-Mar-15 A
976	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	12-Dec-14 A
977		**Permit WR014**	0.0	0%	0%	09-Jun-14 A	06-May-15 A
978		**WR014 Permits - City of Markham**	0.0	0%	0%	09-Jun-14 A	06-May-15 A
979	PLE-	GTA Receive Permit	0.0	100%	100%		06-May-15 A
980	PLE-	Review by City of Markham (inc utilities) - EGD Receive Pe	0.0	100%	100%	30-Jan-15 A	06-May-15 A
981	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	30-Jan-15 A
982		**WR014 Permits - MTO**	0.0	0%	0%	09-Jun-14 A	27-Apr-15 A
983	PLE-	GTA Receive Permit	0.0	100%	100%		27-Apr-15 A
984	PLE-	Review of Application by MTO	0.0	100%	100%	24-Nov-14 A	27-Apr-15 A
985	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	24-Nov-14 A
986		**WR014 Permits - York Region**	0.0	0%	0%	09-Jun-14 A	04-May-15 A
987	PLE-	GTA Receive Permit	0.0	100%	100%		04-May-15 A
988	PLE-	Review by York Rg (inc utilities) - EGD Receive Permit	0.0	100%	100%	09-Jan-15 A	04-May-15 A
989	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	09-Jan-15 A
990		**Permit WR015**	0.0	0%	0%	09-Jun-14 A	11-May-15 A
991		**WR015 Permits - City of Markham**	0.0	0%	0%	09-Jun-14 A	10-Feb-15 A
992	PLE-	GTA Receive Permit	0.0	100%	100%		10-Feb-15 A
993	PLE-	Review by City of Markham (inc utilities)- EGD Receive Per	0.0	100%	100%	04-Dec-14 A	10-Feb-15 A
994	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	04-Dec-14 A
995		**WR015 Permits - TRCA**	0.0	0%	0%	09-Jun-14 A	27-Apr-15 A
996	PLE-	GTA Receive Permit	0.0	100%	100%		27-Apr-15 A
997	PLE-	Review of Application by TRCA	0.0	100%	100%	17-Oct-14 A	27-Apr-15 A
998	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	17-Oct-14 A
999		**WR015 Permits - CN (Pomona) Railway**	0.0	0%	0%	09-Jun-14 A	11-May-15 A
1000	PLE-	GTA Receive executed Docs	0.0	100%	100%		11-May-15 A
1001	PLE-	Review of Application by Railway	0.0	100%	100%	23-Feb-15 A	11-May-15 A
1002	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	23-Feb-15 A
1003		**Permit WR016**	0.0	0%	0%	09-Jun-14 A	28-Jan-15 A
1004		**WR016 Permits - City of Markham**	0.0	0%	0%	09-Jun-14 A	28-Jan-15 A
1005	PLE-	GTA Receive Permit	0.0	100%	100%		28-Jan-15 A
1006	PLE-	Review by City of Markham - EGD Receive Permit	0.0	100%	100%	07-Nov-14 A	28-Jan-15 A
1007	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	07-Nov-14 A
1008		**Permit WR017**	0.0	0%	0%	09-Jun-14 A	17-Aug-15 A
1009		**WR017 Permits - TRCA**	0.0	0%	0%	09-Jun-14 A	17-Aug-15 A

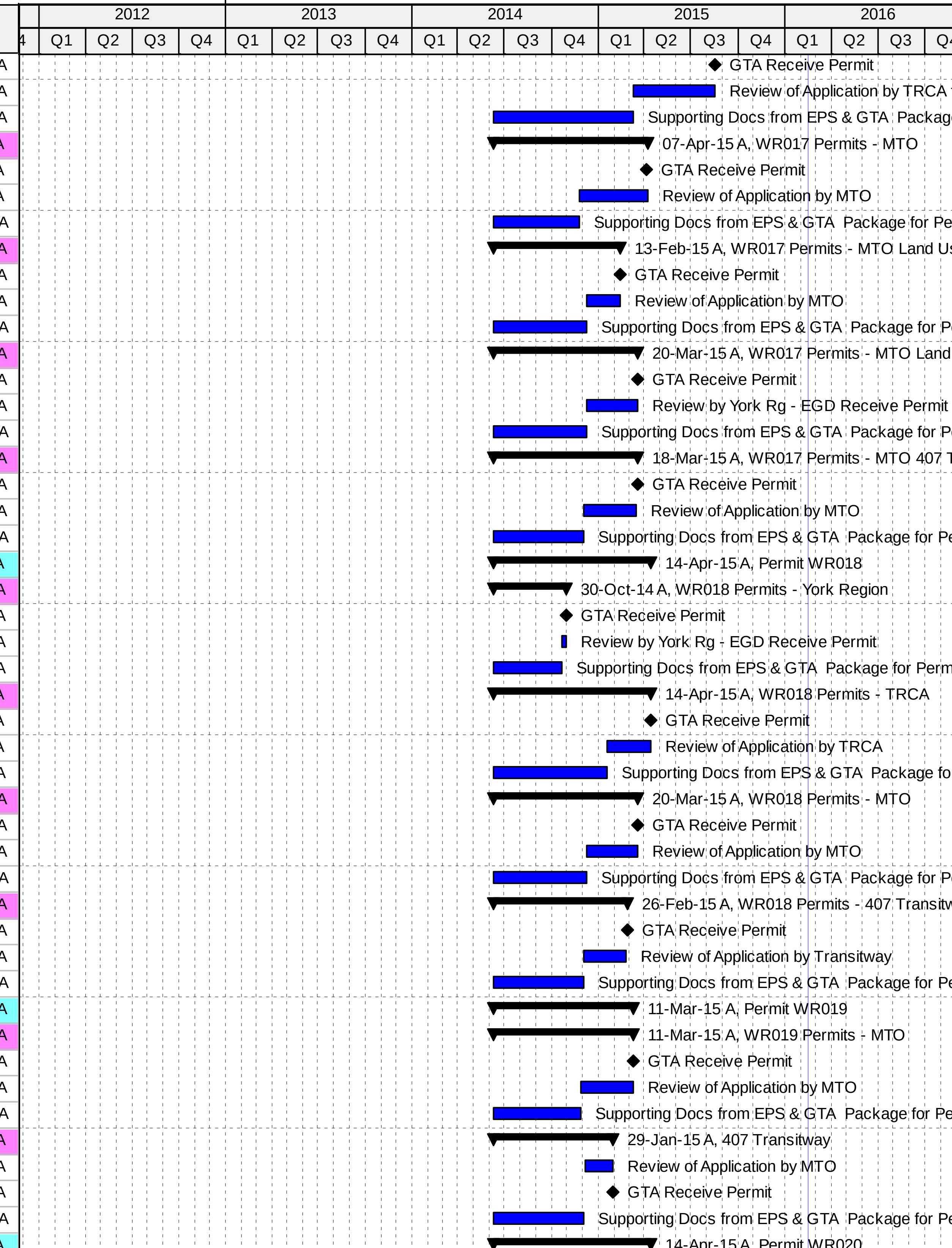


Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1010	PLE-	GTA Receive Permit	0.0	100%	100%		17-Aug-15 A
1011	PLE-	Review of Application by TRCA for German Mills Greek	0.0	100%	100%	11-Mar-15 A	17-Aug-15 A
1012	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	11-Mar-15 A
1013		**WR017 Permits - MTO**	0.0	0%	0%	09-Jun-14 A	07-Apr-15 A
1014	PLE-	GTA Receive Permit	0.0	100%	100%		06-Apr-15 A
1015	PLE-	Review of Application by MTO	0.0	100%	100%	26-Nov-14 A	07-Apr-15 A
1016	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	26-Nov-14 A
1017		**WR017 Permits - MTO Land Use 9**	0.0	0%	0%	09-Jun-14 A	13-Feb-15 A
1018	PLE-	GTA Receive Permit	0.0	100%	100%		13-Feb-15 A
1019	PLE-	Review of Application by MTO	0.0	100%	100%	10-Dec-14 A	13-Feb-15 A
1020	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	10-Dec-14 A
1021		**WR017 Permits - MTO Land Use 10**	0.0	0%	0%	09-Jun-14 A	20-Mar-15 A
1022	PLE-	GTA Receive Permit	0.0	100%	100%		20-Mar-15 A
1023	PLE-	Review by York Rg - EGD Receive Permit	0.0	100%	100%	10-Dec-14 A	20-Mar-15 A
1024	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	10-Dec-14 A
1025		**WR017 Permits - MTO 407 Transitway**	0.0	0%	0%	09-Jun-14 A	18-Mar-15 A
1026	PLE-	GTA Receive Permit	0.0	100%	100%		18-Mar-15 A
1027	PLE-	Review of Application by MTO	0.0	100%	100%	04-Dec-14 A	18-Mar-15 A
1028	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	04-Dec-14 A
1029		**Permit WR018**	0.0	0%	0%	09-Jun-14 A	14-Apr-15 A
1030		**WR018 Permits - York Region**	0.0	0%	0%	09-Jun-14 A	30-Oct-14 A
1031	PLE-	GTA Receive Permit	0.0	100%	100%		30-Oct-14 A
1032	PLE-	Review by York Rg - EGD Receive Permit	0.0	100%	100%	21-Oct-14 A	30-Oct-14 A
1033	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	21-Oct-14 A
1034		**WR018 Permits - TRCA**	0.0	0%	0%	09-Jun-14 A	14-Apr-15 A
1035	PLE-	GTA Receive Permit	0.0	100%	100%		13-Apr-15 A
1036	PLE-	Review of Application by TRCA	0.0	100%	100%	19-Jan-15 A	14-Apr-15 A
1037	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	19-Jan-15 A
1038		**WR018 Permits - MTO**	0.0	0%	0%	09-Jun-14 A	20-Mar-15 A
1039	PLE-	GTA Receive Permit	0.0	100%	100%		20-Mar-15 A
1040	PLE-	Review of Application by MTO	0.0	100%	100%	10-Dec-14 A	20-Mar-15 A
1041	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	10-Dec-14 A
1042		**WR018 Permits - 407 Transitway**	0.0	0%	0%	09-Jun-14 A	26-Feb-15 A
1043	PLE-	GTA Receive Permit	0.0	100%	100%		26-Feb-15 A
1044	PLE-	Review of Application by Transitway	0.0	100%	100%	04-Dec-14 A	26-Feb-15 A
1045	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	04-Dec-14 A
1046		**Permit WR019**	0.0	0%	0%	09-Jun-14 A	11-Mar-15 A
1047		**WR019 Permits - MTO**	0.0	0%	0%	09-Jun-14 A	11-Mar-15 A
1048	PLE-	GTA Receive Permit	0.0	100%	100%		11-Mar-15 A
1049	PLE-	Review of Application by MTO	0.0	100%	100%	27-Nov-14 A	11-Mar-15 A
1050	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	27-Nov-14 A
1051		**407 Transitway**	0.0	0%	0%	09-Jun-14 A	29-Jan-15 A
1052	PLE-	Review of Application by MTO	0.0	100%	100%	05-Dec-14 A	29-Jan-15 A
1053	PLE-	GTA Receive Permit	0.0	100%	100%		29-Jan-15 A
1054	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	04-Dec-14 A
1055		**Permit WR020**	0.0	0%	0%	09-Jun-14 A	14-Apr-15 A



Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1056		**WR017 Permits - MTO 407 Transitway**	0.0	0%	0%	09-Jun-14 A	28-Jan-15 A
1057	PLE-	GTA Receive Permit	0.0	100%	100%		28-Jan-15 A
1058	PLE-	Review of Application by MTO	0.0	100%	100%	04-Dec-14 A	28-Jan-15 A
1059	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	04-Dec-14 A
1060		**WR020 Permits - York Region**	0.0	0%	0%	09-Jun-14 A	18-Nov-14 A
1061	PLE-	GTA Receive Permit	0.0	100%	100%		18-Nov-14 A
1062	PLE-	Review by York Rg - EGD Receive Permit	0.0	100%	100%	29-Oct-14 A	18-Nov-14 A
1063	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	29-Oct-14 A
1064		**WR020 Permits - City of Markham**	0.0	0%	0%	09-Jun-14 A	28-Jan-15 A
1065	PLE-	GTA Receive Permit	0.0	100%	100%		28-Jan-15 A
1066	PLE-	Review by City of Markham (inc utilities) - EGD Receive Pe	0.0	100%	100%	13-Nov-14 A	28-Jan-15 A
1067	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	13-Nov-14 A
1068		**WR020 Permits - TRCA**	0.0	0%	0%	09-Jun-14 A	14-Apr-15 A
1069	PLE-	GTA Receive Permit	0.0	100%	100%		13-Apr-15 A
1070	PLE-	Review of Application by TRCA	0.0	100%	100%	16-Oct-14 A	14-Apr-15 A
1071	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	16-Oct-14 A
1072		**WR020 Permits - MTO**	0.0	0%	0%	09-Jun-14 A	30-Mar-15 A
1073	PLE-	GTA Receive Permit	0.0	100%	100%		30-Mar-15 A
1074	PLE-	Review of Application by MTO	0.0	100%	100%	04-Dec-14 A	30-Mar-15 A
1075	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	04-Dec-14 A
1076		**Spread 3 - Parkway West/Parkway Cons/Parkway Cons/Parkway Cons to**	49.6	99.93%	99.65%	12-Feb-13 A	14-Jul-16
1077		**Material Procurement - Spread 3**	0.0	100%	100%	01-Apr-14 A	26-Feb-16 A
1078		**Spread 3 - Pre-Cast Buildings**	0.0	100%	100%	10-Dec-14 A	31-Dec-15 A
1079	SME-17	Fab & Delivery of Prefab Building Units (inc. built-in utilities)	0.0	100%	100%	10-Dec-14 A	31-Dec-15 A
1080		**Spread 3 - UPS for Valve Sites**	0.0	100%	100%	05-Mar-15 A	25-May-15 A
1081	PME12	Fab & Deliver of UPS - PCO102	0.0	100%	100%	05-Mar-15 A	25-May-15 A
1082		**Spread 3 - Flow Computer Panels**	0.0	100%	100%	25-Feb-15 A	18-Nov-15 A
1083	PME12	Fab & Deliver of Flow Computer Panels	0.0	100%	100%	25-Feb-15 A	04-Nov-15 A
1084	PME-P(	Purchase Firewall Appliance Standard Warranty	0.0	0%	100%	02-Nov-15 A	18-Nov-15 A
1085		**Spread 3 - Solar Panels**	0.0	100%	100%	10-Feb-15 A	09-Mar-15 A
1086	SME-17	Fab & Delivery of Prefab For Solar Power Units	0.0	100%	100%	10-Feb-15 A	09-Mar-15 A
1087		**Spread 3 - Cathodic Protection**	0.0	100%	100%	27-Feb-15 A	26-Feb-16 A
1088	SME-P(	Purchase Additional Magnesium Anodes	0.0	0%	100%	02-Nov-15 A	26-Feb-16 A
1089	SME-17	Fab & Delivery of Cathodic Protection Materials	0.0	100%	100%	27-Feb-15 A	25-May-15 A
1090		**Spread 3 - Transmitters**	0.0	100%	100%	25-Mar-15 A	08-Jun-15 A
1091	PME12	Fab & Deliver of Transmitters - PCO102	0.0	100%	100%	25-Mar-15 A	08-Jun-15 A
1092		**Spread 3 - Ball Valves**	0.0	100%	100%	23-Jul-14 A	08-Jun-15 A
1093	SME14	Fab & Delivery of Ball Valves (42" Block Valves - SP3)	0.0	100%	100%	23-Jul-14 A	08-Jun-15 A
1094		**Spread 3 - Plug Valves with Actuators**	0.0	100%	100%	24-Oct-14 A	09-Jul-15 A
1095	SME-15	Fab & Delivery of Actuated Plug Valves	0.0	100%	100%	24-Oct-14 A	09-Jul-15 A
1096		**Spread 3 - Fittings and Flanges,- Long Leads**	0.0	100%	100%	29-Sep-14 A	31-Aug-15 A
1097	SME-17	Fab & Delivery of Pipes, Fittings & Flanges l(Long lead - for	0.0	100%	100%	29-Sep-14 A	31-Aug-15 A
1098		**Spread 3 - Facilities Pipe//Valve Site Pipe**	0.0	100%	100%	09-Oct-14 A	26-Feb-16 A
1099	SME-17	Fab & Delivery of Facilities Pipes	0.0	100%	100%	09-Oct-14 A	10-Jul-15 A
1100	PME-P(	Purchase Anodeless Risers	0.0	0%	100%	01-Feb-16 A	26-Feb-16 A
1101		**Actuators**	0.0	100%	100%	17-Oct-14 A	05-May-15 A

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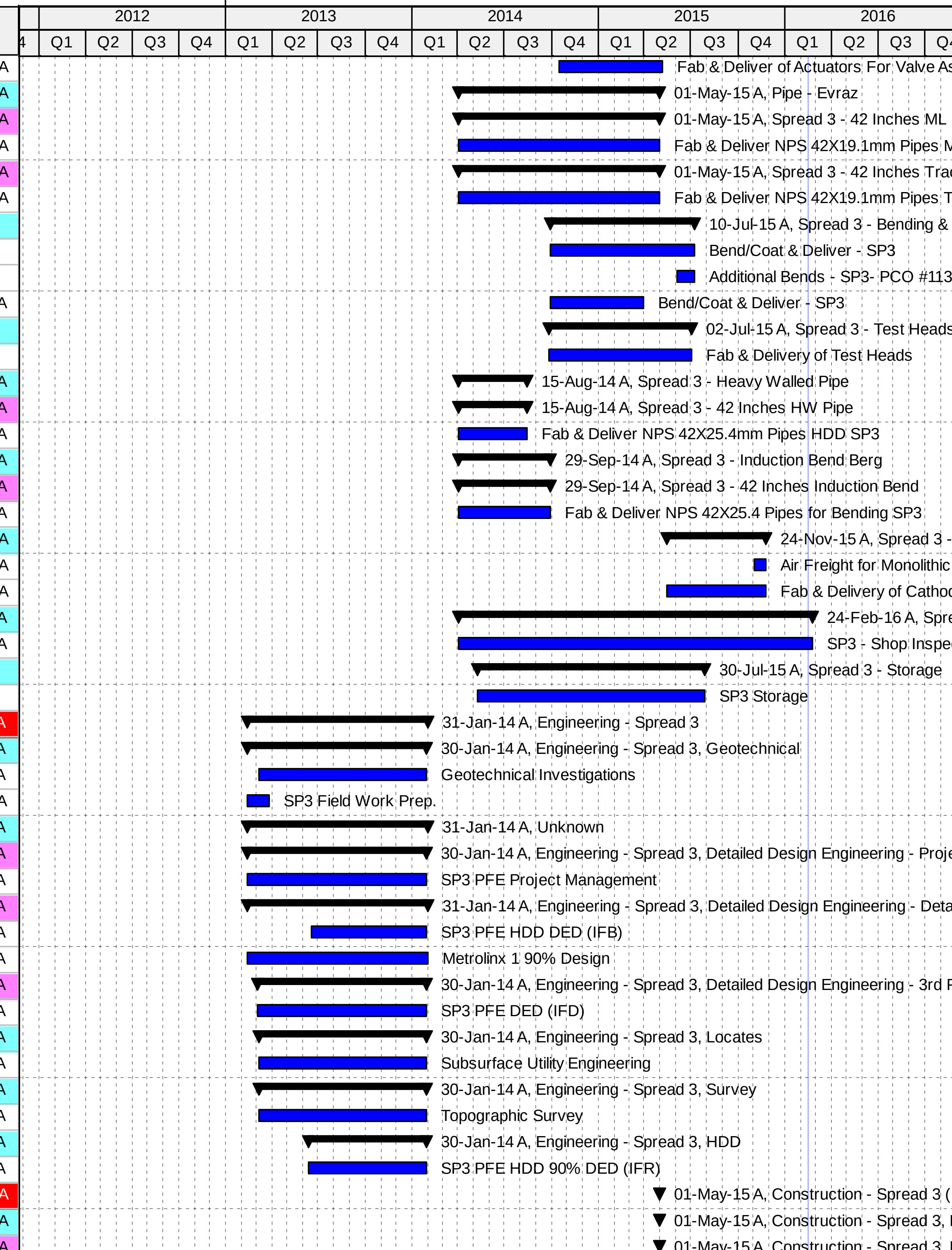
GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1102	SME-1!	Fab & Deliver of Actuators For Valve Assembly	0.0	100%	100%	17-Oct-14 A	05-May-15 A
1103		**Pipe - Evraz**	0.0	100%	100%	01-Apr-14 A	01-May-15 A
1104		**Spread 3 - 42 Inches ML Pipe**	0.0	100%	100%	01-Apr-14 A	01-May-15 A
1105	PME	Fab & Deliver NPS 42X19.1mm Pipes ML SP3	0.0	100%	100%	01-Apr-14 A	01-May-15 A
1106		**Spread 3 - 42 Inches Track bore pipe**	0.0	100%	100%	01-Apr-14 A	01-May-15 A
1107	PME	Fab & Deliver NPS 42X19.1mm Pipes TB SP3	0.0	100%	100%	01-Apr-14 A	01-May-15 A
1108		**Spread 3 - Bending & Coating**	0.0	100%	100%	30-Sep-14 A	10-Jul-15 A
1109	PME16	Bend/Coat & Deliver - SP3	0.0	100%	100%	30-Sep-14 A	10-Jul-15 A
1110	PME12	Additional Bends - SP3- PCO #113	0.0	0%	100%	05-Jun-15 A	10-Jul-15 A
1111	PME12	Bend/Coat & Deliver - SP3	0.0	0%	100%	30-Sep-14 A	31-Mar-15 A
1112		**Spread 3 - Test Heads**	0.0	100%	100%	26-Sep-14 A	02-Jul-15 A
1113	SME-1!	Fab & Delivery of Test Heads	0.0	100%	100%	26-Sep-14 A	02-Jul-15 A
1114		**Spread 3 - Heavy Walled Pipe**	0.0	100%	100%	01-Apr-14 A	15-Aug-14 A
1115		**Spread 3 - 42 Inches HW Pipe**	0.0	100%	100%	01-Apr-14 A	15-Aug-14 A
1116	PME	Fab & Deliver NPS 42X25.4mm Pipes HDD SP3	0.0	100%	100%	01-Apr-14 A	15-Aug-14 A
1117		**Spread 3 - Induction Bend Berg**	0.0	100%	100%	01-Apr-14 A	29-Sep-14 A
1118		**Spread 3 - 42 Inches Induction Bend**	0.0	100%	100%	01-Apr-14 A	29-Sep-14 A
1119	PME	Fab & Deliver NPS 42X25.4 Pipes for Bending SP3	0.0	100%	100%	01-Apr-14 A	29-Sep-14 A
1120		**Spread 3 - Monolitic Isolators**	0.0	100%	100%	15-May-15 A	24-Nov-15 A
1121	SME-P(	Air Freight for Monolithic Isolators	0.0	0%	100%	02-Nov-15 A	24-Nov-15 A
1122	SME-1ξ	Fab & Delivery of Cathodic Protection Materials	0.0	100%	100%	15-May-15 A	24-Nov-15 A
1123		**Spread 3 - Shop Inspection**	0.0	100%	100%	01-Apr-14 A	24-Feb-16 A
1124	PME15	SP3 - Shop Inspection	0.0	100%	100%	01-Apr-14 A	24-Feb-16 A
1125		**Spread 3 - Storage**	0.0	100%	100%	08-May-14 A	30-Jul-15 A
1126	PME15	SP3 Storage	0.0	100%	100%	08-May-14 A	30-Jul-15 A
1127		**Engineering - Spread 3**	0.0	100%	100%	12-Feb-13 A	31-Jan-14 A
1128		**Engineering - Spread 3, Geotechnical**	0.0	100%	100%	12-Feb-13 A	30-Jan-14 A
1129	PRT-11	Geotechnical Investigations	0.0	100%	100%	06-Mar-13 A	30-Jan-14 A
1130	PRT-10	SP3 Field Work Prep.	0.0	100%	100%	12-Feb-13 A	28-Mar-13 A
1131		**Unknown**	0.0	100%	100%	12-Feb-13 A	31-Jan-14 A
1132		**Engineering - Spread 3, Detailed Design Engineering - Project M**	0.0	100%	100%	12-Feb-13 A	30-Jan-14 A
1133	PRT	SP3 PFE Project Management	0.0	100%	100%	12-Feb-13 A	30-Jan-14 A
1134		**Engineering - Spread 3, Detailed Design Engineering - Detailed I**	0.0	100%	100%	12-Feb-13 A	31-Jan-14 A
1135	PRT	SP3 PFE HDD DED (IFB)	0.0	100%	100%	19-Jun-13 A	30-Jan-14 A
1136	PRT	Metrolinx 1 90% Design	0.0	100%	100%	12-Feb-13 A	31-Jan-14 A
1137		**Engineering - Spread 3, Detailed Design Engineering - 3rd Party**	0.0	100%	100%	04-Mar-13 A	30-Jan-14 A
1138	PRT	SP3 PFE DED (IFD)	0.0	100%	100%	04-Mar-13 A	30-Jan-14 A
1139		**Engineering - Spread 3, Locates**	0.0	100%	100%	06-Mar-13 A	30-Jan-14 A
1140	PRT-11	Subsurface Utility Engineering	0.0	100%	100%	06-Mar-13 A	30-Jan-14 A
1141		**Engineering - Spread 3, Survey**	0.0	100%	100%	06-Mar-13 A	30-Jan-14 A
1142	PRT-11	Topographic Survey	0.0	100%	100%	06-Mar-13 A	30-Jan-14 A
1143		**Engineering - Spread 3, HDD**	0.0	100%	100%	11-Jun-13 A	30-Jan-14 A
1144	PRT-12	SP3 PFE HDD 90% DED (IFR)	0.0	100%	100%	11-Jun-13 A	30-Jan-14 A
1145		**Construction - Spread 3 (Parkway West to Albion Rd Pipeline (A-1.2.1))**	0.0	0%	0%	01-May-15 A	01-May-15 A
1146		**Construction - Spread 3, Pipeline**	0.0	0%	0%	01-May-15 A	01-May-15 A
1147		**Construction - Spread 3, ML**	0.0	0%	0%	01-May-15 A	01-May-15 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1148	PWC	Pipe on Site - String {Late}	0.0	100%	100%	01-May-15 A	
1149	Spread 3 Permit Work Requests		0.0	100%	100%	03-Feb-14 A	31-Mar-16 A
1150	PLE-PCO-	University of Guelph Grant	0.0	0%	100%	01-Mar-16 A	31-Mar-16 A
1151	PLE-07-11	WBS Summary - SP3 Permits WRs	0.0	100%	100%	03-Feb-14 A	31-Mar-16 A
1152	Permit WR021		0.0	0%	0%	09-Jun-14 A	23-Mar-15 A
1153	WR021 Permits - MTO Land Use		0.0	0%	0%	09-Jun-14 A	16-Mar-15 A
1154	PLE-	GTA Receive Permit	0.0	100%	100%		16-Mar-15 A
1155	PLE-	Review of Application by MTO	0.0	100%	100%	11-Dec-14 A	16-Mar-15 A
1156	PLE-	Supporting Docs from ESP, Supporting Docs from EPS & G	0.0	100%	100%	09-Jun-14 A	11-Dec-14 A
1157	WR021 Permits - CN Rail		0.0	0%	0%	09-Jun-14 A	23-Mar-15 A
1158	PLE-	GTA Receive executed Docs	0.0	100%	100%		23-Mar-15 A
1159	PLE-	Review of Application by CN Rails	0.0	100%	100%	05-Nov-14 A	23-Mar-15 A
1160	PLE-	Supporting Docs from ESP, Supporting Docs from EPS & G	0.0	100%	100%	09-Jun-14 A	05-Nov-14 A
1161	Permit WR022		0.0	0%	0%	09-Jun-14 A	12-Dec-14 A
1162	WR022 Permits - Peel Region		0.0	0%	0%	09-Jun-14 A	12-Dec-14 A
1163	PLE-	GTA Receive Permit	0.0	100%	100%		12-Dec-14 A
1164	PLE-	Review by Peel Rg - EGD Receive Permit	0.0	100%	100%	21-Oct-14 A	12-Dec-14 A
1165	PLE-	Supporting Docs from ESP, Supporting Docs from EPS & G	0.0	100%	100%	09-Jun-14 A	21-Oct-14 A
1166	WR022 Permits - City of Toronto		0.0	0%	0%	09-Jun-14 A	09-Dec-14 A
1167	PLE-	GTA Receive Permit	0.0	100%	100%		09-Dec-14 A
1168	PLE-	Review by City of Toronto - EGD Receive Permit	0.0	100%	100%	18-Nov-14 A	09-Dec-14 A
1169	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	18-Nov-14 A
1170	WR022 Permits - TRCA		0.0	0%	0%	09-Jun-14 A	28-Nov-14 A
1171	PLE-	GTA Receive Permit	0.0	100%	100%		28-Nov-14 A
1172	PLE-	Review of Application by TRCA	0.0	100%	100%	21-Oct-14 A	28-Nov-14 A
1173	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	21-Oct-14 A
1174	Permit WR023		0.0	0%	0%	09-Jun-14 A	30-Apr-15 A
1175	WR023 Permits - TRCA		0.0	0%	0%	09-Jun-14 A	02-Mar-15 A
1176	PLE-	GTA Receive Permit	0.0	100%	100%		02-Mar-15 A
1177	PLE-	Review of Application by TRCA	0.0	100%	100%	03-Oct-14 A	02-Mar-15 A
1178	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	03-Oct-14 A
1179	WR023 Permits - City of Brampton		0.0	0%	0%	09-Jun-14 A	30-Apr-15 A
1180	PLE-	GTA Receive Permit	0.0	100%	100%		30-Apr-15 A
1181	PLE-	Review by City of Brampton - EGD Receive Permit	0.0	100%	100%	24-Oct-14 A	30-Apr-15 A
1182	PLE-	EGD Permitting Submit to Brampton & Utilities	0.0	100%	100%	09-Jun-14 A	24-Oct-14 A
1183	Permit WR024		0.0	0%	0%	09-Jun-14 A	14-May-15 A
1184	WR024 Permits - CN Rail		0.0	0%	0%	09-Jun-14 A	14-May-15 A
1185	PLE-	GTA Receive executed Docs	0.0	100%	100%		14-May-15 A
1186	PLE-	Review of Application by CN Rails	0.0	100%	100%	28-Oct-14 A	14-May-15 A
1187	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	28-Oct-14 A
1188	WR024 Permits - Peel Region		0.0	0%	0%	09-Jun-14 A	15-Apr-15 A
1189	PLE-	GTA Receive executed Docs	0.0	100%	100%		15-Apr-15 A
1190	PLE-	Review of Application by CN Rails	0.0	100%	100%	03-Nov-14 A	15-Apr-15 A
1191	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	03-Nov-14 A
1192	Permit WR025		0.0	0%	0%	09-Jun-14 A	31-Jul-15 A
1193	WR025 Permits - CN Rail		0.0	0%	0%	09-Jun-14 A	06-May-15 A

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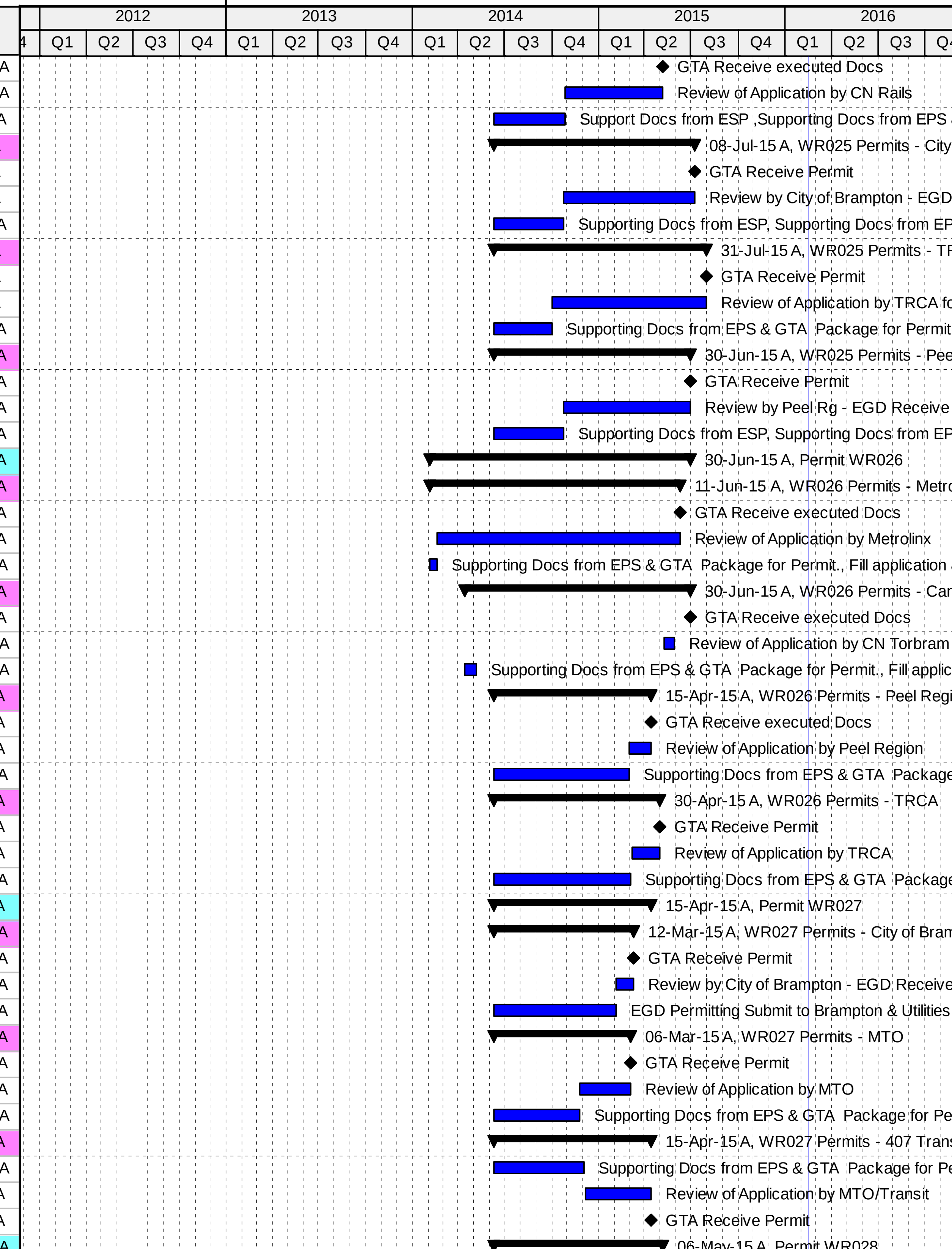
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1194	PLE-	GTA Receive executed Docs	0.0	100%	100%		06-May-15 A
1195	PLE-	Review of Application by CN Rails	0.0	100%	100%	28-Oct-14 A	06-May-15 A
1196	PLE-	Support Docs from ESP ,Supporting Docs from EPS & GTA	0.0	100%	100%	09-Jun-14 A	28-Oct-14 A
1197		**WR025 Permits - City of Brampton**	0.0	0%	0%	09-Jun-14 A	08-Jul-15 A
1198	PLE-	GTA Receive Permit	0.0	100%	100%		08-Jul-15 A
1199	PLE-	Review by City of Brampton - EGD Receive Permit	0.0	100%	100%	24-Oct-14 A	08-Jul-15 A
1200	PLE-	Supporting Docs from ESP, Supporting Docs from EPS & G	0.0	100%	100%	09-Jun-14 A	24-Oct-14 A
1201		**WR025 Permits - TRCA**	0.0	0%	0%	09-Jun-14 A	31-Jul-15 A
1202	PLE-	GTA Receive Permit	0.0	100%	100%		31-Jul-15 A
1203	PLE-	Review of Application by TRCA for Mimico Greek Trib 2	0.0	100%	100%	03-Oct-14 A	31-Jul-15 A
1204	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	03-Oct-14 A
1205		**WR025 Permits - Peel Region**	0.0	0%	0%	09-Jun-14 A	30-Jun-15 A
1206	PLE-	GTA Receive Permit	0.0	100%	100%		30-Jun-15 A
1207	PLE-	Review by Peel Rg - EGD Receive Permit	0.0	100%	100%	24-Oct-14 A	30-Jun-15 A
1208	PLE-	Supporting Docs from ESP, Supporting Docs from EPS & G	0.0	100%	100%	09-Jun-14 A	24-Oct-14 A
1209		**Permit WR026**	0.0	0%	0%	03-Feb-14 A	30-Jun-15 A
1210		**WR026 Permits - Metrolinx**	0.0	0%	0%	03-Feb-14 A	11-Jun-15 A
1211	PLE-	GTA Receive executed Docs	0.0	100%	100%		11-Jun-15 A
1212	PLE-	Review of Application by Metrolinx	0.0	100%	100%	19-Feb-14 A	11-Jun-15 A
1213	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	03-Feb-14 A	19-Feb-14 A
1214		**WR026 Permits - Canadian National (CN) - Work Permit through**	0.0	0%	0%	15-Apr-14 A	30-Jun-15 A
1215	PLE-	GTA Receive executed Docs	0.0	0%	100%		30-Jun-15 A
1216	PLE-	Review of Application by CN Torbram	0.0	0%	100%	09-May-15 A	31-May-15 A
1217	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	0%	100%	15-Apr-14 A	08-May-14 A
1218		**WR026 Permits - Peel Region**	0.0	0%	0%	09-Jun-14 A	15-Apr-15 A
1219	PLE-	GTA Receive executed Docs	0.0	100%	100%		15-Apr-15 A
1220	PLE-	Review of Application by Peel Region	0.0	100%	100%	02-Mar-15 A	15-Apr-15 A
1221	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	02-Mar-15 A
1222		**WR026 Permits - TRCA**	0.0	0%	0%	09-Jun-14 A	30-Apr-15 A
1223	PLE-	GTA Receive Permit	0.0	100%	100%		30-Apr-15 A
1224	PLE-	Review of Application by TRCA	0.0	100%	100%	09-Mar-15 A	30-Apr-15 A
1225	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	06-Mar-15 A
1226		**Permit WR027**	0.0	0%	0%	09-Jun-14 A	15-Apr-15 A
1227		**WR027 Permits - City of Brampton**	0.0	0%	0%	09-Jun-14 A	12-Mar-15 A
1228	PLE-	GTA Receive Permit	0.0	100%	100%		12-Mar-15 A
1229	PLE-	Review by City of Brampton - EGD Receive Permit	0.0	100%	100%	05-Feb-15 A	12-Mar-15 A
1230	PLE-	EGD Permitting Submit to Brampton & Utilities	0.0	100%	100%	09-Jun-14 A	05-Feb-15 A
1231		**WR027 Permits - MTO**	0.0	0%	0%	09-Jun-14 A	06-Mar-15 A
1232	PLE-	GTA Receive Permit	0.0	100%	100%		06-Mar-15 A
1233	PLE-	Review of Application by MTO	0.0	100%	100%	25-Nov-14 A	06-Mar-15 A
1234	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	25-Nov-14 A
1235		**WR027 Permits - 407 Transitway**	0.0	0%	0%	09-Jun-14 A	15-Apr-15 A
1236	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	04-Dec-14 A
1237	PLE-	Review of Application by MTO/Transit	0.0	100%	100%	05-Dec-14 A	15-Apr-15 A
1238	PLE-	GTA Receive Permit	0.0	100%	100%		14-Apr-15 A
1239		**Permit WR028**	0.0	0%	0%	09-Jun-14 A	06-May-15 A



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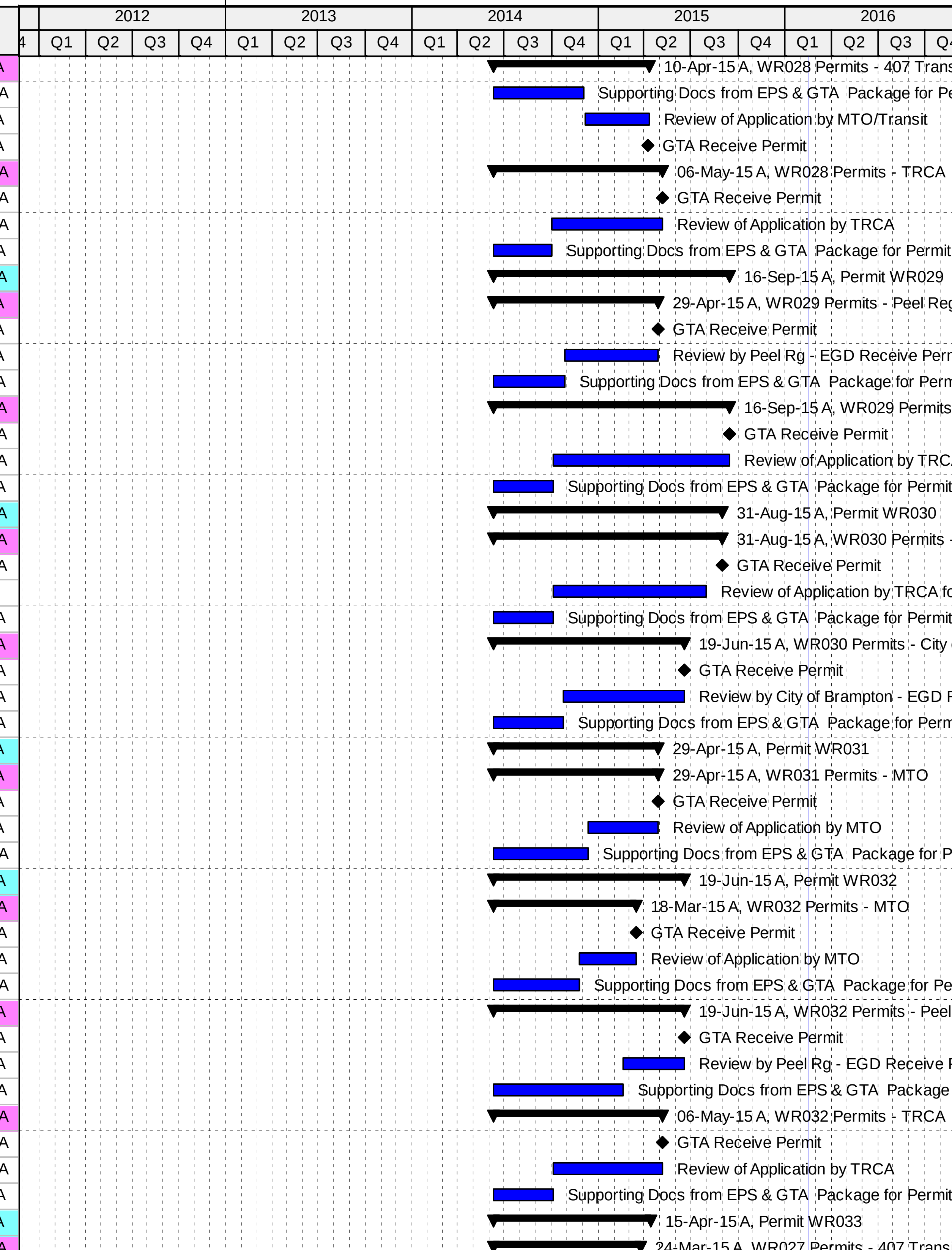
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1240	**WR028 Permits - 407 Transitway**		0.0	0%	0%	09-Jun-14 A	10-Apr-15 A
1241	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	04-Dec-14 A
1242	PLE-	Review of Application by MTO/Transit	0.0	100%	100%	05-Dec-14 A	10-Apr-15 A
1243	PLE-	GTA Receive Permit	0.0	100%	100%		09-Apr-15 A
1244	**WR028 Permits - TRCA**		0.0	0%	0%	09-Jun-14 A	06-May-15 A
1245	PLE-	GTA Receive Permit	0.0	100%	100%		06-May-15 A
1246	PLE-	Review of Application by TRCA	0.0	100%	100%	02-Oct-14 A	06-May-15 A
1247	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	02-Oct-14 A
1248	**Permit WR029**		0.0	0%	0%	09-Jun-14 A	16-Sep-15 A
1249	**WR029 Permits - Peel Region**		0.0	0%	0%	09-Jun-14 A	29-Apr-15 A
1250	PLE-	GTA Receive Permit	0.0	100%	100%		29-Apr-15 A
1251	PLE-	Review by Peel Rg - EGD Receive Permit	0.0	100%	100%	27-Oct-14 A	29-Apr-15 A
1252	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	27-Oct-14 A
1253	**WR029 Permits - TRCA**		0.0	0%	0%	09-Jun-14 A	16-Sep-15 A
1254	PLE-	GTA Receive Permit	0.0	100%	100%		16-Sep-15 A
1255	PLE-	Review of Application by TRCA for Etobicoke Greek Trib 3	0.0	100%	100%	06-Oct-14 A	16-Sep-15 A
1256	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	06-Oct-14 A
1257	**Permit WR030**		0.0	0%	0%	09-Jun-14 A	31-Aug-15 A
1258	**WR030 Permits - TRCA**		0.0	0%	0%	09-Jun-14 A	31-Aug-15 A
1259	PLE-	GTA Receive Permit	0.0	100%	100%		31-Aug-15 A
1260	PLE-	Review of Application by TRCA for Etobicoke Greek	0.0	100%	100%	06-Oct-14 A	31-Jul-15 A
1261	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	06-Oct-14 A
1262	**WR030 Permits - City of Brampton**		0.0	0%	0%	09-Jun-14 A	19-Jun-15 A
1263	PLE-	GTA Receive Permit	0.0	100%	100%		19-Jun-15 A
1264	PLE-	Review by City of Brampton - EGD Receive Permit	0.0	100%	100%	24-Oct-14 A	19-Jun-15 A
1265	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	24-Oct-14 A
1266	**Permit WR031**		0.0	0%	0%	09-Jun-14 A	29-Apr-15 A
1267	**WR031 Permits - MTO**		0.0	0%	0%	09-Jun-14 A	29-Apr-15 A
1268	PLE-	GTA Receive Permit	0.0	100%	100%		29-Apr-15 A
1269	PLE-	Review of Application by MTO	0.0	100%	100%	12-Dec-14 A	29-Apr-15 A
1270	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	12-Dec-14 A
1271	**Permit WR032**		0.0	0%	0%	09-Jun-14 A	19-Jun-15 A
1272	**WR032 Permits - MTO**		0.0	0%	0%	09-Jun-14 A	18-Mar-15 A
1273	PLE-	GTA Receive Permit	0.0	100%	100%		18-Mar-15 A
1274	PLE-	Review of Application by MTO	0.0	100%	100%	24-Nov-14 A	18-Mar-15 A
1275	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	24-Nov-14 A
1276	**WR032 Permits - Peel Region**		0.0	0%	0%	09-Jun-14 A	19-Jun-15 A
1277	PLE-	GTA Receive Permit	0.0	100%	100%		19-Jun-15 A
1278	PLE-	Review by Peel Rg - EGD Receive Permit	0.0	100%	100%	20-Feb-15 A	19-Jun-15 A
1279	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	20-Feb-15 A
1280	**WR032 Permits - TRCA**		0.0	0%	0%	09-Jun-14 A	06-May-15 A
1281	PLE-	GTA Receive Permit	0.0	100%	100%		06-May-15 A
1282	PLE-	Review of Application by TRCA	0.0	100%	100%	06-Oct-14 A	06-May-15 A
1283	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	06-Oct-14 A
1284	**Permit WR033**		0.0	0%	0%	09-Jun-14 A	15-Apr-15 A
1285	**WR027 Permits - 407 Transitway**		0.0	0%	0%	09-Jun-14 A	24-Mar-15 A

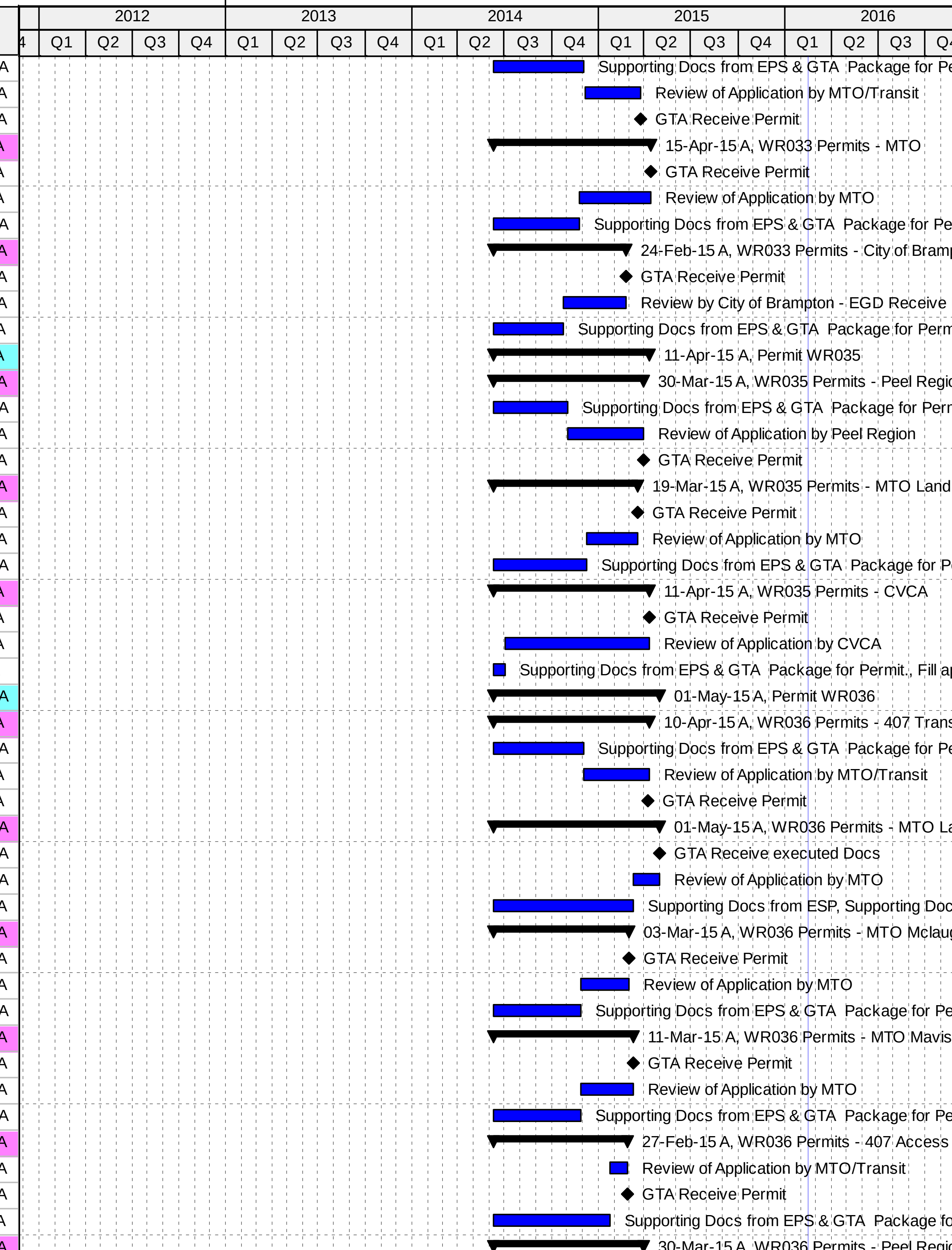


Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1286	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	04-Dec-14 A
1287	PLE-	Review of Application by MTO/Transit	0.0	100%	100%	05-Dec-14 A	24-Mar-15 A
1288	PLE-	GTA Receive Permit	0.0	100%	100%		24-Mar-15 A
1289		**WR033 Permits - MTO**	0.0	0%	0%	09-Jun-14 A	15-Apr-15 A
1290	PLE-	GTA Receive Permit	0.0	100%	100%		14-Apr-15 A
1291	PLE-	Review of Application by MTO	0.0	100%	100%	25-Nov-14 A	15-Apr-15 A
1292	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	24-Nov-14 A
1293		**WR033 Permits - City of Brampton**	0.0	0%	0%	09-Jun-14 A	24-Feb-15 A
1294	PLE-	GTA Receive Permit	0.0	100%	100%		24-Feb-15 A
1295	PLE-	Review by City of Brampton - EGD Receive Permit	0.0	100%	100%	24-Oct-14 A	24-Feb-15 A
1296	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	24-Oct-14 A
1297		**Permit WR035**	0.0	0%	0%	09-Jun-14 A	11-Apr-15 A
1298		**WR035 Permits - Peel Region**	0.0	0%	0%	09-Jun-14 A	30-Mar-15 A
1299	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	03-Nov-14 A
1300	PLE-	Review of Application by Peel Region	0.0	100%	100%	03-Nov-14 A	30-Mar-15 A
1301	PLE-	GTA Receive Permit	0.0	100%	100%		30-Mar-15 A
1302		**WR035 Permits - MTO Land Use**	0.0	0%	0%	09-Jun-14 A	19-Mar-15 A
1303	PLE-	GTA Receive Permit	0.0	100%	100%		19-Mar-15 A
1304	PLE-	Review of Application by MTO	0.0	100%	100%	11-Dec-14 A	19-Mar-15 A
1305	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	11-Dec-14 A
1306		**WR035 Permits - CVCA**	0.0	0%	0%	09-Jun-14 A	11-Apr-15 A
1307	PLE-	GTA Receive Permit	0.0	100%	100%		10-Apr-15 A
1308	PLE-	Review of Application by CVCA	0.0	100%	100%	03-Jul-14 A	11-Apr-15 A
1309	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	03-Jul-14 A
1310		**Permit WR036**	0.0	0%	0%	09-Jun-14 A	01-May-15 A
1311		**WR036 Permits - 407 Transitway**	0.0	0%	0%	09-Jun-14 A	10-Apr-15 A
1312	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	04-Dec-14 A
1313	PLE-	Review of Application by MTO/Transit	0.0	100%	100%	04-Dec-14 A	10-Apr-15 A
1314	PLE-	GTA Receive Permit	0.0	100%	100%		09-Apr-15 A
1315		**WR036 Permits - MTO Land Use**	0.0	0%	0%	09-Jun-14 A	01-May-15 A
1316	PLE-	GTA Receive executed Docs	0.0	100%	100%		01-May-15 A
1317	PLE-	Review of Application by MTO	0.0	100%	100%	10-Mar-15 A	01-May-15 A
1318	PLE-	Supporting Docs from ESP, Supporting Docs from EPS & G	0.0	100%	100%	09-Jun-14 A	10-Mar-15 A
1319		**WR036 Permits - MTO Mclaughlin RD.**	0.0	0%	0%	09-Jun-14 A	03-Mar-15 A
1320	PLE-	GTA Receive Permit	0.0	100%	100%		03-Mar-15 A
1321	PLE-	Review of Application by MTO	0.0	100%	100%	27-Nov-14 A	03-Mar-15 A
1322	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	27-Nov-14 A
1323		**WR036 Permits - MTO Mavis RD.**	0.0	0%	0%	09-Jun-14 A	11-Mar-15 A
1324	PLE-	GTA Receive Permit	0.0	100%	100%		11-Mar-15 A
1325	PLE-	Review of Application by MTO	0.0	100%	100%	27-Nov-14 A	11-Mar-15 A
1326	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	27-Nov-14 A
1327		**WR036 Permits - 407 Access off of Maavis Ramps**	0.0	0%	0%	09-Jun-14 A	27-Feb-15 A
1328	PLE-	Review of Application by MTO/Transit	0.0	100%	100%	23-Jan-15 A	27-Feb-15 A
1329	PLE-	GTA Receive Permit	0.0	100%	100%		27-Feb-15 A
1330	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	23-Jan-15 A
1331		**WR036 Permits - Peel Region**	0.0	0%	0%	09-Jun-14 A	30-Mar-15 A

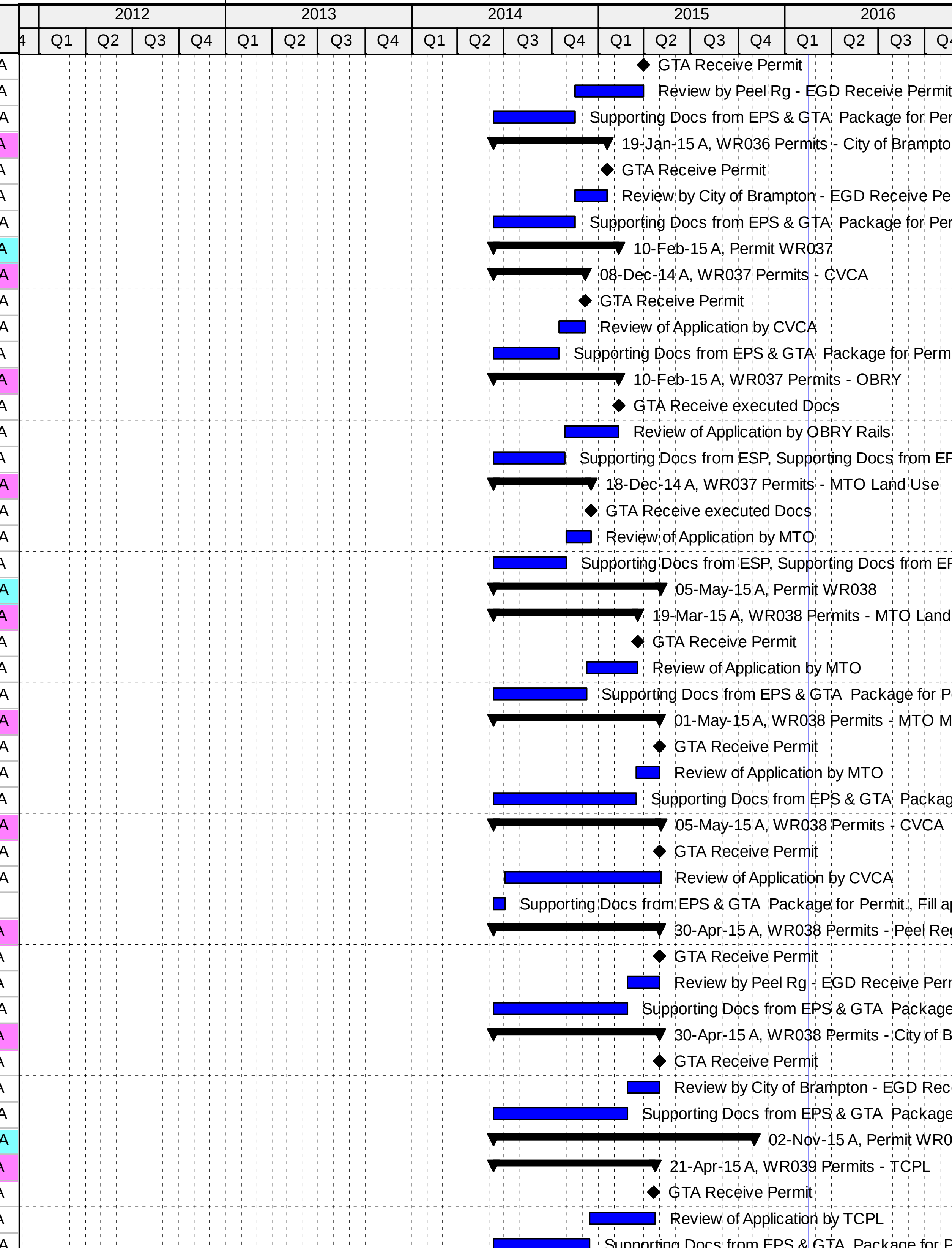


Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1332	PLE-	GTA Receive Permit	0.0	100%	100%		30-Mar-15 A
1333	PLE-	Review by Peel Rg - EGD Receive Permit	0.0	100%	100%	18-Nov-14 A	30-Mar-15 A
1334	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	18-Nov-14 A
1335		**WR036 Permits - City of Brampton**	0.0	0%	0%	09-Jun-14 A	19-Jan-15 A
1336	PLE-	GTA Receive Permit	0.0	100%	100%		19-Jan-15 A
1337	PLE-	Review by City of Brampton - EGD Receive Permit	0.0	100%	100%	18-Nov-14 A	19-Jan-15 A
1338	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	18-Nov-14 A
1339		**Permit WR037**	0.0	0%	0%	09-Jun-14 A	10-Feb-15 A
1340		**WR037 Permits - CVCA**	0.0	0%	0%	09-Jun-14 A	08-Dec-14 A
1341	PLE-	GTA Receive Permit	0.0	100%	100%		08-Dec-14 A
1342	PLE-	Review of Application by CVCA	0.0	100%	100%	16-Oct-14 A	08-Dec-14 A
1343	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	16-Oct-14 A
1344		**WR037 Permits - OBRY**	0.0	0%	0%	09-Jun-14 A	10-Feb-15 A
1345	PLE-	GTA Receive executed Docs	0.0	100%	100%		10-Feb-15 A
1346	PLE-	Review of Application by OBRY Rails	0.0	100%	100%	28-Oct-14 A	10-Feb-15 A
1347	PLE-	Supporting Docs from ESP, Supporting Docs from EPS & G	0.0	100%	100%	09-Jun-14 A	28-Oct-14 A
1348		**WR037 Permits - MTO Land Use**	0.0	0%	0%	09-Jun-14 A	18-Dec-14 A
1349	PLE-	GTA Receive executed Docs	0.0	100%	100%		18-Dec-14 A
1350	PLE-	Review of Application by MTO	0.0	100%	100%	31-Oct-14 A	18-Dec-14 A
1351	APLI	Supporting Docs from ESP, Supporting Docs from EPS & G	0.0	0%	100%	09-Jun-14 A	31-Oct-14 A
1352		**Permit WR038**	0.0	0%	0%	09-Jun-14 A	05-May-15 A
1353		**WR038 Permits - MTO Land Use**	0.0	0%	0%	09-Jun-14 A	19-Mar-15 A
1354	PLE-	GTA Receive Permit	0.0	100%	100%		19-Mar-15 A
1355	PLE-	Review of Application by MTO	0.0	100%	100%	09-Dec-14 A	19-Mar-15 A
1356	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	09-Dec-14 A
1357		**WR038 Permits - MTO Mississauga RD.**	0.0	0%	0%	09-Jun-14 A	01-May-15 A
1358	PLE-	GTA Receive Permit	0.0	100%	100%		01-May-15 A
1359	PLE-	Review of Application by MTO	0.0	100%	100%	17-Mar-15 A	01-May-15 A
1360	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	17-Mar-15 A
1361		**WR038 Permits - CVCA**	0.0	0%	0%	09-Jun-14 A	05-May-15 A
1362	PLE-	GTA Receive Permit	0.0	100%	100%		01-May-15 A
1363	PLE-	Review of Application by CVCA	0.0	100%	100%	03-Jul-14 A	05-May-15 A
1364	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	03-Jul-14 A
1365		**WR038 Permits - Peel Region**	0.0	0%	0%	09-Jun-14 A	30-Apr-15 A
1366	PLE-	GTA Receive Permit	0.0	100%	100%		30-Apr-15 A
1367	PLE-	Review by Peel Rg - EGD Receive Permit	0.0	100%	100%	27-Feb-15 A	30-Apr-15 A
1368	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	27-Feb-15 A
1369		**WR038 Permits - City of Brampton**	0.0	0%	0%	09-Jun-14 A	30-Apr-15 A
1370	PLE-	GTA Receive Permit	0.0	100%	100%		30-Apr-15 A
1371	PLE-	Review by City of Brampton - EGD Receive Permit	0.0	100%	100%	27-Feb-15 A	30-Apr-15 A
1372	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	27-Feb-15 A
1373		**Permit WR039**	0.0	0%	0%	09-Jun-14 A	02-Nov-15 A
1374		**WR039 Permits - TCPL**	0.0	0%	0%	09-Jun-14 A	21-Apr-15 A
1375	PLE-	GTA Receive Permit	0.0	100%	100%		21-Apr-15 A
1376	PLE-	Review of Application by TCPL	0.0	100%	100%	15-Dec-14 A	21-Apr-15 A
1377	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	15-Dec-14 A

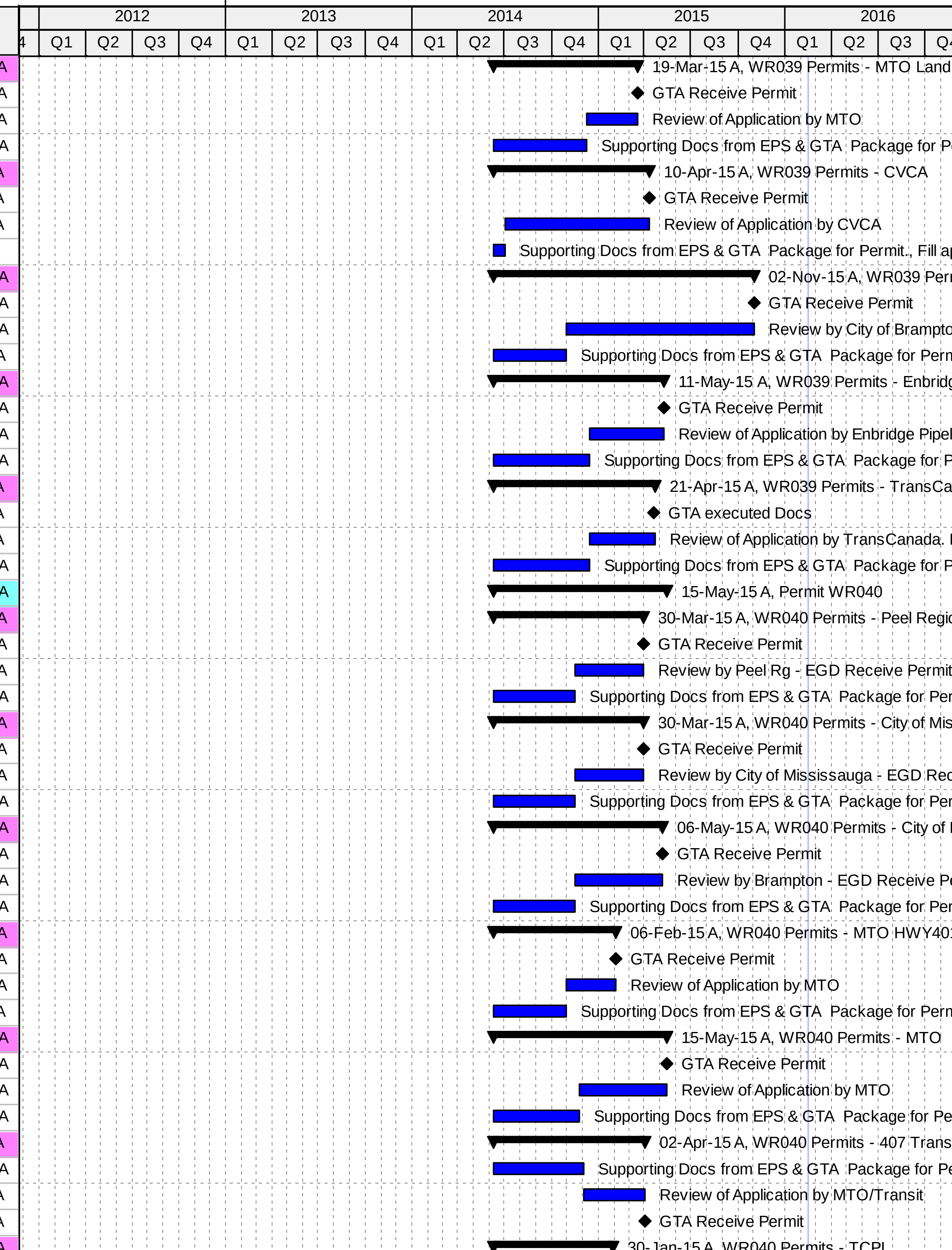


Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1378		**WR039 Permits - MTO Land Use**	0.0	0%	0%	09-Jun-14 A	19-Mar-15 A
1379	PLE-	GTA Receive Permit	0.0	100%	100%		19-Mar-15 A
1380	PLE-	Review of Application by MTO	0.0	100%	100%	09-Dec-14 A	19-Mar-15 A
1381	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	09-Dec-14 A
1382		**WR039 Permits - CVCA**	0.0	0%	0%	09-Jun-14 A	10-Apr-15 A
1383	PLE-	GTA Receive Permit	0.0	100%	100%		10-Apr-15 A
1384	PLE-	Review of Application by CVCA	0.0	100%	100%	03-Jul-14 A	10-Apr-15 A
1385	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	03-Jul-14 A
1386		**WR039 Permits - City of Brampton**	0.0	0%	0%	09-Jun-14 A	02-Nov-15 A
1387	PLE-	GTA Receive Permit	0.0	100%	100%		02-Nov-15 A
1388	PLE-	Review by City of Brampton - EGD Receive Permit	0.0	100%	100%	31-Oct-14 A	02-Nov-15 A
1389	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	31-Oct-14 A
1390		**WR039 Permits - Enbridge Pipelines Inc.**	0.0	0%	0%	09-Jun-14 A	11-May-15 A
1391	PLE-	GTA Receive Permit	0.0	100%	100%		11-May-15 A
1392	PLE-	Review of Application by Enbridge Pipeline	0.0	100%	100%	15-Dec-14 A	11-May-15 A
1393	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	15-Dec-14 A
1394		**WR039 Permits - TransCanada Pipelines**	0.0	0%	0%	09-Jun-14 A	21-Apr-15 A
1395	PLE-	GTA executed Docs	0.0	100%	100%		21-Apr-15 A
1396	PLE-	Review of Application by TransCanada. Pl	0.0	100%	100%	15-Dec-14 A	21-Apr-15 A
1397	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	15-Dec-14 A
1398		**Permit WR040**	0.0	0%	0%	09-Jun-14 A	15-May-15 A
1399		**WR040 Permits - Peel Region**	0.0	0%	0%	09-Jun-14 A	30-Mar-15 A
1400	PLE-	GTA Receive Permit	0.0	100%	100%		30-Mar-15 A
1401	PLE-	Review by Peel Rg - EGD Receive Permit	0.0	100%	100%	17-Nov-14 A	30-Mar-15 A
1402	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	17-Nov-14 A
1403		**WR040 Permits - City of Mississauga**	0.0	0%	0%	09-Jun-14 A	30-Mar-15 A
1404	PLE-	GTA Receive Permit	0.0	100%	100%		30-Mar-15 A
1405	PLE-	Review by City of Mississauga - EGD Receive Permit	0.0	100%	100%	17-Nov-14 A	30-Mar-15 A
1406	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	17-Nov-14 A
1407		**WR040 Permits - City of Brampton**	0.0	0%	0%	09-Jun-14 A	06-May-15 A
1408	PLE-	GTA Receive Permit	0.0	100%	100%		06-May-15 A
1409	PLE-	Review by Brampton - EGD Receive Permit	0.0	100%	100%	17-Nov-14 A	06-May-15 A
1410	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	17-Nov-14 A
1411		**WR040 Permits - MTO HWY401**	0.0	0%	0%	09-Jun-14 A	06-Feb-15 A
1412	PLE-	GTA Receive Permit	0.0	100%	100%		06-Feb-15 A
1413	PLE-	Review of Application by MTO	0.0	100%	100%	30-Oct-14 A	06-Feb-15 A
1414	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	30-Oct-14 A
1415		**WR040 Permits - MTO**	0.0	0%	0%	09-Jun-14 A	15-May-15 A
1416	PLE-	GTA Receive Permit	0.0	100%	100%		15-May-15 A
1417	PLE-	Review of Application by MTO	0.0	100%	100%	26-Nov-14 A	15-May-15 A
1418	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	26-Nov-14 A
1419		**WR040 Permits - 407 Transitway**	0.0	0%	0%	09-Jun-14 A	02-Apr-15 A
1420	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	04-Dec-14 A
1421	PLE-	Review of Application by MTO/Transit	0.0	100%	100%	04-Dec-14 A	02-Apr-15 A
1422	PLE-	GTA Receive Permit	0.0	100%	100%		02-Apr-15 A
1423		**WR040 Permits - TCPL**	0.0	0%	0%	09-Jun-14 A	30-Jan-15 A

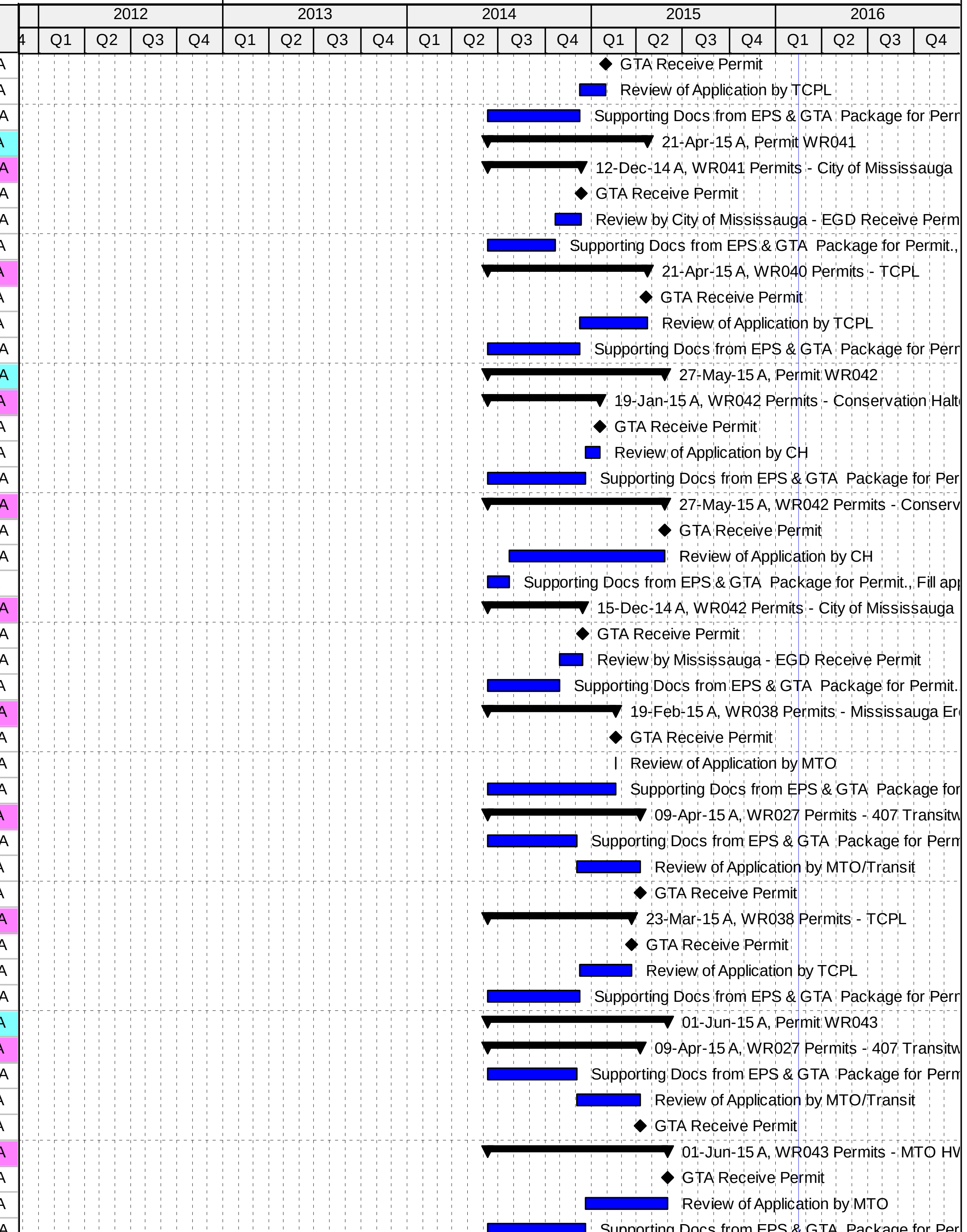


Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule...	Classic Schedule Layout	03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1424	PLE-	GTA Receive Permit	0.0	100%	100%		30-Jan-15 A
1425	PLE-	Review of Application by TCPL	0.0	100%	100%	10-Dec-14 A	30-Jan-15 A
1426	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	10-Dec-14 A
1427		**Permit WR041**	0.0	0%	0%	09-Jun-14 A	21-Apr-15 A
1428		**WR041 Permits - City of Mississauga**	0.0	0%	0%	09-Jun-14 A	12-Dec-14 A
1429	PLE-	GTA Receive Permit	0.0	100%	100%		12-Dec-14 A
1430	PLE-	Review by City of Mississauga - EGD Receive Permit	0.0	100%	100%	22-Oct-14 A	12-Dec-14 A
1431	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	22-Oct-14 A
1432		**WR040 Permits - TCPL**	0.0	0%	0%	09-Jun-14 A	21-Apr-15 A
1433	PLE-	GTA Receive Permit	0.0	0%	100%		21-Apr-15 A
1434	PLE-	Review of Application by TCPL	0.0	100%	100%	10-Dec-14 A	21-Apr-15 A
1435	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	10-Dec-14 A
1436		**Permit WR042**	0.0	0%	0%	09-Jun-14 A	27-May-15 A
1437		**WR042 Permits - Conservation Halton- Lisgar Meadow Brook**	0.0	0%	0%	09-Jun-14 A	19-Jan-15 A
1438	PLE-	GTA Receive Permit	0.0	100%	100%		19-Jan-15 A
1439	PLE-	Review of Application by CH	0.0	100%	100%	22-Dec-14 A	19-Jan-15 A
1440	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	22-Dec-14 A
1441		**WR042 Permits - Conservation Halton - 16 Miles Crk**	0.0	0%	0%	09-Jun-14 A	27-May-15 A
1442	PLE-	GTA Receive Permit	0.0	100%	100%		27-May-15 A
1443	PLE-	Review of Application by CH	0.0	100%	100%	22-Jul-14 A	27-May-15 A
1444	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	22-Jul-14 A
1445		**WR042 Permits - City of Mississauga**	0.0	0%	0%	09-Jun-14 A	15-Dec-14 A
1446	PLE-	GTA Receive Permit	0.0	100%	100%		15-Dec-14 A
1447	PLE-	Review by Mississauga - EGD Receive Permit	0.0	100%	100%	31-Oct-14 A	15-Dec-14 A
1448	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	31-Oct-14 A
1449		**WR038 Permits - Mississauga Erosion and Sediment Control**	0.0	0%	0%	09-Jun-14 A	19-Feb-15 A
1450	PLE-	GTA Receive Permit	0.0	100%	100%		19-Feb-15 A
1451	PLE-	Review of Application by MTO	0.0	100%	100%	18-Feb-15 A	19-Feb-15 A
1452	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	18-Feb-15 A
1453		**WR027 Permits - 407 Transitway**	0.0	0%	0%	09-Jun-14 A	09-Apr-15 A
1454	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	04-Dec-14 A
1455	PLE-	Review of Application by MTO/Transit	0.0	100%	100%	04-Dec-14 A	09-Apr-15 A
1456	PLE-	GTA Receive Permit	0.0	100%	100%		09-Apr-15 A
1457		**WR038 Permits - TCPL**	0.0	0%	0%	09-Jun-14 A	23-Mar-15 A
1458	PLE-	GTA Receive Permit	0.0	100%	100%		23-Mar-15 A
1459	PLE-	Review of Application by TCPL	0.0	100%	100%	10-Dec-14 A	23-Mar-15 A
1460	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	10-Dec-14 A
1461		**Permit WR043**	0.0	0%	0%	09-Jun-14 A	01-Jun-15 A
1462		**WR027 Permits - 407 Transitway**	0.0	0%	0%	09-Jun-14 A	09-Apr-15 A
1463	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	04-Dec-14 A
1464	PLE-	Review of Application by MTO/Transit	0.0	100%	100%	04-Dec-14 A	09-Apr-15 A
1465	PLE-	GTA Receive Permit	0.0	100%	100%		09-Apr-15 A
1466		**WR043 Permits - MTO HWY407**	0.0	0%	0%	09-Jun-14 A	01-Jun-15 A
1467	PLE-	GTA Receive Permit	0.0	100%	100%		01-Jun-15 A
1468	PLE-	Review of Application by MTO	0.0	100%	100%	22-Dec-14 A	01-Jun-15 A
1469	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	22-Dec-14 A

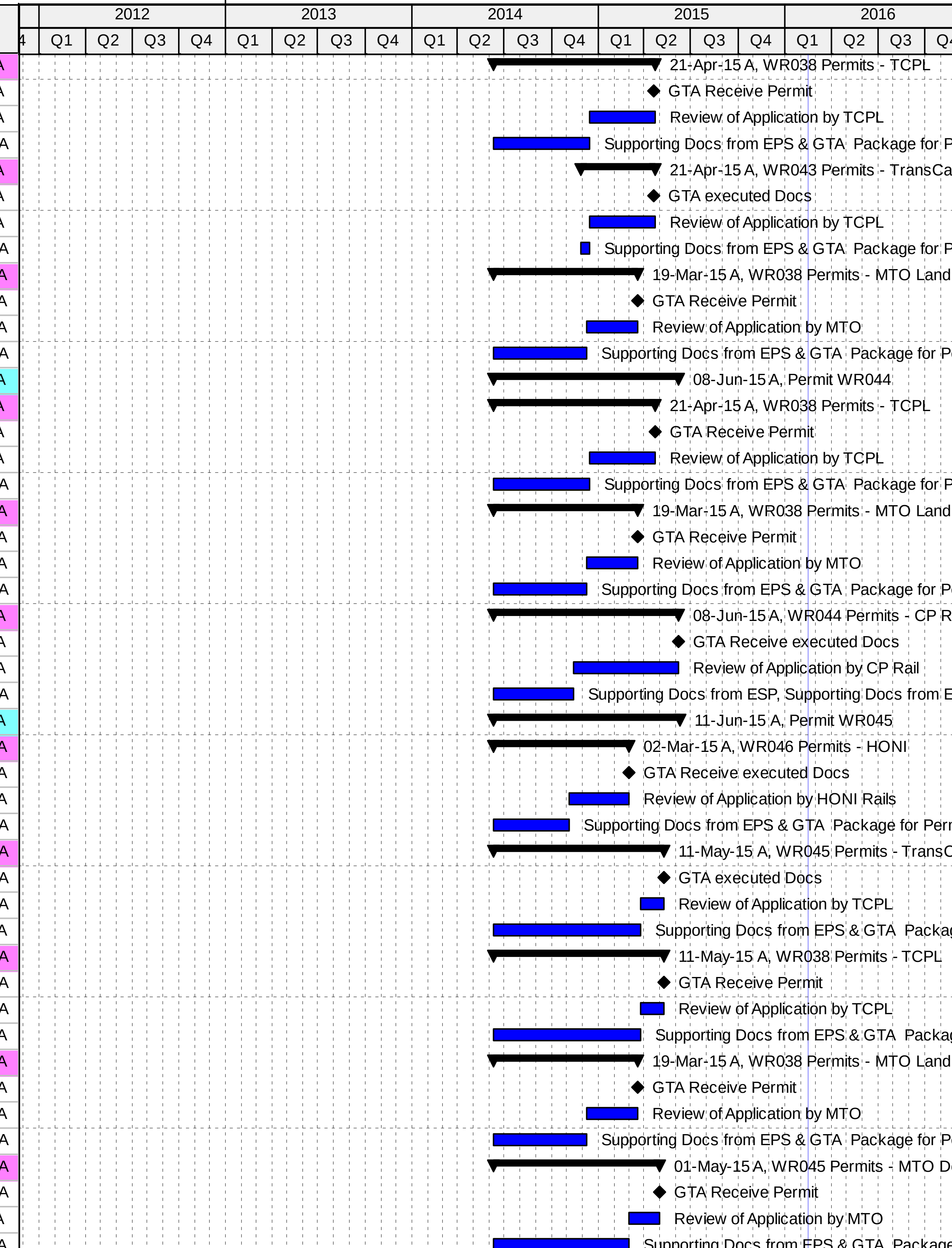


Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1470	**WR038 Permits - TCPL**		0.0	0%	0%	09-Jun-14 A	21-Apr-15 A
1471	PLE-	GTA Receive Permit	0.0	100%	100%		21-Apr-15 A
1472	PLE-	Review of Application by TCPL	0.0	100%	100%	16-Dec-14 A	21-Apr-15 A
1473	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	16-Dec-14 A
1474	**WR043 Permits - TransCanada Pipeline**		0.0	0%	0%	28-Nov-14 A	21-Apr-15 A
1475	PLE-	GTA executed Docs	0.0	100%	100%		21-Apr-15 A
1476	PLE-	Review of Application by TCPL	0.0	100%	100%	16-Dec-14 A	21-Apr-15 A
1477	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	28-Nov-14 A	16-Dec-14 A
1478	**WR038 Permits - MTO Land Use**		0.0	0%	0%	09-Jun-14 A	19-Mar-15 A
1479	PLE-	GTA Receive Permit	0.0	100%	100%		19-Mar-15 A
1480	PLE-	Review of Application by MTO	0.0	100%	100%	09-Dec-14 A	19-Mar-15 A
1481	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	09-Dec-14 A
1482	**Permit WR044**		0.0	0%	0%	09-Jun-14 A	08-Jun-15 A
1483	**WR038 Permits - TCPL**		0.0	0%	0%	09-Jun-14 A	21-Apr-15 A
1484	PLE-	GTA Receive Permit	0.0	100%	100%		21-Apr-15 A
1485	PLE-	Review of Application by TCPL	0.0	100%	100%	16-Dec-14 A	21-Apr-15 A
1486	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	15-Dec-14 A
1487	**WR038 Permits - MTO Land Use**		0.0	0%	0%	09-Jun-14 A	19-Mar-15 A
1488	PLE-	GTA Receive Permit	0.0	100%	100%		19-Mar-15 A
1489	PLE-	Review of Application by MTO	0.0	100%	100%	09-Dec-14 A	19-Mar-15 A
1490	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	09-Dec-14 A
1491	**WR044 Permits - CP Rail**		0.0	0%	0%	09-Jun-14 A	08-Jun-15 A
1492	PLE-	GTA Receive executed Docs	0.0	100%	100%		08-Jun-15 A
1493	PLE-	Review of Application by CP Rail	0.0	100%	100%	14-Nov-14 A	08-Jun-15 A
1494	PLE-	Supporting Docs from ESP, Supporting Docs from EPS & G	0.0	100%	100%	09-Jun-14 A	14-Nov-14 A
1495	**Permit WR045**		0.0	0%	0%	09-Jun-14 A	11-Jun-15 A
1496	**WR046 Permits - HONI**		0.0	0%	0%	09-Jun-14 A	02-Mar-15 A
1497	PLE-	GTA Receive executed Docs	0.0	100%	100%		02-Mar-15 A
1498	PLE-	Review of Application by HONI Rails	0.0	100%	100%	04-Nov-14 A	02-Mar-15 A
1499	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	04-Nov-14 A
1500	**WR045 Permits - TransCanada Pipeline**		0.0	0%	0%	09-Jun-14 A	11-May-15 A
1501	PLE-	GTA executed Docs	0.0	100%	100%		11-May-15 A
1502	PLE-	Review of Application by TCPL	0.0	100%	100%	26-Mar-15 A	11-May-15 A
1503	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	26-Mar-15 A
1504	**WR038 Permits - TCPL**		0.0	0%	0%	09-Jun-14 A	11-May-15 A
1505	PLE-	GTA Receive Permit	0.0	100%	100%		11-May-15 A
1506	PLE-	Review of Application by TCPL	0.0	100%	100%	26-Mar-15 A	11-May-15 A
1507	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	26-Mar-15 A
1508	**WR038 Permits - MTO Land Use**		0.0	0%	0%	09-Jun-14 A	19-Mar-15 A
1509	PLE-	GTA Receive Permit	0.0	100%	100%		19-Mar-15 A
1510	PLE-	Review of Application by MTO	0.0	100%	100%	09-Dec-14 A	19-Mar-15 A
1511	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	09-Dec-14 A
1512	**WR045 Permits - MTO Derry Road**		0.0	0%	0%	09-Jun-14 A	01-May-15 A
1513	PLE-	GTA Receive Permit	0.0	100%	100%		01-May-15 A
1514	PLE-	Review of Application by MTO	0.0	100%	100%	02-Mar-15 A	30-Apr-15 A
1515	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	02-Mar-15 A

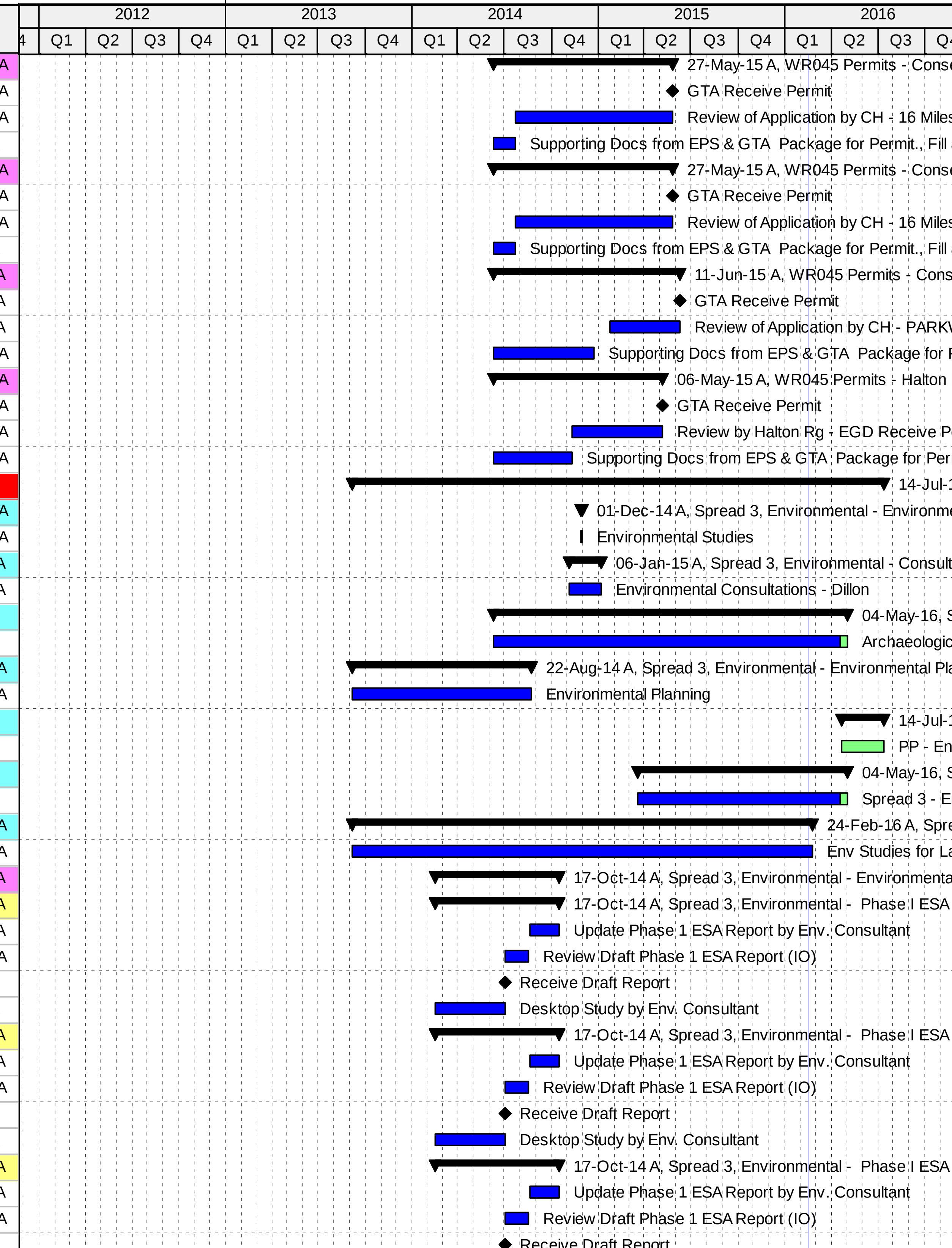


Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule...	Classic Schedule Layout	03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1516		**WR045 Permits - Conservation Halton - 16 Miles 1a**	0.0	0%	0%	09-Jun-14 A	27-May-15 A
1517	PLE-	GTA Receive Permit	0.0	100%	100%		27-May-15 A
1518	PLE-	Review of Application by CH - 16 Miles 1A - OC	0.0	100%	100%	22-Jul-14 A	27-May-15 A
1519	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	22-Jul-14 A
1520		**WR045 Permits - Conservation Halton - 16 Miles 1b**	0.0	0%	0%	09-Jun-14 A	27-May-15 A
1521	PLE-	GTA Receive Permit	0.0	100%	100%		27-May-15 A
1522	PLE-	Review of Application by CH - 16 Miles 1B	0.0	100%	100%	22-Jul-14 A	27-May-15 A
1523	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	22-Jul-14 A
1524		**WR045 Permits - Conservation Halton - Parkway West Wetland**	0.0	0%	0%	09-Jun-14 A	11-Jun-15 A
1525	PLE-	GTA Receive Permit	0.0	100%	100%		11-Jun-15 A
1526	PLE-	Review of Application by CH - PARKWAY WEST WETLANE	0.0	100%	100%	23-Jan-15 A	11-Jun-15 A
1527	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	23-Dec-14 A
1528		**WR045 Permits - Halton Region**	0.0	0%	0%	09-Jun-14 A	06-May-15 A
1529	PLE-	GTA Receive Permit	0.0	100%	100%		06-May-15 A
1530	PLE-	Review by Halton Rg - EGD Receive Permit	0.0	100%	100%	10-Nov-14 A	06-May-15 A
1531	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	10-Nov-14 A
1532		**Environment - Spread 3**	49.6	98.4%	92.11%	05-Sep-13 A	14-Jul-16
1533		**Spread 3, Environmental - Environmental Survey & Studies**	0.0	0%	0%	28-Nov-14 A	01-Dec-14 A
1534	A13980	Environmental Studies	0.0	100%	100%	28-Nov-14 A	01-Dec-14 A
1535		**Spread 3, Environmental - Consultation Support**	0.0	100%	100%	04-Nov-14 A	06-Jan-15 A
1536	A14110	Environmental Consultations - Dillon	0.0	100%	100%	04-Nov-14 A	06-Jan-15 A
1537		**Spread 3, Environmental - Archaeological Assessment**	10.0	100%	99%	09-Jun-14 A	04-May-16
1538	A15850	Archaeological investigations	10.0	100%	99%	09-Jun-14 A	04-May-16
1539		**Spread 3, Environmental - Environmental Planning and Permitting**	0.0	100%	100%	05-Sep-13 A	22-Aug-14 A
1540	A14130	Environmental Planning	0.0	100%	100%	05-Sep-13 A	22-Aug-14 A
1541		**Spread 3, Environmental - Post-Construction Monitoring**	46.4	23.17%	0%	22-Apr-16	14-Jul-16
1542	A13990	PP - Env Post Construction	46.4	23.17%	0%	22-Apr-16	14-Jul-16
1543		**Spread 3, Environmental - Environment Inspection**	10.0	100%	86%	20-Mar-15 A	04-May-16
1544	A14000	Spread 3 - Env Inspections	10.0	100%	86%	20-Mar-15 A	04-May-16
1545		**Spread 3, Environmental - Environmental Studies for Land/ROW a**	0.0	100%	100%	05-Sep-13 A	24-Feb-16 A
1546	A14080	Env Studies for Land/ROW SP3	0.0	100%	100%	05-Sep-13 A	24-Feb-16 A
1547		**Spread 3, Environmental - Environmental Site Assessment (ESA**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
1548		**Spread 3, Environmental - Phase I ESA - E1**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
1549	P	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	19-Aug-14 A	17-Oct-14 A
1550	P	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	03-Jul-14 A	18-Aug-14 A
1551	P	Receive Draft Report	0.0	100%	100%	03-Jul-14 A	
1552	P	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	02-Jul-14 A
1553		**Spread 3, Environmental - Phase I ESA - E6**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
1554	P	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	19-Aug-14 A	17-Oct-14 A
1555	P	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	03-Jul-14 A	18-Aug-14 A
1556	P	Receive Draft Report	0.0	100%	100%	03-Jul-14 A	
1557	P	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	02-Jul-14 A
1558		**Spread 3, Environmental - Phase I ESA - E7**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
1559	P	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	19-Aug-14 A	17-Oct-14 A
1560	P	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	03-Jul-14 A	18-Aug-14 A
1561	P	Receive Draft Report	0.0	100%	100%	03-Jul-14 A	

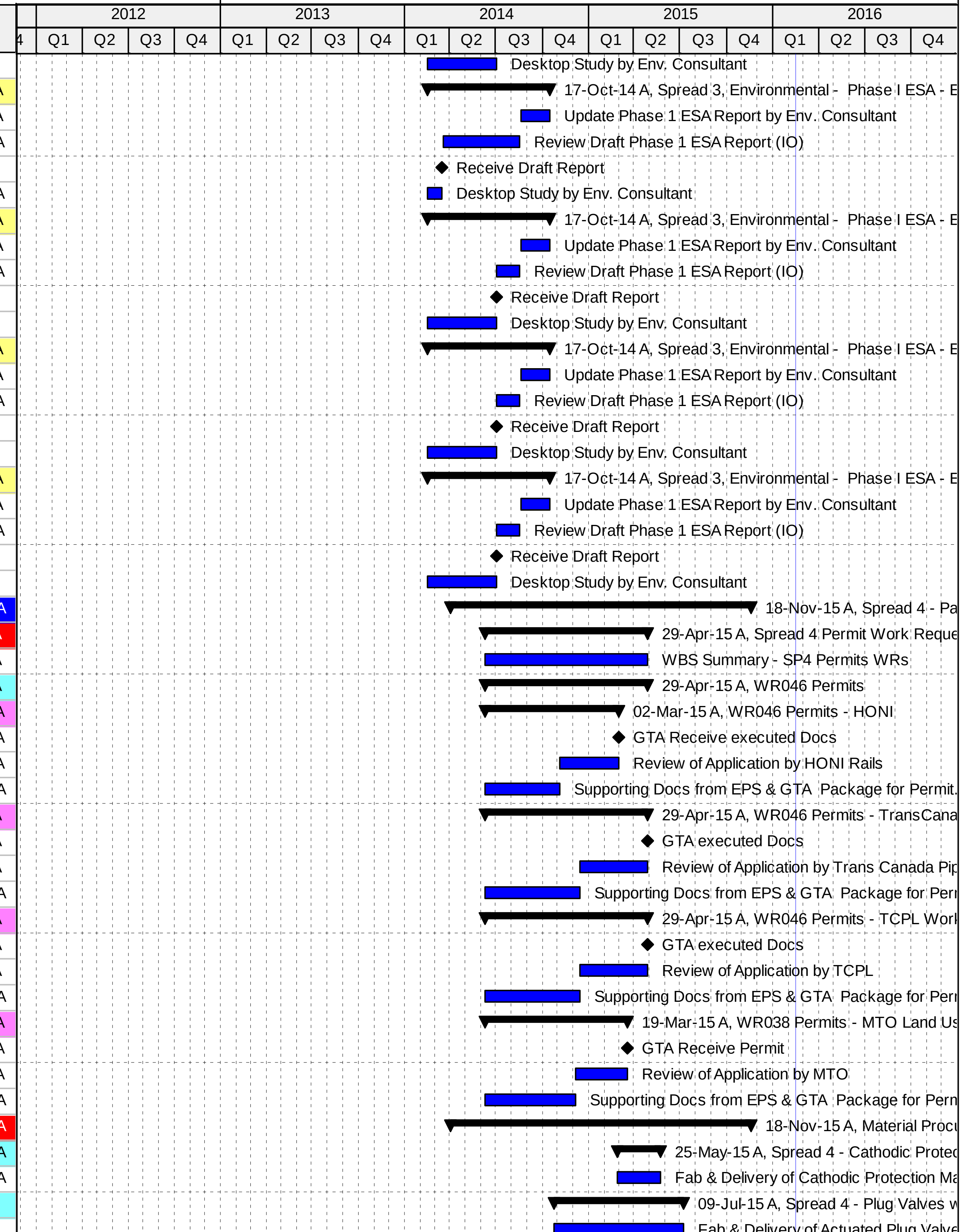


Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1562	P	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	02-Jul-14 A
1563		**Spread 3, Environmental - Phase I ESA - E10**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
1564	P	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	19-Aug-14 A	17-Oct-14 A
1565	P	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	18-Mar-14 A	18-Aug-14 A
1566	P	Receive Draft Report	0.0	100%	100%	17-Mar-14 A	
1567	P	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	17-Mar-14 A
1568		**Spread 3, Environmental - Phase I ESA - E11**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
1569	P	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	19-Aug-14 A	17-Oct-14 A
1570	P	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	03-Jul-14 A	18-Aug-14 A
1571	P	Receive Draft Report	0.0	100%	100%	03-Jul-14 A	
1572	P	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	02-Jul-14 A
1573		**Spread 3, Environmental - Phase I ESA - E12**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
1574	P	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	19-Aug-14 A	17-Oct-14 A
1575	P	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	03-Jul-14 A	18-Aug-14 A
1576	P	Receive Draft Report	0.0	100%	100%	03-Jul-14 A	
1577	P	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	02-Jul-14 A
1578		**Spread 3, Environmental - Phase I ESA - E13**	0.0	0%	0%	14-Feb-14 A	17-Oct-14 A
1579	P	Update Phase 1 ESA Report by Env. Consultant	0.0	100%	100%	19-Aug-14 A	17-Oct-14 A
1580	P	Review Draft Phase 1 ESA Report (IO)	0.0	100%	100%	03-Jul-14 A	18-Aug-14 A
1581	P	Receive Draft Report	0.0	100%	100%	03-Jul-14 A	
1582	P	Desktop Study by Env. Consultant	0.0	100%	100%	14-Feb-14 A	02-Jul-14 A
1583		**Spread 4 - Parkway West to Parkway Cons**	0.0	100%	100%	01-Apr-14 A	18-Nov-15 A
1584		**Spread 4 Permit Work Requests**	0.0	100%	100%	09-Jun-14 A	29-Apr-15 A
1585	PLE-07-14	WBS Summary - SP4 Permits WRs	0.0	100%	100%	09-Jun-14 A	29-Apr-15 A
1586		**WR046 Permits**	0.0	0%	0%	09-Jun-14 A	29-Apr-15 A
1587		**WR046 Permits - HONI**	0.0	0%	0%	09-Jun-14 A	02-Mar-15 A
1588	PLE-	GTA Receive executed Docs	0.0	100%	100%		02-Mar-15 A
1589	PLE-	Review of Application by HONI Rails	0.0	100%	100%	04-Nov-14 A	02-Mar-15 A
1590	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	04-Nov-14 A
1591		**WR046 Permits - TransCanada Pipeline**	0.0	0%	0%	09-Jun-14 A	29-Apr-15 A
1592	PLE-	GTA executed Docs	0.0	100%	100%		29-Apr-15 A
1593	PLE-	Review of Application by Trans Canada Pipeline	0.0	100%	100%	16-Dec-14 A	29-Apr-15 A
1594	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	16-Dec-14 A
1595		**WR046 Permits - TCPL Work Permit**	0.0	0%	0%	09-Jun-14 A	29-Apr-15 A
1596	PLE-	GTA executed Docs	0.0	100%	100%		29-Apr-15 A
1597	PLE-	Review of Application by TCPL	0.0	100%	100%	16-Dec-14 A	29-Apr-15 A
1598	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	16-Dec-14 A
1599		**WR038 Permits - MTO Land Use**	0.0	0%	0%	09-Jun-14 A	19-Mar-15 A
1600	PLE-	GTA Receive Permit	0.0	100%	100%		19-Mar-15 A
1601	PLE-	Review of Application by MTO	0.0	100%	100%	08-Dec-14 A	19-Mar-15 A
1602	PLE-	Supporting Docs from EPS & GTA Package for Permit., Fill	0.0	100%	100%	09-Jun-14 A	08-Dec-14 A
1603		**Material Procurement - Spread 4**	0.0	100%	100%	01-Apr-14 A	18-Nov-15 A
1604		**Spread 4 - Cathodic Protection**	0.0	100%	100%	27-Feb-15 A	25-May-15 A
1605	SME-17	Fab & Delivery of Cathodic Protection Materials	0.0	100%	100%	27-Feb-15 A	25-May-15 A
1606		**Spread 4 - Plug Valves with Actuators**	0.0	100%	100%	24-Oct-14 A	09-Jul-15 A
1607	SME-15	Fab & Delivery of Actuated Plug Valves	0.0	100%	100%	24-Oct-14 A	09-Jul-15 A

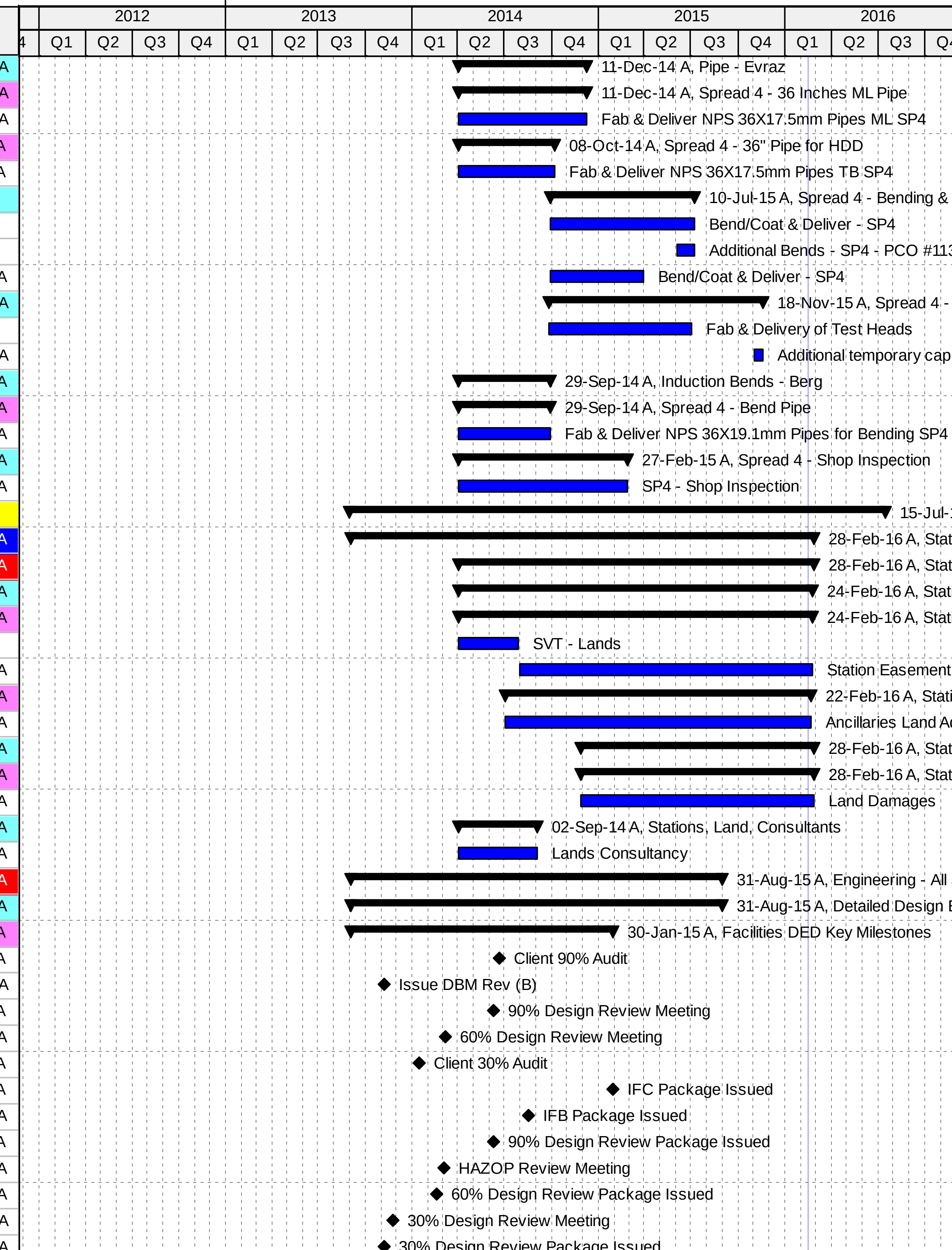


Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1608		**Pipe - Evraz**	0.0	100%	100%	01-Apr-14 A	11-Dec-14 A
1609		**Spread 4 - 36 Inches ML Pipe**	0.0	100%	100%	01-Apr-14 A	11-Dec-14 A
1610	PME	Fab & Deliver NPS 36X17.5mm Pipes ML SP4	0.0	100%	100%	01-Apr-14 A	11-Dec-14 A
1611		**Spread 4 - 36" Pipe for HDD**	0.0	100%	100%	01-Apr-14 A	08-Oct-14 A
1612	PME	Fab & Deliver NPS 36X17.5mm Pipes TB SP4	0.0	100%	100%	01-Apr-14 A	08-Oct-14 A
1613		**Spread 4 - Bending & Coating**	0.0	100%	100%	30-Sep-14 A	10-Jul-15 A
1614	PME16	Bend/Coat & Deliver - SP4	0.0	100%	100%	30-Sep-14 A	10-Jul-15 A
1615	PME12	Additional Bends - SP4 - PCO #113	0.0	0%	100%	05-Jun-15 A	10-Jul-15 A
1616	PME12	Bend/Coat & Deliver - SP4	0.0	0%	100%	30-Sep-14 A	31-Mar-15 A
1617		**Spread 4 - Test Heads**	0.0	100%	100%	26-Sep-14 A	18-Nov-15 A
1618	A17840	Fab & Delivery of Test Heads	0.0	100%	100%	26-Sep-14 A	02-Jul-15 A
1619	A-PCO	Additional temporary cap for pipeline tie in	0.0	0%	100%	02-Nov-15 A	18-Nov-15 A
1620		**Induction Bends - Berg**	0.0	100%	100%	01-Apr-14 A	29-Sep-14 A
1621		**Spread 4 - Bend Pipe**	0.0	100%	100%	01-Apr-14 A	29-Sep-14 A
1622	PME	Fab & Deliver NPS 36X19.1mm Pipes for Bending SP4	0.0	100%	100%	01-Apr-14 A	29-Sep-14 A
1623		**Spread 4 - Shop Inspection**	0.0	100%	100%	01-Apr-14 A	27-Feb-15 A
1624	PME15	SP4 - Shop Inspection	0.0	100%	100%	01-Apr-14 A	27-Feb-15 A
1625		**STATIONS**	50.4	99.29%	94.33%	30-Aug-13 A	15-Jul-16
1626		**Station 0**	0.0	100%	100%	02-Sep-13 A	28-Feb-16 A
1627		**Station 0, Land**	0.0	100%	100%	01-Apr-14 A	28-Feb-16 A
1628		**Stations, Land, Compensation**	0.0	100%	100%	01-Apr-14 A	24-Feb-16 A
1629		**Stations, Land, Compensation - Easements**	0.0	100%	100%	01-Apr-14 A	24-Feb-16 A
1630	A138	SVT - Lands	0.0	100%	100%	01-Apr-14 A	29-Jul-14 A
1631	A137	Station Easement	0.0	100%	100%	30-Jul-14 A	24-Feb-16 A
1632		**Stations, Land, Compensation - Ancillary Acquisitions**	0.0	0%	0%	02-Jul-14 A	22-Feb-16 A
1633	A138	Ancillaries Land Aquisitions	0.0	100%	100%	02-Jul-14 A	22-Feb-16 A
1634		**Stations, Land, Damages**	0.0	0%	0%	28-Nov-14 A	28-Feb-16 A
1635		**Stations, Land, Damages - Inconvenience**	0.0	0%	0%	28-Nov-14 A	28-Feb-16 A
1636	A138	Land Damages	0.0	84.67%	100%	28-Nov-14 A	28-Feb-16 A
1637		**Stations, Land, Consultants**	0.0	100%	100%	01-Apr-14 A	02-Sep-14 A
1638	A13760	Lands Consultancy	0.0	100%	100%	01-Apr-14 A	02-Sep-14 A
1639		**Engineering - All Stations**	0.0	100%	100%	02-Sep-13 A	31-Aug-15 A
1640		**Detailed Design Engineering - All Stations**	0.0	100%	100%	02-Sep-13 A	31-Aug-15 A
1641		**Facilities DED Key Milestones**	0.0	0%	0%	02-Sep-13 A	30-Jan-15 A
1642	KM1	Client 90% Audit	0.0	100%	100%		20-Jun-14 A
1643	KM1	Issue DBM Rev (B)	0.0	100%	100%		08-Nov-13 A
1644	KM1	90% Design Review Meeting	0.0	100%	100%		09-Jun-14 A
1645	KM1	60% Design Review Meeting	0.0	100%	100%		07-Mar-14 A
1646	KM1	Client 30% Audit	0.0	100%	100%		16-Jan-14 A
1647	KM1	IFC Package Issued	0.0	100%	100%		30-Jan-15 A
1648	KM1	IFB Package Issued	0.0	100%	100%		18-Aug-14 A
1649	KM1	90% Design Review Package Issued	0.0	100%	100%		09-Jun-14 A
1650	KM1	HAZOP Review Meeting	0.0	100%	100%		05-Mar-14 A
1651	KM1	60% Design Review Package Issued	0.0	100%	100%		18-Feb-14 A
1652	KM1	30% Design Review Meeting	0.0	100%	100%		25-Nov-13 A
1653	KM1	30% Design Review Package Issued	0.0	100%	100%		08-Nov-13 A



Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

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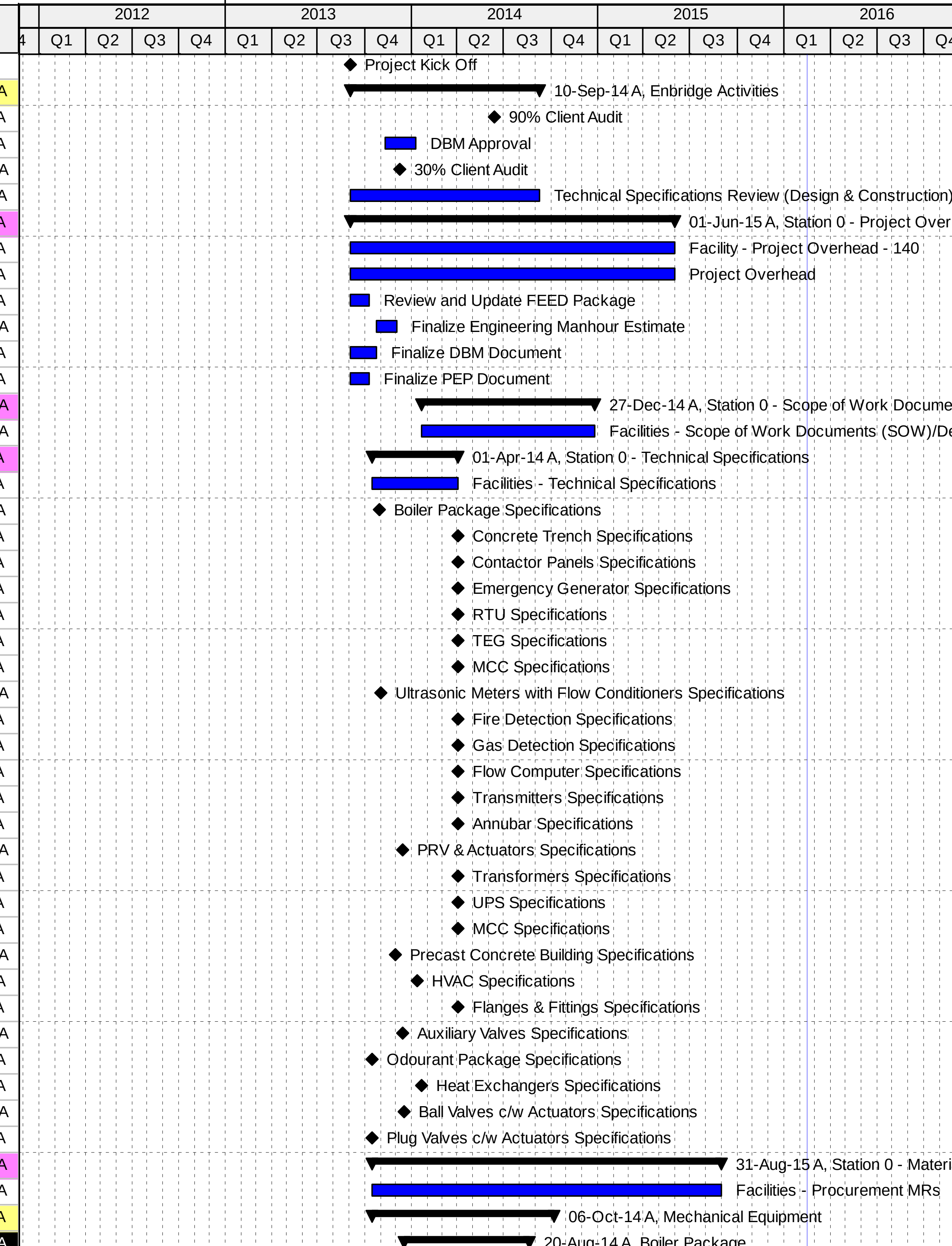
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1654	KM1	Project Kick Off	0.0	100%	100%	02-Sep-13 A	
1655		**Enbridge Activities**	0.0	0%	0%	02-Sep-13 A	10-Sep-14 A
1656	C	90% Client Audit	0.0	100%	100%		12-Jun-14 A
1657	C	DBM Approval	0.0	100%	100%	12-Nov-13 A	10-Jan-14 A
1658	C	30% Client Audit	0.0	100%	100%		09-Dec-13 A
1659	C	Technical Specifications Review (Design & Construction)	0.0	100%	100%	02-Sep-13 A	10-Sep-14 A
1660		**Station 0 - Project Overhead**	0.0	100%	100%	02-Sep-13 A	01-Jun-15 A
1661	WBS	Facility - Project Overhead - 140	0.0	100%	100%	02-Sep-13 A	01-Jun-15 A
1662	PM1	Project Overhead	0.0	100%	100%	02-Sep-13 A	01-Jun-15 A
1663	PM1	Review and Update FEED Package	0.0	100%	100%	02-Sep-13 A	11-Oct-13 A
1664	PM1	Finalize Engineering Manhour Estimate	0.0	100%	100%	24-Oct-13 A	05-Dec-13 A
1665	PM1	Finalize DBM Document	0.0	100%	100%	02-Sep-13 A	24-Oct-13 A
1666	PM1	Finalize PEP Document	0.0	100%	100%	02-Sep-13 A	10-Oct-13 A
1667		**Station 0 - Scope of Work Documents (SOW)/Design Basis Mem**	0.0	100%	100%	20-Jan-14 A	27-Dec-14 A
1668	WBS	Facilities - Scope of Work Documents (SOW)/Design Basis	0.0	100%	100%	20-Jan-14 A	27-Dec-14 A
1669		**Station 0 - Technical Specifications**	0.0	100%	100%	15-Oct-13 A	01-Apr-14 A
1670	WBS	Facilities - Technical Specifications	0.0	100%	100%	15-Oct-13 A	01-Apr-14 A
1671	TS4	Boiler Package Specifications	0.0	100%	100%		30-Oct-13 A
1672	TS4	Concrete Trench Specifications	0.0	100%	100%		01-Apr-14 A
1673	TS4	Contactor Panels Specifications	0.0	100%	100%		01-Apr-14 A
1674	TS4	Emergency Generator Specifications	0.0	100%	100%		01-Apr-14 A
1675	TS4	RTU Specifications	0.0	100%	100%		01-Apr-14 A
1676	TS4	TEG Specifications	0.0	100%	100%		01-Apr-14 A
1677	TS4	MCC Specifications	0.0	100%	100%		01-Apr-14 A
1678	TS3	Ultrasonic Meters with Flow Conditioners Specifications	0.0	100%	100%		01-Nov-13 A
1679	TS3	Fire Detection Specifications	0.0	100%	100%		01-Apr-14 A
1680	TS3	Gas Detection Specifications	0.0	100%	100%		01-Apr-14 A
1681	TS3	Flow Computer Specifications	0.0	100%	100%		01-Apr-14 A
1682	TS3	Transmitters Specifications	0.0	100%	100%		01-Apr-14 A
1683	TS3	Annubar Specifications	0.0	100%	100%		01-Apr-14 A
1684	TS2	PRV & Actuators Specifications	0.0	100%	100%		16-Dec-13 A
1685	TS2	Transformers Specifications	0.0	100%	100%		01-Apr-14 A
1686	TS2	UPS Specifications	0.0	100%	100%		01-Apr-14 A
1687	TS2	MCC Specifications	0.0	100%	100%		01-Apr-14 A
1688	TS2	Precast Concrete Building Specifications	0.0	100%	100%		02-Dec-13 A
1689	TS2	HVAC Specifications	0.0	100%	100%		14-Jan-14 A
1690	TS1	Flanges & Fittings Specifications	0.0	100%	100%		01-Apr-14 A
1691	TS1	Auxiliary Valves Specifications	0.0	100%	100%		16-Dec-13 A
1692	TS1	Odourant Package Specifications	0.0	100%	100%		15-Oct-13 A
1693	TS1	Heat Exchangers Specifications	0.0	100%	100%		20-Jan-14 A
1694	TS1	Ball Valves c/w Actuators Specifications	0.0	100%	100%		19-Dec-13 A
1695	TS1	Plug Valves c/w Actuators Specifications	0.0	100%	100%		15-Oct-13 A
1696		**Station 0 - Material Requisitions**	0.0	100%	100%	17-Oct-13 A	31-Aug-15 A
1697	WBS	Facilities - Procurement MRs	0.0	100%	100%	17-Oct-13 A	31-Aug-15 A
1698		**Mechanical Equipment**	0.0	0%	0%	17-Oct-13 A	06-Oct-14 A
1699		**Boiler Package**	0.0	0%	0%	17-Dec-13 A	20-Aug-14 A



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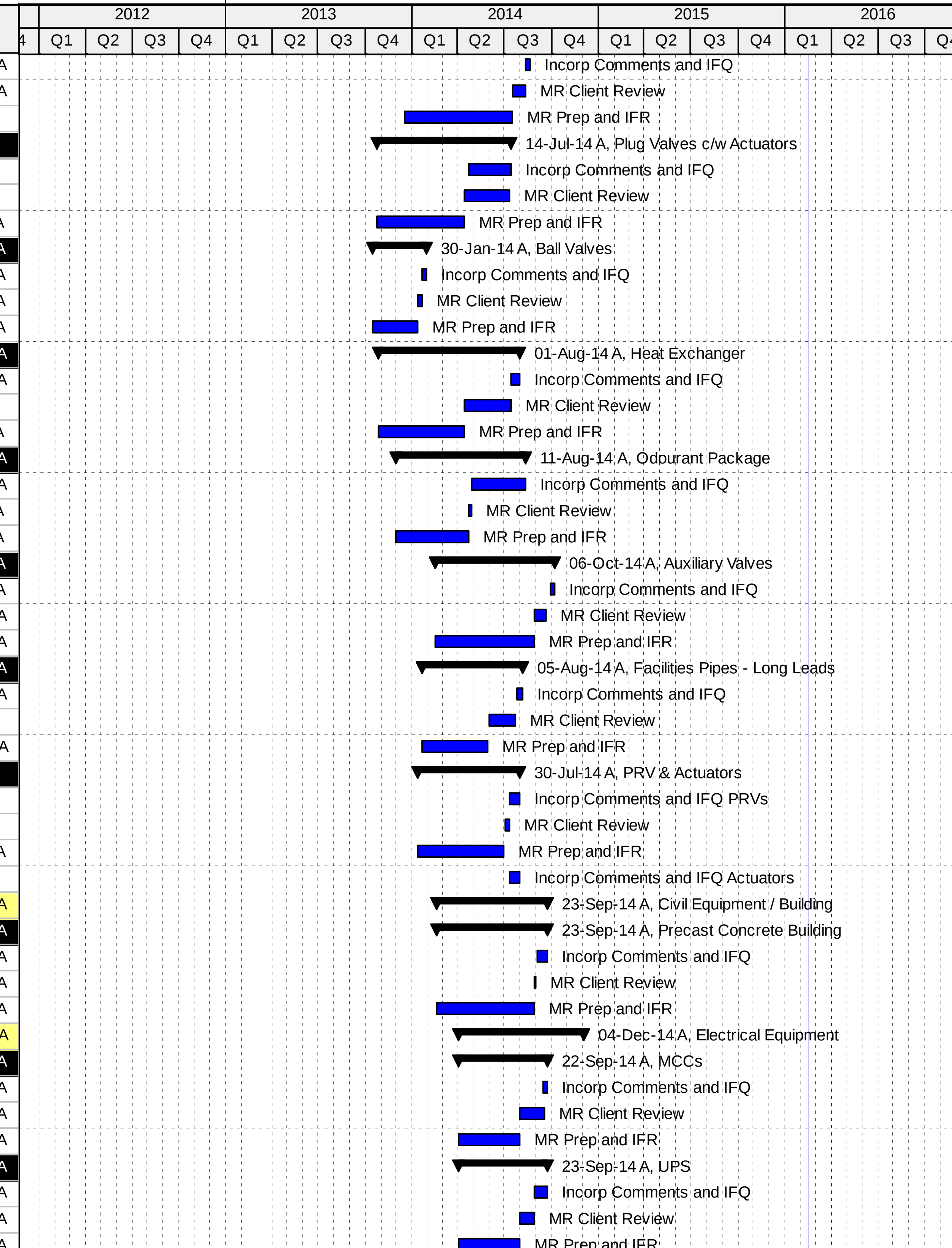
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1700		Incorp Comments and IFQ	0.0	100%	100%	12-Aug-14 A	20-Aug-14 A
1701		MR Client Review	0.0	100%	100%	16-Jul-14 A	11-Aug-14 A
1702		MR Prep and IFR	0.0	100%	100%	17-Dec-13 A	15-Jul-14 A
1703		**Plug Valves c/w Actuators**	0.0	0%	0%	24-Oct-13 A	14-Jul-14 A
1704		Incorp Comments and IFQ	0.0	100%	100%	23-Apr-14 A	14-Jul-14 A
1705		MR Client Review	0.0	100%	100%	14-Apr-14 A	11-Jul-14 A
1706		MR Prep and IFR	0.0	100%	100%	24-Oct-13 A	14-Apr-14 A
1707		**Ball Valves**	0.0	0%	0%	17-Oct-13 A	30-Jan-14 A
1708		Incorp Comments and IFQ	0.0	100%	100%	21-Jan-14 A	30-Jan-14 A
1709		MR Client Review	0.0	100%	100%	13-Jan-14 A	20-Jan-14 A
1710		MR Prep and IFR	0.0	100%	100%	17-Oct-13 A	13-Jan-14 A
1711		**Heat Exchanger**	0.0	0%	0%	28-Oct-13 A	01-Aug-14 A
1712		Incorp Comments and IFQ	0.0	100%	100%	15-Jul-14 A	01-Aug-14 A
1713		MR Client Review	0.0	100%	100%	15-Apr-14 A	14-Jul-14 A
1714		MR Prep and IFR	0.0	100%	100%	28-Oct-13 A	14-Apr-14 A
1715		**Odourant Package**	0.0	0%	0%	02-Dec-13 A	11-Aug-14 A
1716		Incorp Comments and IFQ	0.0	100%	100%	29-Apr-14 A	11-Aug-14 A
1717		MR Client Review	0.0	100%	100%	21-Apr-14 A	29-Apr-14 A
1718		MR Prep and IFR	0.0	100%	100%	02-Dec-13 A	21-Apr-14 A
1719		**Auxiliary Valves**	0.0	0%	0%	17-Feb-14 A	06-Oct-14 A
1720		Incorp Comments and IFQ	0.0	100%	100%	29-Sep-14 A	06-Oct-14 A
1721		MR Client Review	0.0	100%	100%	29-Aug-14 A	22-Sep-14 A
1722		MR Prep and IFR	0.0	100%	100%	17-Feb-14 A	29-Aug-14 A
1723		**Facilities Pipes - Long Leads**	0.0	0%	0%	20-Jan-14 A	05-Aug-14 A
1724		Incorp Comments and IFQ	0.0	100%	100%	25-Jul-14 A	05-Aug-14 A
1725		MR Client Review	0.0	100%	100%	02-Jun-14 A	24-Jul-14 A
1726		MR Prep and IFR	0.0	100%	100%	20-Jan-14 A	30-May-14 A
1727		**PRV & Actuators**	0.0	0%	0%	13-Jan-14 A	30-Jul-14 A
1728		Incorp Comments and IFQ PRVs	0.0	100%	100%	11-Jul-14 A	30-Jul-14 A
1729		MR Client Review	0.0	100%	100%	02-Jul-14 A	10-Jul-14 A
1730		MR Prep and IFR	0.0	100%	100%	13-Jan-14 A	30-Jun-14 A
1731		Incorp Comments and IFQ Actuators	0.0	100%	100%	11-Jul-14 A	30-Jul-14 A
1732		**Civil Equipment / Building**	0.0	0%	0%	20-Feb-14 A	23-Sep-14 A
1733		**Precast Concrete Building**	0.0	0%	0%	20-Feb-14 A	23-Sep-14 A
1734		Incorp Comments and IFQ	0.0	100%	100%	03-Sep-14 A	23-Sep-14 A
1735		MR Client Review	0.0	100%	100%	29-Aug-14 A	02-Sep-14 A
1736		MR Prep and IFR	0.0	100%	100%	20-Feb-14 A	28-Aug-14 A
1737		**Electrical Equipment**	0.0	0%	0%	01-Apr-14 A	04-Dec-14 A
1738		**MCCs**	0.0	0%	0%	01-Apr-14 A	22-Sep-14 A
1739		Incorp Comments and IFQ	0.0	100%	100%	16-Sep-14 A	22-Sep-14 A
1740		MR Client Review	0.0	100%	100%	01-Aug-14 A	16-Sep-14 A
1741		MR Prep and IFR	0.0	100%	100%	01-Apr-14 A	01-Aug-14 A
1742		**UPS**	0.0	0%	0%	01-Apr-14 A	23-Sep-14 A
1743		Incorp Comments and IFQ	0.0	100%	100%	29-Aug-14 A	23-Sep-14 A
1744		MR Client Review	0.0	100%	100%	01-Aug-14 A	29-Aug-14 A
1745		MR Prep and IFR	0.0	100%	100%	01-Apr-14 A	01-Aug-14 A



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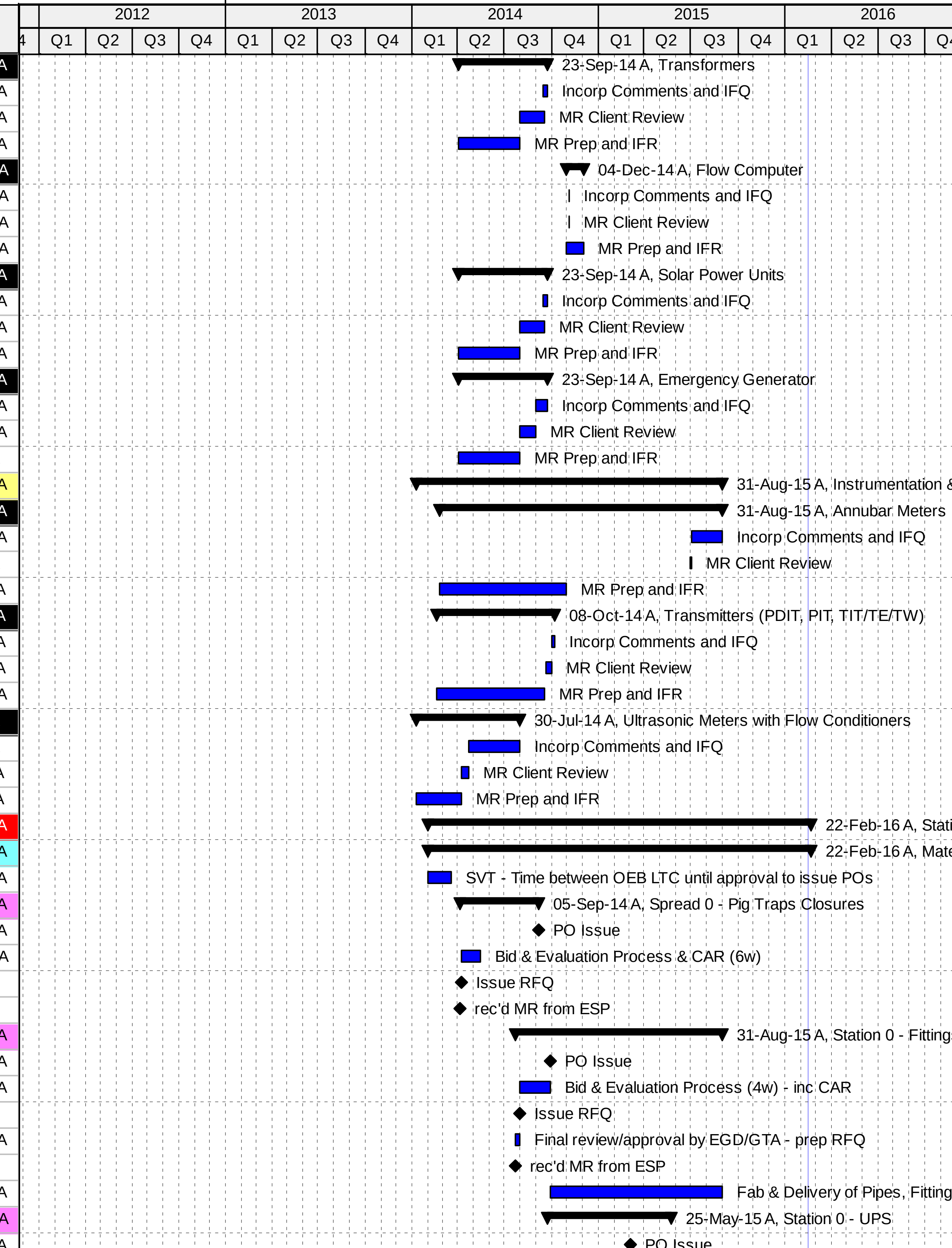
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1746		**Transformers**	0.0	0%	0%	01-Apr-14 A	23-Sep-14 A
1747		Incorp Comments and IFQ	0.0	100%	100%	16-Sep-14 A	23-Sep-14 A
1748		MR Client Review	0.0	100%	100%	01-Aug-14 A	16-Sep-14 A
1749		MR Prep and IFR	0.0	100%	100%	01-Apr-14 A	01-Aug-14 A
1750		**Flow Computer**	0.0	0%	0%	31-Oct-14 A	04-Dec-14 A
1751		Incorp Comments and IFQ	0.0	100%	100%	06-Nov-14 A	06-Nov-14 A
1752		MR Client Review	0.0	100%	100%	04-Nov-14 A	06-Nov-14 A
1753		MR Prep and IFR	0.0	100%	100%	31-Oct-14 A	04-Dec-14 A
1754		**Solar Power Units**	0.0	0%	0%	01-Apr-14 A	23-Sep-14 A
1755		Incorp Comments and IFQ	0.0	100%	100%	16-Sep-14 A	23-Sep-14 A
1756		MR Client Review	0.0	100%	100%	01-Aug-14 A	16-Sep-14 A
1757		MR Prep and IFR	0.0	100%	100%	01-Apr-14 A	01-Aug-14 A
1758		**Emergency Generator**	0.0	0%	0%	01-Apr-14 A	23-Sep-14 A
1759		Incorp Comments and IFQ	0.0	100%	100%	02-Sep-14 A	23-Sep-14 A
1760		MR Client Review	0.0	100%	100%	01-Aug-14 A	01-Sep-14 A
1761		MR Prep and IFR	0.0	100%	100%	01-Apr-14 A	31-Jul-14 A
1762		**Instrumentation & Control Equipment**	0.0	0%	0%	10-Jan-14 A	31-Aug-15 A
1763		**Annubar Meters**	0.0	0%	0%	24-Feb-14 A	31-Aug-15 A
1764		Incorp Comments and IFQ	0.0	100%	100%	02-Jul-15 A	31-Aug-15 A
1765		MR Client Review	0.0	100%	100%	30-Jun-15 A	02-Jul-15 A
1766		MR Prep and IFR	0.0	100%	100%	24-Feb-14 A	30-Oct-14 A
1767		**Transmitters (PDIT, PIT, TIT/TE/TW)**	0.0	0%	0%	20-Feb-14 A	08-Oct-14 A
1768		Incorp Comments and IFQ	0.0	100%	100%	01-Oct-14 A	08-Oct-14 A
1769		MR Client Review	0.0	100%	100%	22-Sep-14 A	01-Oct-14 A
1770		MR Prep and IFR	0.0	100%	100%	20-Feb-14 A	19-Sep-14 A
1771		**Ultrasonic Meters with Flow Conditioners**	0.0	0%	0%	10-Jan-14 A	30-Jul-14 A
1772		Incorp Comments and IFQ	0.0	100%	100%	21-Apr-14 A	30-Jul-14 A
1773		MR Client Review	0.0	100%	100%	08-Apr-14 A	21-Apr-14 A
1774		MR Prep and IFR	0.0	100%	100%	10-Jan-14 A	08-Apr-14 A
1775		**Station 0 - Procurement**	0.0	0%	0%	31-Jan-14 A	22-Feb-16 A
1776		**Material Procurement - Station 0**	0.0	0%	0%	31-Jan-14 A	22-Feb-16 A
1777	PME12	SVT - Time between OEB LTC until approval to issue POs	0.0	100%	100%	31-Jan-14 A	18-Mar-14 A
1778		**Spread 0 - Pig Traps Closures**	0.0	0%	0%	04-Apr-14 A	05-Sep-14 A
1779	SME	PO Issue	0.0	100%	100%		05-Sep-14 A
1780	SME	Bid & Evaluation Process & CAR (6w)	0.0	100%	100%	08-Apr-14 A	15-May-14 A
1781	SME	Issue RFQ	0.0	100%	100%	07-Apr-14 A	
1782	SME	rec'd MR from ESP	0.0	100%	100%	04-Apr-14 A	
1783		**Station 0 - Fittings & Flanges**	0.0	0%	0%	22-Jul-14 A	31-Aug-15 A
1784	SME	PO Issue	0.0	100%	100%		29-Sep-14 A
1785	SME	Bid & Evaluation Process (4w) - inc CAR	0.0	100%	100%	01-Aug-14 A	29-Sep-14 A
1786	SME	Issue RFQ	0.0	100%	100%	01-Aug-14 A	
1787	SME	Final review/approval by EGD/GTA - prep RFQ	0.0	100%	100%	22-Jul-14 A	01-Aug-14 A
1788	SME	rec'd MR from ESP	0.0	100%	100%	22-Jul-14 A	
1789	A171	Fab & Delivery of Pipes, Fittings & Flanges I(Long lead - for	0.0	100%	100%	29-Sep-14 A	31-Aug-15 A
1790		**Station 0 - UPS**	0.0	0%	0%	23-Sep-14 A	25-May-15 A
1791	A14	PO Issue	0.0	100%	0%		05-Mar-15 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1792	A149	Fab & Deliver of UPSs	0.0	100%	100%	05-Mar-15 A	25-May-15 A
1793	A149	Bid & Evaluation Process (4w) - inc CAR	0.0	100%	100%	24-Oct-14 A	05-Mar-15 A
1794	A149	Issue RFQ	0.0	100%	100%	24-Oct-14 A	
1795	A149	Final review/approval by EGD/GTA - Prep RFQ	0.0	100%	100%	23-Sep-14 A	24-Oct-14 A
1796	A149	rec'd MR from ESP	0.0	100%	100%	23-Sep-14 A	
1797		**Station 0 - Transmitters (PDIT, PIT, TIT/TE/TW)**	0.0	0%	0%	08-Oct-14 A	08-Jun-15 A
1798	A148	PO Issue	0.0	100%	100%		24-Mar-15 A
1799	A148	Fab & Deliver of Transmitters	0.0	100%	100%	25-Mar-15 A	08-Jun-15 A
1800	A148	Bid & Evaluation Process (4w) - inc CAR	0.0	100%	100%	15-Oct-14 A	24-Mar-15 A
1801	A148	Issue RFQ	0.0	100%	100%	15-Oct-14 A	
1802	A148	Final review/approval by EGD/GTA - Prep RFQ	0.0	100%	100%	08-Oct-14 A	15-Oct-14 A
1803	A148	rec'd MR from ESP	0.0	100%	100%	08-Oct-14 A	
1804		**Station 0 - Ball Valves**	0.0	0%	0%	31-Jan-14 A	23-Jul-14 A
1805	A145	PO Issue	0.0	100%	100%		23-Jul-14 A
1806	A145	CAR review/approval	0.0	100%	100%	01-Apr-14 A	23-Jul-14 A
1807	A145	Bid & Evaluation Process (4w) - inc material approval	0.0	100%	100%	03-Mar-14 A	26-Mar-14 A
1808	A145	Issue RFQ	0.0	100%	100%	28-Feb-14 A	
1809	A145	CDP review/approval	0.0	100%	100%	03-Feb-14 A	28-Feb-14 A
1810	A145	rec'd MR from ESP	0.0	100%	100%	31-Jan-14 A	
1811		**Station 0 - Flow Computer Panels, RTUd, Contactor Panels**	0.0	0%	0%	06-Nov-14 A	22-Feb-16 A
1812	A147	PO Issue	0.0	100%	100%		25-Feb-15 A
1813	A147	Fab & Deliver of Flow Computers, RTUs, Contactor Panels	0.0	100%	100%	25-Feb-15 A	22-Feb-16 A
1814	A147	Bid & Evaluation Process (4w) - inc CAR	0.0	100%	100%	08-Nov-14 A	25-Feb-15 A
1815	A146	Issue RFQ	0.0	100%	100%	07-Nov-14 A	
1816	A146	Final review/approval by EGD/GTA - Prep RFQ	0.0	100%	100%	06-Nov-14 A	07-Nov-14 A
1817	A146	rec'd MR from ESP	0.0	100%	100%	06-Nov-14 A	
1818		**Station 0 - Boiler Package**	0.0	0%	0%	20-Aug-14 A	26-May-15 A
1819	SME	Fab & Delivery of Boilers	0.0	100%	100%	09-Dec-14 A	26-May-15 A
1820	SME	PO Issue	0.0	100%	100%		09-Dec-14 A
1821	SME	Bid & Evaluation Process (4w) - inc CAR	0.0	100%	100%	26-Aug-14 A	09-Dec-14 A
1822	SME	Issue RFQ	0.0	100%	100%	26-Aug-14 A	
1823	SME	Final review/approval by EGD/GTA - Prep RFQ	0.0	100%	100%	20-Aug-14 A	26-Aug-14 A
1824	SME	rec'd MR from ESP	0.0	100%	100%	20-Aug-14 A	
1825		**Station 0 - Motor Control Centres & ATS**	0.0	0%	0%	22-Sep-14 A	27-Aug-15 A
1826	A150	PO Issue	0.0	100%	100%		03-Feb-15 A
1827	A150	Fab & Deliver of MCCs & ATSs	0.0	100%	100%	03-Feb-15 A	27-Aug-15 A
1828	A150	Bid & Evaluation Process (4w)	0.0	100%	100%	24-Oct-14 A	03-Feb-15 A
1829	A150	Issue RFQ	0.0	100%	100%	24-Oct-14 A	
1830	A149	Final review/approval by EGD/GTA - Prep RFQ	0.0	100%	100%	22-Sep-14 A	24-Oct-14 A
1831	A149	rec'd MR from ESP	0.0	100%	100%	22-Sep-14 A	
1832		**Station 0 - Pressure Regulating Valves (PRVs)**	0.0	0%	0%	30-Jul-14 A	21-Oct-14 A
1833	SME	PO Issue	0.0	100%	100%		21-Oct-14 A
1834	SME	Bid & Evaluation Process (4w) - inc CAR	0.0	100%	100%	08-Aug-14 A	21-Oct-14 A
1835	SME	Issue RFQ	0.0	100%	100%	08-Aug-14 A	
1836	SME	Final review/approval by EGD/GTA - Prep RFQ	0.0	100%	100%	30-Jul-14 A	08-Aug-14 A
1837	SME	rec'd MR from ESP	0.0	100%	100%	30-Jul-14 A	

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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1838		**Station 0 - Auxiliary Valves**	0.0	0%	0%	29-Sep-14 A	30-May-15 A
1839	SME	Fab & Delivery of Auxiliary Valves	0.0	100%	100%	23-Dec-14 A	30-May-15 A
1840	SME	PO Issue	0.0	100%	100%		22-Dec-14 A
1841	SME	Bid & Evaluation Process (4w) - inc CAR	0.0	100%	100%	06-Oct-14 A	22-Dec-14 A
1842	SME	Issue RFQ	0.0	100%	100%	06-Oct-14 A	
1843	SME	Final review/approval by EGD/GTA - Prep RFQ	0.0	100%	100%	29-Sep-14 A	06-Oct-14 A
1844	SME	rec'd MR from ESP	0.0	100%	100%	29-Sep-14 A	
1845		**Station 0 - Pre-cast buildings**	0.0	0%	0%	23-Sep-14 A	22-Feb-16 A
1846	SME	Fab & Delivery of Prefab Building Units (inc. built-in utilities)	0.0	100%	100%	10-Dec-14 A	22-Feb-16 A
1847	SME	PO Issue	0.0	100%	100%		10-Dec-14 A
1848	SME	Bid & Evaluation Process (4w) - inc CAR	0.0	100%	100%	07-Oct-14 A	10-Dec-14 A
1849	SME	Issue RFQ	0.0	100%	100%	07-Oct-14 A	
1850	SME	Final review/approval by EGD/GTA - Prep RFQ	0.0	100%	100%	23-Sep-14 A	07-Oct-14 A
1851	SME	rec'd MR from ESP	0.0	100%	100%	23-Sep-14 A	
1852		**Station 0 - Gas Detection**	0.0	0%	0%	15-Oct-14 A	19-Mar-15 A
1853	A178	PO Issue	0.0	0%	100%		19-Mar-15 A
1854	A178	Bid & Evaluation Process (4w) - inc CAR	0.0	0%	100%	15-Oct-14 A	19-Mar-15 A
1855		**Station 0 - Plug Valves with Actuators**	0.0	0%	0%	14-Jul-14 A	24-Oct-14 A
1856	SME	PO Issue	0.0	100%	100%		24-Oct-14 A
1857	SME	Bid & Evaluation Process (4w) - inc CAR	0.0	100%	100%	17-Jul-14 A	23-Oct-14 A
1858	SME	Issue RFQ	0.0	100%	100%	16-Jul-14 A	
1859	SME	Final review/approval by EGD/GTA - Prep RFQ	0.0	100%	100%	14-Jul-14 A	16-Jul-14 A
1860	SME	rec'd MR from ESP	0.0	100%	100%	14-Jul-14 A	
1861		**Station 0 - Heat Exchanger**	0.0	0%	0%	01-Aug-14 A	30-May-15 A
1862	SME	Fab & Delivery of Heat Exchangers	0.0	100%	100%	19-Dec-14 A	30-May-15 A
1863	SME	PO Issue	0.0	100%	100%		18-Dec-14 A
1864	SME	Bid & Evaluation Process (4w) inc CAR	0.0	100%	100%	11-Aug-14 A	18-Dec-14 A
1865	SME	Issue RFQ	0.0	100%	100%	08-Aug-14 A	
1866	SME	Final review/approval by EGD/GTA - Prep RFQ	0.0	100%	100%	01-Aug-14 A	08-Aug-14 A
1867	SME	rec'd MR from ESP	0.0	100%	100%	01-Aug-14 A	
1868		**Station 0 - Odourant Package**	0.0	0%	0%	11-Aug-14 A	08-Jul-15 A
1869	SME	Fab & Delivery of Odourant	0.0	100%	100%	23-Dec-14 A	08-Jul-15 A
1870	SME	PO Issue	0.0	100%	100%		23-Dec-14 A
1871	SME	Bid & Evaluation Process (4w) - inc CAR	0.0	100%	100%	19-Aug-14 A	23-Dec-14 A
1872	SME	Issue RFQ	0.0	100%	100%	18-Aug-14 A	
1873	SME	Final review/approval by EGD/GTA - Prep RFQ	0.0	100%	100%	11-Aug-14 A	15-Aug-14 A
1874	SME	rec'd MR from ESP	0.0	100%	100%	11-Aug-14 A	
1875		**Station 0 - Facilities Pipes - Long Leads (Required for Fabricatic**	0.0	0%	0%	05-Aug-14 A	10-Jul-15 A
1876	SME	PO Issue	0.0	100%	100%		17-Oct-14 A
1877	SME	Issue RFQ	0.0	100%	100%	12-Aug-14 A	
1878	SME	Bid & Evaluation Process (4w) inc CAR	0.0	100%	100%	13-Aug-14 A	09-Oct-14 A
1879	SME	Final review/approval by EGD/GTA - Prep RFQ	0.0	100%	100%	05-Aug-14 A	12-Aug-14 A
1880	SME	rec'd MR from ESP	0.0	100%	100%	05-Aug-14 A	
1881	A155	Fab & Delivery of Facilities Pipes - Spread 3	0.0	100%	100%	09-Oct-14 A	10-Jul-15 A
1882	A155	Fab & Delivery of Facilities Pipes - Spread 1	0.0	100%	100%	09-Oct-14 A	10-Jul-15 A
1883		**Station 0 - Emergency Generators**	0.0	0%	0%	23-Sep-14 A	10-Aug-15 A

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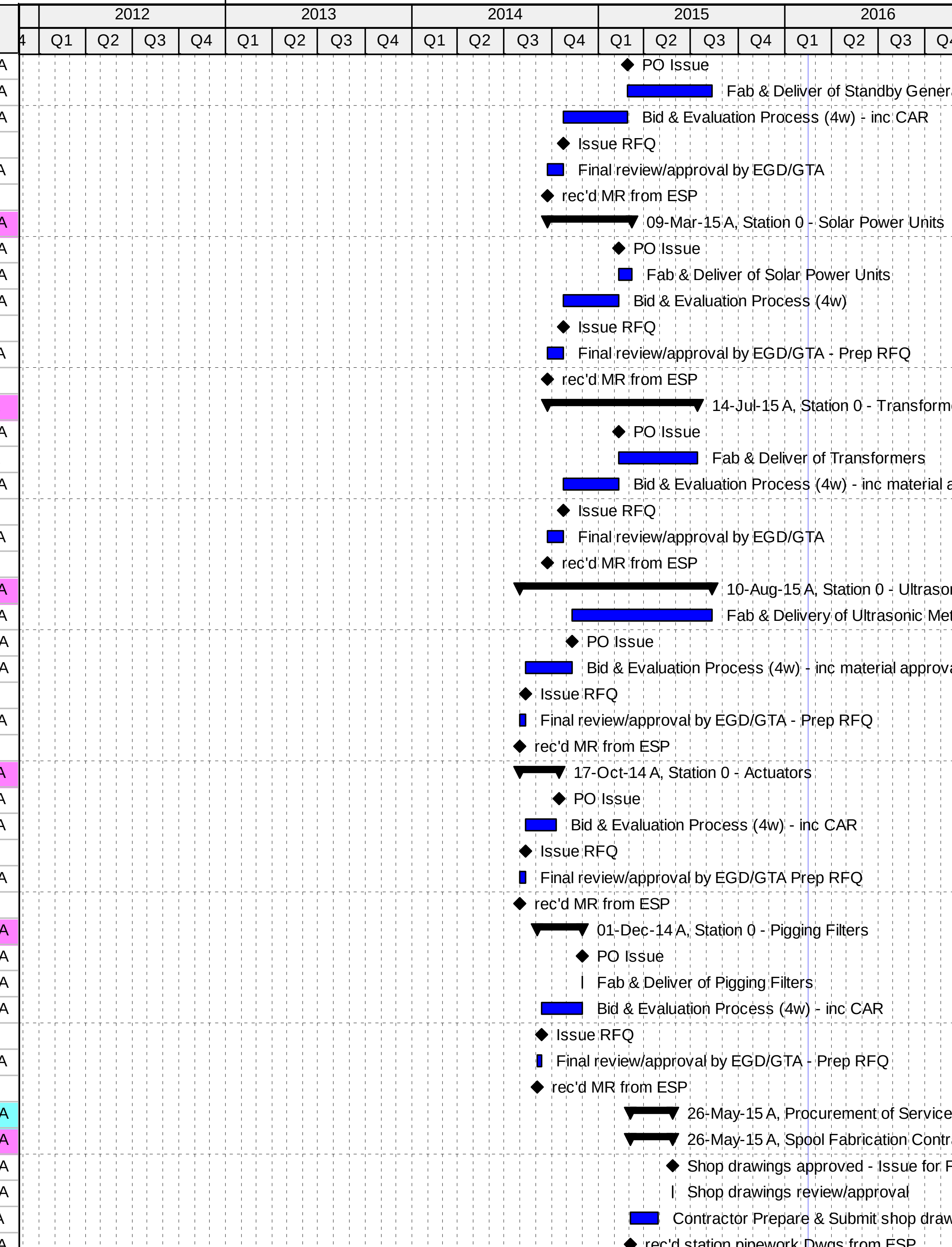
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1884	A148	PO Issue	0.0	100%	100%		27-Feb-15 A
1885	A148	Fab & Deliver of Standby Generator Sets	0.0	100%	100%	27-Feb-15 A	10-Aug-15 A
1886	A147	Bid & Evaluation Process (4w) - inc CAR	0.0	100%	100%	24-Oct-14 A	27-Feb-15 A
1887	A147	Issue RFQ	0.0	100%	100%	24-Oct-14 A	
1888	A147	Final review/approval by EGD/GTA	0.0	100%	100%	24-Sep-14 A	24-Oct-14 A
1889	A147	rec'd MR from ESP	0.0	100%	100%	23-Sep-14 A	
1890		**Station 0 - Solar Power Units**	0.0	0%	0%	23-Sep-14 A	09-Mar-15 A
1891	A152	PO Issue	0.0	100%	100%		10-Feb-15 A
1892	A152	Fab & Deliver of Solar Power Units	0.0	100%	100%	10-Feb-15 A	09-Mar-15 A
1893	A151	Bid & Evaluation Process (4w)	0.0	100%	100%	24-Oct-14 A	10-Feb-15 A
1894	A151	Issue RFQ	0.0	100%	100%	24-Oct-14 A	
1895	A151	Final review/approval by EGD/GTA - Prep RFQ	0.0	100%	100%	23-Sep-14 A	24-Oct-14 A
1896	A151	rec'd MR from ESP	0.0	100%	100%	23-Sep-14 A	
1897		**Station 0 - Transformers**	0.0	0%	0%	23-Sep-14 A	14-Jul-15 A
1898	A151	PO Issue	0.0	100%	100%		09-Feb-15 A
1899	A151	Fab & Deliver of Transformers	0.0	100%	100%	10-Feb-15 A	14-Jul-15 A
1900	A151	Bid & Evaluation Process (4w) - inc material approval	0.0	100%	100%	24-Oct-14 A	09-Feb-15 A
1901	A150	Issue RFQ	0.0	100%	100%	24-Oct-14 A	
1902	A150	Final review/approval by EGD/GTA	0.0	100%	100%	23-Sep-14 A	24-Oct-14 A
1903	A150	rec'd MR from ESP	0.0	100%	100%	23-Sep-14 A	
1904		**Station 0 - Ultrasonic Meters with Flow Conditioners**	0.0	0%	0%	30-Jul-14 A	10-Aug-15 A
1905	SME	Fab & Delivery of Ultrasonic Meters	0.0	100%	100%	12-Nov-14 A	10-Aug-15 A
1906	SME	PO Issue	0.0	100%	100%		12-Nov-14 A
1907	SME	Bid & Evaluation Process (4w) - inc material approval	0.0	100%	100%	13-Aug-14 A	12-Nov-14 A
1908	SME	Issue RFQ	0.0	100%	100%	12-Aug-14 A	
1909	SME	Final review/approval by EGD/GTA - Prep RFQ	0.0	100%	100%	01-Aug-14 A	12-Aug-14 A
1910	SME	rec'd MR from ESP	0.0	100%	100%	30-Jul-14 A	
1911		**Station 0 - Actuators**	0.0	0%	0%	30-Jul-14 A	17-Oct-14 A
1912	A146	PO Issue	0.0	100%	100%		17-Oct-14 A
1913	A146	Bid & Evaluation Process (4w) - inc CAR	0.0	100%	100%	12-Aug-14 A	10-Oct-14 A
1914	A146	Issue RFQ	0.0	100%	100%	12-Aug-14 A	
1915	A145	Final review/approval by EGD/GTA Prep RFQ	0.0	100%	100%	30-Jul-14 A	12-Aug-14 A
1916	A145	rec'd MR from ESP	0.0	100%	100%	30-Jul-14 A	
1917		**Station 0 - Pigging Filters**	0.0	0%	0%	04-Sep-14 A	01-Dec-14 A
1918	A152	PO Issue	0.0	100%	100%		01-Dec-14 A
1919	A152	Fab & Deliver of Pigging Filters	0.0	100%	100%	01-Dec-14 A	01-Dec-14 A
1920	A152	Bid & Evaluation Process (4w) - inc CAR	0.0	100%	100%	12-Sep-14 A	01-Dec-14 A
1921	A152	Issue RFQ	0.0	100%	100%	12-Sep-14 A	
1922	A152	Final review/approval by EGD/GTA - Prep RFQ	0.0	100%	100%	04-Sep-14 A	12-Sep-14 A
1923	A152	rec'd MR from ESP	0.0	100%	100%	04-Sep-14 A	
1924		**Procurement of Services**	0.0	0%	0%	05-Mar-15 A	26-May-15 A
1925		**Spool Fabrication Contract Process**	0.0	0%	0%	05-Mar-15 A	26-May-15 A
1926	SME	Shop drawings approved - Issue for Fabrication	0.0	100%	100%		26-May-15 A
1927	SME	Shop drawings review/approval	0.0	100%	100%	26-May-15 A	26-May-15 A
1928	SME	Contractor Prepare & Submit shop drawings	0.0	100%	100%	05-Mar-15 A	28-Apr-15 A
1929	SME	rec'd station pipework Dwgs from ESP	0.0	100%	100%		05-Mar-15 A



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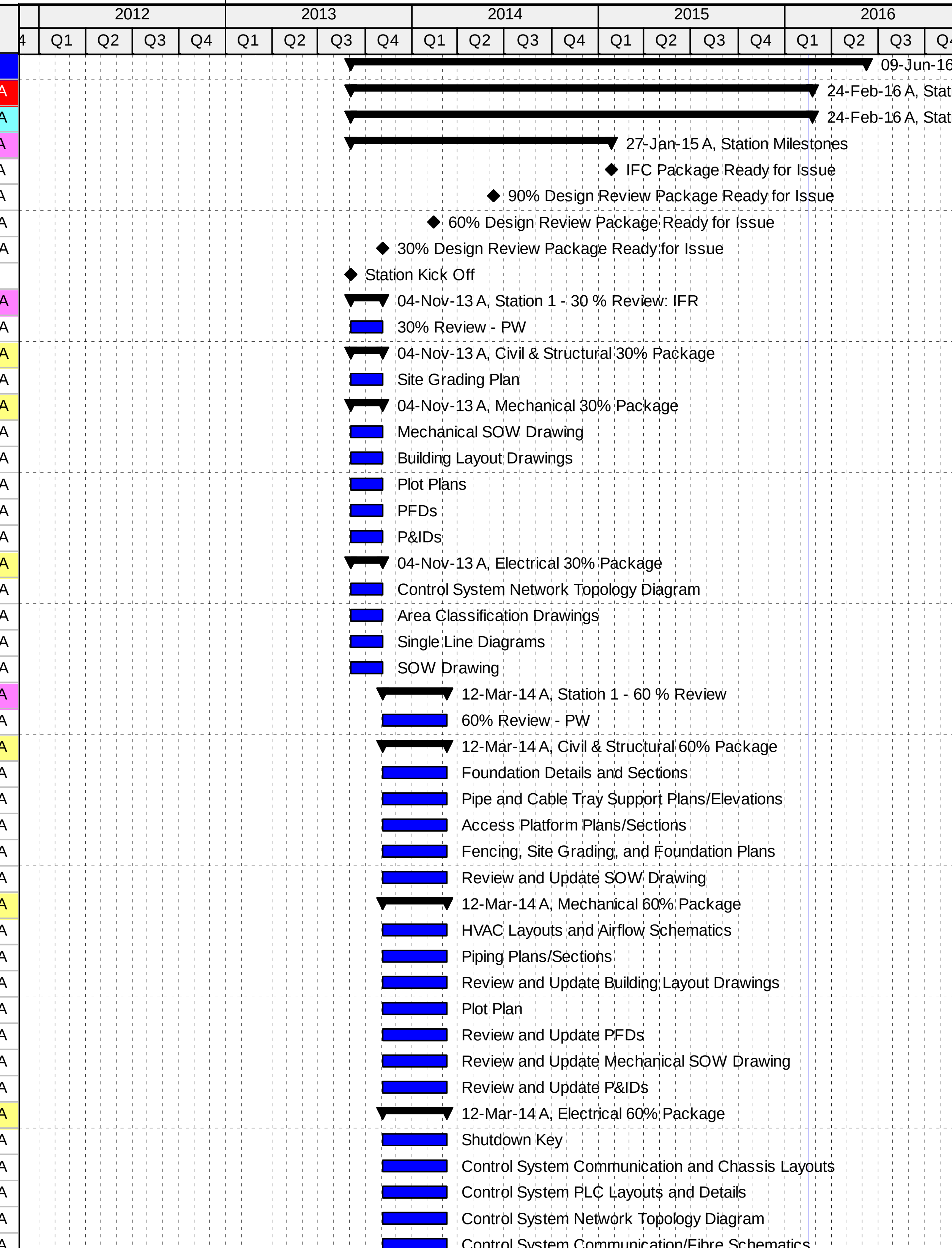
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1930		**Station 1 - Parkway West Station**	30.0	100%	85.49%	02-Sep-13 A	09-Jun-16
1931		**Station 1, Engineering**	0.0	100%	100%	02-Sep-13 A	24-Feb-16 A
1932		**Station 1 - Detailed Design Engineering**	0.0	100%	100%	02-Sep-13 A	24-Feb-16 A
1933		**Station Milestones**	0.0	0%	0%	02-Sep-13 A	27-Jan-15 A
1934	PWS	IFC Package Ready for Issue	0.0	100%	100%		27-Jan-15 A
1935	PWS	90% Design Review Package Ready for Issue	0.0	100%	100%		09-Jun-14 A
1936	PWS	60% Design Review Package Ready for Issue	0.0	100%	100%		12-Feb-14 A
1937	PWS	30% Design Review Package Ready for Issue	0.0	100%	100%		05-Nov-13 A
1938	PWS	Station Kick Off	0.0	100%	100%	02-Sep-13 A	
1939		**Station 1 - 30 % Review: IFR**	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
1940	WBS	30% Review - PW	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
1941		**Civil & Structural 30% Package**	0.0	0%	0%	02-Sep-13 A	04-Nov-13 A
1942	C	Site Grading Plan	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
1943		**Mechanical 30% Package**	0.0	0%	0%	02-Sep-13 A	04-Nov-13 A
1944	M	Mechanical SOW Drawing	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
1945	M	Building Layout Drawings	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
1946	M	Plot Plans	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
1947	M	PFDs	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
1948	E	P&IDs	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
1949		**Electrical 30% Package**	0.0	0%	0%	02-Sep-13 A	04-Nov-13 A
1950	E	Control System Network Topology Diagram	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
1951	E	Area Classification Drawings	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
1952	E	Single Line Diagrams	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
1953	E	SOW Drawing	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
1954		**Station 1 - 60 % Review**	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1955	WBS	60% Review - PW	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1956		**Civil & Structural 60% Package**	0.0	0%	0%	06-Nov-13 A	12-Mar-14 A
1957	C	Foundation Details and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1958	C	Pipe and Cable Tray Support Plans/Elevations	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1959	C	Access Platform Plans/Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1960	C	Fencing, Site Grading, and Foundation Plans	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1961	C	Review and Update SOW Drawing	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1962		**Mechanical 60% Package**	0.0	0%	0%	06-Nov-13 A	12-Mar-14 A
1963	M	HVAC Layouts and Airflow Schematics	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1964	M	Piping Plans/Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1965	M	Review and Update Building Layout Drawings	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1966	M	Plot Plan	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1967	M	Review and Update PFDs	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1968	M	Review and Update Mechanical SOW Drawing	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1969	E	Review and Update P&IDs	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1970		**Electrical 60% Package**	0.0	0%	0%	06-Nov-13 A	12-Mar-14 A
1971	E	Shutdown Key	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1972	E	Control System Communication and Chassis Layouts	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1973	E	Control System PLC Layouts and Details	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1974	E	Control System Network Topology Diagram	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1975	E	Control System Communication/Fibre Schematics	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
1976	E	Control System Network Topology Diagram	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1977	E	Lighting Layouts and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1978	E	Building Layout and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1979	E	Layout Plans and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1980	E	Cable, Cable Tray, and Grounding Layout Diagrams	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1981	E	MCC Elevation Drawings	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1982	E	Review and Update Single Line Diagrams	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1983	E	Review and Update SOW Drawing	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
1984	**Station 1 - 90 % Review: IFB**		0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
1985	WBS	90% Review - PW	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
1986	**Civil & Structural 90% Package**		0.0	0%	0%	18-Feb-14 A	09-Jun-14 A
1987	C	Review and Update Foundation Details and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
1988	C	Civil and Structural Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
1989	C	Review and Update Pipe and Cable Tray Support Plans/Ele	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
1990	C	Review and Update Access Platform Plans/Sections (or 3D	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
1991	C	Review and Update Fencing, Site Grading, and Foundation	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
1992	C	Review and Update SOW Drawing	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
1993	**Mechanical 90% Package**		0.0	0%	0%	18-Feb-14 A	09-Jun-14 A
1994	M	Review and Update Pipe Support Deatails	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
1995	M	Review and Update Piping Plans/Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
1996	M	Review and Update Building Layout Drawings	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
1997	M	Review and Update Plot Plan	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
1998	M	Review and Update Mech SOW Drawing	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
1999	M	Review and Update PFDs	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2000	E	Review and Update P&IDs	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2001	**Electrical 90% Package**		0.0	0%	0%	18-Feb-14 A	09-Jun-14 A
2002	E	Review and Update Shutdown Key	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2003	E	Instrumentation Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2004	E	Control System PLC Interconnection Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2005	E	Review and Update Control System PLC Layouts and Detai	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2006	E	Review and Update Control System Communication/Fibre S	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2007	E	Review and Update Control System Communication and Ch	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2008	E	Review and Update Control System Network Topology Diag	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2009	E	Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2010	E	Heat Tracing Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2011	E	Cable and Conduit Schedules	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2012	E	Review and Update Lighting Layouts and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2013	E	Review and Update Building Layout and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2014	E	Review and Update Layout Plans and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2015	E	Review and Update Cable, Cable Tray, and Grounding Layc	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2016	E	Panel Schedules	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2017	E	Schematic Drawings	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2018	E	Review and Update Single Line Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2019	E	Review and Update SOW Drawing	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2020	**Station 1 - IFC**		0.0	100%	100%	10-Jun-14 A	27-Jan-15 A
2021	WBS	IFC - PW	0.0	100%	100%	10-Jun-14 A	27-Jan-15 A

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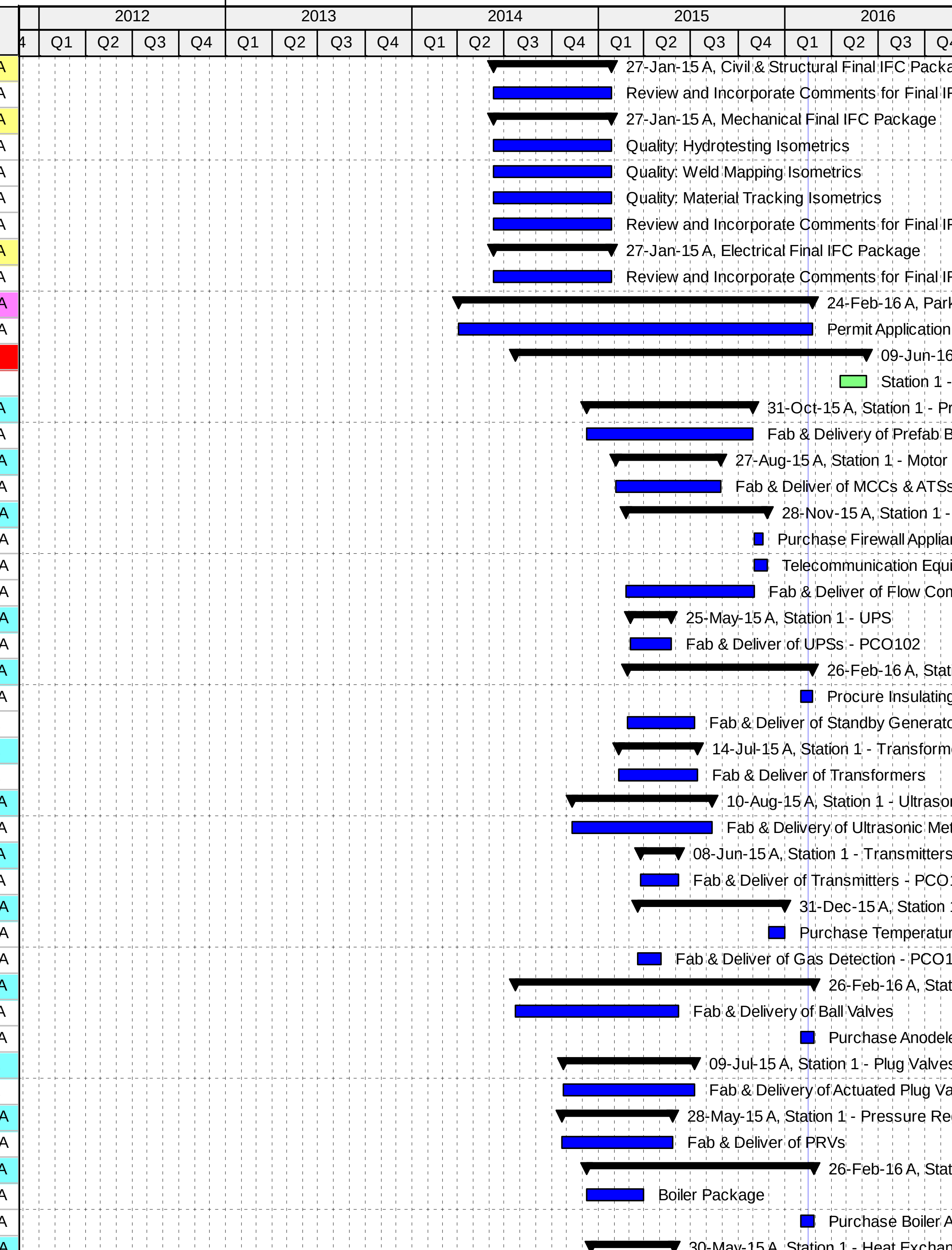
2022		**Civil & Structural Final IFC Package**	0.0	0%	0%	10-Jun-14 A	27-Jan-15 A
2023	C	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	10-Jun-14 A	27-Jan-15 A
2024		**Mechanical Final IFC Package**	0.0	0%	0%	10-Jun-14 A	27-Jan-15 A
2025	M	Quality: Hydrotesting Isometrics	0.0	100%	100%	10-Jun-14 A	27-Jan-15 A
2026	M	Quality: Weld Mapping Isometrics	0.0	100%	100%	10-Jun-14 A	27-Jan-15 A
2027	M	Quality: Material Tracking Isometrics	0.0	100%	100%	10-Jun-14 A	27-Jan-15 A
2028	M	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	10-Jun-14 A	27-Jan-15 A
2029		**Electrical Final IFC Package**	0.0	0%	0%	10-Jun-14 A	27-Jan-15 A
2030	El	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	10-Jun-14 A	27-Jan-15 A
2031		**Parkway West - Permit Application Package Preparation**	0.0	100%	100%	01-Apr-14 A	24-Feb-16 A
2032	A15:	Permit Application Package Prep	0.0	100%	100%	01-Apr-14 A	24-Feb-16 A
2033		**Material Procurement - Station 1**	30.0	100%	82.28%	23-Jul-14 A	09-Jun-16
2034	SME16000	Station 1 - Material Procurement	30.0	100%	0%	18-Apr-16	09-Jun-16
2035		**Station 1 - Pre-cast buildings**	0.0	100%	100%	10-Dec-14 A	31-Oct-15 A
2036	SME-1	Fab & Delivery of Prefab Building Units (inc. built-in utilities)	0.0	100%	100%	10-Dec-14 A	31-Oct-15 A
2037		**Station 1 - Motor Control Centres**	0.0	100%	100%	03-Feb-15 A	27-Aug-15 A
2038	SME-1	Fab & Deliver of MCCs & ATSs	0.0	100%	100%	03-Feb-15 A	27-Aug-15 A
2039		**Station 1 - Flow Computer Panels**	0.0	100%	100%	25-Feb-15 A	28-Nov-15 A
2040	SME-P	Purchase Firewall Appliance Standard Warranty	0.0	0%	100%	02-Nov-15 A	18-Nov-15 A
2041	SME-P	Telecommunication Equipment	0.0	0%	100%	02-Nov-15 A	28-Nov-15 A
2042	SME-1	Fab & Deliver of Flow Computers, RTUs, Contactor Panels	0.0	100%	100%	25-Feb-15 A	02-Nov-15 A
2043		**Station 1 - UPS**	0.0	100%	100%	05-Mar-15 A	25-May-15 A
2044	SME-1	Fab & Deliver of UPSs - PCO102	0.0	100%	100%	05-Mar-15 A	25-May-15 A
2045		**Station 1 - Emergency Generators**	0.0	100%	100%	27-Feb-15 A	26-Feb-16 A
2046	SME-P	Procure Insulating Blankets and Hanging Bands	0.0	0%	100%	01-Feb-16 A	26-Feb-16 A
2047	SME-1	Fab & Deliver of Standby Generator Sets - PCO102	0.0	100%	100%	27-Feb-15 A	10-Jul-15 A
2048		**Station 1 - Transformers**	0.0	100%	100%	09-Feb-15 A	14-Jul-15 A
2049	SME-1	Fab & Deliver of Transformers	0.0	100%	100%	09-Feb-15 A	14-Jul-15 A
2050		**Station 1 - Ultrasonic Meters with Flow Conditioners**	0.0	100%	100%	12-Nov-14 A	10-Aug-15 A
2051	SME-1	Fab & Delivery of Ultrasonic Meters	0.0	100%	100%	12-Nov-14 A	10-Aug-15 A
2052		**Station 1 - Transmitters (PDIT, PIT, TIT/TE/TW)**	0.0	100%	100%	24-Mar-15 A	08-Jun-15 A
2053	SME-1	Fab & Deliver of Transmitters - PCO102	0.0	100%	100%	24-Mar-15 A	08-Jun-15 A
2054		**Station 1 - Gas Detection**	0.0	100%	100%	19-Mar-15 A	31-Dec-15 A
2055	SME-P	Purchase Temperature Transmitter RTD Extension Kits	0.0	0%	100%	01-Dec-15 A	31-Dec-15 A
2056	SME-1	Fab & Deliver of Gas Detection - PCO102	0.0	100%	100%	19-Mar-15 A	05-May-15 A
2057		**Station 1 - Ball Valves**	0.0	100%	100%	23-Jul-14 A	26-Feb-16 A
2058	SME-1	Fab & Delivery of Ball Valves	0.0	100%	100%	23-Jul-14 A	08-Jun-15 A
2059	PME-P	Purchase Anodeless Risers	0.0	0%	100%	01-Feb-16 A	26-Feb-16 A
2060		**Station 1 - Plug Valves with Actuators**	0.0	100%	100%	24-Oct-14 A	09-Jul-15 A
2061	SME-1	Fab & Delivery of Actuated Plug Valves	0.0	100%	100%	24-Oct-14 A	09-Jul-15 A
2062		**Station 1 - Pressure Regulating Valves (PCV's) & Electric Actuators**	0.0	100%	100%	21-Oct-14 A	28-May-15 A
2063	SME15	Fab & Deliver of PRVs	0.0	100%	100%	21-Oct-14 A	28-May-15 A
2064		**Station 1 - Boiler Package**	0.0	100%	100%	09-Dec-14 A	26-Feb-16 A
2065	SME-1	Boiler Package	0.0	100%	100%	09-Dec-14 A	31-Mar-15 A
2066	PME-P	Purchase Boiler Actuators	0.0	0%	100%	01-Feb-16 A	26-Feb-16 A
2067		**Station 1 - Heat Exchanger**	0.0	100%	100%	18-Dec-14 A	30-May-15 A



Actual Work — Critical Remaining Work — Summary
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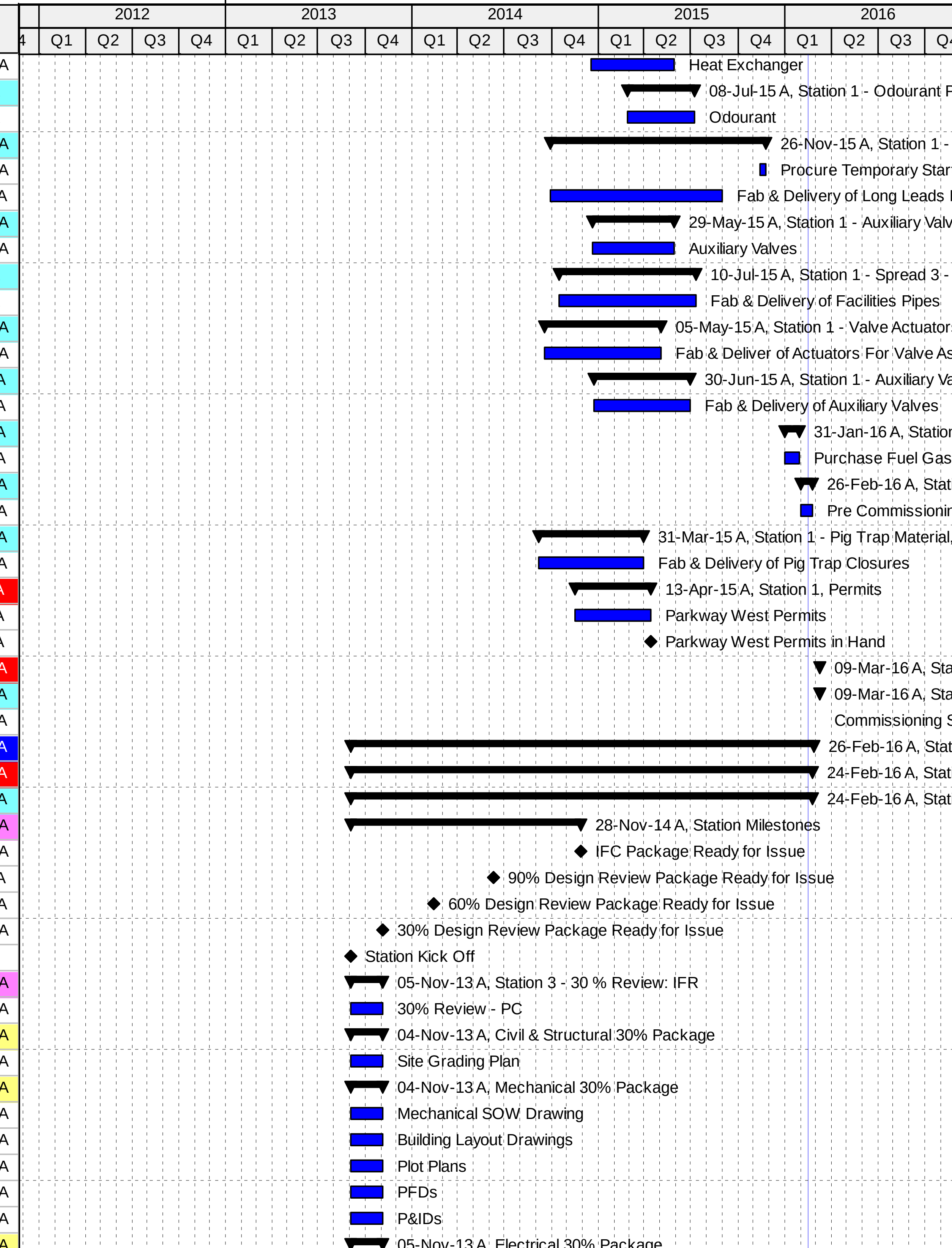
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2068	SME-17	Heat Exchanger	0.0	100%	100%	18-Dec-14 A	30-May-15 A
2069		**Station 1 - Odourant Package**	0.0	100%	100%	28-Feb-15 A	08-Jul-15 A
2070	SME-17	Odourant	0.0	100%	100%	28-Feb-15 A	08-Jul-15 A
2071		**Station 1 - Pipe, Fittings, and Flanges - Long Leads (Required for I**	0.0	100%	100%	29-Sep-14 A	26-Nov-15 A
2072	SME-P(	Procure Temporary Start-up Strainers	0.0	0%	100%	13-Nov-15 A	26-Nov-15 A
2073	SME-17	Fab & Delivery of Long Leads Fitting and Flanges	0.0	100%	100%	29-Sep-14 A	01-Sep-15 A
2074		**Station 1 - Auxiliary Valves**	0.0	100%	100%	22-Dec-14 A	29-May-15 A
2075	SME-18	Auxiliary Valves	0.0	100%	100%	22-Dec-14 A	29-May-15 A
2076		**Station 1 - Spread 3 - Facilities Pipe/Valve Site Pipe**	0.0	100%	100%	17-Oct-14 A	10-Jul-15 A
2077	SME-15	Fab & Delivery of Facilities Pipes	0.0	100%	100%	17-Oct-14 A	10-Jul-15 A
2078		**Station 1 - Valve Actuators**	0.0	100%	100%	17-Sep-14 A	05-May-15 A
2079	SME-15	Fab & Deliver of Actuators For Valve Assembly	0.0	100%	100%	17-Sep-14 A	05-May-15 A
2080		**Station 1 - Auxiliary Valves (Water/Glycol Systems)**	0.0	100%	100%	23-Dec-14 A	30-Jun-15 A
2081	SME-17	Fab & Delivery of Auxiliary Valves	0.0	100%	100%	23-Dec-14 A	30-Jun-15 A
2082		**Station 1 - Fuel Gas Station**	0.0	0%	0%	01-Jan-16 A	31-Jan-16 A
2083	SME-P(	Purchase Fuel Gas Station	0.0	0%	100%	01-Jan-16 A	31-Jan-16 A
2084		**Station 1 - Pre Commissioning Miscellaneous Item**	0.0	0%	0%	01-Feb-16 A	26-Feb-16 A
2085	SME-P(	Pre Commissioning Miscellaneous Items	0.0	0%	100%	01-Feb-16 A	26-Feb-16 A
2086		**Station 1 - Pig Trap Material, Parkway West.**	0.0	100%	100%	05-Sep-14 A	31-Mar-15 A
2087	SME-15	Fab & Delivery of Pig Trap Closures	0.0	100%	100%	05-Sep-14 A	31-Mar-15 A
2088		**Station 1, Permits**	0.0	100%	100%	17-Nov-14 A	13-Apr-15 A
2089	SLE14180	Parkway West Permits	0.0	100%	100%	17-Nov-14 A	13-Apr-15 A
2090	SLE1210	Parkway West Permits in Hand	0.0	100%	100%		13-Apr-15 A
2091		**Station 1, Commissioning**	0.0	100%	100%	09-Mar-16 A	09-Mar-16 A
2092		**Station 1, Commissioning, Facility**	0.0	100%	100%	09-Mar-16 A	09-Mar-16 A
2093	SOE31	Commissioning Station 1 - Parkway West Meter Station	0.0	100%	100%	09-Mar-16 A	09-Mar-16 A
2094		**Station 3 - Parkway Cons Reg Station**	0.0	100%	100%	02-Sep-13 A	26-Feb-16 A
2095		**Station 3, Engineering**	0.0	100%	100%	02-Sep-13 A	24-Feb-16 A
2096		**Station 3 - Detailed Design Engineering**	0.0	100%	100%	02-Sep-13 A	24-Feb-16 A
2097		**Station Milestones**	0.0	0%	0%	02-Sep-13 A	28-Nov-14 A
2098	PCS	IFC Package Ready for Issue	0.0	100%	100%		28-Nov-14 A
2099	PCS	90% Design Review Package Ready for Issue	0.0	100%	100%		09-Jun-14 A
2100	PCS	60% Design Review Package Ready for Issue	0.0	100%	100%		12-Feb-14 A
2101	PCS	30% Design Review Package Ready for Issue	0.0	100%	100%		05-Nov-13 A
2102	PCS	Station Kick Off	0.0	100%	100%	02-Sep-13 A	
2103		**Station 3 - 30 % Review: IFR**	0.0	100%	100%	02-Sep-13 A	05-Nov-13 A
2104	WBS	30% Review - PC	0.0	100%	100%	02-Sep-13 A	05-Nov-13 A
2105		**Civil & Structural 30% Package**	0.0	0%	0%	02-Sep-13 A	04-Nov-13 A
2106	C	Site Grading Plan	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2107		**Mechanical 30% Package**	0.0	0%	0%	02-Sep-13 A	04-Nov-13 A
2108	M	Mechanical SOW Drawing	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2109	M	Building Layout Drawings	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2110	M	Plot Plans	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2111	M	PFDs	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2112	E	P&IDs	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2113		**Electrical 30% Package**	0.0	0%	0%	02-Sep-13 A	05-Nov-13 A



Actual Work | Critical Remaining Work | Summary
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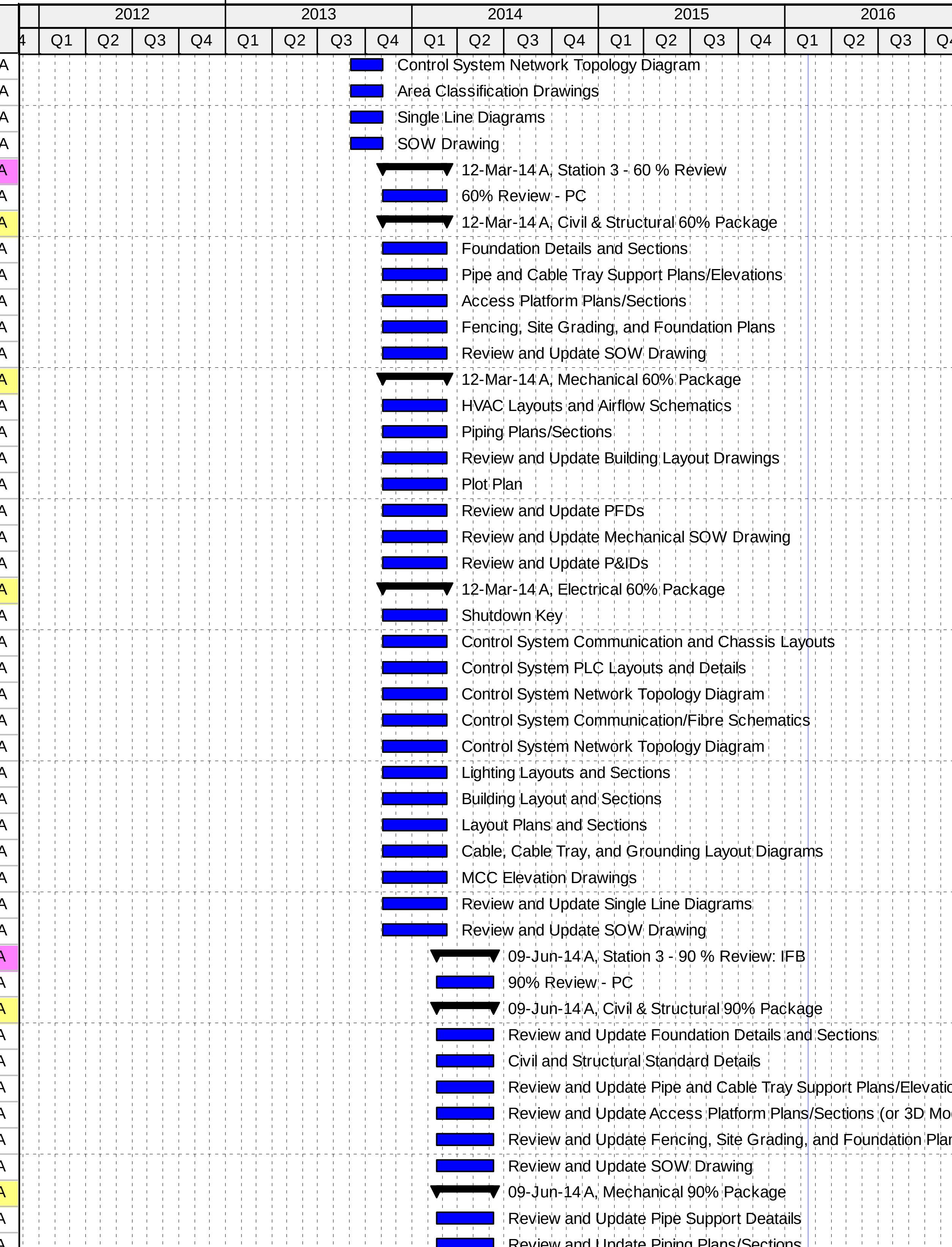
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2114	E	Control System Network Topology Diagram	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2115	E	Area Classification Drawings	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2116	E	Single Line Diagrams	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2117	E	SOW Drawing	0.0	100%	100%	02-Sep-13 A	05-Nov-13 A
2118		**Station 3 - 60 % Review**	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2119	WBS	60% Review - PC	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2120		**Civil & Structural 60% Package**	0.0	0%	0%	06-Nov-13 A	12-Mar-14 A
2121	C	Foundation Details and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2122	C	Pipe and Cable Tray Support Plans/Elevations	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2123	C	Access Platform Plans/Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2124	C	Fencing, Site Grading, and Foundation Plans	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2125	C	Review and Update SOW Drawing	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2126		**Mechanical 60% Package**	0.0	0%	0%	06-Nov-13 A	12-Mar-14 A
2127	M	HVAC Layouts and Airflow Schematics	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2128	M	Piping Plans/Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2129	M	Review and Update Building Layout Drawings	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2130	M	Plot Plan	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2131	M	Review and Update PFDs	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2132	M	Review and Update Mechanical SOW Drawing	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2133	E	Review and Update P&IDs	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2134		**Electrical 60% Package**	0.0	0%	0%	06-Nov-13 A	12-Mar-14 A
2135	E	Shutdown Key	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2136	E	Control System Communication and Chassis Layouts	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2137	E	Control System PLC Layouts and Details	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2138	E	Control System Network Topology Diagram	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2139	E	Control System Communication/Fibre Schematics	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2140	E	Control System Network Topology Diagram	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2141	E	Lighting Layouts and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2142	E	Building Layout and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2143	E	Layout Plans and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2144	E	Cable, Cable Tray, and Grounding Layout Diagrams	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2145	E	MCC Elevation Drawings	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2146	E	Review and Update Single Line Diagrams	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2147	E	Review and Update SOW Drawing	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2148		**Station 3 - 90 % Review: IFB**	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2149	WBS	90% Review - PC	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2150		**Civil & Structural 90% Package**	0.0	0%	0%	18-Feb-14 A	09-Jun-14 A
2151	C	Review and Update Foundation Details and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2152	C	Civil and Structural Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2153	C	Review and Update Pipe and Cable Tray Support Plans/Elev	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2154	C	Review and Update Access Platform Plans/Sections (or 3D	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2155	C	Review and Update Fencing, Site Grading, and Foundation	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2156	C	Review and Update SOW Drawing	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2157		**Mechanical 90% Package**	0.0	0%	0%	18-Feb-14 A	09-Jun-14 A
2158	M	Review and Update Pipe Support Deatails	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2159	M	Review and Update Piping Plans/Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A



Actual Work | Critical Remaining Work | Summary
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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2160	M	Review and Update Building Layout Drawings	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2161	M	Review and Update Plot Plan	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2162	M	Review and Update Mech SOW Drawing	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2163	M	Review and Update PFDs	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2164	E	Review and Update P&IDs	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2165	**Electrical 90% Package**		0.0	0%	0%	18-Feb-14 A	09-Jun-14 A
2166	E	Review and Update Shutdown Key	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2167	E	Instrumentation Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2168	E	Control System PLC Interconnection Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2169	E	Review and Update Control System PLC Layouts and Detai	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2170	E	Review and Update Control System Communication/Fibre S	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2171	E	Review and Update Control System Communication and Ch	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2172	E	Review and Update Control System Network Topology Diag	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2173	E	Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2174	E	Heat Tracing Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2175	E	Cable and Conduit Schedules	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2176	E	Review and Update Lighting Layouts and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2177	E	Review and Update Building Layout and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2178	E	Review and Update Layout Plans and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2179	E	Review and Update Cable, Cable Tray, and Grounding Layc	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2180	E	Panel Schedules	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2181	E	Schematic Drawings	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2182	E	Review and Update Single Line Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2183	E	Review and Update SOW Drawing	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2184	**Station 3 - IFC**		0.0	100%	100%	09-Jun-14 A	28-Nov-14 A
2185	WBS	IFC - PC	0.0	100%	100%	09-Jun-14 A	28-Nov-14 A
2186	**Civil & Structural Final IFC Package**		0.0	0%	0%	09-Jun-14 A	28-Nov-14 A
2187	C	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	09-Jun-14 A	28-Nov-14 A
2188	**Mechanical Final IFC Package**		0.0	0%	0%	09-Jun-14 A	28-Nov-14 A
2189	M	Quality: Hydrotesting Isometrics	0.0	100%	100%	09-Jun-14 A	28-Nov-14 A
2190	M	Quality: Weld Mapping Isometrics	0.0	100%	100%	09-Jun-14 A	28-Nov-14 A
2191	M	Quality: Material Tracking Isometrics	0.0	100%	100%	09-Jun-14 A	28-Nov-14 A
2192	M	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	09-Jun-14 A	28-Nov-14 A
2193	**Electrical Final IFC Package**		0.0	0%	0%	09-Jun-14 A	28-Nov-14 A
2194	E	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	09-Jun-14 A	28-Nov-14 A
2195	**Parkway Cons - Permit Application Package Preparation**		0.0	100%	100%	01-Apr-14 A	24-Feb-16 A
2196	A15	Permit Application Package Prep	0.0	100%	100%	01-Apr-14 A	24-Feb-16 A
2197	**Station 3 - Material Procurement**		0.0	100%	100%	23-Jul-14 A	26-Feb-16 A
2198	**Station 3 - Pre-cast buildings**		0.0	100%	100%	10-Dec-14 A	04-Nov-15 A
2199	SME-1	Fab & Delivery of Prefab Building Units (inc. built-in utilities)	0.0	100%	100%	10-Dec-14 A	04-Nov-15 A
2200	**Station 3 - UPS**		0.0	100%	100%	31-Mar-15 A	25-May-15 A
2201	SME-1	Fab & Deliver of UPSs - PCO102	0.0	100%	100%	31-Mar-15 A	25-May-15 A
2202	**Station 3 - Flow Computer Panels**		0.0	100%	100%	25-Feb-15 A	18-Nov-15 A
2203	SME-P	Purchase Firewall Appliance Standard Warranty	0.0	0%	100%	02-Nov-15 A	18-Nov-15 A
2204	SME-1	Fab & Deliver of Flow Computers, RTUs, Contactor Panels	0.0	100%	100%	25-Feb-15 A	04-Nov-15 A
2205	**Station 3 - Solar Panels**		0.0	100%	100%	10-Feb-15 A	09-Mar-15 A

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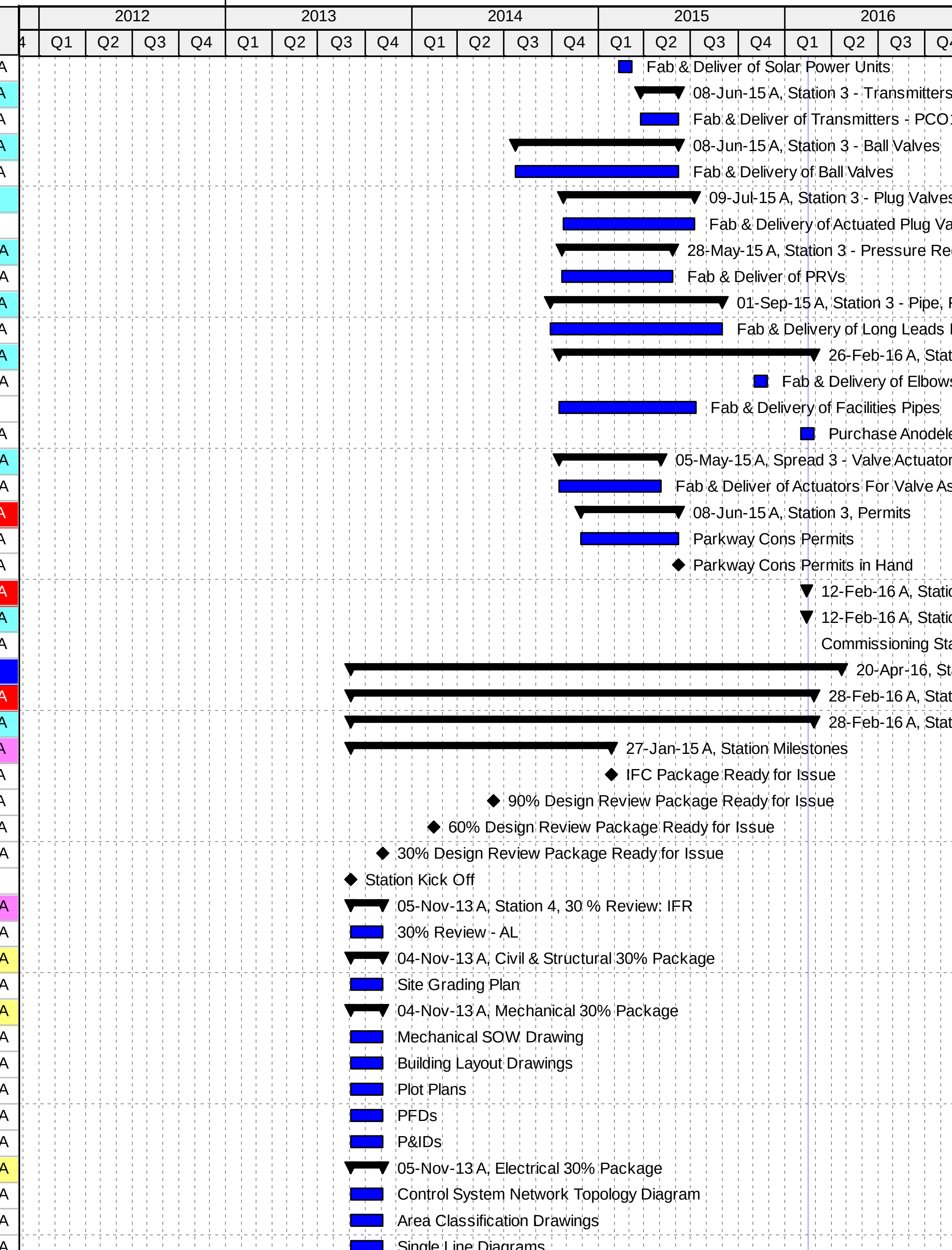
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2206	SME-17	Fab & Deliver of Solar Power Units	0.0	100%	100%	10-Feb-15 A	09-Mar-15 A
2207		**Station 3 - Transmitters (PDIT, PIT, TIT/TE/TW)**	0.0	100%	100%	24-Mar-15 A	08-Jun-15 A
2208	SME-18	Fab & Deliver of Transmitters - PCO102	0.0	100%	100%	24-Mar-15 A	08-Jun-15 A
2209		**Station 3 - Ball Valves**	0.0	100%	100%	23-Jul-14 A	08-Jun-15 A
2210	SME-15	Fab & Delivery of Ball Valves	0.0	100%	100%	23-Jul-14 A	08-Jun-15 A
2211		**Station 3 - Plug Valves with Actuators**	0.0	100%	100%	24-Oct-14 A	09-Jul-15 A
2212	SME-15	Fab & Delivery of Actuated Plug Valves	0.0	100%	100%	24-Oct-14 A	09-Jul-15 A
2213		**Station 3 - Pressure Regulating Valves (PCV's) & Electric Actuators**	0.0	100%	100%	21-Oct-14 A	28-May-15 A
2214	SME-15	Fab & Deliver of PRVs	0.0	100%	100%	21-Oct-14 A	28-May-15 A
2215		**Station 3 - Pipe, Fittings, and Flanges - Long Leads (Required for I**	0.0	100%	100%	29-Sep-14 A	01-Sep-15 A
2216	SME-17	Fab & Delivery of Long Leads Fitting and Flanges	0.0	100%	100%	29-Sep-14 A	01-Sep-15 A
2217		**Station 3 - Spread 3 - Facilities Pipe/Valve Site Pipe**	0.0	100%	100%	17-Oct-14 A	26-Feb-16 A
2218	SME-P(	Fab & Delivery of Elbows	0.0	0%	100%	02-Nov-15 A	28-Nov-15 A
2219	SME-15	Fab & Delivery of Facilities Pipes	0.0	100%	100%	17-Oct-14 A	10-Jul-15 A
2220	PME-P(	Purchase Anodeless Risers	0.0	0%	100%	01-Feb-16 A	26-Feb-16 A
2221		**Spread 3 - Valve Actuators**	0.0	100%	100%	17-Oct-14 A	05-May-15 A
2222	SME-15	Fab & Deliver of Actuators For Valve Assembly	0.0	100%	100%	17-Oct-14 A	05-May-15 A
2223		**Station 3, Permits**	0.0	100%	100%	28-Nov-14 A	08-Jun-15 A
2224	WBS-SLE	Parkway Cons Permits	0.0	100%	100%	28-Nov-14 A	08-Jun-15 A
2225	SLE1200	Parkway Cons Permits in Hand	0.0	100%	100%		08-Jun-15 A
2226		**Station 3, Commissioning**	0.0	0%	0%	12-Feb-16 A	12-Feb-16 A
2227		**Station 3, Commissioning, Facility**	0.0	0%	0%	12-Feb-16 A	12-Feb-16 A
2228	SOE31	Commissioning Station 3 - Parkway Cons Bypass Regulator	0.0	100%	100%	12-Feb-16 A	12-Feb-16 A
2229		**Station 4 - Albion Gate Station**	2.4	100%	99.85%	02-Sep-13 A	20-Apr-16
2230		**Station 4, Engineering**	0.0	100%	100%	02-Sep-13 A	28-Feb-16 A
2231		**Station 4, Detailed Design Engineering**	0.0	100%	100%	02-Sep-13 A	28-Feb-16 A
2232		**Station Milestones**	0.0	0%	0%	02-Sep-13 A	27-Jan-15 A
2233	ALSI	IFC Package Ready for Issue	0.0	100%	100%		27-Jan-15 A
2234	ALSI	90% Design Review Package Ready for Issue	0.0	100%	100%		09-Jun-14 A
2235	ALSI	60% Design Review Package Ready for Issue	0.0	100%	100%		12-Feb-14 A
2236	ALSI	30% Design Review Package Ready for Issue	0.0	100%	100%		05-Nov-13 A
2237	ALSI	Station Kick Off	0.0	100%	100%	02-Sep-13 A	
2238		**Station 4, 30 % Review: IFR**	0.0	100%	100%	02-Sep-13 A	05-Nov-13 A
2239	WBS	30% Review - AL	0.0	100%	100%	02-Sep-13 A	05-Nov-13 A
2240		**Civil & Structural 30% Package**	0.0	0%	0%	02-Sep-13 A	04-Nov-13 A
2241	C	Site Grading Plan	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2242		**Mechanical 30% Package**	0.0	0%	0%	02-Sep-13 A	04-Nov-13 A
2243	M	Mechanical SOW Drawing	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2244	M	Building Layout Drawings	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2245	M	Plot Plans	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2246	M	PFDs	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2247	E	P&IDs	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2248		**Electrical 30% Package**	0.0	0%	0%	02-Sep-13 A	05-Nov-13 A
2249	E	Control System Network Topology Diagram	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2250	E	Area Classification Drawings	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2251	E	Single Line Diagrams	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A



Actual Work | Critical Remaining Work | Summary
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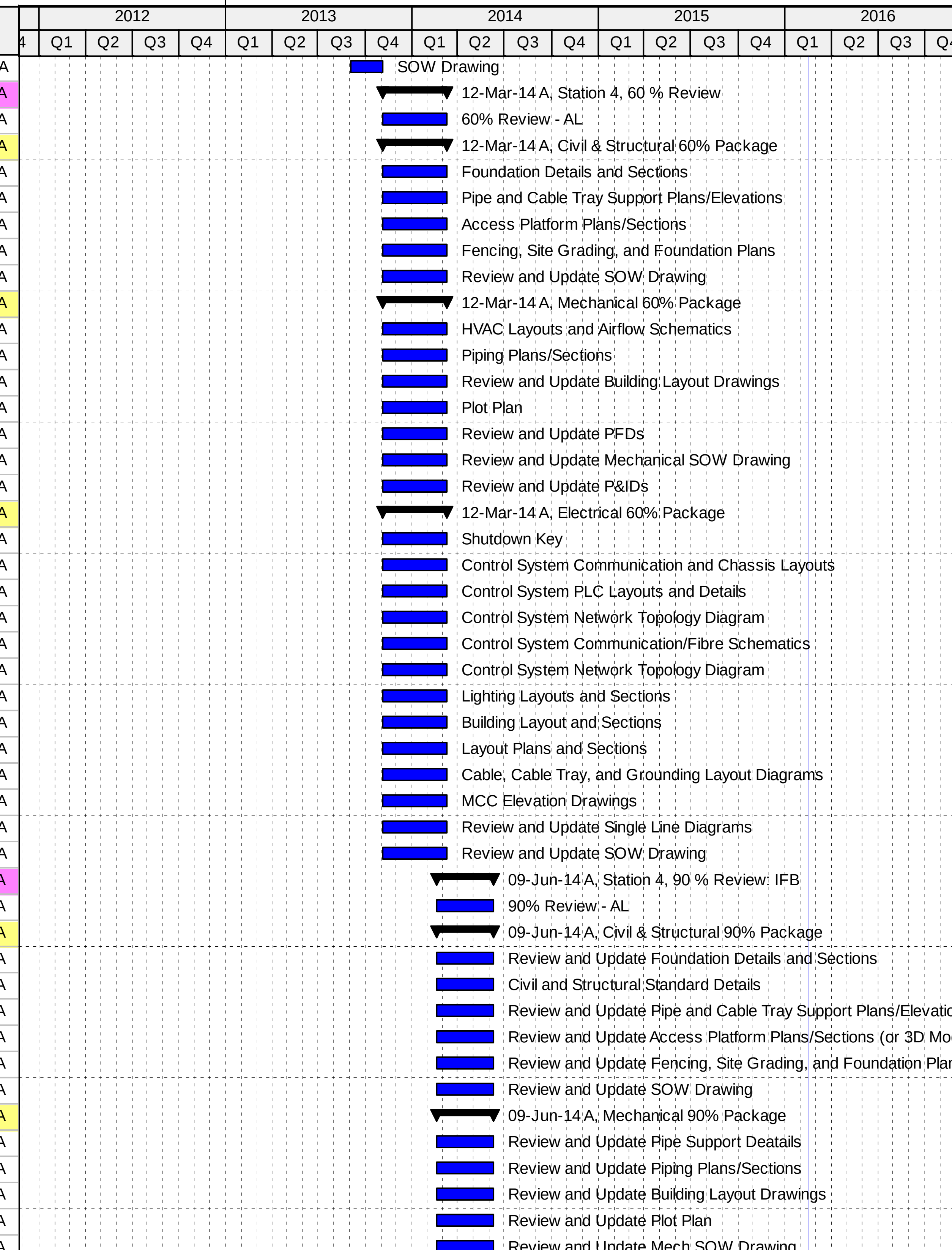
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2252	E	SOW Drawing	0.0	100%	100%	02-Sep-13 A	05-Nov-13 A
2253	**Station 4, 60 % Review**		0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2254	WBS	60% Review - AL	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2255	**Civil & Structural 60% Package**		0.0	0%	0%	06-Nov-13 A	12-Mar-14 A
2256	C	Foundation Details and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2257	C	Pipe and Cable Tray Support Plans/Elevations	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2258	C	Access Platform Plans/Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2259	C	Fencing, Site Grading, and Foundation Plans	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2260	C	Review and Update SOW Drawing	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2261	**Mechanical 60% Package**		0.0	0%	0%	06-Nov-13 A	12-Mar-14 A
2262	M	HVAC Layouts and Airflow Schematics	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2263	M	Piping Plans/Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2264	M	Review and Update Building Layout Drawings	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2265	M	Plot Plan	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2266	M	Review and Update PFDs	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2267	M	Review and Update Mechanical SOW Drawing	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2268	E	Review and Update P&IDs	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2269	**Electrical 60% Package**		0.0	0%	0%	06-Nov-13 A	12-Mar-14 A
2270	E	Shutdown Key	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2271	E	Control System Communication and Chassis Layouts	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2272	E	Control System PLC Layouts and Details	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2273	E	Control System Network Topology Diagram	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2274	E	Control System Communication/Fibre Schematics	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2275	E	Control System Network Topology Diagram	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2276	E	Lighting Layouts and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2277	E	Building Layout and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2278	E	Layout Plans and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2279	E	Cable, Cable Tray, and Grounding Layout Diagrams	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2280	E	MCC Elevation Drawings	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2281	E	Review and Update Single Line Diagrams	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2282	E	Review and Update SOW Drawing	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2283	**Station 4, 90 % Review: IFB**		0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2284	WBS	90% Review - AL	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2285	**Civil & Structural 90% Package**		0.0	0%	0%	18-Feb-14 A	09-Jun-14 A
2286	C	Review and Update Foundation Details and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2287	C	Civil and Structural Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2288	C	Review and Update Pipe and Cable Tray Support Plans/Elev	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2289	C	Review and Update Access Platform Plans/Sections (or 3D	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2290	C	Review and Update Fencing, Site Grading, and Foundation	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2291	C	Review and Update SOW Drawing	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2292	**Mechanical 90% Package**		0.0	0%	0%	18-Feb-14 A	09-Jun-14 A
2293	M	Review and Update Pipe Support Deatails	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2294	M	Review and Update Piping Plans/Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2295	M	Review and Update Building Layout Drawings	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2296	M	Review and Update Plot Plan	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2297	M	Review and Update Mech SOW Drawing	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2298	M	Review and Update PFDs	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2299	E	Review and Update P&IDs	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2300		**Electrical 90% Package**	0.0	0%	0%	18-Feb-14 A	09-Jun-14 A
2301	E	Review and Update Shutdown Key	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2302	E	Instrumentation Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2303	E	Control System PLC Interconnection Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2304	E	Review and Update Control System PLC Layouts and Detai	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2305	E	Review and Update Control System Communication/Fibre S	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2306	E	Review and Update Control System Communication and Ch	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2307	E	Review and Update Control System Network Topology Diag	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2308	E	Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2309	E	Heat Tracing Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2310	E	Cable and Conduit Schedules	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2311	E	Review and Update Lighting Layouts and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2312	E	Review and Update Building Layout and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2313	E	Review and Update Layout Plans and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2314	E	Review and Update Cable, Cable Tray, and Grounding Layc	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2315	E	Panel Schedules	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2316	E	Schematic Drawings	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2317	E	Review and Update Single Line Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2318	E	Review and Update SOW Drawing	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2319		**Station 4, IFC**	0.0	100%	100%	09-Jun-14 A	27-Jan-15 A
2320	WBS	IFC - AL	0.0	100%	100%	09-Jun-14 A	27-Jan-15 A
2321		**Civil & Structural Final IFC Package**	0.0	0%	0%	09-Jun-14 A	27-Jan-15 A
2322	C	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	09-Jun-14 A	27-Jan-15 A
2323		**Mechanical Final IFC Package**	0.0	0%	0%	09-Jun-14 A	27-Jan-15 A
2324	M	Quality: Hydrotesting Isometrics	0.0	100%	100%	09-Jun-14 A	27-Jan-15 A
2325	M	Quality: Weld Mapping Isometrics	0.0	100%	100%	09-Jun-14 A	27-Jan-15 A
2326	M	Quality: Material Tracking Isometrics	0.0	100%	100%	09-Jun-14 A	27-Jan-15 A
2327	M	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	09-Jun-14 A	27-Jan-15 A
2328		**Electrical Final IFC Package**	0.0	0%	0%	09-Jun-14 A	27-Jan-15 A
2329	E	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	09-Jun-14 A	27-Jan-15 A
2330		**Albion - Permit Application Package Preparation**	0.0	100%	100%	01-Apr-14 A	28-Feb-16 A
2331	A15	Permit Application Package Prep	0.0	100%	100%	01-Apr-14 A	28-Feb-16 A
2332		**Material Procurement - Station 4**	0.0	100%	100%	23-Jul-14 A	26-Feb-16 A
2333		**Station 4 - Pre-cast buildings**	0.0	100%	100%	10-Dec-14 A	04-Nov-15 A
2334	SME-18	Fab & Delivery of Prefab Building Units (inc. built-in utilities)	0.0	100%	100%	10-Dec-14 A	04-Nov-15 A
2335		**Station 4 - Motor Control Centres**	0.0	100%	100%	03-Feb-15 A	27-Aug-15 A
2336	SME-18	Fab & Deliver of MCCs & ATSs	0.0	100%	100%	03-Feb-15 A	27-Aug-15 A
2337		**Station 4 - UPS**	0.0	100%	100%	05-Mar-15 A	25-May-15 A
2338	SME-18	Fab & Deliver of UPSs - PCO102	0.0	100%	100%	05-Mar-15 A	25-May-15 A
2339		**Station 4 - Flow Computer Panels**	0.0	100%	100%	25-Feb-15 A	18-Nov-15 A
2340	SME-PO	Purchase Firewall Appliance Standard Warranty	0.0	0%	100%	02-Nov-15 A	18-Nov-15 A
2341	SME-18	Fab & Deliver of Flow Computers, RTUs, Contactor Panels	0.0	100%	100%	25-Feb-15 A	05-Nov-15 A
2342		**Station 4 - Emergency Generators**	0.0	100%	100%	27-Feb-15 A	26-Feb-16 A
2343	SME-PO	Procure Insulating Blankets and Hanging Bands	0.0	0%	100%	01-Feb-16 A	26-Feb-16 A

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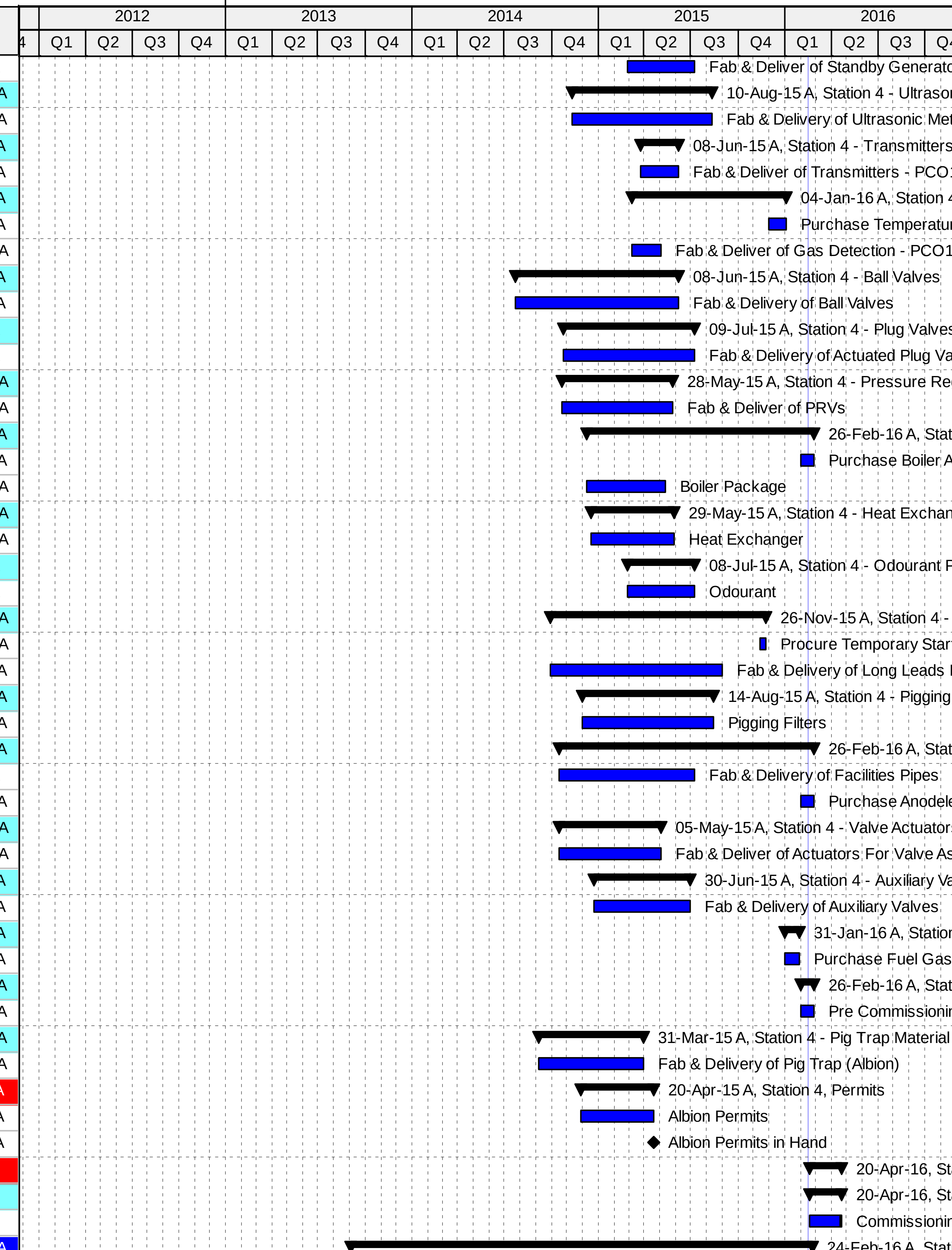
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2344	SME-18	Fab & Deliver of Standby Generator Sets - PCO102	0.0	100%	100%	27-Feb-15 A	10-Jul-15 A
2345		**Station 4 - Ultrasonic Meters with Flow Conditioners**	0.0	100%	100%	12-Nov-14 A	10-Aug-15 A
2346	SME-18	Fab & Delivery of Ultrasonic Meters	0.0	100%	100%	12-Nov-14 A	10-Aug-15 A
2347		**Station 4 - Transmitters (PDIT, PIT, TIT/TE/TW)**	0.0	100%	100%	24-Mar-15 A	08-Jun-15 A
2348	SME-18	Fab & Deliver of Transmitters - PCO102	0.0	100%	100%	24-Mar-15 A	08-Jun-15 A
2349		**Station 4 - Gas Detection**	0.0	100%	100%	09-Mar-15 A	04-Jan-16 A
2350	SME-PC	Purchase Temperature Transmitter RTD Extension Kits	0.0	0%	100%	01-Dec-15 A	04-Jan-16 A
2351	SME-18	Fab & Deliver of Gas Detection - PCO102	0.0	100%	100%	09-Mar-15 A	05-May-15 A
2352		**Station 4 - Ball Valves**	0.0	100%	100%	23-Jul-14 A	08-Jun-15 A
2353	SME-15	Fab & Delivery of Ball Valves	0.0	100%	100%	23-Jul-14 A	08-Jun-15 A
2354		**Station 4 - Plug Valves with Actuators**	0.0	100%	100%	24-Oct-14 A	09-Jul-15 A
2355	SME-15	Fab & Delivery of Actuated Plug Valves	0.0	100%	100%	24-Oct-14 A	09-Jul-15 A
2356		**Station 4 - Pressure Regulating Valves (PCV's) & Electric Actuators**	0.0	100%	100%	21-Oct-14 A	28-May-15 A
2357	SME-15	Fab & Deliver of PRVs	0.0	100%	100%	21-Oct-14 A	28-May-15 A
2358		**Station 4 - Boiler Package**	0.0	100%	100%	09-Dec-14 A	26-Feb-16 A
2359	SME-PC	Purchase Boiler Actuators	0.0	0%	100%	01-Feb-16 A	26-Feb-16 A
2360	SME-17	Boiler Package	0.0	100%	100%	09-Dec-14 A	11-May-15 A
2361		**Station 4 - Heat Exchanger**	0.0	100%	100%	18-Dec-14 A	29-May-15 A
2362	SME-17	Heat Exchanger	0.0	100%	100%	18-Dec-14 A	29-May-15 A
2363		**Station 4 - Odourant Package**	0.0	100%	100%	28-Feb-15 A	08-Jul-15 A
2364	SME-17	Odourant	0.0	100%	100%	28-Feb-15 A	08-Jul-15 A
2365		**Station 4 - Pipe, Fittings, and Flanges - Long Leads (Required for I**	0.0	100%	100%	29-Sep-14 A	26-Nov-15 A
2366	SME-PC	Procure Temporary Start-up Strainers	0.0	0%	100%	13-Nov-15 A	26-Nov-15 A
2367	SME-17	Fab & Delivery of Long Leads Fitting and Flanges	0.0	100%	100%	29-Sep-14 A	01-Sep-15 A
2368		**Station 4 - Pigging Filters**	0.0	0%	0%	01-Dec-14 A	14-Aug-15 A
2369	SME-18	Pigging Filters	0.0	0%	100%	01-Dec-14 A	14-Aug-15 A
2370		**Station 4 - Spread 3 - Facilities Pipe/Valve Site Pipe**	0.0	100%	100%	17-Oct-14 A	26-Feb-16 A
2371	SME-15	Fab & Delivery of Facilities Pipes	0.0	100%	100%	17-Oct-14 A	10-Jul-15 A
2372	PME-PC	Purchase Anodeless Risers	0.0	0%	100%	01-Feb-16 A	26-Feb-16 A
2373		**Station 4 - Valve Actuators**	0.0	100%	100%	17-Oct-14 A	05-May-15 A
2374	SME-15	Fab & Deliver of Actuators For Valve Assembly	0.0	100%	100%	17-Oct-14 A	05-May-15 A
2375		**Station 4 - Auxiliary Valves (Water/Glycol Systems)**	0.0	100%	100%	23-Dec-14 A	30-Jun-15 A
2376	SME-18	Fab & Delivery of Auxiliary Valves	0.0	100%	100%	23-Dec-14 A	30-Jun-15 A
2377		**Station 4 - Fuel Gas Station**	0.0	0%	0%	01-Jan-16 A	31-Jan-16 A
2378	SME-PC	Purchase Fuel Gas Station	0.0	0%	100%	01-Jan-16 A	31-Jan-16 A
2379		**Station 4 - Pre Commissioning Miscellaneous Item**	0.0	0%	0%	01-Feb-16 A	26-Feb-16 A
2380	SME-PC	Pre Commissioning Miscellaneous Item	0.0	0%	100%	01-Feb-16 A	26-Feb-16 A
2381		**Station 4 - Pig Trap Material - Albion**	0.0	100%	100%	05-Sep-14 A	31-Mar-15 A
2382	SME-15	Fab & Delivery of Pig Trap (Albion)	0.0	100%	100%	05-Sep-14 A	31-Mar-15 A
2383		**Station 4, Permits**	0.0	100%	100%	28-Nov-14 A	20-Apr-15 A
2384	WBS-SLE	Albion Permits	0.0	100%	100%	28-Nov-14 A	20-Apr-15 A
2385	SLE1190	Albion Permits in Hand	0.0	100%	100%		20-Apr-15 A
2386		**Station 4, Commissioning**	2.9	100%	98%	20-Feb-16 A	20-Apr-16
2387		**Station 4, Commissioning, Facility**	2.9	100%	98%	20-Feb-16 A	20-Apr-16
2388	SOE31	Commissioning Station 4 - Albion Station	2.9	100%	98%	20-Feb-16 A	20-Apr-16
2389		**Station 5 - Keele/CNR Station**	0.0	100%	100%	02-Sep-13 A	24-Feb-16 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2390		**Station 5, Engineering**	0.0	100%	100%	02-Sep-13 A	24-Feb-16 A
2391		**Station 5, Detailed Design Engineering**	0.0	100%	100%	02-Sep-13 A	24-Feb-16 A
2392		**Station Milestones**	0.0	0%	0%	02-Sep-13 A	28-Nov-14 A
2393	KLSI	IFC Package Ready for Issue	0.0	100%	100%		28-Nov-14 A
2394	KLSI	90% Design Review Package Ready for Issue	0.0	100%	100%		09-Jun-14 A
2395	KLSI	60% Design Review Package Ready for Issue	0.0	100%	100%		12-Feb-14 A
2396	KLSI	30% Design Review Package Ready for Issue	0.0	100%	100%		05-Nov-13 A
2397	KLSI	Station Kick Off	0.0	100%	100%	02-Sep-13 A	
2398		**Station 5, 30 % Review: IFR**	0.0	100%	100%	02-Sep-13 A	05-Nov-13 A
2399	WBS	30% Review - KL	0.0	100%	100%	02-Sep-13 A	05-Nov-13 A
2400		**Civil & Structural 30% Package**	0.0	0%	0%	02-Sep-13 A	04-Nov-13 A
2401	C	Site Grading Plan	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2402		**Mechanical 30% Package**	0.0	0%	0%	02-Sep-13 A	04-Nov-13 A
2403	M	Mechanical SOW Drawing	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2404	M	Building Layout Drawings	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2405	M	Plot Plans	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2406	M	PFDs	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2407	E	P&IDs	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2408		**Electrical 30% Package**	0.0	0%	0%	02-Sep-13 A	05-Nov-13 A
2409	E	Control System Network Topology Diagram	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2410	E	Area Classification Drawings	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2411	E	Single Line Diagrams	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2412	E	SOW Drawing	0.0	100%	100%	02-Sep-13 A	05-Nov-13 A
2413		**Station 5, 60 % Review**	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2414	WBS	60% Review - KL	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2415		**Civil & Structural 60% Package**	0.0	0%	0%	06-Nov-13 A	12-Mar-14 A
2416	C	Foundation Details and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2417	C	Pipe and Cable Tray Support Plans/Elevations	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2418	C	Access Platform Plans/Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2419	C	Fencing, Site Grading, and Foundation Plans	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2420	C	Review and Update SOW Drawing	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2421		**Mechanical 60% Package**	0.0	0%	0%	06-Nov-13 A	12-Mar-14 A
2422	M	HVAC Layouts and Airflow Schematics	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2423	M	Piping Plans/Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2424	M	Review and Update Building Layout Drawings	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2425	M	Plot Plan	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2426	M	Review and Update PFDs	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2427	M	Review and Update Mechanical SOW Drawing	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2428	E	Review and Update P&IDs	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2429		**Electrical 60% Package**	0.0	0%	0%	06-Nov-13 A	12-Mar-14 A
2430	E	Shutdown Key	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2431	E	Control System Communication and Chassis Layouts	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2432	E	Control System PLC Layouts and Details	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2433	E	Control System Network Topology Diagram	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2434	E	Control System Communication/Fibre Schematics	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2435	E	Control System Network Topology Diagram	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A

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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2436	E	Lighting Layouts and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2437	E	Building Layout and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2438	E	Layout Plans and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2439	E	Cable, Cable Tray, and Grounding Layout Diagrams	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2440	E	MCC Elevation Drawings	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2441	E	Review and Update Single Line Diagrams	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2442	E	Review and Update SOW Drawing	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2443	**Station 5, 90 % Review: IFB**		0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2444	WBS	90% Review - KL	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2445	**Civil & Structural 90% Package**		0.0	0%	0%	18-Feb-14 A	09-Jun-14 A
2446	C	Review and Update Foundation Details and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2447	C	Civil and Structural Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2448	C	Review and Update Pipe and Cable Tray Support Plans/Elev	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2449	C	Review and Update Access Platform Plans/Sections (or 3D	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2450	C	Review and Update Fencing, Site Grading, and Foundation	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2451	C	Review and Update SOW Drawing	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2452	**Mechanical 90% Package**		0.0	0%	0%	18-Feb-14 A	09-Jun-14 A
2453	M	Review and Update Pipe Support Deatails	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2454	M	Review and Update Piping Plans/Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2455	M	Review and Update Building Layout Drawings	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2456	M	Review and Update Plot Plan	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2457	M	Review and Update Mech SOW Drawing	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2458	M	Review and Update PFDs	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2459	E	Review and Update P&IDs	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2460	**Electrical 90% Package**		0.0	0%	0%	18-Feb-14 A	09-Jun-14 A
2461	E	Review and Update Shutdown Key	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2462	E	Instrumentation Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2463	E	Control System PLC Interconnection Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2464	E	Review and Update Control System PLC Layouts and Detai	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2465	E	Review and Update Control System Communication/Fibre S	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2466	E	Review and Update Control System Communication and Ch	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2467	E	Review and Update Control System Network Topology Diag	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2468	E	Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2469	E	Heat Tracing Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2470	E	Cable and Conduit Schedules	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2471	E	Review and Update Lighting Layouts and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2472	E	Review and Update Building Layout and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2473	E	Review and Update Layout Plans and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2474	E	Review and Update Cable, Cable Tray, and Grounding Layc	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2475	E	Panel Schedules	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2476	E	Schematic Drawings	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2477	E	Review and Update Single Line Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2478	E	Review and Update SOW Drawing	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2479	**Station 5, IFC**		0.0	100%	100%	09-Jun-14 A	28-Nov-14 A
2480	WBS	IFC - KL	0.0	100%	100%	09-Jun-14 A	28-Nov-14 A
2481	**Civil & Structural Final IFC Package**		0.0	0%	0%	09-Jun-14 A	28-Nov-14 A

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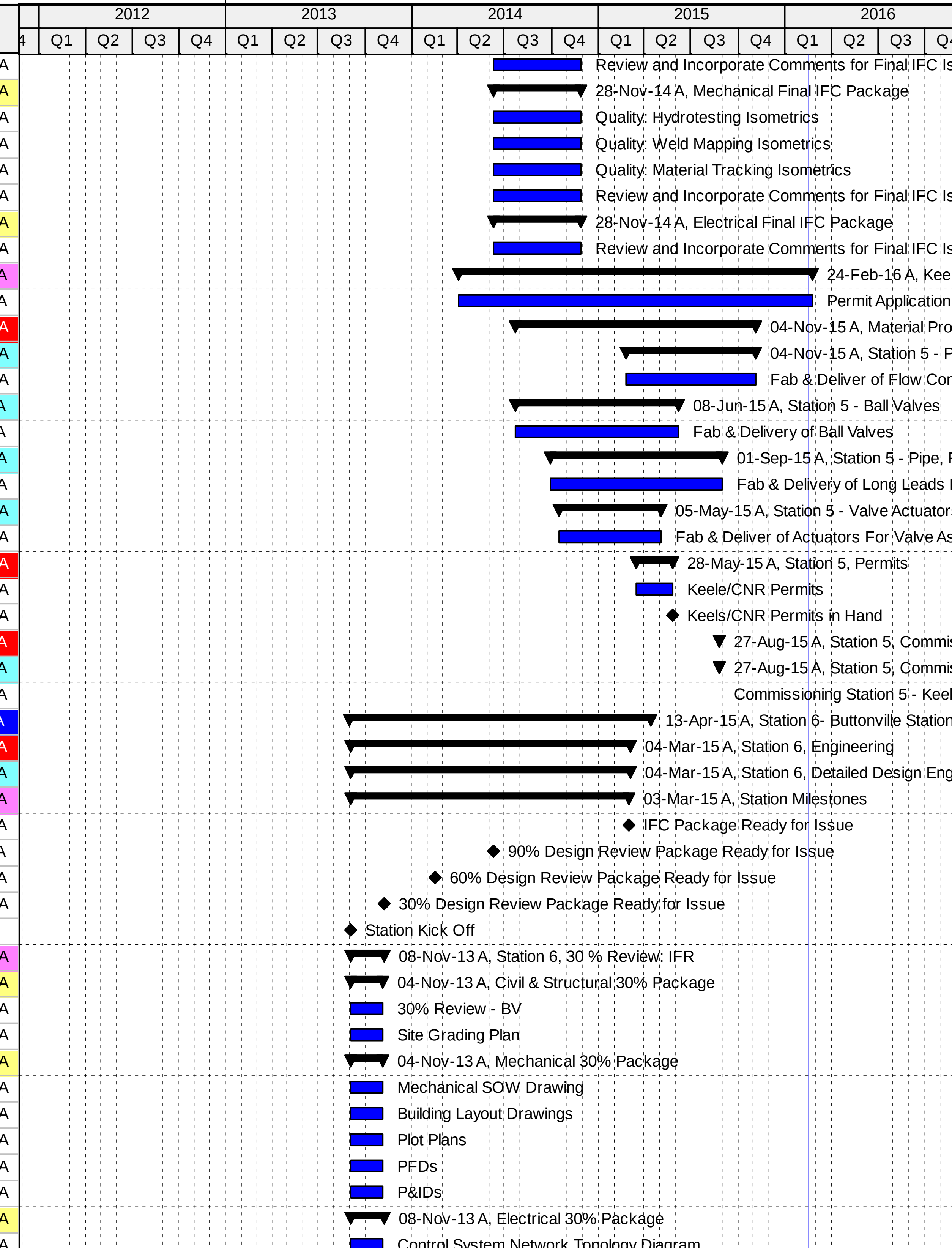
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2482	C	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	09-Jun-14 A	28-Nov-14 A
2483		**Mechanical Final IFC Package**	0.0	0%	0%	09-Jun-14 A	28-Nov-14 A
2484	M	Quality: Hydrotesting Isometrics	0.0	100%	100%	09-Jun-14 A	28-Nov-14 A
2485	M	Quality: Weld Mapping Isometrics	0.0	100%	100%	09-Jun-14 A	28-Nov-14 A
2486	M	Quality: Material Tracking Isometrics	0.0	100%	100%	09-Jun-14 A	28-Nov-14 A
2487	M	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	09-Jun-14 A	28-Nov-14 A
2488		**Electrical Final IFC Package**	0.0	0%	0%	09-Jun-14 A	28-Nov-14 A
2489	E	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	09-Jun-14 A	28-Nov-14 A
2490		**Keele - Permit Application Package Preparation**	0.0	100%	100%	01-Apr-14 A	24-Feb-16 A
2491	A15	Permit Application Package Prep	0.0	100%	100%	01-Apr-14 A	24-Feb-16 A
2492		**Material Procurement - Station 5**	0.0	100%	100%	23-Jul-14 A	04-Nov-15 A
2493		**Station 5 - Panels**	0.0	100%	100%	25-Feb-15 A	04-Nov-15 A
2494	SME-18	Fab & Deliver of Flow Computers, RTUs, Contactor Panels	0.0	100%	100%	25-Feb-15 A	04-Nov-15 A
2495		**Station 5 - Ball Valves**	0.0	100%	100%	23-Jul-14 A	08-Jun-15 A
2496	SME-15	Fab & Delivery of Ball Valves	0.0	100%	100%	23-Jul-14 A	08-Jun-15 A
2497		**Station 5 - Pipe, Fittings, and Flanges - Long Leads (Required for**	0.0	100%	100%	29-Sep-14 A	01-Sep-15 A
2498	SME-17	Fab & Delivery of Long Leads Fitting and Flanges	0.0	100%	100%	29-Sep-14 A	01-Sep-15 A
2499		**Station 5 - Valve Actuators**	0.0	100%	100%	17-Oct-14 A	05-May-15 A
2500	SME-15	Fab & Deliver of Actuators For Valve Assembly	0.0	100%	100%	17-Oct-14 A	05-May-15 A
2501		**Station 5, Permits**	0.0	100%	100%	17-Mar-15 A	28-May-15 A
2502	WBS-SLE	Keele/CNR Permits	0.0	100%	100%	17-Mar-15 A	28-May-15 A
2503	SLE1310	Keels/CNR Permits in Hand	0.0	100%	100%		28-May-15 A
2504		**Station 5, Commissioning**	0.0	100%	100%	27-Aug-15 A	27-Aug-15 A
2505		**Station 5, Commissioning, Facility**	0.0	100%	100%	27-Aug-15 A	27-Aug-15 A
2506	SOE31	Commissioning Station 5 - Keele / CNR	0.0	100%	100%	27-Aug-15 A	27-Aug-15 A
2507		**Station 6- Buttonville Station**	0.0	100%	100%	30-Aug-13 A	13-Apr-15 A
2508		**Station 6, Engineering**	0.0	100%	100%	02-Sep-13 A	04-Mar-15 A
2509		**Station 6, Detailed Design Engineering**	0.0	100%	100%	02-Sep-13 A	04-Mar-15 A
2510		**Station Milestones**	0.0	0%	0%	02-Sep-13 A	03-Mar-15 A
2511	BVS	IFC Package Ready for Issue	0.0	100%	100%		03-Mar-15 A
2512	BVS	90% Design Review Package Ready for Issue	0.0	100%	100%		09-Jun-14 A
2513	BVS	60% Design Review Package Ready for Issue	0.0	100%	100%		17-Feb-14 A
2514	BVS	30% Design Review Package Ready for Issue	0.0	100%	100%		08-Nov-13 A
2515	BVS	Station Kick Off	0.0	100%	100%	02-Sep-13 A	
2516		**Station 6, 30 % Review: IFR**	0.0	100%	100%	02-Sep-13 A	08-Nov-13 A
2517		**Civil & Structural 30% Package**	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2518	W	30% Review - BV	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2519	C	Site Grading Plan	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2520		**Mechanical 30% Package**	0.0	0%	0%	02-Sep-13 A	04-Nov-13 A
2521	M	Mechanical SOW Drawing	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2522	M	Building Layout Drawings	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2523	M	Plot Plans	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2524	M	PFDs	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2525	E	P&IDs	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2526		**Electrical 30% Package**	0.0	0%	0%	02-Sep-13 A	08-Nov-13 A
2527	E	Control System Network Topology Diagram	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2528	E	Area Classification Drawings	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2529	E	Single Line Diagrams	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2530	E	SOW Drawing	0.0	100%	100%	02-Sep-13 A	08-Nov-13 A
2531		**Station 6, 60 % Review**	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2532		**Civil & Structural 60% Package**	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2533	W	60% Review - BV	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2534	C	Foundation Details and Sections	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2535	C	Pipe and Cable Tray Support Plans/Elevations	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2536	C	Access Platform Plans/Sections	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2537	C	Fencing, Site Grading, and Foundation Plans	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2538	C	Review and Update SOW Drawing	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2539		**Mechanical 60% Package**	0.0	0%	0%	11-Nov-13 A	12-Mar-14 A
2540	M	HVAC Layouts and Airflow Schematics	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2541	M	Piping Plans/Sections	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2542	M	Review and Update Building Layout Drawings	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2543	M	Plot Plan	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2544	M	Review and Update PFDs	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2545	M	Review and Update Mechanical SOW Drawing	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2546	E	Review and Update P&IDs	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2547		**Electrical 60% Package**	0.0	0%	0%	11-Nov-13 A	12-Mar-14 A
2548	E	Shutdown Key	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2549	E	Control System Communication and Chassis Layouts	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2550	E	Control System PLC Layouts and Details	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2551	E	Control System Network Topology Diagram	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2552	E	Control System Communication/Fibre Schematics	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2553	E	Control System Network Topology Diagram	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2554	E	Lighting Layouts and Sections	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2555	E	Building Layout and Sections	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2556	E	Layout Plans and Sections	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2557	E	Cable, Cable Tray, and Grounding Layout Diagrams	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2558	E	MCC Elevation Drawings	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2559	E	Review and Update Single Line Diagrams	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2560	E	Review and Update SOW Drawing	0.0	100%	100%	11-Nov-13 A	12-Mar-14 A
2561		**Station 6, 90 % Review: IFB**	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2562		**Civil & Structural 90% Package**	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2563	W	90% Review - BV	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2564	C	Review and Update Foundation Details and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2565	C	Civil and Structural Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2566	C	Review and Update Pipe and Cable Tray Support Plans/Elev	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2567	C	Review and Update Access Platform Plans/Sections (or 3D	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2568	C	Review and Update Fencing, Site Grading, and Foundation	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2569	C	Review and Update SOW Drawing	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2570		**Mechanical 90% Package**	0.0	0%	0%	18-Feb-14 A	09-Jun-14 A
2571	M	Review and Update Pipe Support Deatails	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2572	M	Review and Update Piping Plans/Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2573	M	Review and Update Building Layout Drawings	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A

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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2574	M	Review and Update Plot Plan	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2575	M	Review and Update Mech SOW Drawing	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2576	M	Review and Update PFDs	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2577	E	Review and Update P&IDs	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2578		**Electrical 90% Package**	0.0	0%	0%	18-Feb-14 A	09-Jun-14 A
2579	E	Review and Update Shutdown Key	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2580	E	Instrumentation Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2581	E	Control System PLC Interconnection Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2582	E	Review and Update Control System PLC Layouts and Detai	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2583	E	Review and Update Control System Communication/Fibre S	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2584	E	Review and Update Control System Communication and Ch	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2585	E	Review and Update Control System Network Topology Diag	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2586	E	Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2587	E	Heat Tracing Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2588	E	Cable and Conduit Schedules	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2589	E	Review and Update Lighting Layouts and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2590	E	Review and Update Building Layout and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2591	E	Review and Update Layout Plans and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2592	E	Review and Update Cable, Cable Tray, and Grounding Layc	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2593	E	Panel Schedules	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2594	E	Schematic Drawings	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2595	E	Review and Update Single Line Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2596	E	Review and Update SOW Drawing	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2597		**Station 6, IFC**	0.0	100%	100%	02-Mar-15 A	03-Mar-15 A
2598		**Civil & Structural Final IFC Package**	0.0	100%	100%	02-Mar-15 A	03-Mar-15 A
2599	W	IFC - BV	0.0	100%	100%	02-Mar-15 A	03-Mar-15 A
2600	C	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	02-Mar-15 A	03-Mar-15 A
2601		**Mechanical Final IFC Package**	0.0	0%	0%	02-Mar-15 A	03-Mar-15 A
2602	M	Quality: Hydrotesting Isometrics	0.0	100%	100%	02-Mar-15 A	03-Mar-15 A
2603	M	Quality: Weld Mapping Isometrics	0.0	100%	100%	02-Mar-15 A	03-Mar-15 A
2604	M	Quality: Material Tracking Isometrics	0.0	100%	100%	02-Mar-15 A	03-Mar-15 A
2605	M	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	02-Mar-15 A	03-Mar-15 A
2606		**Electrical Final IFC Package**	0.0	0%	0%	02-Mar-15 A	03-Mar-15 A
2607	E	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	02-Mar-15 A	03-Mar-15 A
2608		**Station 6, Final Turnover Package**	0.0	0%	0%	03-Mar-15 A	04-Mar-15 A
2609	A93	Final Turnover Package	0.0	100%	100%	03-Mar-15 A	04-Mar-15 A
2610		**Buttonville - Permit Application Package Preparation**	0.0	100%	100%	31-Oct-14 A	28-Nov-14 A
2611	A15	Permit Application Package Prep	0.0	100%	100%	31-Oct-14 A	28-Nov-14 A
2612		**Station 6, Environment**	0.0	100%	100%	30-Aug-13 A	13-Apr-15 A
2613		**Station 6, Environmental - Environmental Studies for Land/ROW a**	0.0	100%	100%	30-Aug-13 A	13-Apr-15 A
2614	A14070	Env study for Land & ROW	0.0	100%	100%	30-Aug-13 A	13-Apr-15 A
2615		**Station 6, Permits**	0.0	100%	100%	31-Mar-15 A	01-Apr-15 A
2616	WBS-SLE	Buttonville Permits	0.0	100%	100%	31-Mar-15 A	01-Apr-15 A
2617		**Station 7 - Jonesville Station**	17.6	94.99%	94.99%	02-Sep-13 A	15-Jul-16
2618		**Station 7, Engineering**	0.0	100%	100%	02-Sep-13 A	15-Apr-15 A
2619		**Station 7, Detailed Design Engineering**	0.0	100%	100%	02-Sep-13 A	15-Apr-15 A

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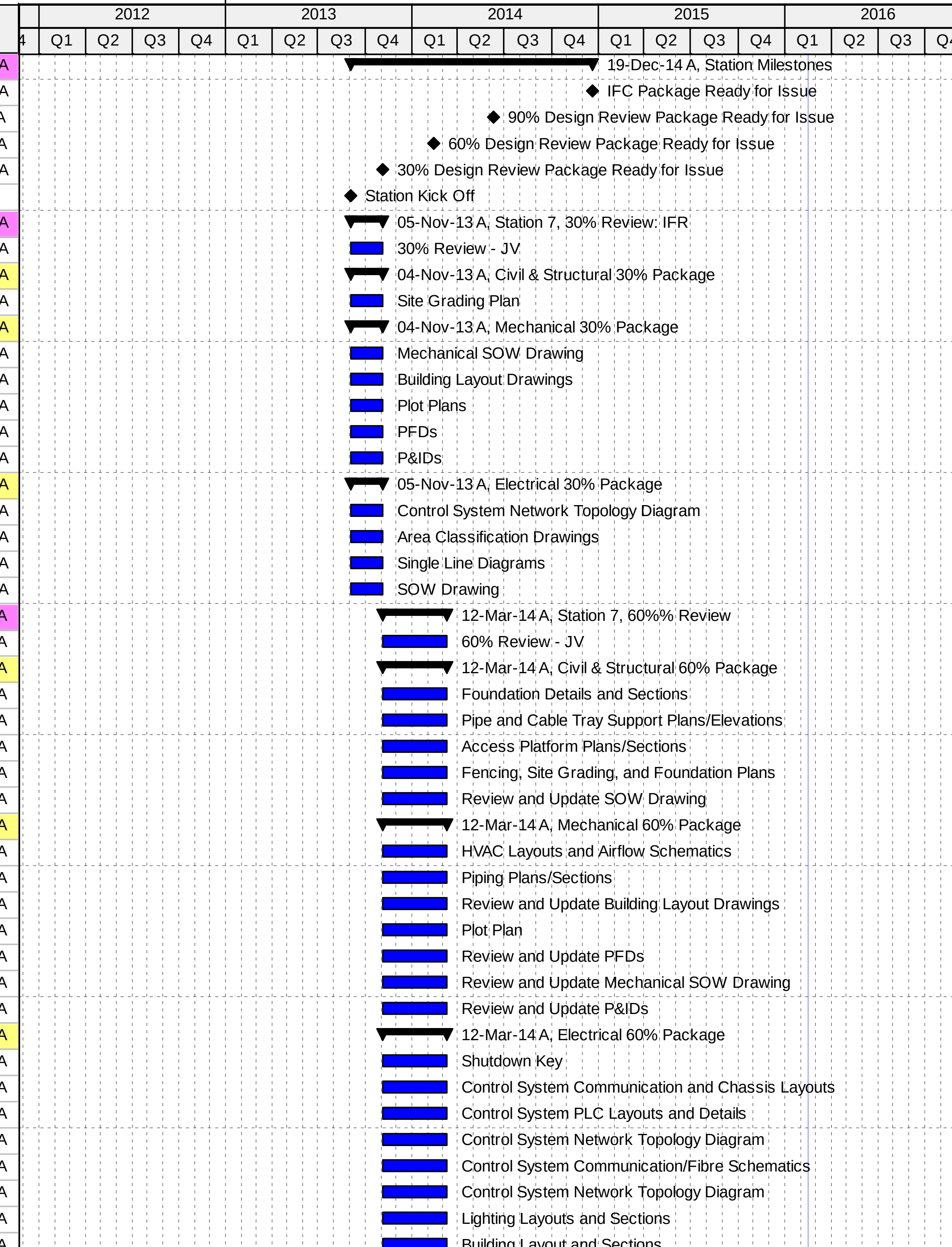
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2620		**Station Milestones**	0.0	0%	0%	02-Sep-13 A	19-Dec-14 A
2621	JVSI	IFC Package Ready for Issue	0.0	100%	100%		19-Dec-14 A
2622	JVSI	90% Design Review Package Ready for Issue	0.0	100%	100%		09-Jun-14 A
2623	JVSI	60% Design Review Package Ready for Issue	0.0	100%	100%		12-Feb-14 A
2624	JVSI	30% Design Review Package Ready for Issue	0.0	100%	100%		05-Nov-13 A
2625	JVSI	Station Kick Off	0.0	100%	100%	02-Sep-13 A	
2626		**Station 7, 30% Review: IFR**	0.0	100%	100%	02-Sep-13 A	05-Nov-13 A
2627	WBS	30% Review - JV	0.0	100%	100%	02-Sep-13 A	05-Nov-13 A
2628		**Civil & Structural 30% Package**	0.0	0%	0%	02-Sep-13 A	04-Nov-13 A
2629	C	Site Grading Plan	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2630		**Mechanical 30% Package**	0.0	0%	0%	02-Sep-13 A	04-Nov-13 A
2631	M	Mechanical SOW Drawing	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2632	M	Building Layout Drawings	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2633	M	Plot Plans	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2634	M	PFDs	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2635	E	P&IDs	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2636		**Electrical 30% Package**	0.0	0%	0%	02-Sep-13 A	05-Nov-13 A
2637	E	Control System Network Topology Diagram	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2638	E	Area Classification Drawings	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2639	E	Single Line Diagrams	0.0	100%	100%	02-Sep-13 A	04-Nov-13 A
2640	E	SOW Drawing	0.0	100%	100%	02-Sep-13 A	05-Nov-13 A
2641		**Station 7, 60%% Review**	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2642	WBS	60% Review - JV	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2643		**Civil & Structural 60% Package**	0.0	0%	0%	06-Nov-13 A	12-Mar-14 A
2644	C	Foundation Details and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2645	C	Pipe and Cable Tray Support Plans/Elevations	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2646	C	Access Platform Plans/Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2647	C	Fencing, Site Grading, and Foundation Plans	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2648	C	Review and Update SOW Drawing	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2649		**Mechanical 60% Package**	0.0	0%	0%	06-Nov-13 A	12-Mar-14 A
2650	M	HVAC Layouts and Airflow Schematics	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2651	M	Piping Plans/Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2652	M	Review and Update Building Layout Drawings	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2653	M	Plot Plan	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2654	M	Review and Update PFDs	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2655	M	Review and Update Mechanical SOW Drawing	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2656	E	Review and Update P&IDs	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2657		**Electrical 60% Package**	0.0	0%	0%	06-Nov-13 A	12-Mar-14 A
2658	E	Shutdown Key	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2659	E	Control System Communication and Chassis Layouts	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2660	E	Control System PLC Layouts and Details	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2661	E	Control System Network Topology Diagram	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2662	E	Control System Communication/Fibre Schematics	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2663	E	Control System Network Topology Diagram	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2664	E	Lighting Layouts and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2665	E	Building Layout and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A



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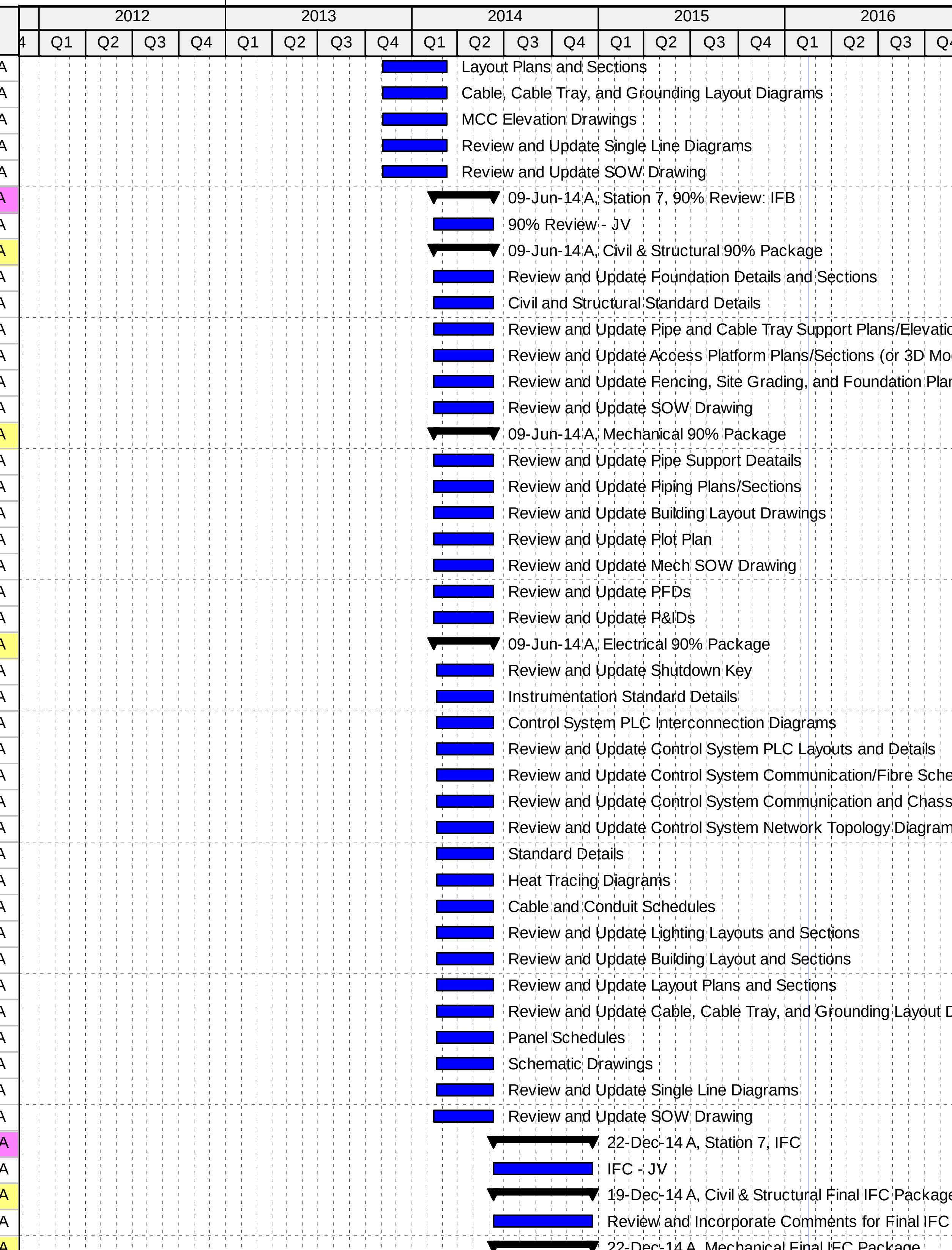
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2666	E	Layout Plans and Sections	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2667	E	Cable, Cable Tray, and Grounding Layout Diagrams	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2668	E	MCC Elevation Drawings	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2669	E	Review and Update Single Line Diagrams	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2670	E	Review and Update SOW Drawing	0.0	100%	100%	06-Nov-13 A	12-Mar-14 A
2671	**Station 7, 90% Review: IFB**		0.0	100%	100%	13-Feb-14 A	09-Jun-14 A
2672	WBS	90% Review - JV	0.0	100%	100%	13-Feb-14 A	09-Jun-14 A
2673	**Civil & Structural 90% Package**		0.0	0%	0%	13-Feb-14 A	09-Jun-14 A
2674	C	Review and Update Foundation Details and Sections	0.0	100%	100%	13-Feb-14 A	09-Jun-14 A
2675	C	Civil and Structural Standard Details	0.0	100%	100%	13-Feb-14 A	09-Jun-14 A
2676	C	Review and Update Pipe and Cable Tray Support Plans/Elev	0.0	100%	100%	13-Feb-14 A	09-Jun-14 A
2677	C	Review and Update Access Platform Plans/Sections (or 3D	0.0	100%	100%	13-Feb-14 A	09-Jun-14 A
2678	C	Review and Update Fencing, Site Grading, and Foundation	0.0	100%	100%	13-Feb-14 A	09-Jun-14 A
2679	C	Review and Update SOW Drawing	0.0	100%	100%	13-Feb-14 A	09-Jun-14 A
2680	**Mechanical 90% Package**		0.0	0%	0%	13-Feb-14 A	09-Jun-14 A
2681	M	Review and Update Pipe Support Deatails	0.0	100%	100%	13-Feb-14 A	09-Jun-14 A
2682	M	Review and Update Piping Plans/Sections	0.0	100%	100%	13-Feb-14 A	09-Jun-14 A
2683	M	Review and Update Building Layout Drawings	0.0	100%	100%	13-Feb-14 A	09-Jun-14 A
2684	M	Review and Update Plot Plan	0.0	100%	100%	13-Feb-14 A	09-Jun-14 A
2685	M	Review and Update Mech SOW Drawing	0.0	100%	100%	13-Feb-14 A	09-Jun-14 A
2686	M	Review and Update PFDs	0.0	100%	100%	13-Feb-14 A	09-Jun-14 A
2687	E	Review and Update P&IDs	0.0	100%	100%	13-Feb-14 A	09-Jun-14 A
2688	**Electrical 90% Package**		0.0	0%	0%	13-Feb-14 A	09-Jun-14 A
2689	E	Review and Update Shutdown Key	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2690	E	Instrumentation Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2691	E	Control System PLC Interconnection Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2692	E	Review and Update Control System PLC Layouts and Detai	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2693	E	Review and Update Control System Communication/Fibre S	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2694	E	Review and Update Control System Communication and Ch	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2695	E	Review and Update Control System Network Topology Diag	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2696	E	Standard Details	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2697	E	Heat Tracing Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2698	E	Cable and Conduit Schedules	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2699	E	Review and Update Lighting Layouts and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2700	E	Review and Update Building Layout and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2701	E	Review and Update Layout Plans and Sections	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2702	E	Review and Update Cable, Cable Tray, and Grounding Layc	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2703	E	Panel Schedules	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2704	E	Schematic Drawings	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2705	E	Review and Update Single Line Diagrams	0.0	100%	100%	18-Feb-14 A	09-Jun-14 A
2706	E	Review and Update SOW Drawing	0.0	100%	100%	13-Feb-14 A	09-Jun-14 A
2707	**Station 7, IFC**		0.0	100%	100%	09-Jun-14 A	22-Dec-14 A
2708	WBS	IFC - JV	0.0	100%	100%	09-Jun-14 A	22-Dec-14 A
2709	**Civil & Structural Final IFC Package**		0.0	0%	0%	09-Jun-14 A	19-Dec-14 A
2710	C	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	09-Jun-14 A	19-Dec-14 A
2711	**Mechanical Final IFC Package**		0.0	0%	0%	09-Jun-14 A	22-Dec-14 A



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2712	M	Quality: Hydrotesting Isometrics	0.0	100%	100%	09-Jun-14 A	19-Dec-14 A
2713	M	Quality: Weld Mapping Isometrics	0.0	100%	100%	09-Jun-14 A	22-Dec-14 A
2714	M	Quality: Material Tracking Isometrics	0.0	100%	100%	09-Jun-14 A	19-Dec-14 A
2715	M	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	09-Jun-14 A	19-Dec-14 A
2716	**Electrical Final IFC Package**		0.0	0%	0%	09-Jun-14 A	19-Dec-14 A
2717	El	Review and Incorporate Comments for Final IFC Issue	0.0	100%	100%	09-Jun-14 A	19-Dec-14 A
2718	**Jonesville - Permit Application Package Preparation**		0.0	100%	100%	01-Apr-14 A	15-Apr-15 A
2719	A15	Permit Application Package Prep	0.0	100%	100%	01-Apr-14 A	15-Apr-15 A
2720	**Material Procurement - Station 7**		0.0	100%	100%	23-Jul-14 A	26-Feb-16 A
2721	SME-18820	Procurement Finish for Station 7	0.0	100%	100%		05-Nov-15 A
2722	**Station 7 - Pre-cast buildings**		0.0	100%	100%	10-Dec-14 A	04-Nov-15 A
2723	SME-18	Fab & Delivery of Prefab Building Units (inc. built-in utilities)	0.0	100%	100%	10-Dec-14 A	04-Nov-15 A
2724	**Station 7 - Motor Control Centres**		0.0	100%	100%	03-Feb-15 A	27-Aug-15 A
2725	SME-18	Fab & Deliver of MCCs & ATSs	0.0	100%	100%	03-Feb-15 A	27-Aug-15 A
2726	**Station 7 - UPS**		0.0	100%	100%	31-Mar-15 A	25-May-15 A
2727	SME-18	Fab & Deliver of UPSs - PCO102	0.0	100%	100%	31-Mar-15 A	25-May-15 A
2728	**Station 7 - Flow Computer Panels**		0.0	100%	100%	25-Feb-15 A	18-Nov-15 A
2729	SME-P	Purchase Firewall Appliance Standard Warranty	0.0	0%	100%	02-Nov-15 A	18-Nov-15 A
2730	SME-18	Fab & Deliver of Flow Computers, RTUs, Contactor Panels	0.0	100%	100%	25-Feb-15 A	04-Nov-15 A
2731	**Station 7 - Emergency Generators**		0.0	100%	100%	27-Feb-15 A	26-Feb-16 A
2732	SME-P	Procure Insulating Blankets and Hanging Bands	0.0	0%	100%	01-Feb-16 A	26-Feb-16 A
2733	SME-18	Fab & Deliver of Standby Generator Sets - PCO102	0.0	100%	100%	27-Feb-15 A	10-Jul-15 A
2734	**Station 7 - Annubar Meter**		0.0	100%	100%	22-Jan-15 A	20-May-15 A
2735	SME-18	Fab & Deliver of Pilot Flow Meters	0.0	100%	100%	22-Jan-15 A	20-May-15 A
2736	**Station 7 - Transmitters (PDIT, PIT, TIT/TE/TW)**		0.0	100%	100%	31-Mar-15 A	08-Jun-15 A
2737	SME-18	Fab & Deliver of Transmitters - PCO102	0.0	100%	100%	31-Mar-15 A	08-Jun-15 A
2738	**Station 7 - Gas Detection**		0.0	100%	100%	31-Mar-15 A	05-May-15 A
2739	SME-18	Fab & Deliver of Gas Detection - PCO102	0.0	100%	100%	31-Mar-15 A	05-May-15 A
2740	**Station 7 - Ball Valves**		0.0	100%	100%	23-Jul-14 A	27-Mar-15 A
2741	SME-15	Fab & Delivery of Ball Valves	0.0	100%	100%	23-Jul-14 A	27-Mar-15 A
2742	**Station 7 - Plug Valves with Actuators**		0.0	100%	100%	24-Oct-14 A	09-Jul-15 A
2743	SME-15	Fab & Delivery of Actuated Plug Valves	0.0	100%	100%	24-Oct-14 A	09-Jul-15 A
2744	**Station 7 - Pressure Regulating Valves (PCV's) & Electric Actuators**		0.0	100%	100%	21-Oct-14 A	28-May-15 A
2745	SME-15	Fab & Deliver of PRVs	0.0	100%	100%	21-Oct-14 A	28-May-15 A
2746	**Station 7 - Pipe, Fittings, and Flanges - Long Leads (Required for I**		0.0	100%	100%	29-Sep-14 A	05-Nov-15 A
2747	SME-17	Fab & Delivery of Long Leads Fitting and Flanges	0.0	100%	100%	29-Sep-14 A	05-Nov-15 A
2748	**Station 7 - Auxiliary Valves**		0.0	100%	100%	23-Dec-14 A	12-May-15 A
2749	SME-18	Fab & Delivery of Auxiliary Valves	0.0	100%	100%	23-Dec-14 A	12-May-15 A
2750	**Station 7 - Pigging Filters**		0.0	100%	100%	01-Dec-14 A	14-Aug-15 A
2751	SME-18	Fab & Deliver of Pigging Filters	0.0	100%	100%	01-Dec-14 A	14-Aug-15 A
2752	**Station 7 - Spread 3 - Facilities Pipe/Valve Site Pipe**		0.0	100%	100%	17-Oct-14 A	10-Jul-15 A
2753	SME-15	Fab & Delivery of Facilities Pipes	0.0	100%	100%	17-Oct-14 A	10-Jul-15 A
2754	**Station 7 - Valve Actuators**		0.0	100%	100%	17-Oct-14 A	05-May-15 A
2755	SME-15	Fab & Deliver of Actuators For Valve Assembly	0.0	100%	100%	17-Oct-14 A	05-May-15 A
2756	**Station 7 - Pig Trap Material - Jonesville**		0.0	100%	100%	05-Sep-14 A	31-Mar-15 A
2757	SME-15	Fab & Delivery of Pig Trap Closures (Jonesville)	0.0	100%	100%	05-Sep-14 A	31-Mar-15 A

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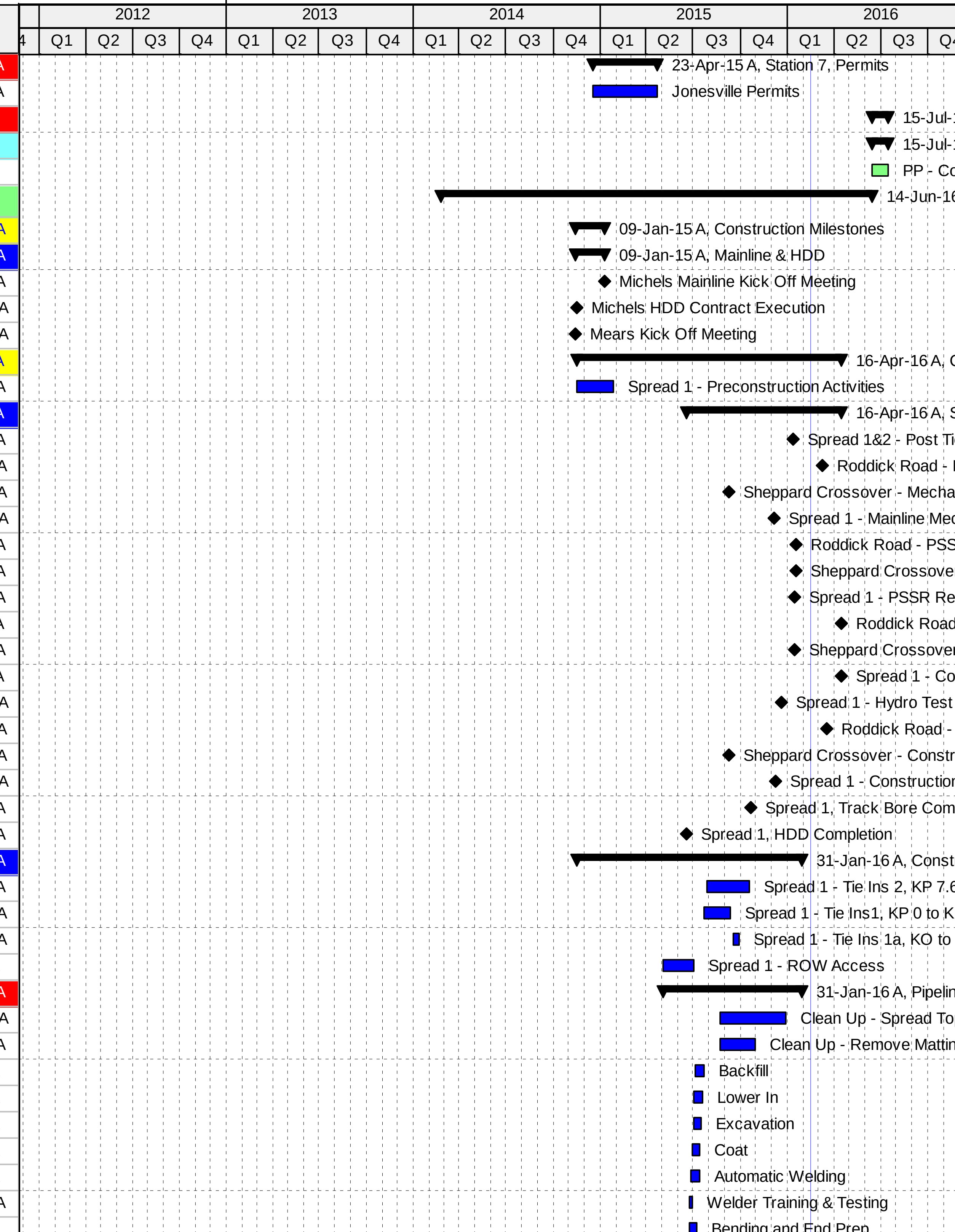
2758		Station 7, Permits	0.0	100%	100%	19-Dec-14 A	23-Apr-15 A
2759	WBS-SLE	Jonesville Permits	0.0	100%	100%	19-Dec-14 A	23-Apr-15 A
2760		Station 7, Commissioning	27.0	0%	0%	15-Jun-16	15-Jul-16
2761		Station 7, Commissioning, Facility	27.0	0%	0%	15-Jun-16	15-Jul-16
2762	SOE31	PP - Commissioning Station 7 - Jonesville Station	27.0	0%	0%	15-Jun-16*	15-Jul-16
2763		Mainline Construction	32.8	100%	99.14%	24-Feb-14 A	14-Jun-16
2764		Construction Milestones	0.0	0%	0%	13-Nov-14 A	09-Jan-15 A
2765		Mainline & HDD	0.0	0%	0%	13-Nov-14 A	09-Jan-15 A
2766	MIL-1020	Michels Mainline Kick Off Meeting	0.0	100%	100%		09-Jan-15 A
2767	MIL-1010	Michels HDD Contract Execution	0.0	100%	100%		17-Nov-14 A
2768	MIL-1000	Mears Kick Off Meeting	0.0	100%	100%		13-Nov-14 A
2769		Construction - Spread 1	0.0	100%	100%	17-Nov-14 A	16-Apr-16 A
2770	S1W04-1020	Spread 1 - Preconstruction Activities	0.0	100%	100%	17-Nov-14 A	26-Jan-15 A
2771		Spread 1, Milestones	0.0	0%	0%	19-Jun-15 A	16-Apr-16 A
2772	MS9250	Spread 1&2 - Post Tie-in Drying Complete	0.0	0%	100%		12-Jan-16 A
2773	MS9190	Roddick Road - Mechanical Complete	0.0	0%	100%		09-Mar-16 A
2774	MS9150	Sheppard Crossover - Mechanical Complete	0.0	0%	100%		10-Sep-15 A
2775	MS9100	Spread 1 - Mainline Mechanical Complete	0.0	0%	100%		06-Dec-15 A
2776	MS8050	Roddick Road - PSSR Review and Walkdowns Complete	0.0	0%	100%		18-Jan-16 A
2777	MS8040	Sheppard Crossover - PSSR Review and Walkdowns Com	0.0	0%	100%		18-Jan-16 A
2778	MS8010	Spread 1 - PSSR Review and Walkdowns Complete	0.0	0%	100%		15-Jan-16 A
2779	MS7070	Roddick Road - Commissioning Complete	0.0	0%	100%		16-Apr-16 A
2780	MS7050	Sheppard Crossover - Commissioning Complete	0.0	0%	100%		15-Jan-16 A
2781	MS6010	Spread 1 - Commissioning Complete	0.0	0%	100%		16-Apr-16 A
2782	MS5010	Spread 1 - Hydro Test Complete	0.0	0%	100%		21-Dec-15 A
2783	MS4070	Roddick Road - Construction Complete	0.0	0%	100%		19-Mar-16 A
2784	MS4050	Sheppard Crossover - Construction Complete	0.0	0%	100%		10-Sep-15 A
2785	MS3010	Spread 1 - Construction Complete	0.0	0%	100%		11-Dec-15 A
2786	MILS1-1080	Spread 1, Track Bore Completion	0.0	100%	100%		22-Oct-15 A
2787	MILS1-1060	Spread 1, HDD Completion	0.0	100%	100%		19-Jun-15 A
2788		Construction - Spread 1, Pipeline	0.0	100%	100%	17-Nov-14 A	31-Jan-16 A
2789	S1W01-1480	Spread 1 - Tie Ins 2, KP 7.6 to KP 3.43 South of Steeles HD	0.0	100%	100%	30-Jul-15 A	20-Oct-15 A
2790	S1W01-1470	Spread 1 - Tie Ins1, KP 0 to KP 3.43 North of Steeles HDD	0.0	62.71%	100%	23-Jul-15 A	12-Sep-15 A
2791	S1W01-1110	Spread 1 - Tie Ins 1a, KO to Beaver Creek Entry	0.0	0%	100%	18-Sep-15 A	30-Sep-15 A
2792	S1W01-1020	Spread 1 - ROW Access	0.0	100%	100%	04-May-15 A	02-Jul-15 A
2793		Pipeline Construction North of Steels	0.0	0%	0%	04-May-15 A	31-Jan-16 A
2794	S1W01-13	Clean Up - Spread Topsoil	0.0	100%	100%	24-Aug-15 A	30-Dec-15 A
2795	S1W01-12	Clean Up - Remove Matting	0.0	100%	100%	24-Aug-15 A	30-Oct-15 A
2796	S1W01-12	Backfill	0.0	100%	100%	07-Jul-15 A	22-Jul-15 A
2797	S1W01-12	Lower In	0.0	100%	100%	04-Jul-15 A	20-Jul-15 A
2798	S1W01-12	Excavation	0.0	100%	100%	02-Jul-15 A	17-Jul-15 A
2799	S1W01-12	Coat	0.0	100%	100%	30-Jun-15 A	15-Jul-15 A
2800	S1W01-12	Automatic Welding	0.0	100%	100%	27-Jun-15 A	13-Jul-15 A
2801	S1W01-12	Welder Training & Testing	0.0	100%	100%	23-Jun-15 A	30-Jun-15 A
2802	S1W01-12	Bending and End Prep	0.0	100%	100%	23-Jun-15 A	08-Jul-15 A



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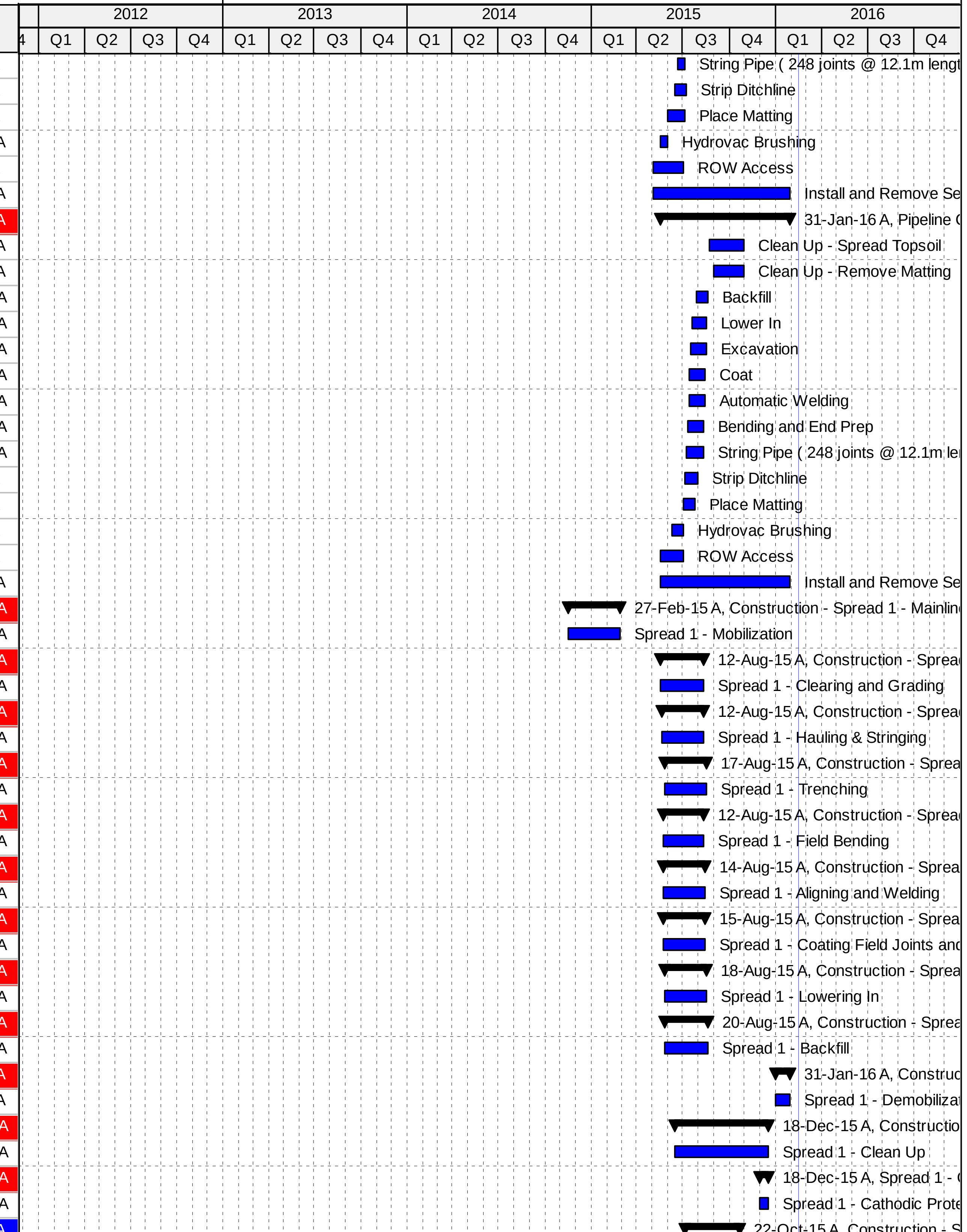
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2803	S1W01-12	String Pipe (248 joints @ 12.1m length)	0.0	100%	100%	20-Jun-15 A	06-Jul-15 A
2804	S1W01-11	Strip Ditchline	0.0	100%	100%	17-Jun-15 A	09-Jul-15 A
2805	S1W01-11	Place Matting	0.0	100%	100%	02-Jun-15 A	04-Jul-15 A
2806	S1W01-11	Hydrovac Brushing	0.0	100%	100%	19-May-15 A	01-Jun-15 A
2807	S1W01-11	ROW Access	0.0	100%	100%	04-May-15 A	02-Jul-15 A
2808	S1W01-11	Install and Remove Security Fencing	0.0	100%	100%	04-May-15 A	31-Jan-16 A
2809		**Pipeline Construction South of Steels**	0.0	0%	0%	19-May-15 A	31-Jan-16 A
2810	S1W01-14	Clean Up - Spread Topsoil	0.0	100%	100%	24-Aug-15 A	30-Oct-15 A
2811	S1W01-14	Clean Up - Remove Matting	0.0	100%	100%	31-Aug-15 A	30-Oct-15 A
2812	S1W01-14	Backfill	0.0	100%	100%	29-Jul-15 A	20-Aug-15 A
2813	S1W01-14	Lower In	0.0	100%	100%	20-Jul-15 A	18-Aug-15 A
2814	S1W01-14	Excavation	0.0	100%	100%	17-Jul-15 A	17-Aug-15 A
2815	S1W01-14	Coat	0.0	100%	100%	15-Jul-15 A	15-Aug-15 A
2816	S1W01-13	Automatic Welding	0.0	100%	100%	13-Jul-15 A	14-Aug-15 A
2817	S1W01-13	Bending and End Prep	0.0	100%	100%	10-Jul-15 A	12-Aug-15 A
2818	S1W01-13	String Pipe (248 joints @ 12.1m length)	0.0	100%	100%	08-Jul-15 A	12-Aug-15 A
2819	S1W01-13	Strip Ditchline	0.0	100%	100%	06-Jul-15 A	31-Jul-15 A
2820	S1W01-13	Place Matting	0.0	100%	100%	03-Jul-15 A	25-Jul-15 A
2821	S1W01-13	Hydrovac Brushing	0.0	100%	100%	10-Jun-15 A	02-Jul-15 A
2822	S1W01-13	ROW Access	0.0	100%	100%	19-May-15 A	02-Jul-15 A
2823	S1W01-13	Install and Remove Security Fencing	0.0	100%	100%	19-May-15 A	31-Jan-16 A
2824		**Construction - Spread 1 - Mainline**	0.0	100%	100%	17-Nov-14 A	27-Feb-15 A
2825	S1W01-10	Spread 1 - Mobilization	0.0	100%	100%	17-Nov-14 A	27-Feb-15 A
2826		**Construction - Spread 1 - Block Valve Installation**	0.0	100%	100%	19-May-15 A	12-Aug-15 A
2827	S1W01-10	Spread 1 - Clearing and Grading	0.0	100%	100%	19-May-15 A	12-Aug-15 A
2828		**Construction - Spread 1 - HDD Support**	0.0	100%	100%	20-May-15 A	12-Aug-15 A
2829	S1W01-10	Spread 1 - Hauling & Stringing	0.0	100%	100%	20-May-15 A	12-Aug-15 A
2830		**Construction - Spread 1 - Survey and locates**	0.0	100%	100%	26-May-15 A	17-Aug-15 A
2831	S1W01-10	Spread 1 - Trenching	0.0	100%	100%	26-May-15 A	17-Aug-15 A
2832		**Construction - Spread 1 - Field Bending**	0.0	100%	100%	23-May-15 A	12-Aug-15 A
2833	S1W01-10	Spread 1 - Field Bending	0.0	100%	100%	23-May-15 A	12-Aug-15 A
2834		**Construction - Spread 1 - Aligning and Welding**	0.0	100%	100%	23-May-15 A	14-Aug-15 A
2835	S1W01-10	Spread 1 - Aligning and Welding	0.0	100%	100%	23-May-15 A	14-Aug-15 A
2836		**Construction - Spread 1 - Coating Field Joints and Coating Repairs**	0.0	100%	100%	25-May-15 A	15-Aug-15 A
2837	S1W01-10	Spread 1 - Coating Field Joints and Coating Repairs	0.0	100%	100%	25-May-15 A	15-Aug-15 A
2838		**Construction - Spread 1 - Lowering In**	0.0	100%	100%	27-May-15 A	18-Aug-15 A
2839	S1W01-10	Spread 1 - Lowering In	0.0	100%	100%	27-May-15 A	18-Aug-15 A
2840		**Construction - Spread 1 - Backfill**	0.0	100%	100%	28-May-15 A	20-Aug-15 A
2841	S1W01-11	Spread 1 - Backfill	0.0	100%	100%	28-May-15 A	20-Aug-15 A
2842		**Construction - Spread 1 - Demobilization**	0.0	100%	100%	01-Jan-16 A	31-Jan-16 A
2843	S1W01-11	Spread 1 - Demobilization	0.0	100%	100%	01-Jan-16 A	31-Jan-16 A
2844		**Construction - Spread 1 - Clean-up and Restoration**	0.0	100%	100%	15-Jun-15 A	18-Dec-15 A
2845	S1W01-11	Spread 1 - Clean Up	0.0	100%	100%	15-Jun-15 A	18-Dec-15 A
2846		**Spread 1 - Cathodic Protection**	0.0	0%	0%	01-Dec-15 A	18-Dec-15 A
2847	S1W01-P	Spread 1 - Cathodic Protection	0.0	0%	100%	01-Dec-15 A	18-Dec-15 A
2848		**Construction - Spread 1, Crossings**	0.0	100%	100%	06-Jul-15 A	22-Oct-15 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2849		**Construction - Spread 1, Track Bore**	0.0	100%	100%	06-Jul-15 A	22-Oct-15 A
2850	S1W02-P(	Spread 1 - Track Bore - UPI	0.0	0%	100%	06-Jul-15 A	22-Oct-15 A
2851	S1W02-11	Spread 1 - Track Bore - UPI	0.0	100%	100%	06-Jul-15 A	22-Oct-15 A
2852		**Track Bore Crew**	0.0	0%	0%	06-Jul-15 A	22-Oct-15 A
2853	S1W02	HUNTINGDALE BLVD Bore (Auger) - 34m	0.0	100%	100%	03-Sep-15 A	22-Oct-15 A
2854	S1W02	COLLINGSBROOK BLVD Bore (Auger) - 29m	0.0	100%	100%	18-Aug-15 A	25-Sep-15 A
2855	S1W02	BEVERLY GLEN BLVD Bore (Auger) - 45m	0.0	100%	100%	30-Jul-15 A	19-Sep-15 A
2856	S1W02	HUNTINGWOOD Bore (Auger) - 33m	0.0	100%	100%	05-Aug-15 A	03-Sep-15 A
2857	S1W02	PINEMEADOW BLVD Bore (Auger) - 34m	0.0	100%	100%	19-Aug-15 A	05-Oct-15 A
2858	S1W02	BRIDLEWOOD BLVD Bore (PR) - 32m	0.0	100%	100%	11-Jul-15 A	03-Sep-15 A
2859	S1W02	HUNTSMILL Bore (PR) - 33m	0.0	100%	100%	11-Jul-15 A	17-Aug-15 A
2860	S1W02	FINCH Bore (Auger) - 86m	0.0	100%	100%	04-Sep-15 A	22-Oct-15 A
2861	S1W02	DENISON Bore (Auger) - 41m	0.0	100%	100%	12-Aug-15 A	16-Sep-15 A
2862	S1W02	McNICOLL Bore (PR) - 58m	0.0	100%	100%	10-Jul-15 A	23-Sep-15 A
2863	S1W02	Fourteenth Ave Bore	0.0	100%	100%	06-Jul-15 A	11-Jul-15 A
2864		**Maineline Spread 1 Track Bore base lay**	0.0	100%	100%	06-Jul-15 A	22-Oct-15 A
2865	S1W02-11	Spread 1 - Track Bore - Base Lay	0.0	100%	100%	06-Jul-15 A	22-Oct-15 A
2866		**Construction - Spread 1, HDD Support**	0.0	100%	100%	06-Jan-15 A	19-Jun-15 A
2867	S1W04-1470	Spread 1 - Pull Back Support for Alden Road	0.0	100%	100%	19-Jun-15 A	19-Jun-15 A
2868	S1W04-1460	Spread 1 - Pull Back Support for Steels Avenue	0.0	100%	100%	15-Apr-15 A	15-Apr-15 A
2869	S1W04-1440	Spread 1 - Field Bending	0.0	100%	100%	16-Jan-15 A	23-Feb-15 A
2870	S1W04-1110	Spread 1 - Pull Back Support for Beaver Creek	0.0	100%	100%	16-Feb-15 A	17-Feb-15 A
2871	S1W04-1100	Spread 1 - Pipe String Testing	0.0	100%	100%	28-Jan-15 A	23-Mar-15 A
2872	S1W04-1090	Spread 1 - Coating	0.0	100%	100%	26-Jan-15 A	04-Mar-15 A
2873	S1W04-1080	Spread 1 - Section Welding	0.0	100%	100%	24-Jan-15 A	02-Mar-15 A
2874	S1W04-1070	Spread 1 - Welder Training &Testing	0.0	100%	100%	19-Jan-15 A	23-Jan-15 A
2875	S1W04-1060	Spread 1 - Stringing - Mainline and HDD	0.0	100%	100%	12-Jan-15 A	17-Feb-15 A
2876	S1W04-1050	Spread 1 - Preparation of Sits, HDD and other Crossings	0.0	100%	100%	08-Jan-15 A	23-Mar-15 A
2877	S1W04-1040	Spread 1 - Clearing and Grading	0.0	100%	100%	07-Jan-15 A	18-Mar-15 A
2878	S1W04-1030	Spread 1 - R.O.W Sweeps, Locates, Signage	0.0	100%	100%	06-Jan-15 A	13-Mar-15 A
2879		**HDD Pad and Right of Way Preparation**	0.0	100%	100%	06-Jan-15 A	19-Jun-15 A
2880	S1W04-1(	Spread 1 - HDD Support	0.0	100%	100%	06-Jan-15 A	19-Jun-15 A
2881		**Maineline Spread 1 HDD base lay**	0.0	100%	100%	07-Jan-15 A	31-Mar-15 A
2882	S1W04-14	spread 1 - HDD Base Lay	0.0	100%	100%	07-Jan-15 A	31-Mar-15 A
2883		**Construction - Spread 1, Preparation of Slits #1**	0.0	0%	0%	07-Jan-15 A	31-Mar-15 A
2884	S1W04	Beaver Creek- Entry & Exit	0.0	100%	100%	07-Jan-15 A	29-Jan-15 A
2885	S1W04	Alden Ave- Entry & Exit	0.0	100%	100%	25-Mar-15 A	31-Mar-15 A
2886	S1W04	Steels Ave- Entry & Exit	0.0	100%	100%	27-Feb-15 A	07-Mar-15 A
2887		**Construction - Spread 1, Horizontal Directional Drilling (HDD)**	0.0	100%	100%	17-Nov-14 A	19-Dec-15 A
2888		**Construction - Spread 1, Steeles Avenue - Rig # 1**	0.0	100%	100%	09-Mar-15 A	20-Apr-15 A
2889		**Construction - Spread 1, HDD 1: Steeles Avenue**	0.0	100%	100%	09-Mar-15 A	19-Mar-15 A
2890	S1W06	Mobililization To Site	0.0	100%	100%	09-Mar-15 A	19-Mar-15 A
2891		**Steeles Ave HDD - Pilot hole**	0.0	100%	100%	20-Mar-15 A	28-Mar-15 A
2892	S1W06	Pilot Hole	0.0	100%	100%	20-Mar-15 A	28-Mar-15 A
2893		**Steeles Ave HDD - Ream**	0.0	100%	100%	30-Mar-15 A	13-Apr-15 A
2894	S1W06	Reem - 48"	0.0	100%	100%	30-Mar-15 A	13-Apr-15 A

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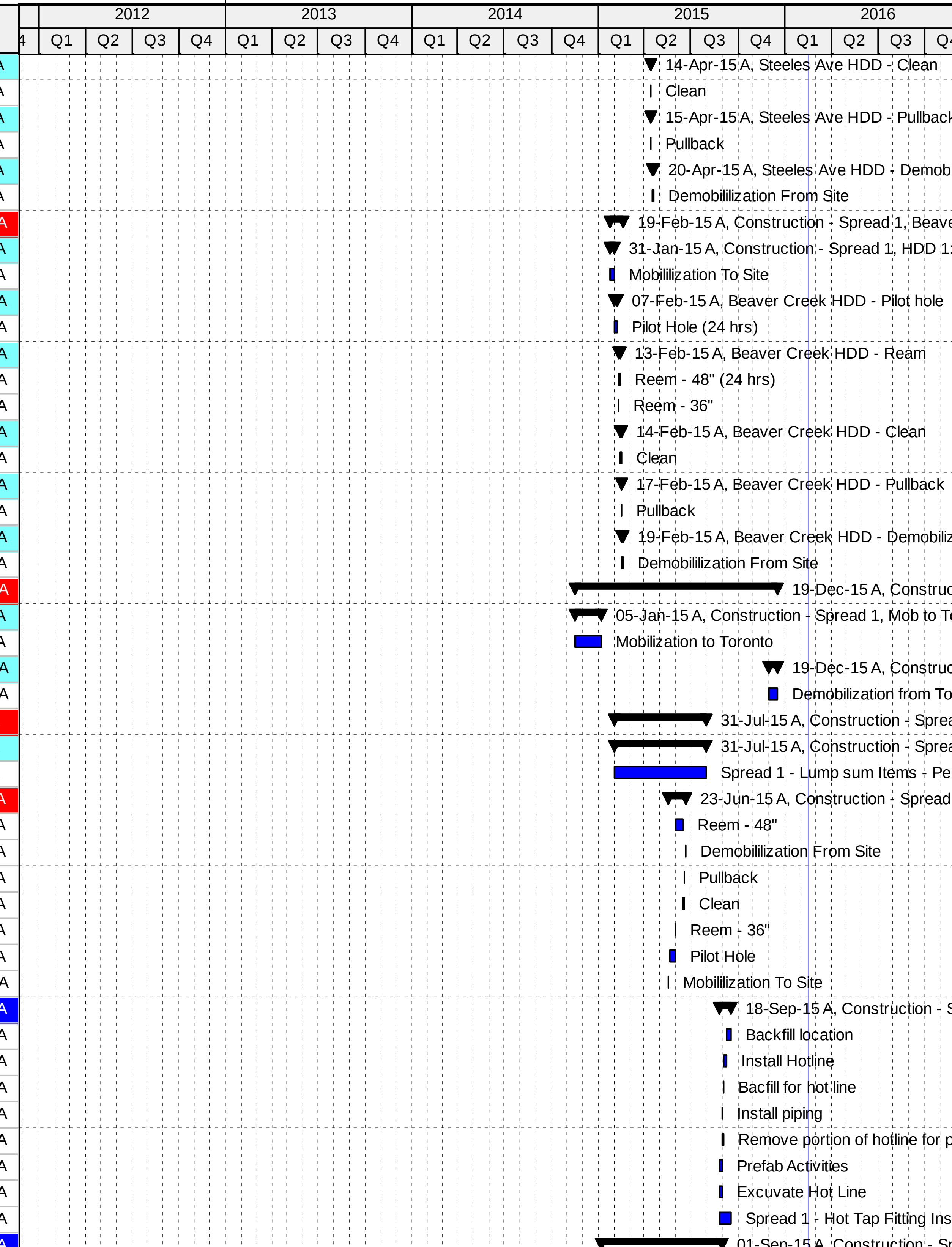
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2895		**Steeles Ave HDD - Clean**	0.0	100%	100%	14-Apr-15 A	14-Apr-15 A
2896	S1W06	Clean	0.0	100%	100%	14-Apr-15 A	14-Apr-15 A
2897		**Steeles Ave HDD - Pullback**	0.0	100%	100%	15-Apr-15 A	15-Apr-15 A
2898	S1W06	Pullback	0.0	100%	100%	15-Apr-15 A	15-Apr-15 A
2899		**Steeles Ave HDD - Demobilization from site**	0.0	100%	100%	16-Apr-15 A	20-Apr-15 A
2900	S1W06	Demobilliization From Site	0.0	100%	100%	16-Apr-15 A	20-Apr-15 A
2901		**Construction - Spread 1, Beaver Creek - Rig # 1**	0.0	100%	100%	24-Jan-15 A	19-Feb-15 A
2902		**Construction - Spread 1, HDD 1: Beaver Creek**	0.0	100%	100%	24-Jan-15 A	31-Jan-15 A
2903	S1W06	Mobilliization To Site	0.0	100%	100%	24-Jan-15 A	31-Jan-15 A
2904		**Beaver Creek HDD - Pilot hole**	0.0	100%	100%	02-Feb-15 A	07-Feb-15 A
2905	S1W06	Pilot Hole (24 hrs)	0.0	100%	100%	02-Feb-15 A	07-Feb-15 A
2906		**Beaver Creek HDD - Ream**	0.0	100%	100%	09-Feb-15 A	13-Feb-15 A
2907	S1W06	Reem - 48" (24 hrs)	0.0	100%	100%	10-Feb-15 A	13-Feb-15 A
2908	S1W06	Reem - 36"	0.0	100%	100%	09-Feb-15 A	09-Feb-15 A
2909		**Beaver Creek HDD - Clean**	0.0	100%	100%	14-Feb-15 A	14-Feb-15 A
2910	S1W06	Clean	0.0	100%	100%	14-Feb-15 A	14-Feb-15 A
2911		**Beaver Creek HDD - Pullback**	0.0	100%	100%	16-Feb-15 A	17-Feb-15 A
2912	S1W06	Pullback	0.0	100%	100%	16-Feb-15 A	17-Feb-15 A
2913		**Beaver Creek HDD - Demobilization from site**	0.0	100%	100%	17-Feb-15 A	19-Feb-15 A
2914	S1W06	Demobilliization From Site	0.0	100%	100%	17-Feb-15 A	19-Feb-15 A
2915		**Construction - Spread 1, Mob/ Demob to Toronto (Michels)**	0.0	100%	100%	17-Nov-14 A	19-Dec-15 A
2916		**Construction - Spread 1, Mob to Toronto (Michels)**	0.0	100%	100%	17-Nov-14 A	05-Jan-15 A
2917	S1W06	Mobilization to Toronto	0.0	100%	100%	17-Nov-14 A	05-Jan-15 A
2918		**Construction - Spread 1, Demob from Toronto (Michels)**	0.0	100%	100%	01-Dec-15 A	19-Dec-15 A
2919	S1W06	Demobilization from Toronto	0.0	100%	100%	01-Dec-15 A	19-Dec-15 A
2920		**Construction - Spread 1, Lump Sum Items**	0.0	100%	100%	02-Feb-15 A	31-Jul-15 A
2921		**Construction - Spread 1, Lump sum items (Michels)**	0.0	100%	100%	02-Feb-15 A	31-Jul-15 A
2922	S1W06	Spread 1 - Lump sum Items - Performance Bond/Mud Engi	0.0	100%	100%	02-Feb-15 A	31-Jul-15 A
2923		**Construction - Spread 1, Alden Road**	0.0	0%	0%	19-May-15 A	23-Jun-15 A
2924	S1W06-4C	Reem - 48"	0.0	0%	100%	03-Jun-15 A	16-Jun-15 A
2925	S1W06-4C	Demobilliization From Site	0.0	100%	100%	22-Jun-15 A	23-Jun-15 A
2926	S1W06-4C	Pullback	0.0	100%	100%	19-Jun-15 A	19-Jun-15 A
2927	S1W06-4C	Clean	0.0	100%	100%	17-Jun-15 A	18-Jun-15 A
2928	S1W06-4C	Reem - 36"	0.0	100%	100%	02-Jun-15 A	02-Jun-15 A
2929	S1W06-4C	Pilot Hole	0.0	100%	100%	20-May-15 A	01-Jun-15 A
2930	S1W06-4C	Mobilliization To Site	0.0	100%	100%	19-May-15 A	19-May-15 A
2931		**Construction - Spread 1 - Hot Tap Installation**	0.0	100%	100%	26-Aug-15 A	18-Sep-15 A
2932	S1W08-1650	Backfill location	0.0	0%	100%	09-Sep-15 A	18-Sep-15 A
2933	S1W08-1640	Install Hotline	0.0	0%	100%	04-Sep-15 A	08-Sep-15 A
2934	S1W08-1630	Bacfill for hot line	0.0	0%	100%	03-Sep-15 A	03-Sep-15 A
2935	S1W08-1620	Install piping	0.0	0%	100%	02-Sep-15 A	02-Sep-15 A
2936	S1W08-1610	Remove portion of hotline for pipe install	0.0	0%	100%	01-Sep-15 A	02-Sep-15 A
2937	S1W08-1600	Prefab Activities	0.0	0%	100%	26-Aug-15 A	31-Aug-15 A
2938	S1W08-1590	Excuvate Hot Line	0.0	0%	100%	26-Aug-15 A	31-Aug-15 A
2939	S1W08-1150	Spread 1 - Hot Tap Fitting Instalation	0.0	100%	100%	26-Aug-15 A	18-Sep-15 A
2940		**Construction - Spread 1 - NDE Services**	0.0	100%	100%	07-Jan-15 A	01-Sep-15 A



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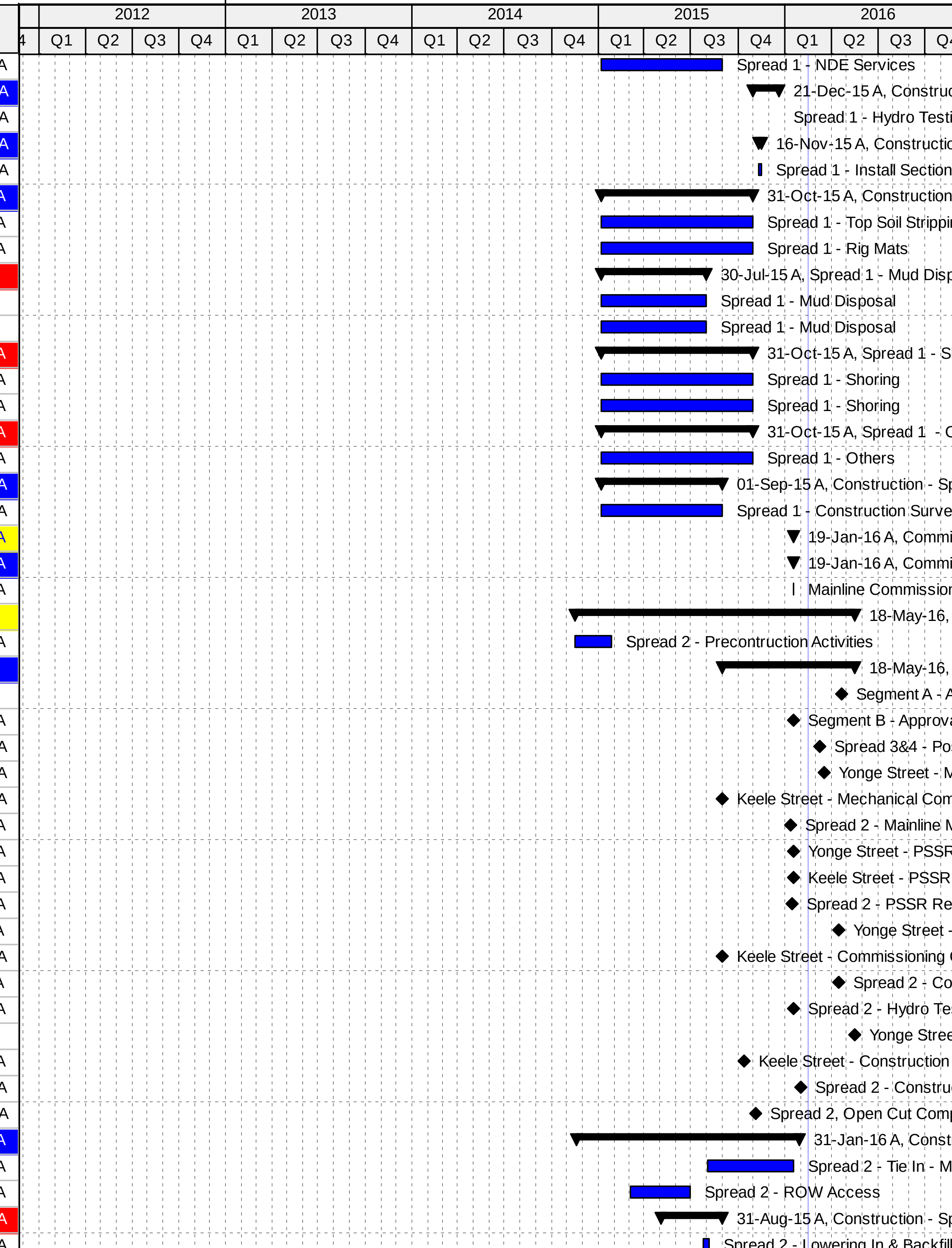
2941	S1W09-1160	Spread 1 - NDE Services	0.0	100%	100%	07-Jan-15 A	01-Sep-15 A
2942	**Construction - Spread 1, Hydro Testing**		0.0	100%	100%	01-Nov-15 A	21-Dec-15 A
2943	S1W10-1130	Spread 1 - Hydro Testing	0.0	100%	100%	01-Nov-15 A	21-Dec-15 A
2944	**Construction - Spread 1 - Block Valves - Final Tie Ins**		0.0	100%	100%	11-Nov-15 A	16-Nov-15 A
2945	S1W11-1170	Spread 1 - Install Sectionalizing Valve @ Sheppard Avenue	0.0	100%	100%	11-Nov-15 A	16-Nov-15 A
2946	**Construction - Spread 1 - UPI**		0.0	100%	100%	07-Jan-15 A	31-Oct-15 A
2947	S1W017-1190	Spread 1 - Top Soil Stripping & Replacement	0.0	100%	100%	07-Jan-15 A	31-Oct-15 A
2948	S1W017-1180	Spread 1 - Rig Mats	0.0	100%	100%	07-Jan-15 A	31-Oct-15 A
2949	**Spread 1 - Mud Disposal**		0.0	100%	100%	07-Jan-15 A	30-Jul-15 A
2950	S1W017-F	Spread 1 - Mud Disposal	0.0	0%	100%	07-Jan-15 A	30-Jul-15 A
2951	S1W017-1	Spread 1 - Mud Disposal	0.0	100%	100%	07-Jan-15 A	30-Jul-15 A
2952	**Spread 1 - Shoring**		0.0	100%	100%	07-Jan-15 A	31-Oct-15 A
2953	S1W017-F	Spread 1 - Shoring	0.0	0%	100%	07-Jan-15 A	31-Oct-15 A
2954	S1W017-1	Spread 1 - Shoring	0.0	100%	100%	07-Jan-15 A	31-Oct-15 A
2955	**Spread 1 - Other UPIs**		0.0	100%	100%	07-Jan-15 A	31-Oct-15 A
2956	S1W017-1	Spread 1 - Others	0.0	100%	100%	07-Jan-15 A	31-Oct-15 A
2957	**Construction - Spread 1 - Construction Survey**		0.0	100%	100%	07-Jan-15 A	01-Sep-15 A
2958	S1W25-1010	Spread 1 - Construction Survey	0.0	100%	100%	07-Jan-15 A	01-Sep-15 A
2959	**Commissioning - Spread 1**		0.0	100%	100%	18-Jan-16 A	19-Jan-16 A
2960	**Commissioning, Spread 1 - Commissioning, Pipeline Section A-2.2.2**		0.0	100%	100%	18-Jan-16 A	19-Jan-16 A
2961	POE322011	Mainline Commissioning - Spread 1	0.0	100%	100%	18-Jan-16 A	19-Jan-16 A
2962	**Construction - Spread 2**		14.5	100%	100%	17-Nov-14 A	18-May-16
2963	S2W04-1140	Spread 2 - Precontruction Activities	0.0	100%	100%	17-Nov-14 A	26-Jan-15 A
2964	**Spread 2, Milestones**		14.5	0%	0%	31-Aug-15 A	18-May-16
2965	MS9280	Segment A - Approvals and Signoff Complete	0.0	0%	0%		22-Apr-16
2966	MS9270	Segment B - Approvals and Signoff Complete	0.0	0%	100%		20-Jan-16 A
2967	MS9260	Spread 3&4 - Post Tie-in Drying Complete	0.0	0%	100%		11-Mar-16 A
2968	MS9180	Yonge Street - Mechanical Complete	0.0	0%	100%		19-Mar-16 A
2969	MS9140	Keele Street - Mechanical Complete	0.0	0%	100%		31-Aug-15 A
2970	MS9110	Spread 2 - Mainline Mechanical Complete	0.0	0%	100%		12-Jan-16 A
2971	MS8060	Yonge Street - PSSR Review and Walkdowns Complete	0.0	0%	100%		18-Jan-16 A
2972	MS8030	Keele Street - PSSR Review and Walkdowns Complete	0.0	0%	100%		18-Jan-16 A
2973	MS8020	Spread 2 - PSSR Review and Walkdowns Complete	0.0	0%	100%		15-Jan-16 A
2974	MS7080	Yonge Street - Commissioning Complete	0.0	0%	100%		16-Apr-16 A
2975	MS7040	Keele Street - Commissioning Complete	0.0	0%	100%		31-Aug-15 A
2976	MS6020	Spread 2 - Commissioning Complete	0.0	0%	100%		16-Apr-16 A
2977	MS5020	Spread 2 - Hydro Test Complete	0.0	0%	100%		19-Jan-16 A
2978	MS4080	Yonge Street - Construction Complete	0.0	0%	0%		18-May-16
2979	MS4040	Keele Street - Construction Complete	0.0	0%	100%		14-Oct-15 A
2980	MS3020	Spread 2 - Construction Complete	0.0	0%	100%		02-Feb-16 A
2981	MILS2-1080	Spread 2, Open Cut Completion	0.0	100%	100%		06-Nov-15 A
2982	**Construction - Spread 2, Pipeline**		0.0	100%	100%	18-Nov-14 A	31-Jan-16 A
2983	S2W01-1410	Spread 2 - Tie In - Mainline	0.0	100%	100%	04-Aug-15 A	20-Jan-16 A
2984	S2W01-1160	Spread 2 - ROW Access	0.0	100%	100%	04-Mar-15 A	30-Jun-15 A
2985	**Construction - Spread 2 Mainline - KP - 15+222 - 0+000**		0.0	0%	0%	04-May-15 A	31-Aug-15 A
2986	S2W01-1:	Spread 2 - Lowering In & Backfill	0.0	100%	100%	25-Jul-15 A	06-Aug-15 A



Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

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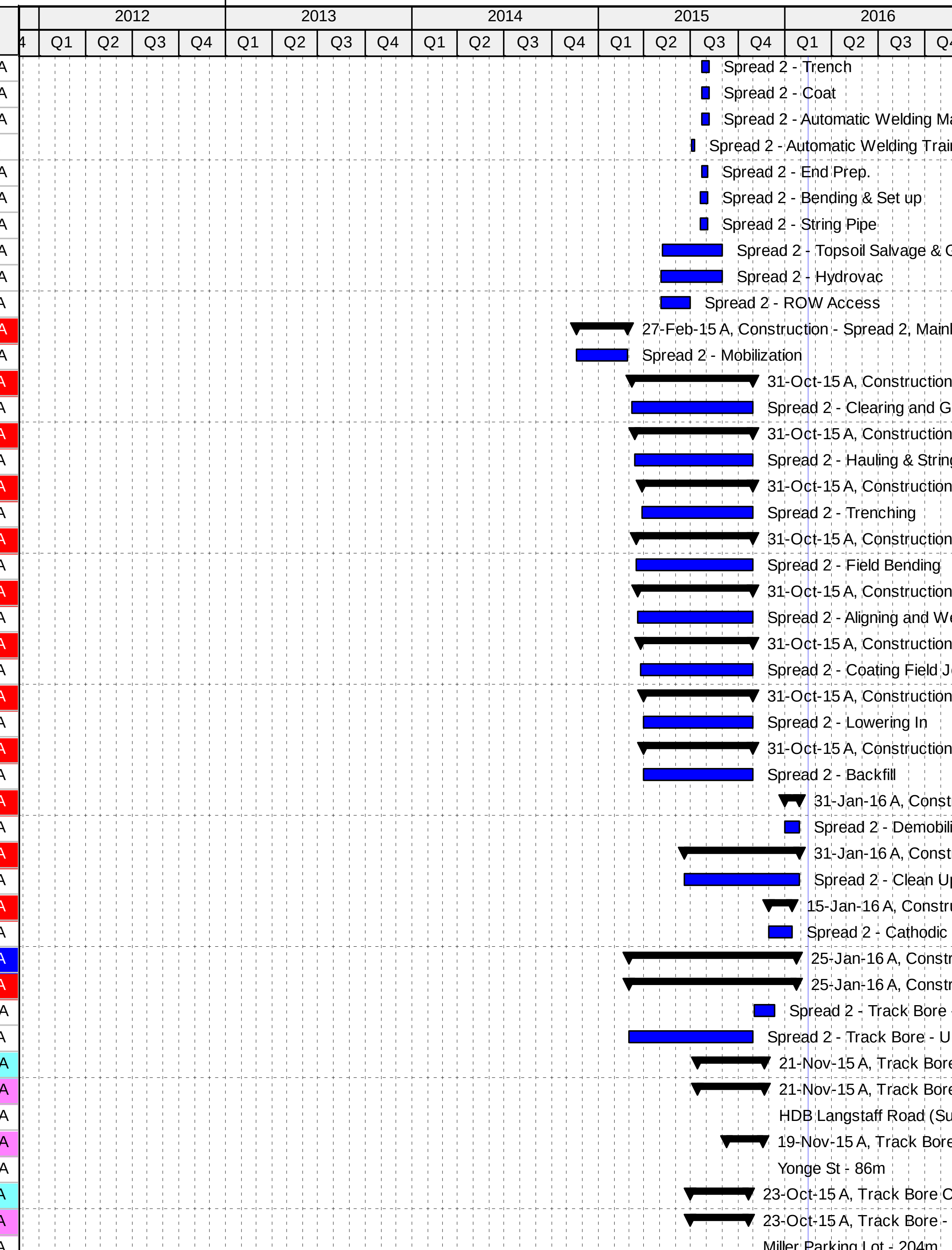
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
2987	S2W01-13	Spread 2 - Trench	0.0	100%	100%	23-Jul-15 A	06-Aug-15 A
2988	S2W01-13	Spread 2 - Coat	0.0	100%	100%	22-Jul-15 A	05-Aug-15 A
2989	S2W01-13	Spread 2 - Automatic Welding Mainline	0.0	100%	100%	22-Jul-15 A	05-Aug-15 A
2990	S2W01-13	Spread 2 - Automatic Welding Training & Testing	0.0	100%	100%	03-Jul-15 A	10-Jul-15 A
2991	S2W01-13	Spread 2 - End Prep.	0.0	100%	100%	22-Jul-15 A	04-Aug-15 A
2992	S2W01-13	Spread 2 - Bending & Set up	0.0	100%	100%	21-Jul-15 A	04-Aug-15 A
2993	S2W01-13	Spread 2 - String Pipe	0.0	100%	100%	21-Jul-15 A	04-Aug-15 A
2994	S2W01-13	Spread 2 - Topsoil Salvage & Grade	0.0	100%	100%	06-May-15 A	31-Aug-15 A
2995	S2W01-13	Spread 2 - Hydrovac	0.0	100%	100%	05-May-15 A	31-Aug-15 A
2996	S2W01-12	Spread 2 - ROW Access	0.0	100%	100%	04-May-15 A	30-Jun-15 A
2997		**Construction - Spread 2, Mainline**	0.0	100%	100%	18-Nov-14 A	27-Feb-15 A
2998	S2W01-11	Spread 2 - Mobilization	0.0	100%	100%	18-Nov-14 A	27-Feb-15 A
2999		**Construction - Spread 2, Block Valve Installation**	0.0	100%	100%	09-Mar-15 A	31-Oct-15 A
3000	S2W01-11	Spread 2 - Clearing and Grading	0.0	100%	100%	09-Mar-15 A	31-Oct-15 A
3001		**Construction - Spread 2, HDD Support**	0.0	100%	100%	13-Mar-15 A	31-Oct-15 A
3002	S2W01-11	Spread 2 - Hauling & Stringing	0.0	100%	100%	13-Mar-15 A	31-Oct-15 A
3003		**Construction - Spread 2, Survey and locates**	0.0	100%	100%	28-Mar-15 A	31-Oct-15 A
3004	S2W01-12	Spread 2 - Trenching	0.0	100%	100%	28-Mar-15 A	31-Oct-15 A
3005		**Construction - Spread 2 - Field Bending**	0.0	100%	100%	17-Mar-15 A	31-Oct-15 A
3006	S2W01-11	Spread 2 - Field Bending	0.0	100%	100%	17-Mar-15 A	31-Oct-15 A
3007		**Construction - Spread 2 - Aligning and Welding**	0.0	100%	100%	20-Mar-15 A	31-Oct-15 A
3008	S2W01-12	Spread 2 - Aligning and Welding	0.0	100%	100%	20-Mar-15 A	31-Oct-15 A
3009		**Construction - Spread 2 - Coating Field Joints and Coating Repairs**	0.0	100%	100%	24-Mar-15 A	31-Oct-15 A
3010	S2W01-12	Spread 2 - Coating Field Joints and Coating Repairs	0.0	100%	100%	24-Mar-15 A	31-Oct-15 A
3011		**Construction - Spread 2 - Lowering In**	0.0	100%	100%	30-Mar-15 A	31-Oct-15 A
3012	S2W01-12	Spread 2 - Lowering In	0.0	100%	100%	30-Mar-15 A	31-Oct-15 A
3013		**Construction - Spread 2 - Backfill**	0.0	100%	100%	30-Mar-15 A	31-Oct-15 A
3014	S2W01-12	Spread 2 - Backfill	0.0	100%	100%	30-Mar-15 A	31-Oct-15 A
3015		**Construction - Spread 2 - Demobilization**	0.0	100%	100%	01-Jan-16 A	31-Jan-16 A
3016	S2W01-12	Spread 2 - Demobilization	0.0	100%	100%	01-Jan-16 A	31-Jan-16 A
3017		**Construction - Spread 2 - Clean-up and Restoration**	0.0	100%	100%	18-Jun-15 A	31-Jan-16 A
3018	S2W01-12	Spread 2 - Clean Up	0.0	100%	100%	18-Jun-15 A	31-Jan-16 A
3019		**Construction - Spread 2 - Cathodic Protection**	0.0	0%	0%	01-Dec-15 A	15-Jan-16 A
3020	S2W01-PC	Spread 2 - Cathodic Protection	0.0	0%	100%	01-Dec-15 A	15-Jan-16 A
3021		**Construction - Spread 2, Crossings**	0.0	100%	100%	01-Mar-15 A	25-Jan-16 A
3022		**Construction - Spread 2, Track Bore**	0.0	100%	100%	01-Mar-15 A	25-Jan-16 A
3023	S2W02-PC	Spread 2 - Track Bore - UPI	0.0	0%	100%	02-Nov-15 A	12-Dec-15 A
3024	S2W02-11	Spread 2 - Track Bore - UPI (71%)	0.0	100%	100%	01-Mar-15 A	31-Oct-15 A
3025		**Track Bore Crew #2 - NPS 36 Spread 2**	0.0	0%	0%	14-Jul-15 A	21-Nov-15 A
3026		**Track Bore - Langstaf f Rd (Sussex Ave) - 58m**	0.0	0%	0%	14-Jul-15 A	21-Nov-15 A
3027	S2W	HDB Langstaff Road (Sussex Ave.) - 45m	0.0	0%	100%	14-Jul-15 A	21-Nov-15 A
3028		**Track Bore - Yonge St - 93m (KP 8.16) (SL/SP)**	0.0	0%	0%	08-Sep-15 A	19-Nov-15 A
3029	S2W	Yonge St - 86m	0.0	0%	100%	08-Sep-15 A	19-Nov-15 A
3030		**Track Bore Crew #3 - NPS 36 Spread 2**	0.0	0%	0%	01-Jul-15 A	23-Oct-15 A
3031		**Track Bore - Woodbine Ave & Burncrest - 220m**	0.0	0%	0%	01-Jul-15 A	23-Oct-15 A
3032	S2W	Miller Parking Lot - 204m	0.0	0%	100%	01-Jul-15 A	23-Oct-15 A



Actual Work | Critical Remaining Work | Summary
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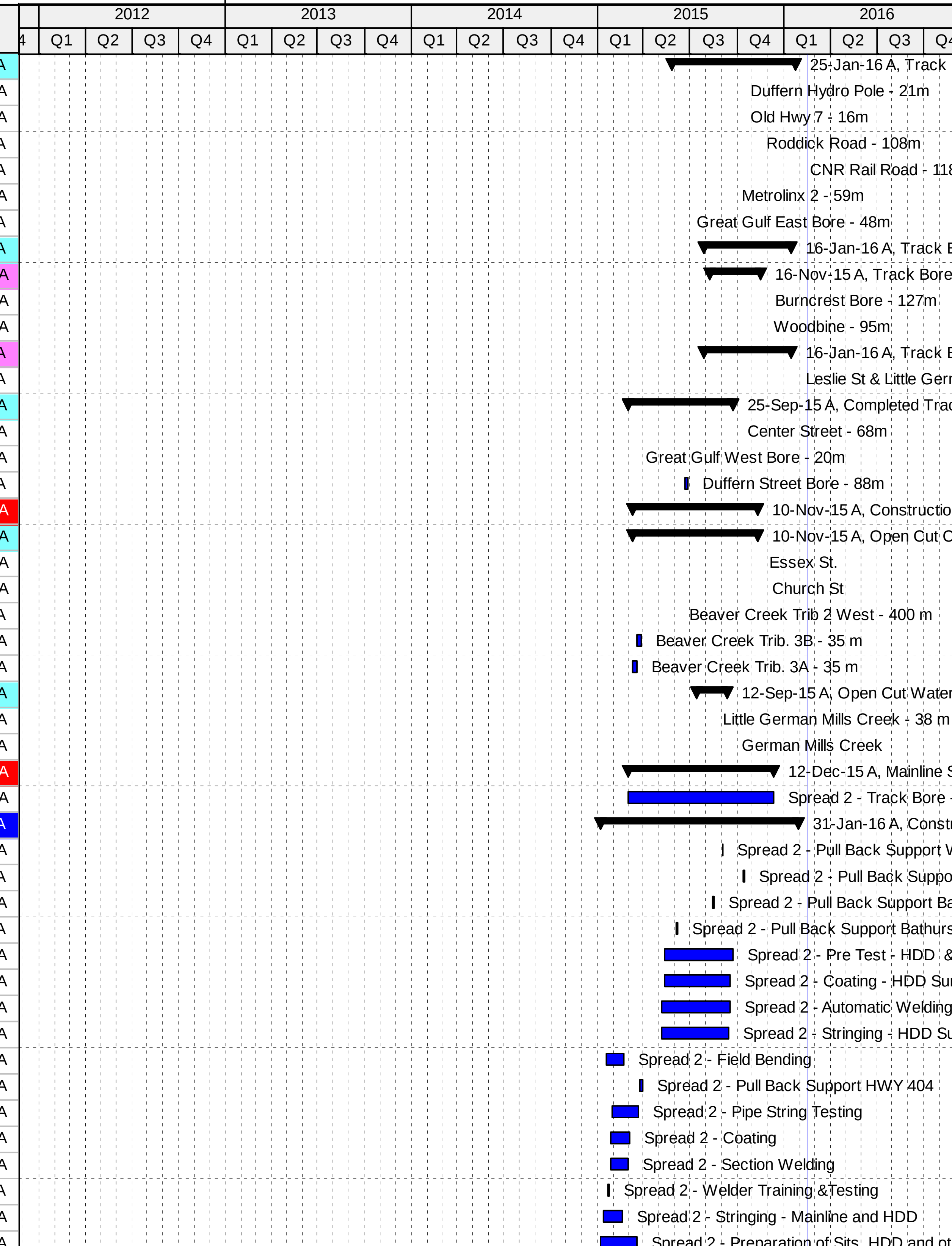
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3033		**Track Bore Crew #4 - NPS 36 Spread 2**	0.0	0%	0%	26-May-15 A	25-Jan-16 A
3034	S2W02	Duffern Hydro Pole - 21m	0.0	0%	100%	26-Sep-15 A	30-Sep-15 A
3035	S2W02	Old Hwy 7 - 16m	0.0	0%	100%	26-Sep-15 A	30-Sep-15 A
3036	S2W02	Roddick Road - 108m	0.0	100%	100%	21-Jul-15 A	30-Oct-15 A
3037	S2W02	CNR Rail Road - 118m (Keele)	0.0	100%	100%	24-Jun-15 A	25-Jan-16 A
3038	S2W02	Metrolinx 2 - 59m	0.0	100%	100%	02-Jul-15 A	12-Sep-15 A
3039	S2W02	Great Gulf East Bore - 48m	0.0	100%	100%	26-May-15 A	15-Jun-15 A
3040		**Track Bore Crew #6 - NPS 36 Spread 2**	0.0	0%	0%	28-Jul-15 A	16-Jan-16 A
3041		**Track Bore - Miller Parking Lots & Hydro Lines - 210m**	0.0	0%	0%	08-Aug-15 A	16-Nov-15 A
3042	S2W	Burncrest Bore - 127m	0.0	0%	100%	19-Oct-15 A	16-Nov-15 A
3043	S2W	Woodbine - 95m	0.0	0%	100%	08-Aug-15 A	12-Nov-15 A
3044		**Track Bore - Leslie St & Little German Mills Trib 1 - 25**	0.0	0%	0%	28-Jul-15 A	16-Jan-16 A
3045	S2W	Leslie St & Little German Mills Trib 1 - 250m	0.0	0%	100%	28-Jul-15 A	16-Jan-16 A
3046		**Completed Track Bore Spread 2**	0.0	0%	0%	01-Mar-15 A	25-Sep-15 A
3047	S2W02	Center Street - 68m	0.0	100%	100%	25-Jun-15 A	25-Sep-15 A
3048	S2W02	Great Gulf West Bore - 20m	0.0	100%	100%	01-Mar-15 A	09-Mar-15 A
3049	S2W02	Duffern Street Bore - 88m	0.0	100%	100%	21-Jun-15 A	27-Jun-15 A
3050		**Construction - Spread 2, Open Cut**	0.0	0%	0%	10-Mar-15 A	10-Nov-15 A
3051		**Open Cut Crossings Crew #1 - NPS 36 Spread 2**	0.0	0%	0%	10-Mar-15 A	10-Nov-15 A
3052	S2W02	Essex St.	0.0	0%	100%	23-Oct-15 A	05-Nov-15 A
3053	S2W02	Church St	0.0	100%	100%	02-Nov-15 A	10-Nov-15 A
3054	S2W02	Beaver Creek Trib 2 West - 400 m	0.0	100%	100%	22-May-15 A	02-Jun-15 A
3055	S2W02	Beaver Creek Trib. 3B - 35 m	0.0	100%	100%	20-Mar-15 A	27-Mar-15 A
3056	S2W02	Beaver Creek Trib. 3A - 35 m	0.0	100%	100%	10-Mar-15 A	19-Mar-15 A
3057		**Open Cut Watercourse Crew #2 - NPS 36 Spread 2**	0.0	0%	0%	13-Jul-15 A	12-Sep-15 A
3058	S2W02	Little German Mills Creek - 38 m	0.0	100%	100%	13-Jul-15 A	06-Aug-15 A
3059	S2W02	German Mills Creek	0.0	100%	100%	31-Aug-15 A	12-Sep-15 A
3060		**Mainline Spread 2 Track Bore base lay**	0.0	100%	100%	01-Mar-15 A	12-Dec-15 A
3061	S2W02-11	Spread 2 - Track Bore - Base Lay	0.0	100%	100%	01-Mar-15 A	12-Dec-15 A
3062		**Construction - Spread 2, HDD Support**	0.0	100%	100%	06-Jan-15 A	31-Jan-16 A
3063	S2W04-1650	Spread 2 - Pull Back Support West Don River	0.0	100%	100%	03-Sep-15 A	04-Sep-15 A
3064	S2W04-1640	Spread 2 - Pull Back Support Pomona	0.0	100%	100%	13-Oct-15 A	16-Oct-15 A
3065	S2W04-1630	Spread 2 - Pull Back Support Bayview	0.0	100%	100%	15-Aug-15 A	17-Aug-15 A
3066	S2W04-1620	Spread 2 - Pull Back Support Bathurst St .	0.0	100%	100%	04-Jun-15 A	06-Jun-15 A
3067	S2W04-1610	Spread 2 - Pre Test - HDD & Bore Summer Construction	0.0	100%	100%	13-May-15 A	25-Sep-15 A
3068	S2W04-1600	Spread 2 - Coating - HDD Summer Construction	0.0	100%	100%	11-May-15 A	19-Sep-15 A
3069	S2W04-1590	Spread 2 - Automatic Welding - HDD Summer Construction	0.0	100%	100%	07-May-15 A	17-Sep-15 A
3070	S2W04-1580	Spread 2 - Stringing - HDD Summer Construction	0.0	100%	100%	06-May-15 A	15-Sep-15 A
3071	S2W04-1550	Spread 2 - Field Bending	0.0	100%	100%	17-Jan-15 A	21-Feb-15 A
3072	S2W04-1230	Spread 2 - Pull Back Support HWY 404	0.0	100%	100%	26-Mar-15 A	30-Mar-15 A
3073	S2W04-1220	Spread 2 - Pipe String Testing	0.0	100%	100%	29-Jan-15 A	23-Mar-15 A
3074	S2W04-1210	Spread 2 - Coating	0.0	100%	100%	27-Jan-15 A	04-Mar-15 A
3075	S2W04-1200	Spread 2 - Section Welding	0.0	100%	100%	26-Jan-15 A	02-Mar-15 A
3076	S2W04-1190	Spread 2 - Welder Training &Testing	0.0	100%	100%	20-Jan-15 A	24-Jan-15 A
3077	S2W04-1180	Spread 2 - Stringing - Mainline and HDD	0.0	100%	100%	13-Jan-15 A	18-Feb-15 A
3078	S2W04-1170	Spread 2 - Preparation of Sits, HDD and other Crossings	0.0	100%	100%	08-Jan-15 A	20-Mar-15 A



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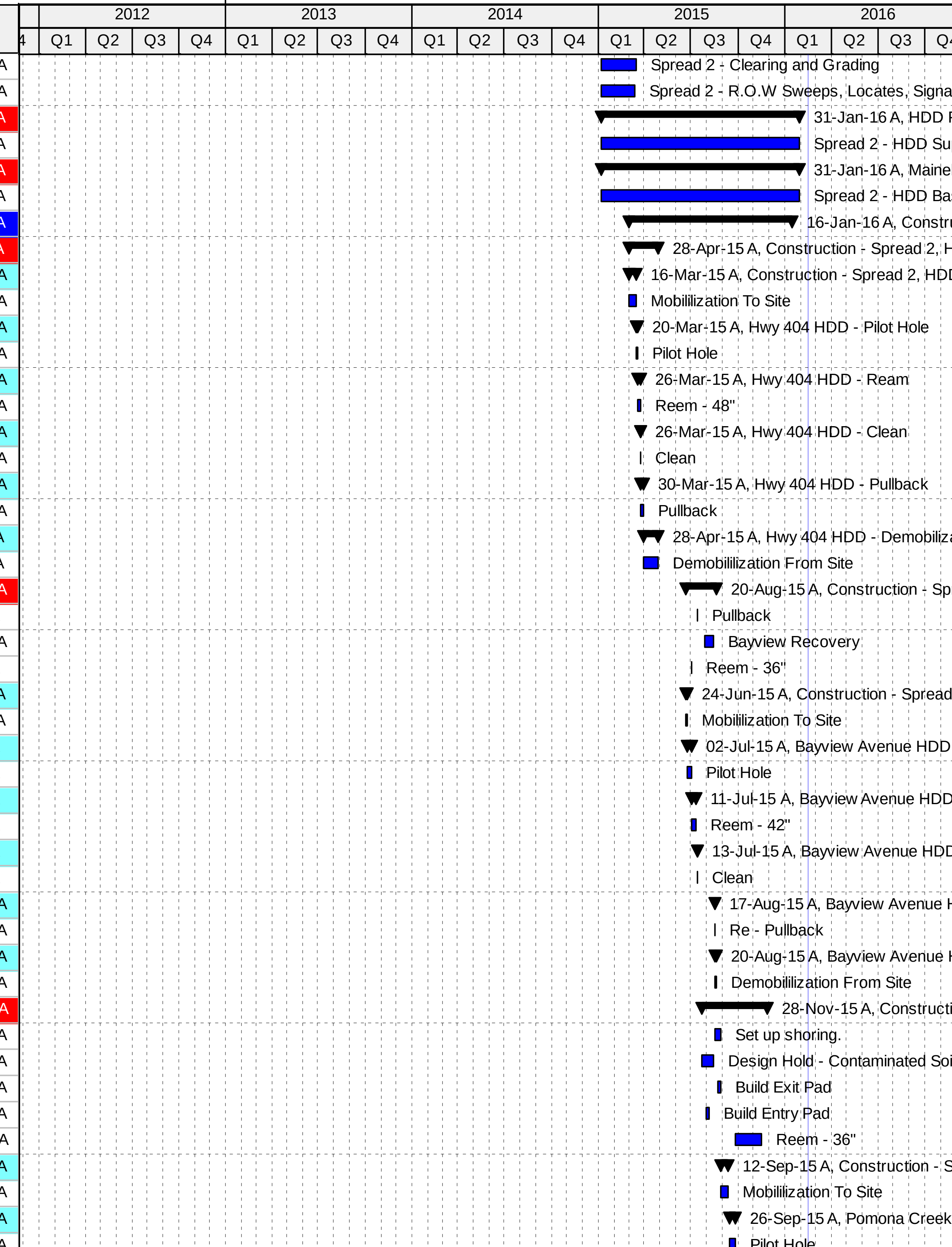
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3079	S2W04-1160	Spread 2 - Clearing and Grading	0.0	100%	100%	07-Jan-15 A	18-Mar-15 A
3080	S2W04-1150	Spread 2 - R.O.W Sweeps, Locates, Signage	0.0	100%	100%	06-Jan-15 A	13-Mar-15 A
3081		**HDD Pad Ramp; Right of Way Preparation**	0.0	100%	100%	06-Jan-15 A	31-Jan-16 A
3082	S2W04-11	Spread 2 - HDD Support	0.0	100%	100%	06-Jan-15 A	31-Jan-16 A
3083		**Maineline Spread 2 HDD base lay**	0.0	100%	100%	06-Jan-15 A	31-Jan-16 A
3084	S2W04-15	Spread 2 - HDD Base Lay	0.0	100%	100%	06-Jan-15 A	31-Jan-16 A
3085		**Construction - Spread 2, Horizontal Directional Drilling (HDD)**	0.0	100%	100%	03-Mar-15 A	16-Jan-16 A
3086		**Construction - Spread 2, HDD 3: Highway 404**	0.0	100%	100%	03-Mar-15 A	28-Apr-15 A
3087		**Construction - Spread 2, HDD 3: Highway 404**	0.0	100%	100%	03-Mar-15 A	16-Mar-15 A
3088	S2W06	Mobilliization To Site	0.0	100%	100%	03-Mar-15 A	16-Mar-15 A
3089		**Hwy 404 HDD - Pilot Hole**	0.0	100%	100%	16-Mar-15 A	20-Mar-15 A
3090	S2W06	Pilot Hole	0.0	100%	100%	16-Mar-15 A	20-Mar-15 A
3091		**Hwy 404 HDD - Ream**	0.0	100%	100%	20-Mar-15 A	26-Mar-15 A
3092	S2W06	Reem - 48"	0.0	100%	100%	20-Mar-15 A	26-Mar-15 A
3093		**Hwy 404 HDD - Clean**	0.0	100%	100%	26-Mar-15 A	26-Mar-15 A
3094	S2W06	Clean	0.0	100%	100%	26-Mar-15 A	26-Mar-15 A
3095		**Hwy 404 HDD - Pullback**	0.0	100%	100%	26-Mar-15 A	30-Mar-15 A
3096	S2W06	Pullback	0.0	100%	100%	26-Mar-15 A	30-Mar-15 A
3097		**Hwy 404 HDD - Demobilization from site**	0.0	100%	100%	31-Mar-15 A	28-Apr-15 A
3098	S2W06	Demobilliization From Site	0.0	100%	100%	31-Mar-15 A	28-Apr-15 A
3099		**Construction - Spread 2, Bayview Avenue - Rig # 1**	0.0	100%	100%	22-Jun-15 A	20-Aug-15 A
3100	S2W06-4C	Pullback	0.0	100%	100%	14-Jul-15 A	15-Jul-15 A
3101	S2W06-4C	Bayview Recovery	0.0	100%	100%	29-Jul-15 A	15-Aug-15 A
3102	S2W06-11	Reem - 36"	0.0	100%	100%	02-Jul-15 A	03-Jul-15 A
3103		**Construction - Spread 2, HDD 4: Bayview Avenue**	0.0	100%	100%	22-Jun-15 A	24-Jun-15 A
3104	S2W06	Mobilliization To Site	0.0	100%	100%	22-Jun-15 A	24-Jun-15 A
3105		**Bayview Avenue HDD - Pilot Hole**	0.0	100%	100%	25-Jun-15 A	02-Jul-15 A
3106	S2W06	Pilot Hole	0.0	100%	100%	25-Jun-15 A	02-Jul-15 A
3107		**Bayview Avenue HDD - Ream**	0.0	100%	100%	03-Jul-15 A	11-Jul-15 A
3108	S2W06	Reem - 42"	0.0	100%	100%	03-Jul-15 A	11-Jul-15 A
3109		**Bayview Avenue HDD - Clean**	0.0	100%	100%	13-Jul-15 A	13-Jul-15 A
3110	S2W06	Clean	0.0	100%	100%	13-Jul-15 A	13-Jul-15 A
3111		**Bayview Avenue HDD - Pullback**	0.0	100%	100%	17-Aug-15 A	17-Aug-15 A
3112	S2W06	Re - Pullback	0.0	100%	100%	17-Aug-15 A	17-Aug-15 A
3113		**Bayview Avenue HDD - Demobilization from site**	0.0	100%	100%	18-Aug-15 A	20-Aug-15 A
3114	S2W06	Demobilliization From Site	0.0	100%	100%	18-Aug-15 A	20-Aug-15 A
3115		**Construction - Spread 2, Pomona Creek - Rig # 1**	0.0	100%	100%	24-Jul-15 A	28-Nov-15 A
3116	S2W06-41	Set up shoring.	0.0	0%	100%	19-Aug-15 A	29-Aug-15 A
3117	S2W06-41	Design Hold - Contaminated Soil Issues	0.0	0%	100%	24-Jul-15 A	14-Aug-15 A
3118	S2W06-41	Build Exit Pad	0.0	0%	100%	22-Aug-15 A	29-Aug-15 A
3119	S2W06-41	Build Entry Pad	0.0	0%	100%	31-Jul-15 A	07-Aug-15 A
3120	S2W06-12	Reem - 36"	0.0	100%	100%	28-Sep-15 A	16-Nov-15 A
3121		**Construction - Spread 2, HDD 5: Pomona Creek**	0.0	100%	100%	29-Aug-15 A	12-Sep-15 A
3122	S2W06	Mobilliization To Site	0.0	100%	100%	29-Aug-15 A	12-Sep-15 A
3123		**Pomona Creek HDD - Pilot Hole**	0.0	100%	100%	14-Sep-15 A	26-Sep-15 A
3124	S2W06	Pilot Hole	0.0	100%	100%	14-Sep-15 A	26-Sep-15 A



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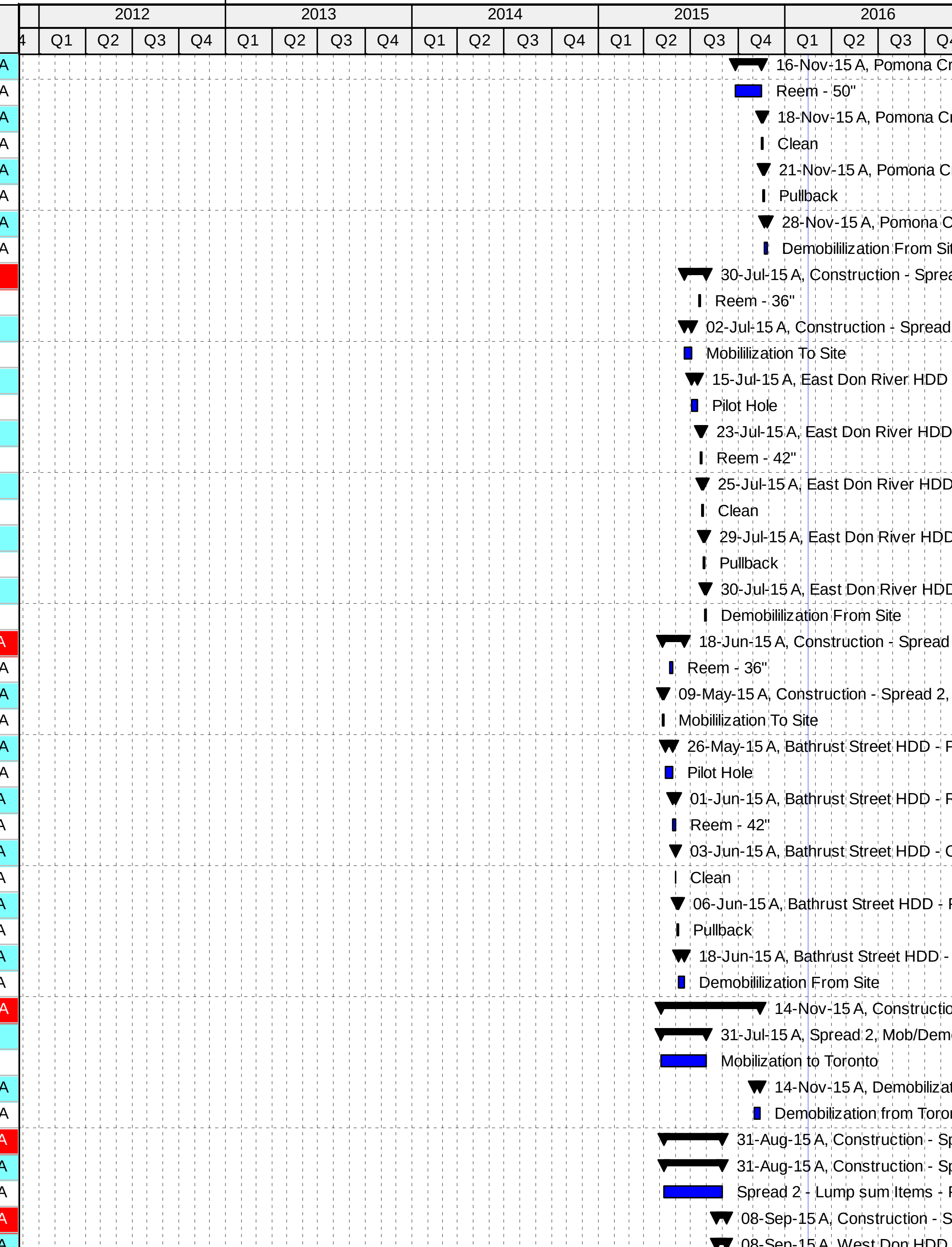
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3125		**Pomona Creek HDD - Ream**	0.0	100%	100%	28-Sep-15 A	16-Nov-15 A
3126	S2W06	Reem - 50"	0.0	100%	100%	28-Sep-15 A	16-Nov-15 A
3127		**Pomona Creek HDD - Clean**	0.0	100%	100%	16-Nov-15 A	18-Nov-15 A
3128	S2W06	Clean	0.0	100%	100%	16-Nov-15 A	18-Nov-15 A
3129		**Pomona Creek HDD - Pullback**	0.0	100%	100%	19-Nov-15 A	21-Nov-15 A
3130	S2W06	Pullback	0.0	100%	100%	19-Nov-15 A	21-Nov-15 A
3131		**Pomona Creek HDD - Demobilization from site**	0.0	100%	100%	23-Nov-15 A	28-Nov-15 A
3132	S2W06	Demobilliization From Site	0.0	100%	100%	23-Nov-15 A	28-Nov-15 A
3133		**Construction - Spread 2, East Don River - Rig # 2**	0.0	100%	100%	18-Jun-15 A	30-Jul-15 A
3134	S2W06-14	Reem - 36"	0.0	100%	100%	16-Jul-15 A	20-Jul-15 A
3135		**Construction - Spread 2, HDD 6: East Don River**	0.0	100%	100%	18-Jun-15 A	02-Jul-15 A
3136	S2W06	Mobillization To Site	0.0	100%	100%	18-Jun-15 A	02-Jul-15 A
3137		**East Don River HDD - Pilot Hole**	0.0	100%	100%	02-Jul-15 A	15-Jul-15 A
3138	S2W06	Pilot Hole	0.0	100%	100%	02-Jul-15 A	15-Jul-15 A
3139		**East Don River HDD - Ream**	0.0	100%	100%	21-Jul-15 A	23-Jul-15 A
3140	S2W06	Reem - 42"	0.0	100%	100%	21-Jul-15 A	23-Jul-15 A
3141		**East Don River HDD - Clean**	0.0	100%	100%	24-Jul-15 A	25-Jul-15 A
3142	S2W06	Clean	0.0	100%	100%	24-Jul-15 A	25-Jul-15 A
3143		**East Don River HDD - Pullback**	0.0	100%	100%	27-Jul-15 A	29-Jul-15 A
3144	S2W06	Pullback	0.0	100%	100%	27-Jul-15 A	29-Jul-15 A
3145		**East Don River HDD - Demobilization from site**	0.0	100%	100%	29-Jul-15 A	30-Jul-15 A
3146	S2W06	Demobilliization From Site	0.0	100%	100%	29-Jul-15 A	30-Jul-15 A
3147		**Construction - Spread 2, Bathrust Street - Rig # 2**	0.0	100%	100%	08-May-15 A	18-Jun-15 A
3148	S2W06-13	Reem - 36"	0.0	100%	100%	20-May-15 A	26-May-15 A
3149		**Construction - Spread 2, HDD 7: Bathrust Street**	0.0	100%	100%	08-May-15 A	09-May-15 A
3150	S2W06	Mobillization To Site	0.0	100%	100%	08-May-15 A	09-May-15 A
3151		**Bathrust Street HDD - Pilot Hole**	0.0	100%	100%	11-May-15 A	26-May-15 A
3152	S2W06	Pilot Hole	0.0	100%	100%	11-May-15 A	26-May-15 A
3153		**Bathrust Street HDD - Ream**	0.0	100%	100%	27-May-15 A	01-Jun-15 A
3154	S2W06	Reem - 42"	0.0	100%	100%	27-May-15 A	01-Jun-15 A
3155		**Bathrust Street HDD - Clean**	0.0	100%	100%	02-Jun-15 A	03-Jun-15 A
3156	S2W06	Clean	0.0	100%	100%	02-Jun-15 A	03-Jun-15 A
3157		**Bathrust Street HDD - Pullback**	0.0	100%	100%	04-Jun-15 A	06-Jun-15 A
3158	S2W06	Pullback	0.0	100%	100%	04-Jun-15 A	06-Jun-15 A
3159		**Bathrust Street HDD - Demobilization from site**	0.0	100%	100%	08-Jun-15 A	18-Jun-15 A
3160	S2W06	Demobilliization From Site	0.0	100%	100%	08-Jun-15 A	18-Jun-15 A
3161		**Construction - Spread 2, Mob/ Demob to Toronto (Michels)**	0.0	100%	100%	04-May-15 A	14-Nov-15 A
3162		**Spread 2, Mob/Demob to Toronto (Michels)**	0.0	100%	100%	04-May-15 A	31-Jul-15 A
3163	S2W06	Mobilization to Toronto	0.0	100%	100%	04-May-15 A	31-Jul-15 A
3164		**Demobilization to Toronto (Michels)**	0.0	100%	100%	02-Nov-15 A	14-Nov-15 A
3165	S2W06	Demobilization from Toronto	0.0	100%	100%	02-Nov-15 A	14-Nov-15 A
3166		**Construction - Spread 2, Lump Sum Items**	0.0	100%	100%	11-May-15 A	31-Aug-15 A
3167		**Construction - Spread 2, Lump sum items - Performance Bond An**	0.0	100%	100%	11-May-15 A	31-Aug-15 A
3168	S2W06	Spread 2 - Lump sum Items - Performance Bond/Mud Engi	0.0	100%	100%	11-May-15 A	31-Aug-15 A
3169		**Construction - Spread 2, West Don River - Rig # 1**	0.0	100%	100%	20-Aug-15 A	08-Sep-15 A
3170		**West Don HDD Drill**	0.0	100%	100%	20-Aug-15 A	08-Sep-15 A



Actual Work | Critical Remaining Work | Summary
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TASK filter: All Activities

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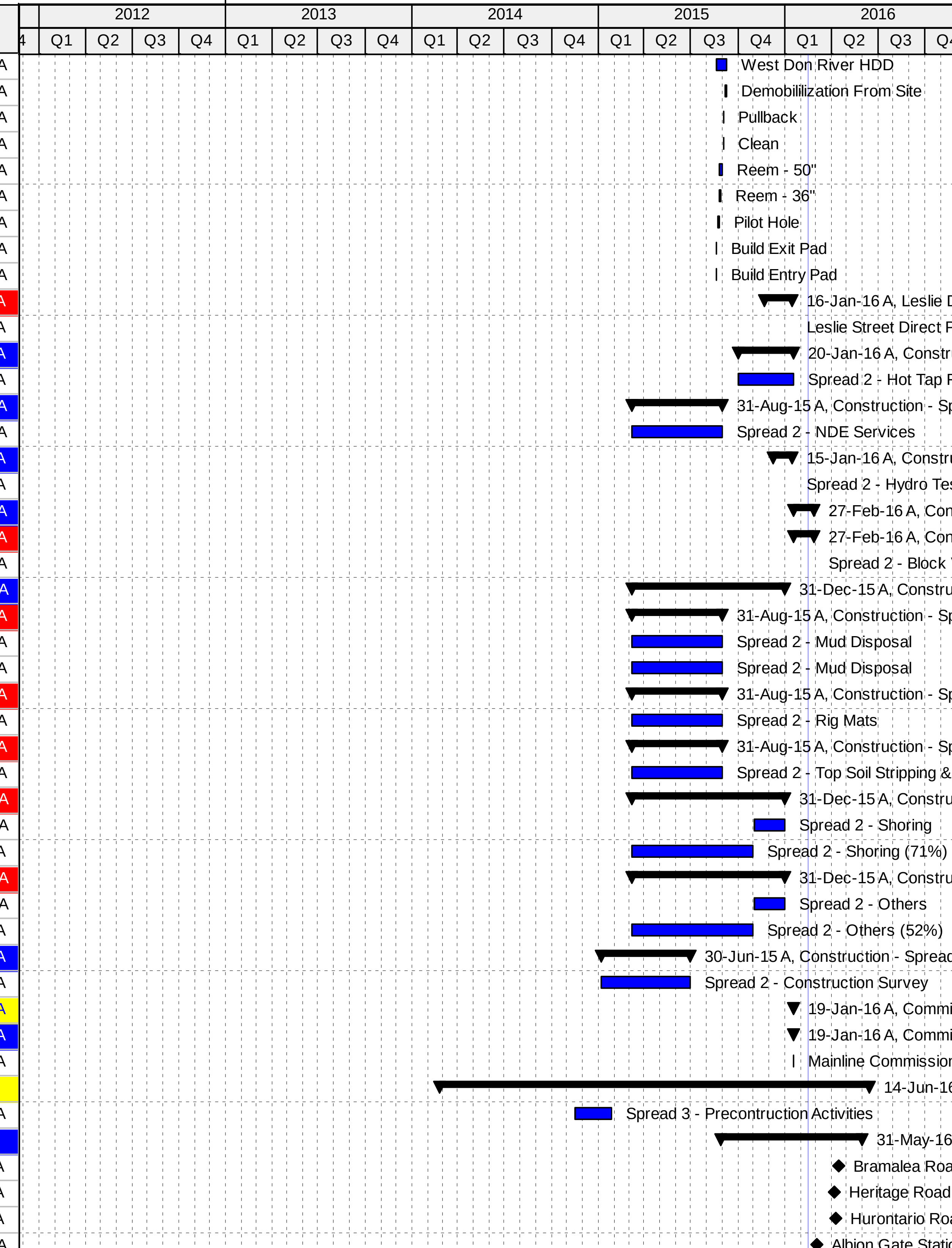
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3171	S2W06	West Don River HDD	0.0	100%	100%	20-Aug-15 A	08-Sep-15 A
3172	S2W06	Demobilliization From Site	0.0	100%	100%	05-Sep-15 A	08-Sep-15 A
3173	S2W06	Pullback	0.0	100%	100%	03-Sep-15 A	04-Sep-15 A
3174	S2W06	Clean	0.0	100%	100%	03-Sep-15 A	03-Sep-15 A
3175	S2W06	Reem - 50"	0.0	100%	100%	27-Aug-15 A	02-Sep-15 A
3176	S2W06	Reem - 36"	0.0	100%	100%	26-Aug-15 A	28-Aug-15 A
3177	S2W06	Pilot Hole	0.0	100%	100%	22-Aug-15 A	25-Aug-15 A
3178	S2W06	Build Exit Pad	0.0	100%	100%	20-Aug-15 A	21-Aug-15 A
3179	S2W06	Build Entry Pad	0.0	100%	100%	20-Aug-15 A	21-Aug-15 A
3180	**Leslie Direct Pipe**		0.0	0%	0%	21-Nov-15 A	16-Jan-16 A
3181	S2W06-P(	Leslie Street Direct Pipe	0.0	0%	100%	21-Nov-15 A	16-Jan-16 A
3182	**Construction - Spread 2 - Hot Tap Installation**		0.0	100%	100%	01-Oct-15 A	20-Jan-16 A
3183	S2W08-1290	Spread 2 - Hot Tap Fitting	0.0	100%	100%	01-Oct-15 A	20-Jan-16 A
3184	**Construction - Spread 2 - NDE Services**		0.0	100%	100%	09-Mar-15 A	31-Aug-15 A
3185	S2W09-1300	Spread 2 - NDE Services	0.0	100%	100%	09-Mar-15 A	31-Aug-15 A
3186	**Construction - Spread 2, Hydro Testing**		0.0	100%	100%	09-Dec-15 A	15-Jan-16 A
3187	S2W10-1270	Spread 2 - Hydro Testing	0.0	100%	100%	09-Dec-15 A	15-Jan-16 A
3188	**Construction - Spread 2 - Block Valves**		0.0	0%	0%	18-Jan-16 A	27-Feb-16 A
3189	**Construction - Spread 2 - Block Valves**		0.0	0%	0%	18-Jan-16 A	27-Feb-16 A
3190	S2W11-13	Spread 2 - Block Valves	0.0	100%	100%	18-Jan-16 A	27-Feb-16 A
3191	**Construction - Spread 2 - UPI**		0.0	100%	100%	09-Mar-15 A	31-Dec-15 A
3192	**Construction - Spread 2 - Mud Disposal**		0.0	100%	100%	09-Mar-15 A	31-Aug-15 A
3193	S2W17-P(	Spread 2 - Mud Disposal	0.0	0%	100%	09-Mar-15 A	31-Aug-15 A
3194	S2W17-1:	Spread 2 - Mud Disposal	0.0	100%	100%	09-Mar-15 A	31-Aug-15 A
3195	**Construction - Spread 2 - Rig Mats**		0.0	100%	100%	09-Mar-15 A	31-Aug-15 A
3196	S2W17-1:	Spread 2 - Rig Mats	0.0	100%	100%	09-Mar-15 A	31-Aug-15 A
3197	**Construction - Spread 2 - Top soil stripping and Replacement**		0.0	100%	100%	09-Mar-15 A	31-Aug-15 A
3198	S2W17-1:	Spread 2 - Top Soil Stripping & Replacement	0.0	100%	100%	09-Mar-15 A	31-Aug-15 A
3199	**Construction - Spread 2 - Shoring**		0.0	100%	100%	09-Mar-15 A	31-Dec-15 A
3200	S2W17-P(	Spread 2 - Shoring	0.0	0%	100%	02-Nov-15 A	31-Dec-15 A
3201	S2W17-1:	Spread 2 - Shoring (71%)	0.0	100%	100%	09-Mar-15 A	31-Oct-15 A
3202	**Construction - Spread 2 - Oher UPIs**		0.0	100%	100%	09-Mar-15 A	31-Dec-15 A
3203	S2W17-P(	Spread 2 - Others	0.0	0%	100%	02-Nov-15 A	31-Dec-15 A
3204	S2W17-1:	Spread 2 - Others (52%)	0.0	100%	100%	09-Mar-15 A	31-Oct-15 A
3205	**Construction - Spread 2 - Construction Survey**		0.0	100%	100%	07-Jan-15 A	30-Jun-15 A
3206	S2W25-1010	Spread 2 - Construction Survey	0.0	100%	100%	07-Jan-15 A	30-Jun-15 A
3207	**Commissioning, Spread 2**		0.0	100%	100%	18-Jan-16 A	19-Jan-16 A
3208	**Commissioning, Spread 2 - Commissioning, Pipeline Section A-2.2.1**		0.0	100%	100%	18-Jan-16 A	19-Jan-16 A
3209	POE322010	Mainline Commissioning - Spread 2	0.0	100%	100%	18-Jan-16 A	19-Jan-16 A
3210	**Construction - Spread 3**		32.8	100%	98.32%	24-Feb-14 A	14-Jun-16
3211	S3W04-1260	Spread 3 - Precontruction Activities	0.0	100%	100%	17-Nov-14 A	26-Jan-15 A
3212	**Spread 3, Milestones**		20.8	0%	0%	29-Aug-15 A	31-May-16
3213	MS9240	Bramalea Road - Mechanical Complete	0.0	0%	100%		16-Apr-16 A
3214	MS9230	Heritage Road - Mechanical Complete	0.0	0%	100%		08-Apr-16 A
3215	MS9220	Hurontario Road - Mechanical Complete	0.0	0%	100%		09-Apr-16 A
3216	MS9210	Albion Gate Station - Mechanical Complete	0.0	0%	100%		05-Mar-16 A



Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3217	MS9200	Parkway Gate Station - Mechanical Complete	0.0	0%	100%		29-Feb-16 A
3218	MS9170	Parkway Cons - Mechanical Complete	0.0	0%	100%		05-Feb-16 A
3219	MS9160	Gravel Road - Mechanical Complete	0.0	0%	100%		29-Aug-15 A
3220	MS9130	Spread 4 - Mainline Mechanical Complete	0.0	0%	100%		08-Feb-16 A
3221	MS9120	Spread 3 - Mainline Mechanical Complete	0.0	0%	100%		03-Mar-16 A
3222	MS9090	Heritage Road - PSSR Review and Walkdowns Complete	0.0	0%	100%		15-Apr-16 A
3223	MS9080	Hurontario Road - PSSR Review and Walkdowns Complete	0.0	0%	100%		15-Apr-16 A
3224	MS9070	Bramalea Road - PSSR Review and Walkdowns Complete	0.0	0%	100%		15-Apr-16 A
3225	MS9060	Gravel Road - PSSR Review and Walkdowns Complete	0.0	0%	100%		25-Feb-16 A
3226	MS9050	Parkway Cons - PSSR Review and Walkdowns Complete	0.0	0%	100%		01-Mar-16 A
3227	MS9040	Parkway Gate Station - PSSR Review and Walkdowns Con	0.0	0%	100%		23-Mar-16 A
3228	MS9030	Albion Gate Station - PSSR Review and Walkdowns Compl	0.0	0%	100%		22-Mar-16 A
3229	MS9020	Spread 4 - PSSR Review and Walkdowns Complete	0.0	0%	100%		25-Feb-16 A
3230	MS9010	Spread 3 - PSSR Review and Walkdowns Complete	0.0	0%	100%		16-Mar-16 A
3231	MS7110	Heritage Road - Commissioning Complete	0.0	0%	100%		16-Apr-16 A
3232	MS7100	Hurontario Road - Commissioning Complete	0.0	0%	100%		16-Apr-16 A
3233	MS7090	Bramalea Road - Commissioning Complete	0.0	0%	100%		17-Apr-16 A
3234	MS7060	Gravel Road - Commissioning Complete	0.0	0%	100%		31-Aug-15 A
3235	MS7030	Parkway Cons - Commissioning Complete	0.0	0%	0%		03-May-16
3236	MS7020	Parkway Gate Station - Commissioning Complete	0.0	0%	0%		03-May-16
3237	MS7010	Albion Gate Station - Commissioning Complete	0.0	0%	100%		09-Apr-16 A
3238	MS6040	Spread 4 - Commissioning Complete	0.0	0%	0%		03-May-16
3239	MS6030	Spread 3 - Commissioning Complete	0.0	0%	0%		03-May-16
3240	MS5040	Spread 4 - Hydro Test Complete	0.0	0%	100%		05-Feb-16 A
3241	MS5030	Spread 3 - Hydro Test Complete	0.0	0%	100%		23-Mar-16 A
3242	MS4110	Heritage Road - Construction Complete	0.0	0%	0%		25-Apr-16
3243	MS4100	Hurontario Road - Construction Complete	0.0	0%	0%		25-Apr-16
3244	MS4090	Bramalea Road - Construction Complete	0.0	0%	0%		23-Apr-16
3245	MS4060	Gravel Road - Construction Complete	0.0	0%	100%		29-Aug-15 A
3246	MS4030	Parkway Cons - Construction Complete	0.0	0%	100%		12-Feb-16 A
3247	MS4020	Parkway Gate Station - Construction Complete	0.0	0%	0%		29-Apr-16
3248	MS4010	Albion Gate Station - Construction Complete	0.0	0%	0%		31-May-16
3249	MS3040	Spread 4 - Construction Complete	0.0	0%	100%		19-Jan-16 A
3250	MS3030	Spread 3 - Construction Complete	0.0	0%	100%		12-Mar-16 A
3251	MILS3-1120	Spread 3, Track Bore Completion	0.0	100%	100%		31-Jan-16 A
3252	MILS3-1110	Spread 3, Mainline Completion	0.0	100%	100%		27-Jan-16 A
3253	MILS3-1100	Spread 3, HDD Completion	0.0	100%	100%		02-Jan-16 A
3254	**Construction - Spread 3, Pipeline**		50.0	100%	97.3%	17-Nov-14 A	14-Jun-16
3255	S3W01-1580	Spread 3 - Tie Ins	0.0	100%	100%	05-Sep-15 A	12-Mar-16 A
3256	S3W01-1570	Spread 3 - Section Tie-ins	0.0	100%	100%	14-Sep-15 A	10-Jan-16 A
3257	S3W01-1290	Spread 3 - ROW Access	0.0	100%	100%	20-Mar-15 A	31-Jul-15 A
3258	**Construction - Spread 3 Mainline - KP - 26+325 - 0+000**		0.0	0%	0%	09-Jun-15 A	27-Jan-16 A
3259	S3W01-15	Spread 3 - Hot Bend Welding	0.0	100%	100%	11-Aug-15 A	06-Dec-15 A
3260	S3W01-15	Spread 3 - Lowering In & Backfill	0.0	100%	100%	22-Jul-15 A	27-Jan-16 A
3261	S3W01-15	Spread 3 - Trench	0.0	100%	100%	21-Jul-15 A	25-Jan-16 A
3262	S3W01-15	Spread 3 - Coat	0.0	100%	100%	20-Jul-15 A	25-Jan-16 A

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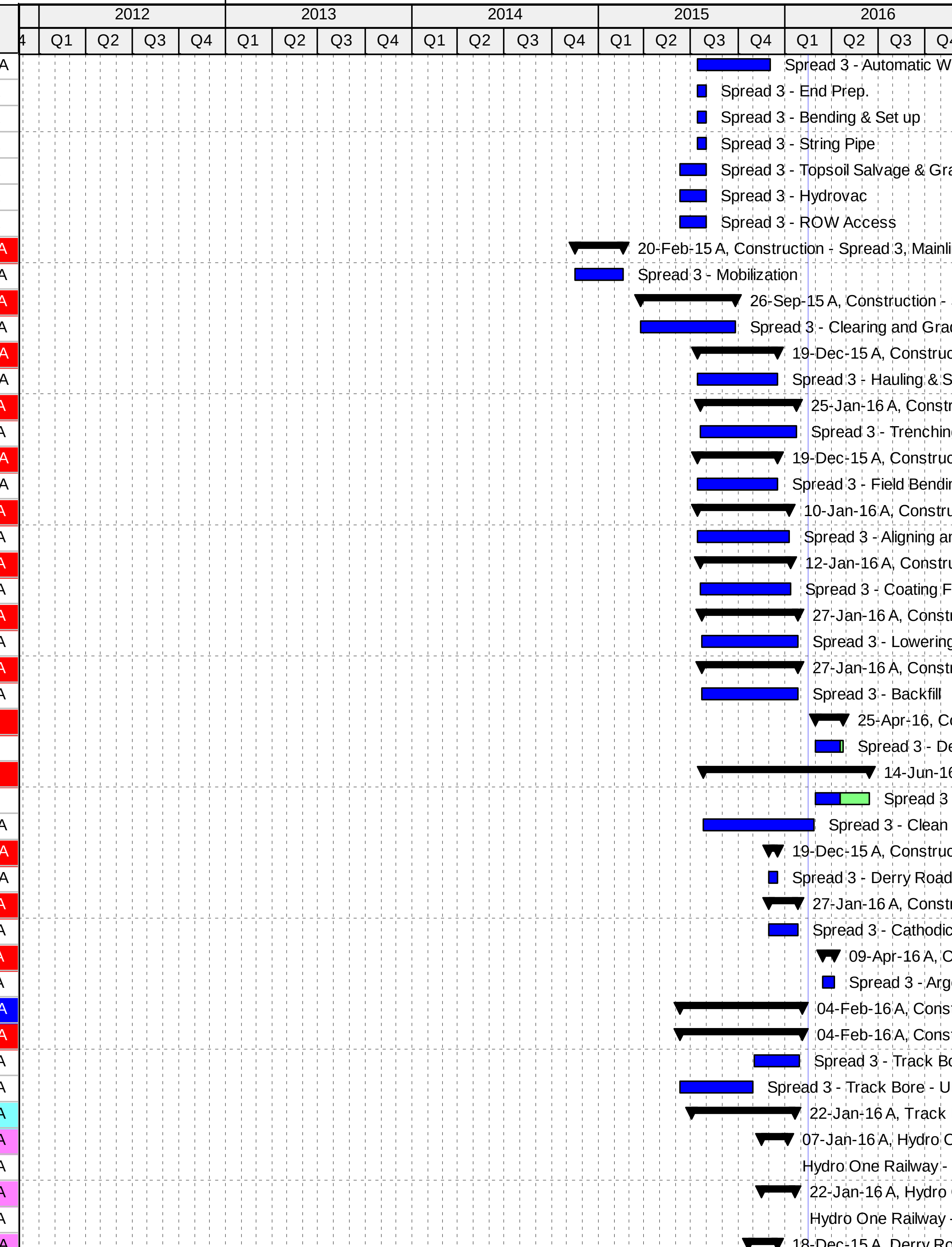
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3263	S3W01-15	Spread 3 - Automatic Welding Mainline	0.0	100%	100%	15-Jul-15 A	05-Dec-15 A
3264	S3W01-15	Spread 3 - End Prep.	0.0	100%	100%	13-Jul-15 A	31-Jul-15 A
3265	S3W01-14	Spread 3 - Bending & Set up	0.0	100%	100%	13-Jul-15 A	31-Jul-15 A
3266	S3W01-14	Spread 3 - String Pipe	0.0	100%	100%	13-Jul-15 A	31-Jul-15 A
3267	S3W01-14	Spread 3 - Topsoil Salvage & Grade	0.0	100%	100%	11-Jun-15 A	31-Jul-15 A
3268	S3W01-14	Spread 3 - Hydrovac	0.0	100%	100%	10-Jun-15 A	31-Jul-15 A
3269	S3W01-14	Spread 3 - ROW Access	0.0	100%	100%	09-Jun-15 A	31-Jul-15 A
3270		**Construction - Spread 3, Mainline**	0.0	100%	100%	17-Nov-14 A	20-Feb-15 A
3271	S3W01-12	Spread 3 - Mobilization	0.0	100%	100%	17-Nov-14 A	20-Feb-15 A
3272		**Construction - Spread 3 Block Valve Installation**	0.0	100%	100%	24-Mar-15 A	26-Sep-15 A
3273	S3W01-13	Spread 3 - Clearing and Grading	0.0	100%	100%	24-Mar-15 A	26-Sep-15 A
3274		**Construction - Spread 3, HDD Support**	0.0	100%	100%	13-Jul-15 A	19-Dec-15 A
3275	S3W01-13	Spread 3 - Hauling & Stringing	0.0	100%	100%	13-Jul-15 A	19-Dec-15 A
3276		**Construction - Spread 3, Survey and locates**	0.0	100%	100%	21-Jul-15 A	25-Jan-16 A
3277	S3W01-13	Spread 3 - Trenching	0.0	100%	100%	21-Jul-15 A	25-Jan-16 A
3278		**Construction - Spread 3 - Field Bending**	0.0	100%	100%	13-Jul-15 A	19-Dec-15 A
3279	S3W01-13	Spread 3 - Field Bending	0.0	100%	100%	13-Jul-15 A	19-Dec-15 A
3280		**Construction - Spread 3 - Aligning and Welding**	0.0	100%	100%	15-Jul-15 A	10-Jan-16 A
3281	S3W01-13	Spread 3 - Aligning and Welding	0.0	100%	100%	15-Jul-15 A	10-Jan-16 A
3282		**Construction - Spread 3 - Coating Field Joints and Coating Repairs**	0.0	100%	100%	20-Jul-15 A	12-Jan-16 A
3283	S3W01-13	Spread 3 - Coating Field Joints and Coating Repairs	0.0	100%	100%	20-Jul-15 A	12-Jan-16 A
3284		**Construction - Spread 3 - Lowering In**	0.0	100%	100%	22-Jul-15 A	27-Jan-16 A
3285	S3W01-13	Spread 3 - Lowering In	0.0	100%	100%	22-Jul-15 A	27-Jan-16 A
3286		**Construction - Spread 3 - Backfill**	0.0	100%	100%	22-Jul-15 A	27-Jan-16 A
3287	S3W01-13	Spread 3 - Backfill	0.0	100%	100%	22-Jul-15 A	27-Jan-16 A
3288		**Construction - Spread 3 - Demobilization**	7.0	100%	58%	01-Mar-16 A	25-Apr-16
3289	S3W01-14	Spread 3 - Demobilization	7.0	100%	58%	01-Mar-16 A	25-Apr-16
3290		**Construction - Spread 3 - Clean-up and Restoration**	50.0	100%	100%	27-Jul-15 A	14-Jun-16
3291	S3W01-15	Spread 3 - Clean Up - Spring 2016	50.0	0%	70%	01-Mar-16 A	14-Jun-16
3292	S3W01-13	Spread 3 - Clean Up	0.0	100%	100%	27-Jul-15 A	28-Feb-16 A
3293		**Construction - Spread 3 - Derry Road Extra Work**	0.0	0%	0%	01-Dec-15 A	19-Dec-15 A
3294	S3W01-P(	Spread 3 - Derry Road Work Extra	0.0	0%	100%	01-Dec-15 A	19-Dec-15 A
3295		**Construction - Spread 3 - Cathodic Protection**	0.0	0%	0%	01-Dec-15 A	27-Jan-16 A
3296	S3W01-P(	Spread 3 - Cathodic Protection	0.0	0%	100%	01-Dec-15 A	27-Jan-16 A
3297		**Construction - Spread 3 - Argentia Road Casing Work**	0.0	0%	0%	15-Mar-16 A	09-Apr-16 A
3298	S3W01-P(	Spread 3 - Argentia Road Casing Work	0.0	0%	100%	15-Mar-16 A	09-Apr-16 A
3299		**Construction - Spread 3, Crossings**	0.0	100%	100%	10-Jun-15 A	04-Feb-16 A
3300		**Construction - Spread 3, Track Bore**	0.0	100%	100%	10-Jun-15 A	04-Feb-16 A
3301	S3W02-P(	Spread 3 - Track Bore - UPI	0.0	0%	100%	02-Nov-15 A	31-Jan-16 A
3302	S3W02-12	Spread 3 - Track Bore - UPI (40%)	0.0	100%	100%	10-Jun-15 A	31-Oct-15 A
3303		**Track Bore Crew #1 - NPS 42 Spread 3 - Test Section #3**	0.0	0%	0%	03-Jul-15 A	22-Jan-16 A
3304		**Hydro One Railway - 36" KP 0.14 (SR)**	0.0	0%	0%	16-Nov-15 A	07-Jan-16 A
3305	S3W	Hydro One Railway - 36m - 36"	0.0	100%	100%	16-Nov-15 A	07-Jan-16 A
3306		**Hydro One Railway - 42" KP 0.14 (SR)**	0.0	0%	0%	16-Nov-15 A	22-Jan-16 A
3307	S3W	Hydro One Railway - 36m - 42"	0.0	100%	100%	16-Nov-15 A	22-Jan-16 A
3308		**Derry Road - 78m KP 0.61 (SR)**	0.0	0%	0%	23-Oct-15 A	18-Dec-15 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3309	S3W	Derry Road - 78m	0.0	100%	100%	23-Oct-15 A	18-Dec-15 A
3310		**CP Rail - kp 1+903 - 36m KP 1.9 (SR)**	0.0	0%	0%	09-Oct-15 A	19-Dec-15 A
3311	S3W	CP Rail - kp 1+903 - 36m	0.0	100%	100%	09-Oct-15 A	19-Dec-15 A
3312		**Highway 407 Ramp - 122m KP 2.18 (SR)**	0.0	0%	0%	05-Oct-15 A	18-Dec-15 A
3313	S3W	Highway 407 Ramp - 122m	0.0	100%	100%	05-Oct-15 A	18-Dec-15 A
3314		**Ninth Line - 48m KP 2.6 (TB)**	0.0	0%	0%	28-Sep-15 A	19-Nov-15 A
3315	S3W	Ninth Line - 48m	0.0	100%	100%	28-Sep-15 A	19-Nov-15 A
3316		**Lisgar Meadow Brook - 240m, 42" KP 3.09 (SP)**	0.0	0%	0%	03-Jul-15 A	13-Jan-16 A
3317	S3W	Lisgar Meadow Brook - 240m	0.0	100%	100%	03-Jul-15 A	13-Jan-16 A
3318		**Tenth Line - 62m KP 4.19 (SP)**	0.0	0%	0%	24-Aug-15 A	14-Jan-16 A
3319	S3W	Tenth Line - 62m	0.0	100%	100%	24-Aug-15 A	14-Jan-16 A
3320		**Heritage Road - 110m KP 6.5 (SR)**	0.0	0%	0%	07-Oct-15 A	09-Jan-16 A
3321	S3W	Heritage Road - 91m	0.0	100%	100%	07-Oct-15 A	09-Jan-16 A
3322		**Fletchers Creek - 96m KP 12.81 (SR)**	0.0	0%	0%	28-Jul-15 A	30-Nov-15 A
3323	S3W	Fletchers Creek - 72m	0.0	100%	100%	28-Jul-15 A	30-Nov-15 A
3324		**Track Bore Crew #2 - NPS 42 Spread 3 - Test Section #2**	0.0	0%	0%	12-Aug-15 A	04-Feb-16 A
3325		**Kennedy Road - 72m KP 14.97 (SR)**	0.0	0%	0%	12-Sep-15 A	23-Nov-15 A
3326	S3W	Kennedy Road - 60m	0.0	100%	100%	12-Sep-15 A	23-Nov-15 A
3327		**Tomken Road - 110m KP 16.39 (SR/TB)**	0.0	0%	0%	12-Aug-15 A	11-Nov-15 A
3328	S3W	Tomken Road - 92m	0.0	100%	100%	12-Aug-15 A	11-Nov-15 A
3329		**Etobicoke Creek - 96m KP 17.2 (SR)**	0.0	0%	0%	05-Oct-15 A	16-Jan-16 A
3330	S3W	Etobicoke Creek - 104m	0.0	100%	100%	05-Oct-15 A	16-Jan-16 A
3331		**Dixie Road - 110m KP 17.87 (SR)**	0.0	0%	0%	28-Sep-15 A	30-Jan-16 A
3332	S3W	Dixie Road - 110m	0.0	100%	100%	28-Sep-15 A	30-Jan-16 A
3333		**Metrolinx 1 / Mimico Trib 1 - 71m KP 20.45 (SR/SP)**	0.0	0%	0%	14-Oct-15 A	13-Dec-15 A
3334	S3W	Metrolinx 1 / Mimico Trib 1 - 71m	0.0	100%	100%	14-Oct-15 A	13-Dec-15 A
3335		**CRN Torbram - 85m KP 20.64 (SR/TB)**	0.0	0%	0%	22-Aug-15 A	04-Feb-16 A
3336	S3W	CNR Torbram - 85m	0.0	100%	100%	22-Aug-15 A	04-Feb-16 A
3337		**Airport Road - 96m - KP 22.37 (SR)**	0.0	0%	0%	14-Oct-15 A	26-Jan-16 A
3338	S3W	Airport Road - 99m	0.0	100%	100%	14-Oct-15 A	26-Jan-16 A
3339		**CNR Railroad - 84m (CNR - Airport KP 22.87) (SR)**	0.0	0%	0%	07-Jan-16 A	04-Feb-16 A
3340	S3W	CNR Railroad - 89m (CNR 20+434) - Pedigree	0.0	100%	100%	07-Jan-16 A	04-Feb-16 A
3341		**CNR Railroad - 96m (CNR - Goreway KP 23.42) (SR)**	0.0	0%	0%	30-Oct-15 A	24-Jan-16 A
3342	S3W	CNR Railroad - 71m (CNR 20+644) - Goreway	0.0	100%	100%	30-Oct-15 A	24-Jan-16 A
3343		**Mimico Creek - 62m - KP 23.97 (SR)**	0.0	0%	0%	02-Nov-15 A	12-Dec-15 A
3344	S3W	Mimico Creek - 60m	0.0	100%	100%	02-Nov-15 A	12-Dec-15 A
3345		**Track Bore Crew #3 - NPS 42 Spread 3**	0.0	0%	0%	07-Jul-15 A	20-Nov-15 A
3346		**CNR Rail (Albion Station) - 8"**	0.0	0%	0%	06-Oct-15 A	24-Oct-15 A
3347	S3W	Complete Bore - 8"	0.0	0%	100%	06-Oct-15 A	24-Oct-15 A
3348		**CNR Rail (Albion Station) - 36" KP 0**	0.0	0%	0%	07-Jul-15 A	10-Nov-15 A
3349	S3W	CNR Rail (Albion Station) - 36" - 51m	0.0	100%	100%	07-Jul-15 A	10-Nov-15 A
3350		**CNR Rail (Albion Station) - 42" KP 0**	0.0	0%	0%	07-Jul-15 A	20-Nov-15 A
3351	S3W	CNR Rail (Albion Station) - 62m	0.0	100%	100%	07-Jul-15 A	20-Nov-15 A
3352		**Track Bore Complete**	0.0	0%	0%	10-Jun-15 A	07-Jan-16 A
3353		**Winston Churchill - 66m KP 5.07**	0.0	0%	0%	15-Jun-15 A	07-Jul-15 A
3354	S3W	Winston Churchill Blvd - 61 m	0.0	100%	100%	15-Jun-15 A	07-Jul-15 A

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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3355		**Hurontario Street - 114m KP 13.56 (SR)**	0.0	0%	0%	23-Jun-15 A	07-Jan-16 A
3356	S3W	Hurontario Street - 115m	0.0	0%	100%	23-Jun-15 A	28-Aug-15 A
3357	S3W	Goreway Drive - 62m	0.0	100%	100%	30-Oct-15 A	07-Jan-16 A
3358		**McLaughlin Road - 76m KP 12.18 (SR)**	0.0	0%	0%	10-Jun-15 A	02-Sep-15 A
3359	S3W	McLaughlin Road - 71m	0.0	100%	100%	10-Jun-15 A	02-Sep-15 A
3360		**Meadowpine Blvd - 100m KP 5.28**	0.0	0%	0%	04-Aug-15 A	08-Sep-15 A
3361	S3W	Meadowpine Blvd - 62 m	0.0	100%	100%	04-Aug-15 A	08-Sep-15 A
3362		**Construction - Spread 3, Open Cut**	0.0	0%	0%	22-Jul-15 A	28-Jan-16 A
3363		**Open Cut Crossing Crew #1- NPS 42 Spread 3**	0.0	0%	0%	22-Jul-15 A	28-Jan-16 A
3364		**Etobicoke Creek Trib 1A**	0.0	0%	0%	22-Jul-15 A	08-Aug-15 A
3365	S3W	Etobicoke Creek Trib 1A	0.0	100%	100%	22-Jul-15 A	08-Aug-15 A
3366		**Etobicoke Creek Trib 1 - 43m (KP 14.45)**	0.0	0%	0%	23-Jul-15 A	11-Aug-15 A
3367	S3W	Etobicoke Creek Trib 1 - 43 m	0.0	100%	100%	23-Jul-15 A	11-Aug-15 A
3368		**16 Mile Creek Trib 1 A/B (KP 1.62/56)**	0.0	0%	0%	20-Aug-15 A	31-Aug-15 A
3369	S3W	16 Mile Creek Tribs 1 A&B - 70 m	0.0	100%	100%	20-Aug-15 A	31-Aug-15 A
3370		**Credit River Tributary and Wetland (KP 10.28)**	0.0	0%	0%	24-Sep-15 A	29-Oct-15 A
3371	S3W	Credit River Tributary & Wetland	0.0	100%	100%	24-Sep-15 A	29-Oct-15 A
3372		**Mullet Creek - 36m (KP 3.13)**	0.0	0%	0%	02-Oct-15 A	10-Oct-15 A
3373	S3W	Mullet Creek - 36 m	0.0	100%	100%	02-Oct-15 A	10-Oct-15 A
3374		**16 Mile Creek Trib 1C (KP 2.45)**	0.0	0%	0%	22-Aug-15 A	08-Sep-15 A
3375	S3W	16 Mile Creek Trib 1C - 35 m	0.0	100%	100%	22-Aug-15 A	08-Sep-15 A
3376		**Fletchers Creek Trib 1 - 20m (KP 12.67)**	0.0	0%	0%	18-Nov-15 A	29-Nov-15 A
3377	S3W	Fletchers Creek Trib 1 - 20 m	0.0	100%	100%	18-Nov-15 A	29-Nov-15 A
3378		**Etobicoke Creek Trib 2 - 35m (KP 15.26)**	0.0	0%	0%	16-Sep-15 A	20-Oct-15 A
3379	S3W	Etobicoke Creek Trib 2 - 35 m	0.0	100%	100%	16-Sep-15 A	20-Oct-15 A
3380		**Argentia Road - 62m KP 3.8**	0.0	0%	0%	06-Jan-16 A	28-Jan-16 A
3381	S3W	Argentia Road	0.0	100%	100%	06-Jan-16 A	28-Jan-16 A
3382		**Etobicoke Creek Trib 2A - 35m (KP 15.41)**	0.0	0%	0%	21-Sep-15 A	24-Sep-15 A
3383	S3W	Etobicoke Creek Trib 2 - 35 m	0.0	100%	100%	21-Sep-15 A	24-Sep-15 A
3384		**Open Cut Watercourse Crew #2 - NPS 42 Spread 3**	0.0	0%	0%	15-Sep-15 A	09-Nov-15 A
3385		**Mimico Creek Trib 5 - 43m (KP 24.33)**	0.0	0%	0%	21-Sep-15 A	02-Oct-15 A
3386	S3W	Mimico Creek Tributary 5 - 43 m	0.0	100%	100%	21-Sep-15 A	02-Oct-15 A
3387		**Mimico Creek Trib 3 - 40m (KP 21.54)**	0.0	0%	0%	06-Oct-15 A	09-Nov-15 A
3388	S3W	Mimico Creek Tributary 3 - 40 m	0.0	100%	100%	06-Oct-15 A	09-Nov-15 A
3389		**Spring Creek Trib 1 - 35m (KP 18.96)**	0.0	0%	0%	21-Sep-15 A	10-Oct-15 A
3390	S3W	Spring Creek Trib 1 - 35 m	0.0	100%	100%	21-Sep-15 A	10-Oct-15 A
3391		**Spring Creek - 63m (KP 19.19)**	0.0	0%	0%	28-Sep-15 A	10-Oct-15 A
3392	S3W	Spring Creek - 65 m	0.0	100%	100%	28-Sep-15 A	10-Oct-15 A
3393		**Etobicoke Creek Trib 3 (KP 17.98)**	0.0	0%	0%	02-Oct-15 A	27-Oct-15 A
3394	S3W	Etobicoke Creek Trib 3	0.0	100%	100%	02-Oct-15 A	27-Oct-15 A
3395		**Unnamed Creek (Wetlands & Bramelea)**	0.0	0%	0%	15-Sep-15 A	18-Sep-15 A
3396	S3W	Unnamed Creek - Wetland at Bramelea	0.0	100%	100%	15-Sep-15 A	18-Sep-15 A
3397		**Unnamed Creek (KP 19.92)**	0.0	0%	0%	23-Sep-15 A	26-Sep-15 A
3398	S3W	Unnamed Creek	0.0	100%	100%	23-Sep-15 A	26-Sep-15 A
3399		**Maineline Spread 3 Track Bore base lay**	0.0	100%	100%	10-Jun-15 A	31-Jan-16 A
3400	S3W02-12	Spread 3 - Track Bore -Base Lay	0.0	100%	100%	10-Jun-15 A	31-Jan-16 A

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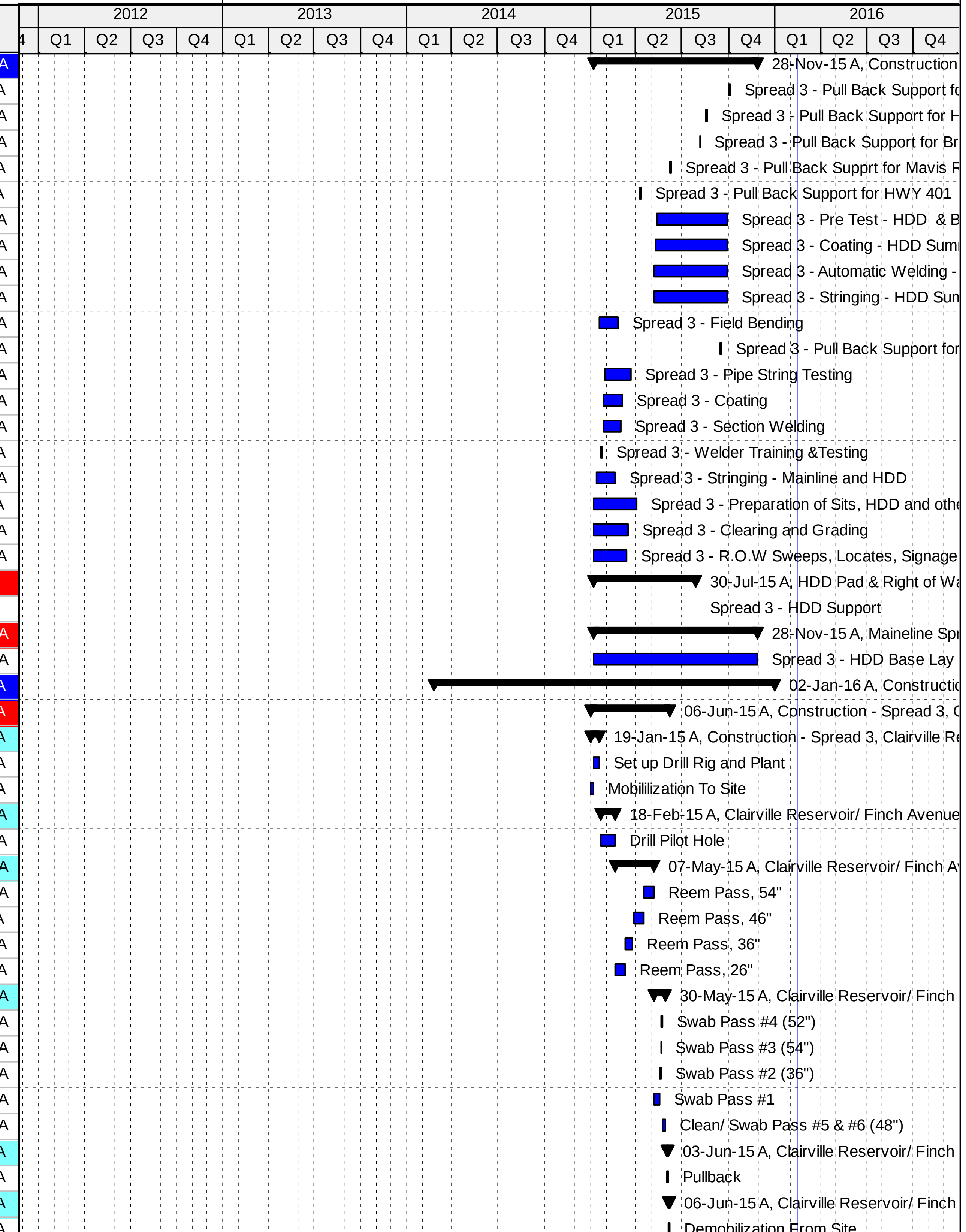
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3401		**Construction - Spread 3, HDD Support**	0.0	100%	100%	06-Jan-15 A	28-Nov-15 A
3402	S3W04-1710	Spread 3 - Pull Back Support for Torbram	0.0	100%	100%	02-Oct-15 A	03-Oct-15 A
3403	S3W04-1700	Spread 3 - Pull Back Support for HWY 410	0.0	100%	100%	19-Aug-15 A	20-Aug-15 A
3404	S3W04-1690	Spread 3 - Pull Back Support for Bramalea Road	0.0	100%	100%	05-Aug-15 A	07-Aug-15 A
3405	S3W04-1680	Spread 3 - Pull Back Supprt for Mavis Road	0.0	100%	100%	08-Jun-15 A	10-Jun-15 A
3406	S3W04-1670	Spread 3 - Pull Back Support for HWY 401	0.0	100%	100%	09-Apr-15 A	10-Apr-15 A
3407	S3W04-1660	Spread 3 - Pre Test - HDD & Bore Summer Construction	0.0	100%	100%	13-May-15 A	30-Sep-15 A
3408	S3W04-1650	Spread 3 - Coating - HDD Summer Construction	0.0	100%	100%	09-May-15 A	30-Sep-15 A
3409	S3W04-1640	Spread 3 - Automatic Welding - HDD Summer Construction	0.0	100%	100%	07-May-15 A	30-Sep-15 A
3410	S3W04-1630	Spread 3 - Stringing - HDD Summer Construction	0.0	100%	100%	06-May-15 A	30-Sep-15 A
3411	S3W04-1510	Spread 3 - Field Bending	0.0	100%	100%	17-Jan-15 A	23-Feb-15 A
3412	S3W04-1350	Spread 3 - Pull Back Support for Mississauga Rd, Levi Cre	0.0	100%	100%	16-Sep-15 A	17-Sep-15 A
3413	S3W04-1340	Spread 3 - Pipe String Testing	0.0	100%	100%	29-Jan-15 A	23-Mar-15 A
3414	S3W04-1330	Spread 3 - Coating	0.0	100%	100%	27-Jan-15 A	04-Mar-15 A
3415	S3W04-1320	Spread 3 - Section Welding	0.0	100%	100%	26-Jan-15 A	02-Mar-15 A
3416	S3W04-1310	Spread 3 - Welder Training &Testing	0.0	100%	100%	20-Jan-15 A	24-Jan-15 A
3417	S3W04-1300	Spread 3 - Stringing - Mainline and HDD	0.0	100%	100%	13-Jan-15 A	18-Feb-15 A
3418	S3W04-1290	Spread 3 - Preparation of Sits, HDD and other Crossings	0.0	100%	100%	08-Jan-15 A	02-Apr-15 A
3419	S3W04-1280	Spread 3 - Clearing and Grading	0.0	100%	100%	07-Jan-15 A	18-Mar-15 A
3420	S3W04-1270	Spread 3 - R.O.W Sweeps, Locates, Signage	0.0	100%	100%	06-Jan-15 A	13-Mar-15 A
3421		**HDD Pad & Right of Way Preparation**	0.0	100%	100%	06-Jan-15 A	30-Jul-15 A
3422	S3W04-12	Spread 3 - HDD Support	0.0	100%	100%	06-Jan-15 A	30-Jul-15 A
3423		**Maineline Spread 3 HDD Base Lay**	0.0	100%	100%	06-Jan-15 A	28-Nov-15 A
3424	S3W04-15	Spread 3 - HDD Base Lay	0.0	100%	100%	06-Jan-15 A	28-Nov-15 A
3425		**Construction - Spread 3, Horizontal Directional Drilling (HDD)**	0.0	100%	100%	24-Feb-14 A	02-Jan-16 A
3426		**Construction - Spread 3, Clairville Reservoir/ Finch Avenue - Rig # 4**	0.0	100%	100%	02-Jan-15 A	06-Jun-15 A
3427		**Construction - Spread 3, Clairville Reservoir/ Finch Avenue**	0.0	100%	100%	02-Jan-15 A	19-Jan-15 A
3428	S3W06	Set up Drill Rig and Plant	0.0	100%	100%	07-Jan-15 A	19-Jan-15 A
3429	S3W06	Mobillization To Site	0.0	100%	100%	02-Jan-15 A	06-Jan-15 A
3430		**Clairville Reservoir/ Finch Avenue HDD - Pilot Hole**	0.0	100%	100%	20-Jan-15 A	18-Feb-15 A
3431	S3W06	Drill Pilot Hole	0.0	100%	100%	20-Jan-15 A	18-Feb-15 A
3432		**Clairville Reservoir/ Finch Avenue HDD - Ream**	0.0	100%	100%	19-Feb-15 A	07-May-15 A
3433	S3W06	Reem Pass, 54"	0.0	100%	100%	17-Apr-15 A	07-May-15 A
3434	S3W06	Reem Pass, 46"	0.0	100%	100%	27-Mar-15 A	16-Apr-15 A
3435	S3W06	Reem Pass, 36"	0.0	100%	100%	12-Mar-15 A	26-Mar-15 A
3436	S3W06	Reem Pass, 26"	0.0	100%	100%	19-Feb-15 A	11-Mar-15 A
3437		**Clairville Reservoir/ Finch Avenue HDD - Clean**	0.0	100%	100%	08-May-15 A	30-May-15 A
3438	S3W06	Swab Pass #4 (52")	0.0	100%	100%	22-May-15 A	23-May-15 A
3439	S3W06	Swab Pass #3 (54")	0.0	100%	100%	21-May-15 A	21-May-15 A
3440	S3W06	Swab Pass #2 (36")	0.0	100%	100%	19-May-15 A	20-May-15 A
3441	S3W06	Swab Pass #1	0.0	100%	100%	08-May-15 A	18-May-15 A
3442	S3W06	Clean/ Swab Pass #5 & #6 (48")	0.0	100%	100%	25-May-15 A	30-May-15 A
3443		**Clairville Reservoir/ Finch Avenue HDD - Pullback**	0.0	100%	100%	01-Jun-15 A	03-Jun-15 A
3444	S3W06	Pullback	0.0	100%	100%	01-Jun-15 A	03-Jun-15 A
3445		**Clairville Reservoir/ Finch Avenue HDD - Demobilization from site**	0.0	100%	100%	04-Jun-15 A	06-Jun-15 A
3446	S3W06	Demobilization From Site	0.0	100%	100%	04-Jun-15 A	06-Jun-15 A



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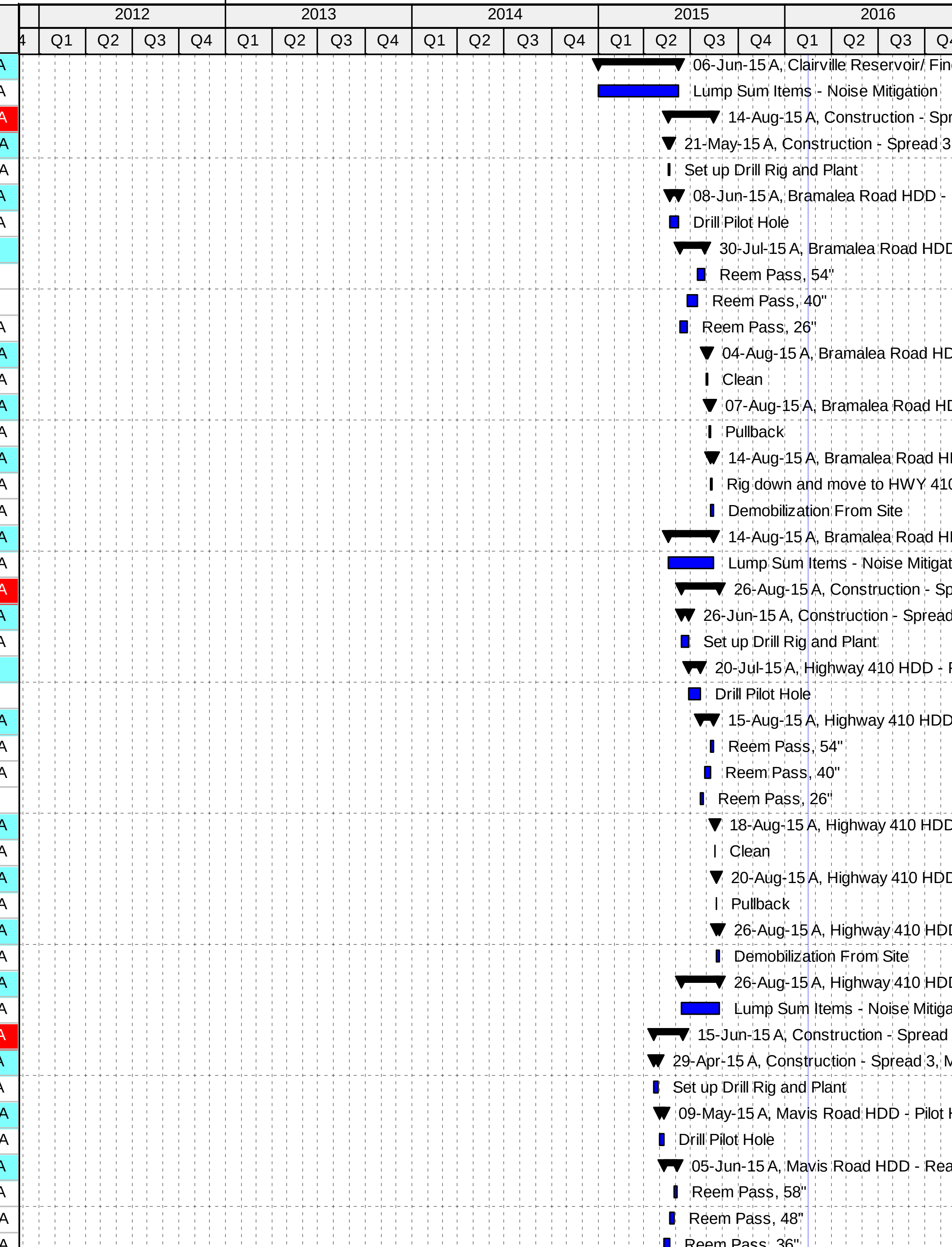
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3447		**Clairville Reservoir/ Finch Avenue HDD - Lumpsum Items - Noise M**	0.0	100%	100%	02-Jan-15 A	06-Jun-15 A
3448	S3W06	Lump Sum Items - Noise Mitigation	0.0	100%	100%	02-Jan-15 A	06-Jun-15 A
3449		**Construction - Spread 3, Bramalea Road - Rig # 4**	0.0	100%	100%	19-May-15 A	14-Aug-15 A
3450		**Construction - Spread 3, Bramalea Road**	0.0	100%	100%	19-May-15 A	21-May-15 A
3451	S3W06	Set up Drill Rig and Plant	0.0	100%	100%	19-May-15 A	21-May-15 A
3452		**Bramalea Road HDD - Pilot Hole**	0.0	100%	100%	22-May-15 A	08-Jun-15 A
3453	S3W06	Drill Pilot Hole	0.0	100%	100%	22-May-15 A	08-Jun-15 A
3454		**Bramalea Road HDD - Ream**	0.0	100%	100%	09-Jun-15 A	30-Jul-15 A
3455	S3W06	Reem Pass, 54"	0.0	100%	100%	15-Jul-15 A	30-Jul-15 A
3456	S3W06	Reem Pass, 40"	0.0	100%	100%	25-Jun-15 A	14-Jul-15 A
3457	S3W06	Reem Pass, 26"	0.0	100%	100%	09-Jun-15 A	24-Jun-15 A
3458		**Bramalea Road HDD - Clean**	0.0	100%	100%	31-Jul-15 A	04-Aug-15 A
3459	S3W06	Clean	0.0	100%	100%	31-Jul-15 A	04-Aug-15 A
3460		**Bramalea Road HDD - Pullback**	0.0	100%	100%	05-Aug-15 A	07-Aug-15 A
3461	S3W06	Pullback	0.0	100%	100%	05-Aug-15 A	07-Aug-15 A
3462		**Bramalea Road HDD - Demobilization from site**	0.0	100%	100%	08-Aug-15 A	14-Aug-15 A
3463	S3W06	Rig down and move to HWY 410	0.0	100%	100%	08-Aug-15 A	11-Aug-15 A
3464	S3W06	Demobilization From Site	0.0	100%	100%	08-Aug-15 A	14-Aug-15 A
3465		**Bramalea Road HDD - Lumpsum Items - Noise Mitigation And Inte**	0.0	100%	100%	19-May-15 A	14-Aug-15 A
3466	S3W06	Lump Sum Items - Noise Mitigation	0.0	100%	100%	19-May-15 A	14-Aug-15 A
3467		**Construction - Spread 3, Highway 410 - Rig # 4**	0.0	100%	100%	12-Jun-15 A	26-Aug-15 A
3468		**Construction - Spread 3, Highway 410**	0.0	100%	100%	12-Jun-15 A	26-Jun-15 A
3469	S3W06	Set up Drill Rig and Plant	0.0	100%	100%	12-Jun-15 A	26-Jun-15 A
3470		**Highway 410 HDD - Pilot Hole**	0.0	100%	100%	27-Jun-15 A	20-Jul-15 A
3471	S3W06	Drill Pilot Hole	0.0	100%	100%	27-Jun-15 A	20-Jul-15 A
3472		**Highway 410 HDD - Ream**	0.0	100%	100%	21-Jul-15 A	15-Aug-15 A
3473	S3W06	Reem Pass, 54"	0.0	100%	100%	10-Aug-15 A	15-Aug-15 A
3474	S3W06	Reem Pass, 40"	0.0	100%	100%	28-Jul-15 A	08-Aug-15 A
3475	S3W06	Reem Pass, 26"	0.0	100%	100%	21-Jul-15 A	27-Jul-15 A
3476		**Highway 410 HDD - Clean**	0.0	100%	100%	17-Aug-15 A	18-Aug-15 A
3477	S3W06	Clean	0.0	100%	100%	17-Aug-15 A	18-Aug-15 A
3478		**Highway 410 HDD - Pullback**	0.0	100%	100%	19-Aug-15 A	20-Aug-15 A
3479	S3W06	Pullback	0.0	100%	100%	19-Aug-15 A	20-Aug-15 A
3480		**Highway 410 HDD - Demobilization from site**	0.0	100%	100%	21-Aug-15 A	26-Aug-15 A
3481	S3W06	Demobilization From Site	0.0	100%	100%	21-Aug-15 A	26-Aug-15 A
3482		**Highway 410 HDD - Lumpsum Items - Noise Mitigation And Interne**	0.0	100%	100%	12-Jun-15 A	26-Aug-15 A
3483	S3W06	Lump Sum Items - Noise Mitigation	0.0	100%	100%	12-Jun-15 A	26-Aug-15 A
3484		**Construction - Spread 3, Mavis Road - Rig #3**	0.0	100%	100%	20-Apr-15 A	15-Jun-15 A
3485		**Construction - Spread 3, Mavis Road**	0.0	100%	100%	20-Apr-15 A	29-Apr-15 A
3486	S3W06	Set up Drill Rig and Plant	0.0	100%	100%	20-Apr-15 A	29-Apr-15 A
3487		**Mavis Road HDD - Pilot Hole**	0.0	100%	100%	30-Apr-15 A	09-May-15 A
3488	S3W06	Drill Pilot Hole	0.0	100%	100%	30-Apr-15 A	09-May-15 A
3489		**Mavis Road HDD - Ream**	0.0	100%	100%	11-May-15 A	05-Jun-15 A
3490	S3W06	Reem Pass, 58"	0.0	100%	100%	29-May-15 A	05-Jun-15 A
3491	S3W06	Reem Pass, 48"	0.0	100%	100%	21-May-15 A	28-May-15 A
3492	S3W06	Reem Pass, 36"	0.0	100%	100%	11-May-15 A	20-May-15 A



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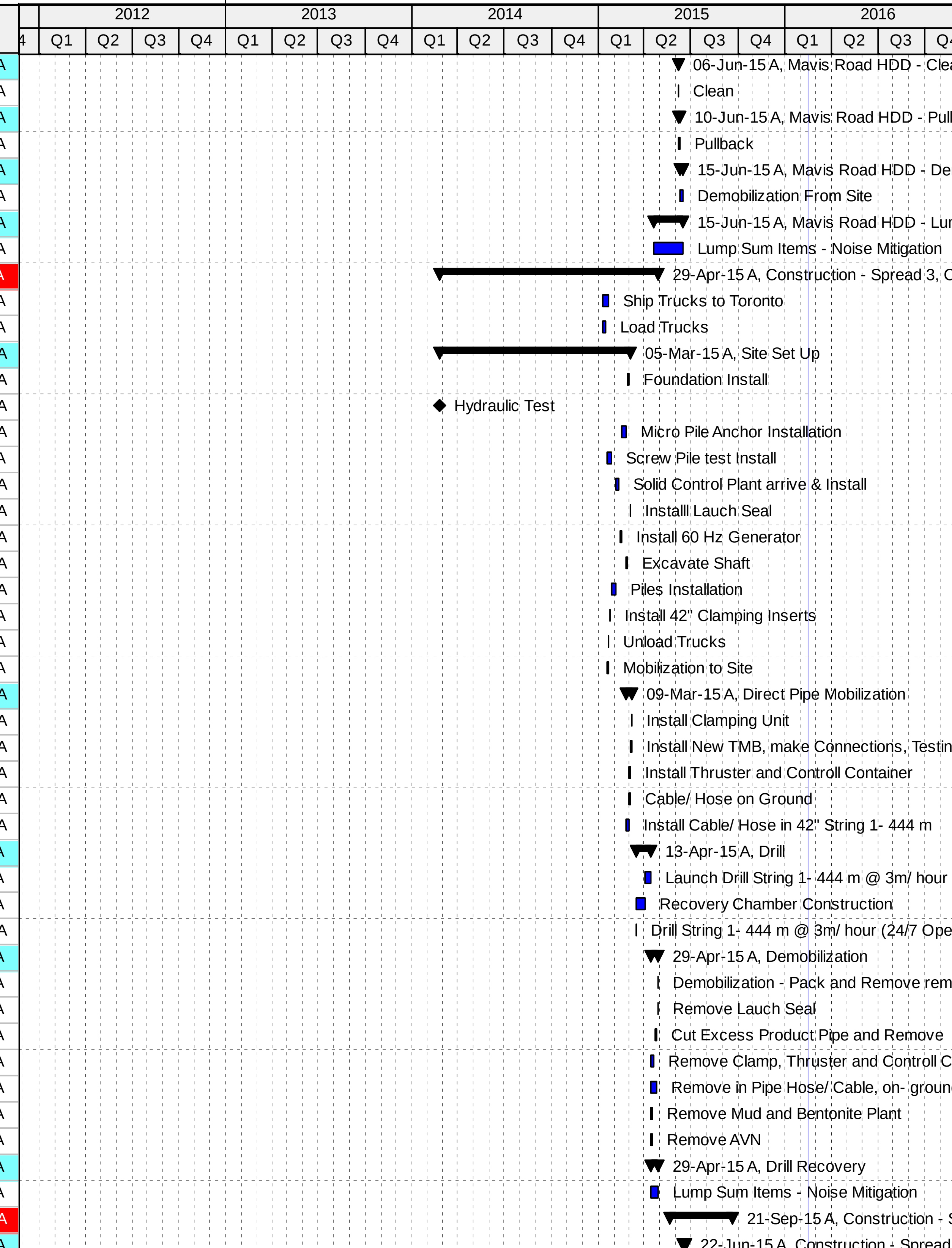
3493		**Mavis Road HDD - Clean**	0.0	100%	100%	06-Jun-15 A	06-Jun-15 A
3494	S3W06	Clean	0.0	100%	100%	06-Jun-15 A	06-Jun-15 A
3495		**Mavis Road HDD - Pullback**	0.0	100%	100%	08-Jun-15 A	10-Jun-15 A
3496	S3W06	Pullback	0.0	100%	100%	08-Jun-15 A	10-Jun-15 A
3497		**Mavis Road HDD - Demobilization from site**	0.0	100%	100%	11-Jun-15 A	15-Jun-15 A
3498	S3W06	Demobilization From Site	0.0	100%	100%	11-Jun-15 A	15-Jun-15 A
3499		**Mavis Road HDD - Lumpsum Items - Noise Mitigation And Internet**	0.0	100%	100%	20-Apr-15 A	15-Jun-15 A
3500	S3W06	Lump Sum Items - Noise Mitigation	0.0	100%	100%	20-Apr-15 A	15-Jun-15 A
3501		**Construction - Spread 3, Credit River**	0.0	100%	100%	24-Feb-14 A	29-Apr-15 A
3502	S3W06-2(	Ship Trucks to Toronto	0.0	100%	100%	09-Jan-15 A	20-Jan-15 A
3503	S3W06-2(	Load Trucks	0.0	100%	100%	09-Jan-15 A	15-Jan-15 A
3504		**Site Set Up**	0.0	100%	100%	24-Feb-14 A	05-Mar-15 A
3505	S3W06	Foundation Install	0.0	100%	100%	27-Feb-15 A	02-Mar-15 A
3506	S3W06	Hydraulic Test	0.0	100%	100%		24-Feb-14 A
3507	S3W06	Micro Pile Anchor Installation	0.0	100%	100%	17-Feb-15 A	24-Feb-15 A
3508	S3W06	Screw Pile test Install	0.0	100%	100%	19-Jan-15 A	26-Jan-15 A
3509	S3W06	Solid Control Plant arrive & Install	0.0	100%	100%	05-Feb-15 A	11-Feb-15 A
3510	S3W06	Installl Lauch Seal	0.0	100%	100%	04-Mar-15 A	05-Mar-15 A
3511	S3W06	Install 60 Hz Generator	0.0	100%	100%	12-Feb-15 A	16-Feb-15 A
3512	S3W06	Excavate Shaft	0.0	100%	100%	25-Feb-15 A	26-Feb-15 A
3513	S3W06	Piles Installation	0.0	100%	100%	27-Jan-15 A	04-Feb-15 A
3514	S3W06	Install 42" Clamping Inserts	0.0	100%	100%	23-Jan-15 A	24-Jan-15 A
3515	S3W06	Unload Trucks	0.0	100%	100%	20-Jan-15 A	21-Jan-15 A
3516	S3W06	Mobilization to Site	0.0	100%	100%	19-Jan-15 A	21-Jan-15 A
3517		**Direct Pipe Mobilization**	0.0	100%	100%	24-Feb-15 A	09-Mar-15 A
3518	S3W06	Install Clamping Unit	0.0	100%	100%	06-Mar-15 A	09-Mar-15 A
3519	S3W06	Install New TMB, make Connections, Testing	0.0	100%	100%	04-Mar-15 A	06-Mar-15 A
3520	S3W06	Install Thruster and Controll Container	0.0	100%	100%	03-Mar-15 A	04-Mar-15 A
3521	S3W06	Cable/ Hose on Ground	0.0	100%	100%	03-Mar-15 A	06-Mar-15 A
3522	S3W06	Install Cable/ Hose in 42" String 1- 444 m	0.0	100%	100%	24-Feb-15 A	02-Mar-15 A
3523		**Drill**	0.0	100%	100%	16-Mar-15 A	13-Apr-15 A
3524	S3W06	Launch Drill String 1- 444 m @ 3m/ hour	0.0	100%	100%	02-Apr-15 A	13-Apr-15 A
3525	S3W06	Recovery Chamber Construction	0.0	100%	100%	17-Mar-15 A	01-Apr-15 A
3526	S3W06	Drill String 1- 444 m @ 3m/ hour (24/7 Operation)	0.0	100%	100%	16-Mar-15 A	17-Mar-15 A
3527		**Demobilization**	0.0	100%	100%	14-Apr-15 A	29-Apr-15 A
3528	S3W06	Demobilization - Pack and Remove remaining Equipment	0.0	100%	100%	27-Apr-15 A	29-Apr-15 A
3529	S3W06	Remove Lauch Seal	0.0	100%	100%	27-Apr-15 A	29-Apr-15 A
3530	S3W06	Cut Excess Product Pipe and Remove	0.0	100%	100%	21-Apr-15 A	24-Apr-15 A
3531	S3W06	Remove Clamp, Thruster and Controll Cab	0.0	100%	100%	14-Apr-15 A	20-Apr-15 A
3532	S3W06	Remove in Pipe Hose/ Cable, on- ground	0.0	100%	100%	14-Apr-15 A	24-Apr-15 A
3533	S3W06	Remove Mud and Bentonite Plant	0.0	100%	100%	14-Apr-15 A	16-Apr-15 A
3534	S3W06	Remove AVN	0.0	100%	100%	14-Apr-15 A	16-Apr-15 A
3535		**Drill Recovery**	0.0	100%	100%	14-Apr-15 A	29-Apr-15 A
3536	S3W06	Lump Sum Items - Noise Mitigation	0.0	100%	100%	14-Apr-15 A	29-Apr-15 A
3537		**Construction - Spread 3, Mississauga Road & Levi's Creek - Rig # 5**	0.0	100%	100%	21-May-15 A	21-Sep-15 A
3538		**Construction - Spread 3, Mississauga Road & Levi's Creek**	0.0	100%	100%	16-Jun-15 A	22-Jun-15 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish	2012–2016 (Q1–Q4)
3539	S3W06	Set up 880k lb Rig and Plant at entry	0.0	100%	100%	16-Jun-15 A	22-Jun-15 A	Set up 880k lb Rig and Plant at entry
3540	S3W06	Set up Drill Rig and Plant	0.0	100%	100%	16-Jun-15 A	18-Jun-15 A	Set up Drill Rig and Plant
3541		**Mississauga Road & Levi's Creek HDD - Pilot Hole**	0.0	100%	100%	21-May-15 A	15-Jul-15 A	15-Jul-15 A, Mississauga Road & Lev
3542	S3W06	Install ~230-ft of 60-in casing at exit	0.0	100%	100%	15-Jun-15 A	15-Jun-15 A	Install ~230-ft of 60-in casing at exit
3543	S3W06	Install ~115-ft of 60-in casing at entry	0.0	100%	100%	04-Jun-15 A	13-Jun-15 A	Install ~115-ft of 60-in casing at entry
3544	S3W06	Procure 60-in casing (~115-ft for entry; ~230-ft for exit)	0.0	100%	100%	21-May-15 A	01-Jun-15 A	Procure 60-in casing (~115-ft for entry; ~
3545	S3W06	Drill Pilot Hole	0.0	100%	100%	23-Jun-15 A	15-Jul-15 A	Drill Pilot Hole
3546		**Mississauga Road & Levi's Creek HDD - Ream**	0.0	100%	100%	15-Jul-15 A	12-Sep-15 A	12-Sep-15 A, Mississauga Road
3547	S3W06	Reem Pass, 54"	0.0	100%	100%	13-Aug-15 A	12-Sep-15 A	Reem Pass, 54"
3548	S3W06	Reem Pass, 40"	0.0	100%	100%	30-Jul-15 A	12-Aug-15 A	Reem Pass, 40"
3549	S3W06	Reem Pass, 26"	0.0	100%	100%	15-Jul-15 A	29-Jul-15 A	Reem Pass, 26"
3550		**Mississauga Road & Levi's Creek HDD - Clean**	0.0	100%	100%	14-Sep-15 A	15-Sep-15 A	15-Sep-15 A, Mississauga Road
3551	S3W06	Clean	0.0	100%	100%	14-Sep-15 A	15-Sep-15 A	Clean
3552		**Mississauga Road & Levi's Creek HDD - Pullback**	0.0	100%	100%	16-Sep-15 A	17-Sep-15 A	17-Sep-15 A, Mississauga Road
3553	S3W06	Pullback	0.0	100%	100%	16-Sep-15 A	17-Sep-15 A	Pullback
3554		**Mississauga Road & Levi's Creek HDD - Demobilization from site**	0.0	100%	100%	18-Sep-15 A	21-Sep-15 A	21-Sep-15 A, Mississauga Road
3555	S3W06	Demobilization From Site	0.0	100%	100%	18-Sep-15 A	21-Sep-15 A	Demobilization From Site
3556	S3W06	Rig and Plant Down	0.0	100%	100%	18-Sep-15 A	21-Sep-15 A	Rig and Plant Down
3557		**Mississauga Road & Levi's Creek HDD - Lumpsum Items - Noise M**	0.0	100%	100%	21-May-15 A	21-Sep-15 A	21-Sep-15 A, Mississauga Road
3558	S3W06	Lump Sum Items - Noise Mitigation	0.0	100%	100%	21-May-15 A	21-Sep-15 A	Lump Sum Items - Noise Mitigat
3559		**Construction - Spread 3, Highway 401 - Rig # 3**	0.0	100%	100%	04-Feb-15 A	24-Apr-15 A	24-Apr-15 A, Construction - Spread 3, High
3560	S3W06-42	Safty Stand Down	0.0	100%	100%	14-Apr-15 A	20-Apr-15 A	Safty Stand Down
3561		**Construction - Spread 3, Highway 401**	0.0	100%	100%	04-Feb-15 A	05-Feb-15 A	05-Feb-15 A, Construction - Spread 3, Highway 4
3562	S3W06	Mobililization To Site	0.0	100%	100%	04-Feb-15 A	05-Feb-15 A	Mobililization To Site
3563		**Highway 401 HDD - Pilot Hole**	0.0	100%	100%	19-Feb-15 A	06-Mar-15 A	06-Mar-15 A, Highway 401 HDD - Pilot Hole
3564	S3W06	Drill Pilot Hole	0.0	100%	100%	19-Feb-15 A	06-Mar-15 A	Drill Pilot Hole
3565		**Highway 401 HDD - Ream**	0.0	100%	100%	07-Mar-15 A	03-Apr-15 A	03-Apr-15 A, Highway 401 HDD - Ream
3566	S3W06	Reem Pass, 54"	0.0	100%	100%	25-Mar-15 A	03-Apr-15 A	Reem Pass, 54"
3567	S3W06	Reem Pass, 40"	0.0	100%	100%	13-Mar-15 A	24-Mar-15 A	Reem Pass, 40"
3568	S3W06	Reem Pass, 26"	0.0	100%	100%	07-Mar-15 A	12-Mar-15 A	Reem Pass, 26"
3569		**Highway 401 HDD - Clean**	0.0	100%	100%	04-Apr-15 A	08-Apr-15 A	08-Apr-15 A, Highway 401 HDD - Clean
3570	S3W06	Clean	0.0	100%	100%	04-Apr-15 A	08-Apr-15 A	Clean
3571		**Highway 401 HDD - Pullback**	0.0	100%	100%	09-Apr-15 A	10-Apr-15 A	10-Apr-15 A, Highway 401 HDD - Pullback
3572	S3W06	Pullback	0.0	100%	100%	09-Apr-15 A	10-Apr-15 A	Pullback
3573		**Highway 401 HDD - Demobilization from site**	0.0	100%	100%	06-Feb-15 A	24-Apr-15 A	24-Apr-15 A, Highway 401 HDD - Demobiliz
3574	S3W06	Demobilization From Site	0.0	100%	100%	21-Apr-15 A	24-Apr-15 A	Demobilization From Site
3575	S3W06	Set up Drill Rig and Plant	0.0	100%	100%	06-Feb-15 A	18-Feb-15 A	Set up Drill Rig and Plant
3576		**Highway 401 HDD - Lumpsum Items - Noise Mitigation And Interne**	0.0	100%	100%	06-Feb-15 A	10-Apr-15 A	10-Apr-15 A, Highway 401 HDD - Lumpsum
3577	S3W06	Lump Sum Items - Noise Mitigation	0.0	100%	100%	06-Feb-15 A	10-Apr-15 A	Lump Sum Items - Noise Mitigation
3578		**Construction - Spread 3, Mob/ Demob to Toronto (Mears)**	0.0	100%	100%	25-Dec-14 A	13-Nov-15 A	13-Nov-15 A, Construction -
3579		**Mobilization To Toronto And Demobilization From Toronto (Mears)**	0.0	100%	100%	25-Dec-14 A	04-Jan-15 A	04-Jan-15 A, Mobilization To Toronto And Demobiliz
3580	S3W06	Construction - Spread 3 Mobilization to Toronto	0.0	100%	100%	25-Dec-14 A	04-Jan-15 A	Construction - Spread 3 Mobilization to Toronto
3581		**Demobilization to Toronto (Mears)**	0.0	100%	100%	02-Nov-15 A	13-Nov-15 A	13-Nov-15 A, Demobilization
3582	S3W06	Construction - Spread 3 Demobilization from Toronto	0.0	100%	100%	02-Nov-15 A	13-Nov-15 A	Construction - Spread 3 Der
3583		**Construction - Spread 3, Lump Sum Items**	0.0	100%	100%	06-Jan-15 A	27-Feb-15 A	27-Feb-15 A, Construction - Spread 3, Lump S
3584		**Lump sum Items - Performance Bond And Mud Engineer (Mears)**	0.0	100%	100%	06-Jan-15 A	27-Feb-15 A	27-Feb-15 A, Lump sum Items - Performance E

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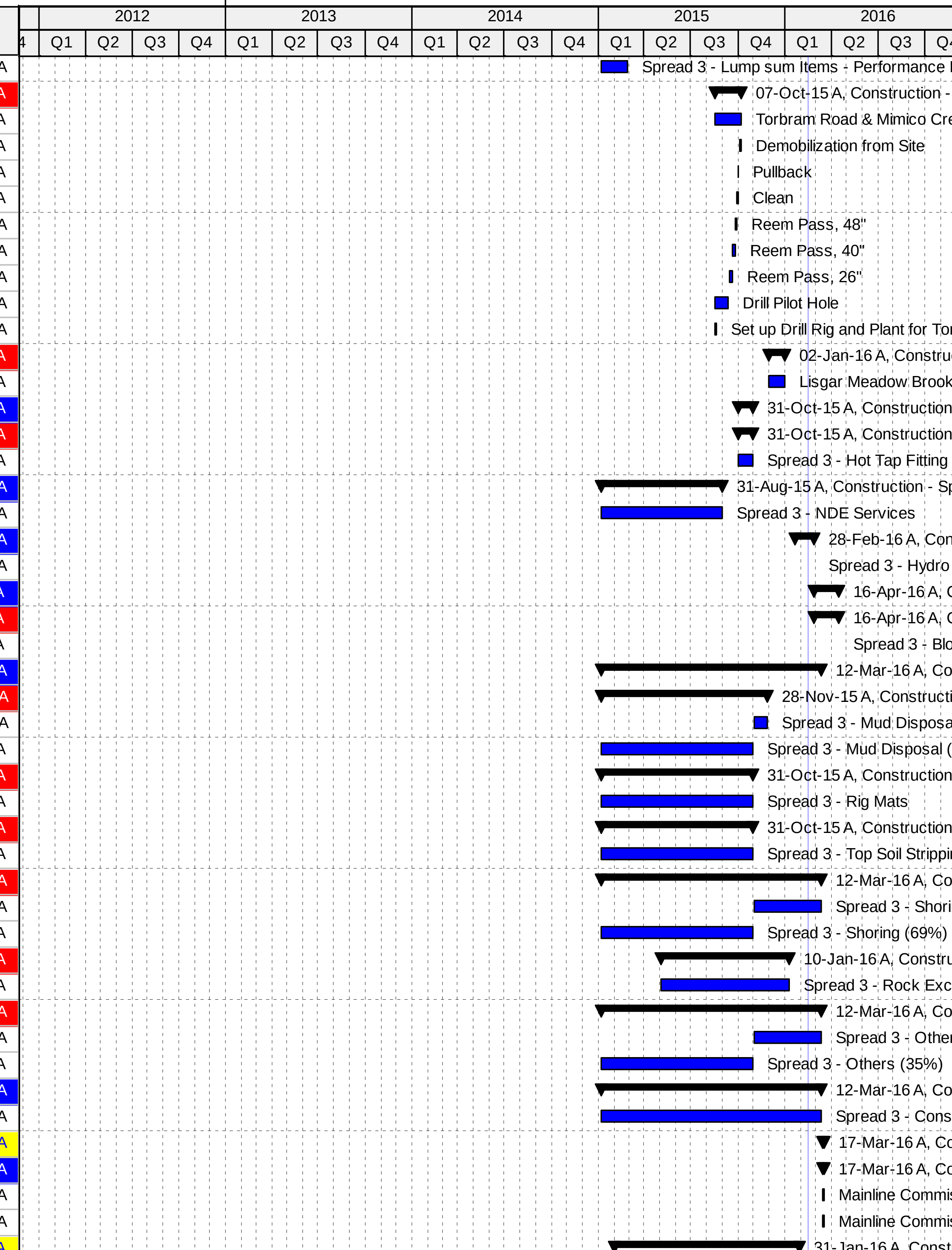
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3585	S3W06	Spread 3 - Lump sum Items - Performance Bond/Mud Engi	0.0	100%	100%	06-Jan-15 A	27-Feb-15 A
3586		**Construction - Spread 3, Torbram Road & Mimico Creek Trib 2 - PCO-**	0.0	100%	100%	17-Aug-15 A	07-Oct-15 A
3587	S3W06-43	Torbram Road & Mimico Creek Trib 2	0.0	100%	100%	17-Aug-15 A	07-Oct-15 A
3588	S3W06-43	Demobilization from Site	0.0	100%	100%	05-Oct-15 A	07-Oct-15 A
3589	S3W06-43	Pullback	0.0	100%	100%	02-Oct-15 A	03-Oct-15 A
3590	S3W06-43	Clean	0.0	100%	100%	30-Sep-15 A	01-Oct-15 A
3591	S3W06-43	Reem Pass, 48"	0.0	100%	100%	26-Sep-15 A	29-Sep-15 A
3592	S3W06-43	Reem Pass, 40"	0.0	100%	100%	21-Sep-15 A	25-Sep-15 A
3593	S3W06-43	Reem Pass, 26"	0.0	100%	100%	14-Sep-15 A	20-Sep-15 A
3594	S3W06-43	Drill Pilot Hole	0.0	100%	100%	18-Aug-15 A	13-Sep-15 A
3595	S3W06-43	Set up Drill Rig and Plant for Torbram	0.0	100%	100%	17-Aug-15 A	21-Aug-15 A
3596		**Construction - Spread 3. Lisgar Meadow Brook - Direct Pipe**	0.0	0%	0%	01-Dec-15 A	02-Jan-16 A
3597	S3W06-45	Lisgar Meadow Brook - Direct Pipe Method	0.0	0%	100%	01-Dec-15 A	02-Jan-16 A
3598		**Construction - Spread 3 - Hot Tap Installation**	0.0	100%	100%	01-Oct-15 A	31-Oct-15 A
3599		**Construction - Spread 3, Hot Tap Fitting Installation**	0.0	100%	100%	01-Oct-15 A	31-Oct-15 A
3600	S3W08-13	Spread 3 - Hot Tap Fitting	0.0	100%	100%	01-Oct-15 A	31-Oct-15 A
3601		**Construction - Spread 3 - NDE Services**	0.0	100%	100%	07-Jan-15 A	31-Aug-15 A
3602	S3W09-1310	Spread 3 - NDE Services	0.0	100%	100%	07-Jan-15 A	31-Aug-15 A
3603		**Construction - Spread 3, Hydro Testing**	0.0	0%	0%	23-Jan-16 A	28-Feb-16 A
3604	S3W10-1400	Spread 3 - Hydro Testing	0.0	0%	100%	23-Jan-16 A	28-Feb-16 A
3605		**Construction - Spread 3 - Block Valves**	0.0	100%	0%	29-Feb-16 A	16-Apr-16 A
3606		**Construction - Spread 3 - Block Valves**	0.0	100%	0%	29-Feb-16 A	16-Apr-16 A
3607	S3W11-13	Spread 3 - Block Valves	0.0	100%	0%	29-Feb-16 A	16-Apr-16 A
3608		**Construction - Spread 3 - UPI**	0.0	100%	100%	07-Jan-15 A	12-Mar-16 A
3609		**Construction - Spread 3 - Mud Disposal**	0.0	100%	100%	07-Jan-15 A	28-Nov-15 A
3610	S3W17-P(	Spread 3 - Mud Disposal	0.0	0%	100%	02-Nov-15 A	28-Nov-15 A
3611	S3W17-13	Spread 3 - Mud Disposal (86%)	0.0	100%	100%	07-Jan-15 A	31-Oct-15 A
3612		**Construction - Spread 3 - Rig Mats**	0.0	100%	100%	07-Jan-15 A	31-Oct-15 A
3613	S3W17-13	Spread 3 - Rig Mats	0.0	100%	100%	07-Jan-15 A	31-Oct-15 A
3614		**Construction - Spread 3 - Top Soil Stripping and Replacement**	0.0	100%	100%	07-Jan-15 A	31-Oct-15 A
3615	S3W17-13	Spread 3 - Top Soil Stripping & Replacement	0.0	100%	100%	07-Jan-15 A	31-Oct-15 A
3616		**Construction - Spread 3 - Shoring**	0.0	100%	100%	07-Jan-15 A	12-Mar-16 A
3617	S3W17-P(	Spread 3 - Shoring	0.0	0%	100%	02-Nov-15 A	12-Mar-16 A
3618	S3W17-14	Spread 3 - Shoring (69%)	0.0	100%	100%	07-Jan-15 A	31-Oct-15 A
3619		**Construction - Spread 3 - Rock Excavation**	0.0	100%	100%	04-May-15 A	10-Jan-16 A
3620	S3W17-14	Spread 3 - Rock Excavation	0.0	100%	100%	04-May-15 A	10-Jan-16 A
3621		**Construction - Spread 3 - Other UPIs**	0.0	100%	100%	07-Jan-15 A	12-Mar-16 A
3622	S3W17-P(	Spread 3 - Others	0.0	0%	100%	02-Nov-15 A	12-Mar-16 A
3623	S3W17-14	Spread 3 - Others (35%)	0.0	100%	100%	07-Jan-15 A	31-Oct-15 A
3624		**Construction - Spread 3 - Construction Survey**	0.0	100%	100%	07-Jan-15 A	12-Mar-16 A
3625	S3W25-1010	Spread 3 - Construction Survey	0.0	100%	100%	07-Jan-15 A	12-Mar-16 A
3626		**Commissioning, Spread 3**	0.0	100%	100%	16-Mar-16 A	17-Mar-16 A
3627		**Commissioning, Spread 3 - Commissioning, Pipeline Section A-1.2.1**	0.0	100%	100%	16-Mar-16 A	17-Mar-16 A
3628	POE322022	Mainline Commissioning - Spread 4	0.0	0%	100%	16-Mar-16 A	17-Mar-16 A
3629	POE322012	Mainline Commissioning - Spread 3	0.0	100%	100%	16-Mar-16 A	17-Mar-16 A
3630		**Construction - Spread 4**	0.0	100%	100%	02-Feb-15 A	31-Jan-16 A



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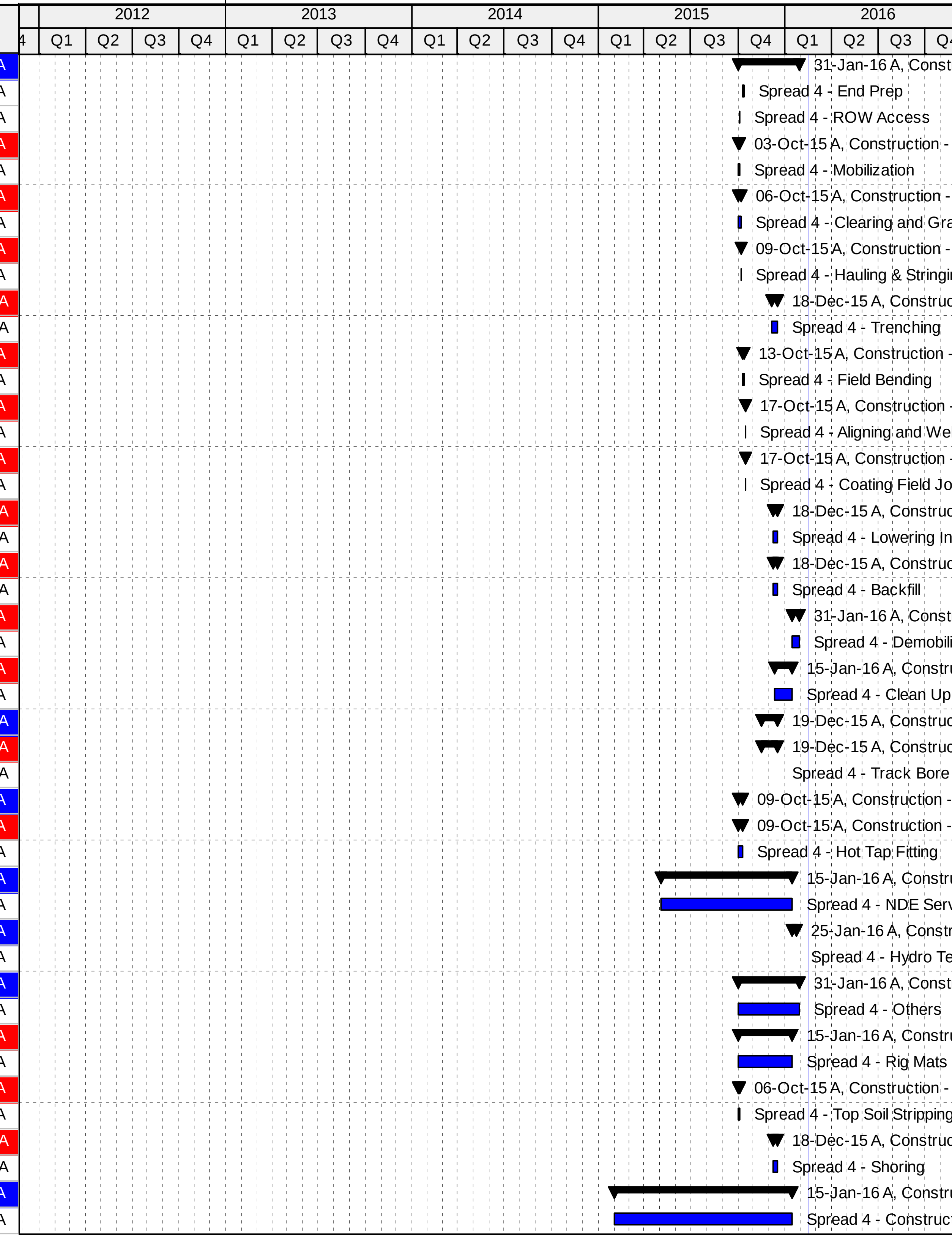
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3631		**Construction - Spread 4, Pipeline**	0.0	100%	100%	01-Oct-15 A	31-Jan-16 A
3632	S4W01-1560	Spread 4 - End Prep	0.0	0%	100%	11-Oct-15 A	15-Oct-15 A
3633	S4W01-1430	Spread 4 - ROW Access	0.0	100%	100%	05-Oct-15 A	06-Oct-15 A
3634		**Construction - Spread 4, Mainline**	0.0	100%	100%	01-Oct-15 A	03-Oct-15 A
3635	S4W01-14	Spread 4 - Mobilization	0.0	100%	100%	01-Oct-15 A	03-Oct-15 A
3636		**Construction - Spread 4 Block Valve Installation**	0.0	100%	100%	01-Oct-15 A	06-Oct-15 A
3637	S4W01-14	Spread 4 - Clearing and Grading	0.0	100%	100%	01-Oct-15 A	06-Oct-15 A
3638		**Construction - Spread 4, HDD Support**	0.0	100%	100%	07-Oct-15 A	09-Oct-15 A
3639	S4W01-14	Spread 4 - Hauling & Stringing	0.0	100%	100%	07-Oct-15 A	09-Oct-15 A
3640		**Construction - Spread 4, Survey and locates**	0.0	100%	100%	07-Dec-15 A	18-Dec-15 A
3641	S4W01-14	Spread 4 - Trenching	0.0	100%	100%	07-Dec-15 A	18-Dec-15 A
3642		**Construction - Spread 4 - Field Bending**	0.0	100%	100%	10-Oct-15 A	13-Oct-15 A
3643	S4W01-14	Spread 4 - Field Bending	0.0	100%	100%	10-Oct-15 A	13-Oct-15 A
3644		**Construction - Spread 4 - Aligning and Welding**	0.0	100%	100%	16-Oct-15 A	17-Oct-15 A
3645	S4W01-14	Spread 4 - Aligning and Welding	0.0	100%	100%	16-Oct-15 A	17-Oct-15 A
3646		**Construction - Spread 4 - Coating Field Joints and Coating Repairs**	0.0	100%	100%	16-Oct-15 A	17-Oct-15 A
3647	S4W01-14	Spread 4 - Coating Field Joints and Coating Repairs	0.0	100%	100%	16-Oct-15 A	17-Oct-15 A
3648		**Construction - Spread 4 - Lowering In**	0.0	100%	100%	09-Dec-15 A	18-Dec-15 A
3649	S4W01-15	Spread 4 - Lowering In	0.0	100%	100%	09-Dec-15 A	18-Dec-15 A
3650		**Construction - Spread 4 - Backfill**	0.0	100%	100%	09-Dec-15 A	18-Dec-15 A
3651	S4W01-15	Spread 4 - Backfill	0.0	100%	100%	09-Dec-15 A	18-Dec-15 A
3652		**Construction - Spread 4 - Demobilization**	0.0	100%	100%	15-Jan-16 A	31-Jan-16 A
3653	S4W01-15	Spread 4 - Demobilization	0.0	100%	100%	15-Jan-16 A	31-Jan-16 A
3654		**Construction - Spread 4 - Clean-up and Restoration**	0.0	100%	100%	11-Dec-15 A	15-Jan-16 A
3655	S4W01-15	Spread 4 - Clean Up	0.0	100%	100%	11-Dec-15 A	15-Jan-16 A
3656		**Construction - Spread 4, Crossings**	0.0	100%	100%	16-Nov-15 A	19-Dec-15 A
3657		**Construction - Spread 4, Track Bore**	0.0	100%	100%	16-Nov-15 A	19-Dec-15 A
3658	S4W02-12	Spread 4 - Track Bore - UPI	0.0	100%	100%	16-Nov-15 A	19-Dec-15 A
3659		**Construction - Spread 4 - Hot Tap Installation**	0.0	100%	100%	02-Oct-15 A	09-Oct-15 A
3660		**Construction - Spread 4 - Hot Tap Installation**	0.0	100%	100%	02-Oct-15 A	09-Oct-15 A
3661	S4W08-13	Spread 4 - Hot Tap Fitting	0.0	100%	100%	02-Oct-15 A	09-Oct-15 A
3662		**Construction - Spread 4 - NDE Services**	0.0	100%	100%	04-May-15 A	15-Jan-16 A
3663	S4W09-1320	Spread 4 - NDE Services	0.0	100%	100%	04-May-15 A	15-Jan-16 A
3664		**Construction - Spread 4, Hydro Testing**	0.0	0%	0%	16-Jan-16 A	25-Jan-16 A
3665	S4W10-1540	Spread 4 - Hydro Testing	0.0	0%	100%	16-Jan-16 A	25-Jan-16 A
3666		**Construction - Spread 4 - UPI**	0.0	100%	100%	01-Oct-15 A	31-Jan-16 A
3667	S4W17-1460	Spread 4 - Others	0.0	100%	100%	01-Oct-15 A	31-Jan-16 A
3668		**Construction - Spread 4 - Rig Mats**	0.0	100%	100%	01-Oct-15 A	15-Jan-16 A
3669	S4W17-14	Spread 4 - Rig Mats	0.0	100%	100%	01-Oct-15 A	15-Jan-16 A
3670		**Construction - Spread 4 - Top Soil Stripping & Replacement**	0.0	100%	100%	01-Oct-15 A	06-Oct-15 A
3671	S4W17-14	Spread 4 - Top Soil Stripping & Replacement	0.0	100%	100%	01-Oct-15 A	06-Oct-15 A
3672		**Construction - Spread 4 - Shoring**	0.0	100%	100%	09-Dec-15 A	18-Dec-15 A
3673	S4W17-14	Spread 4 - Shoring	0.0	100%	100%	09-Dec-15 A	18-Dec-15 A
3674		**Construction - Spread 4 - Construction Survey**	0.0	100%	100%	02-Feb-15 A	15-Jan-16 A
3675	S4W25-1010	Spread 4 - Construction Survey	0.0	100%	100%	02-Feb-15 A	15-Jan-16 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3676		**Stations Construction**	50.4	88.87%	83.9%	25-Mar-15 A	15-Jul-16
3677		**Station Milestones**	0.0	0%	0%	13-Apr-15 A	18-Apr-16
3678		**Permit Milestones**	0.0	0%	0%	13-Apr-15 A	18-Apr-16
3679	PM-18940	Hertiage Rd Permits & Approvals	0.0	100%	0%	18-Apr-16	
3680	PM-18930	Bramalea Permits & Approvals	0.0	100%	0%	18-Apr-16*	
3681	PM-18920	Gravel Road Permits & Approvals Not Required	0.0	100%	100%	10-Aug-15 A	
3682	PM-18910	Hurontario Permits & Approvals	0.0	100%	0%	18-Apr-16	
3683	PM-18900	Yonge Street Permits & Approvals	0.0	100%	0%	18-Apr-16	
3684	PM-18890	Roddick Rd Permits & Approvals	0.0	100%	0%	18-Apr-16*	
3685	PM-18880	Albion Temp Bridge Permit & Approval to Proceed	0.0	100%	100%	10-Jun-15 A	
3686	PM-18870	Parkway Cons Permits & Approvals	0.0	100%	100%	08-Jun-15 A	
3687	PM-18860	Sheppard Crossover Permit & Approvals	0.0	100%	100%	01-Jun-15 A	
3688	PM-18850	Keele Permits & Approvals	0.0	100%	100%	28-May-15 A	
3689	PM-18840	Albion Permits & Approvals	0.0	100%	100%	20-Apr-15 A	
3690	PM-18830	Parkway West Permits & Approvals	0.0	100%	100%	13-Apr-15 A	
3691		**Stations**	50.4	87.92%	83.75%	25-Mar-15 A	15-Jul-16
3692		**Parkway West Gate**	0.0	100%	100%	07-Apr-15 A	27-Feb-16 A
3693		**Station 1 - Shop Fabrication (Less all 42"; Piping and Pig Receiver)**	0.0	100%	100%	20-May-15 A	17-Dec-15 A
3694	ST-18950	Station 1 - Shop Fabrication	0.0	100%	100%	20-May-15 A	17-Dec-15 A
3695		**Station 1 - Contractor Supplied Materials**	0.0	100%	100%	15-May-15 A	01-Dec-15 A
3696	ST-18800	Station 1 - Contractor Supplied Materials	0.0	100%	100%	15-May-15 A	01-Dec-15 A
3697		**Station 1 - Civil Works**	0.0	100%	100%	07-Apr-15 A	26-Feb-16 A
3698	ST-18820	Station 1 - Civil Works	0.0	100%	100%	07-Apr-15 A	26-Feb-16 A
3699		**Station 1 - Mechanical and Piping**	0.0	100%	100%	15-Jun-15 A	26-Feb-16 A
3700	ST-18830	Station 1 - Mechanical and Piping	0.0	100%	100%	15-Jun-15 A	26-Feb-16 A
3701		**Station 1 - Electrical and Instrumentation**	0.0	100%	100%	08-Jun-15 A	26-Feb-16 A
3702	ST-18840	Station 1 - Electrical and Instrumentation	0.0	100%	100%	08-Jun-15 A	26-Feb-16 A
3703		**Station 1 - Permits**	0.0	100%	100%	15-Apr-15 A	15-Apr-15 A
3704	ST-19550	Station 1 - permits	0.0	100%	100%	15-Apr-15 A	15-Apr-15 A
3705		**Station 1 - 42" Piping Installation**	0.0	100%	100%	21-Apr-15 A	20-Feb-16 A
3706	ST-18810	Station 1 - 42" Piping Installation	0.0	100%	100%	21-Apr-15 A	20-Feb-16 A
3707		**Station 1 - NDE Services**	0.0	100%	100%	20-May-15 A	17-Dec-15 A
3708	ST-19640	Station 1 - NDE Services	0.0	100%	100%	20-May-15 A	17-Dec-15 A
3709		**Station 1 - Hydrotest**	0.0	0%	0%	18-Feb-16 A	27-Feb-16 A
3710	ST-PCO-1	Station 1 - Hydrotesting	0.0	0%	100%	18-Feb-16 A	27-Feb-16 A
3711		**Parkway Cons**	0.0	100%	100%	01-Jun-15 A	05-Feb-16 A
3712		**Station 3 - Shop Fabrication**	0.0	100%	100%	13-Jul-15 A	01-Oct-15 A
3713	ST-18960	Station 3 - Shop Fabrication	0.0	100%	100%	13-Jul-15 A	01-Oct-15 A
3714		**Station 3 - Contractor Supplied Materials**	0.0	100%	100%	01-Jun-15 A	12-Dec-15 A
3715	ST-18970	Station 3 - Contractor Supplied Materials	0.0	100%	100%	01-Jun-15 A	12-Dec-15 A
3716		**Station 3 - Civil Works**	0.0	100%	100%	31-Aug-15 A	19-Dec-15 A
3717	ST-18980	Station 3 - Civil Works	0.0	100%	100%	31-Aug-15 A	19-Dec-15 A
3718		**Station 3 - Mechanical and Piping**	0.0	100%	100%	30-Jul-15 A	11-Dec-15 A
3719	ST-18990	Station 3 - Mechanical and Piping	0.0	100%	100%	30-Jul-15 A	11-Dec-15 A
3720		**Station 3 - Electrical and Instrumentation**	0.0	100%	100%	01-Aug-15 A	05-Feb-16 A

Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

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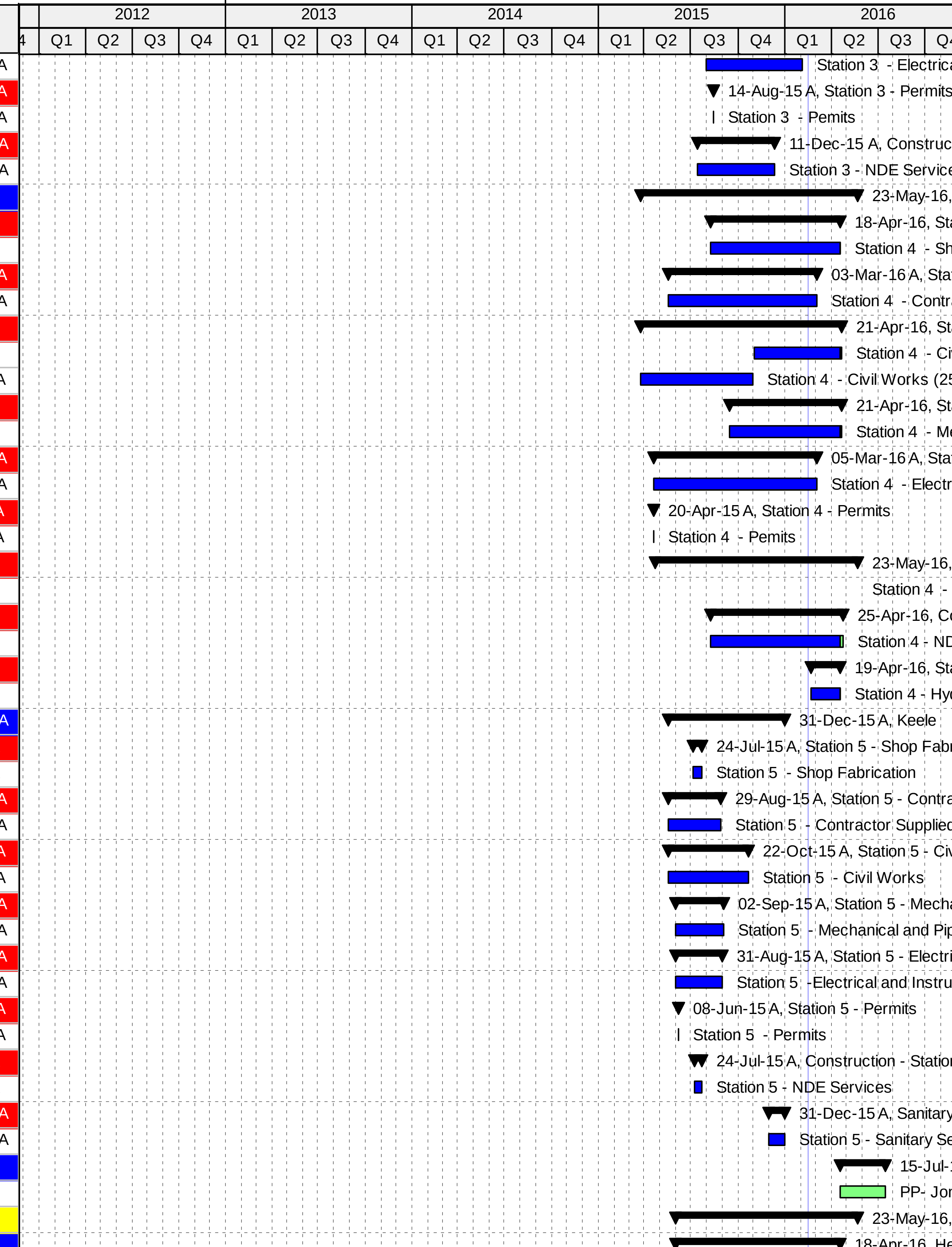
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3721	ST-19000	Station 3 - Electrical and Instrumentation	0.0	100%	100%	01-Aug-15 A	05-Feb-16 A
3722		**Station 3 - Permits**	0.0	100%	100%	14-Aug-15 A	14-Aug-15 A
3723	ST-19560	Station 3 - Pemits	0.0	100%	100%	14-Aug-15 A	14-Aug-15 A
3724		**Construction - Station 3, NDE Services**	0.0	100%	100%	13-Jul-15 A	11-Dec-15 A
3725	ST-19650	Station 3 - NDE Services	0.0	100%	100%	13-Jul-15 A	11-Dec-15 A
3726		**Albion**	20.0	100%	94.94%	25-Mar-15 A	23-May-16
3727		**Station 4 - Shop Fabrication**	1.0	100%	98%	10-Aug-15 A	18-Apr-16
3728	ST-19010	Station 4 - Shop Fabrication (Less all 42" Piping and Pig Re	1.0	100%	98%	10-Aug-15 A	18-Apr-16
3729		**Station 4 - Contractor Supplied Materials**	0.0	100%	100%	19-May-15 A	03-Mar-16 A
3730	ST-18900	Station 4 - Contractor Supplied Materials	0.0	100%	100%	19-May-15 A	03-Mar-16 A
3731		**Station 4 - Civil Works**	4.0	100%	100%	25-Mar-15 A	21-Apr-16
3732	ST-PMO-1	Station 4 - Civil Works	4.0	0%	85%	02-Nov-15 A	21-Apr-16
3733	ST-18870	Station 4 - Civil Works (25%)	0.0	100%	100%	25-Mar-15 A	31-Oct-15 A
3734		**Station 4 - Mechanical and Piping**	4.0	100%	87%	15-Sep-15 A	21-Apr-16
3735	ST-18910	Station 4 - Mechanical and Piping	4.0	100%	87%	15-Sep-15 A	21-Apr-16
3736		**Station 4 - Electrical and Instrumentation**	0.0	100%	100%	21-Apr-15 A	05-Mar-16 A
3737	ST-18880	Station 4 - Electrical and Instrumentation	0.0	100%	100%	21-Apr-15 A	05-Mar-16 A
3738		**Station 4 - Permits**	0.0	100%	100%	20-Apr-15 A	20-Apr-15 A
3739	ST-19570	Station 4 - Pemits	0.0	100%	100%	20-Apr-15 A	20-Apr-15 A
3740		**Station 4 - 42" Piping Installation**	30.9	100%	99%	21-Apr-15 A	23-May-16
3741	ST-19020	Station 4 - 42" Piping Installation	30.9	100%	99%	21-Apr-15 A	23-May-16
3742		**Construction - Station 4, NDE Services**	6.0	100%	95%	10-Aug-15 A	25-Apr-16
3743	ST-19660	Station 4 - NDE Services	6.0	100%	95%	10-Aug-15 A	25-Apr-16
3744		**Station 4 - Hydrotest**	2.0	0%	0%	23-Feb-16 A	19-Apr-16
3745	ST-PCO-1	Station 4 - Hydrotesting	2.0	0%	90%	23-Feb-16 A	19-Apr-16
3746		**Keele**	0.0	100%	100%	19-May-15 A	31-Dec-15 A
3747		**Station 5 - Shop Fabrication**	0.0	100%	100%	07-Jul-15 A	24-Jul-15 A
3748	ST-19030	Station 5 - Shop Fabrication	0.0	100%	100%	07-Jul-15 A	24-Jul-15 A
3749		**Station 5 - Contractor Supplied Materials**	0.0	100%	100%	19-May-15 A	29-Aug-15 A
3750	ST-19040	Station 5 - Contractor Supplied Materials	0.0	100%	100%	19-May-15 A	29-Aug-15 A
3751		**Station 5 - Civil Works**	0.0	100%	100%	19-May-15 A	22-Oct-15 A
3752	ST-18930	Station 5 - Civil Works	0.0	100%	100%	19-May-15 A	22-Oct-15 A
3753		**Station 5 - Mechanical and Piping**	0.0	100%	100%	02-Jun-15 A	02-Sep-15 A
3754	ST-19050	Station 5 - Mechanical and Piping	0.0	100%	100%	02-Jun-15 A	02-Sep-15 A
3755		**Station 5 - Electrical and Instrumentation**	0.0	100%	100%	01-Jun-15 A	31-Aug-15 A
3756	ST-19060	Station 5 -Electrical and Instrumentation	0.0	100%	100%	01-Jun-15 A	31-Aug-15 A
3757		**Station 5 - Permits**	0.0	100%	100%	08-Jun-15 A	08-Jun-15 A
3758	ST-19580	Station 5 - Pemits	0.0	100%	100%	08-Jun-15 A	08-Jun-15 A
3759		**Construction - Station 5, NDE Services**	0.0	0%	0%	07-Jul-15 A	24-Jul-15 A
3760	ST-19670	Station 5 - NDE Services	0.0	0%	100%	07-Jul-15 A	24-Jul-15 A
3761		**Sanitary Sewer at Keele / Sheppard**	0.0	0%	0%	01-Dec-15 A	31-Dec-15 A
3762	ST-PCO-1	Station 5 - Sanitary Sewer at Keele /CNR - CCTV and Shori	0.0	0%	100%	01-Dec-15 A	31-Dec-15 A
3763		**Jonesville**	76.8	14.86%	0%	18-Apr-16	15-Jul-16
3764	ST-18940	PP- Jonesville Station	76.8	15.26%	0%	18-Apr-16*	15-Jul-16
3765		**Valve Sites**	20.0	100%	85.58%	01-Jun-15 A	23-May-16
3766		**Heritage Road - 42" Valve Site 'VS1'**	0.8	100%	72.39%	01-Jun-15 A	18-Apr-16



Actual Work | Critical Remaining Work | Summary
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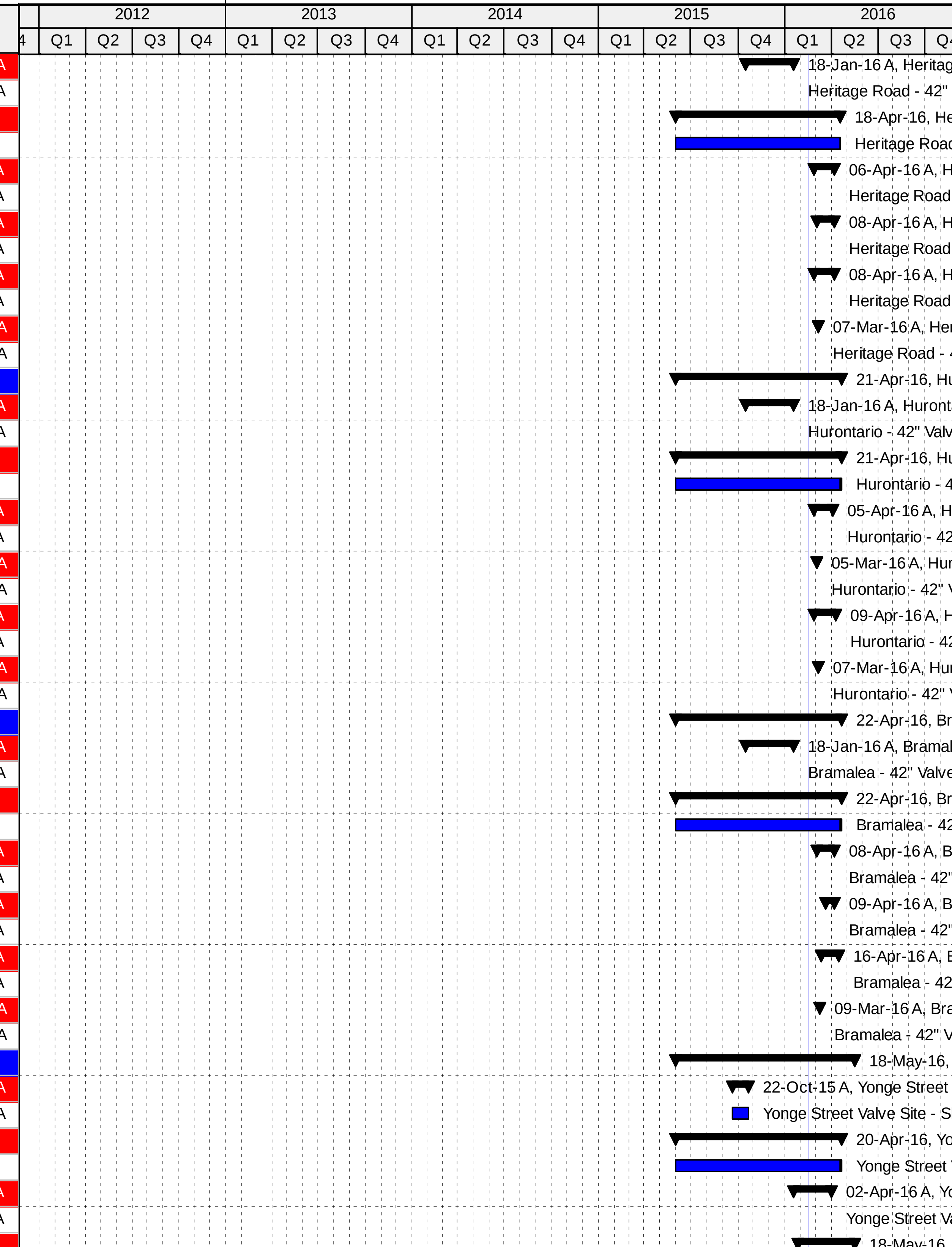
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3767		**Heritage Road - 42" Valve Site - Shop Fabrication**	0.0	100%	100%	15-Oct-15 A	18-Jan-16 A
3768	VS-19250	Heritage Road - 42" Valve Site - Shop Fabrication	0.0	100%	100%	15-Oct-15 A	18-Jan-16 A
3769		**Heritage Road - 42" Valve Site - Contractor Supplied Materials**	1.0	100%	99%	01-Jun-15 A	18-Apr-16
3770	VS-19260	Heritage Road - 42" Valve Site - Contractor Supplied Materi	1.0	100%	99%	01-Jun-15 A	18-Apr-16
3771		**Heritage Road - 42" Valve Site - Civil Works**	0.0	100%	40%	29-Feb-16 A	06-Apr-16 A
3772	VS-19270	Heritage Road - 42" Valve Site - Civil Works	0.0	100%	40%	29-Feb-16 A	06-Apr-16 A
3773		**Heritage Road - 42" Valve Site - Mechanical and Piping**	0.0	100%	92%	03-Mar-16 A	08-Apr-16 A
3774	VS-19280	Heritage Road - 42" Valve Site - Mechanical and Piping	0.0	100%	92%	03-Mar-16 A	08-Apr-16 A
3775		**Heritage Road - 42" Valve Site - Electrical and Instrumentation**	0.0	100%	82%	29-Feb-16 A	08-Apr-16 A
3776	VS-19310	Heritage Road - 42" Valve Site - Electrical and Instrumentati	0.0	100%	82%	29-Feb-16 A	08-Apr-16 A
3777		**Heritage Road - 42" Valve Site - Permits**	0.0	100%	100%	07-Mar-16 A	07-Mar-16 A
3778	VS-19410	Heritage Road - 42" Valve Site - Permits	0.0	100%	100%	07-Mar-16 A	07-Mar-16 A
3779		**Hurontario - 42" Valve Site 'VS2'**	3.2	100%	75.13%	01-Jun-15 A	21-Apr-16
3780		**Hurontario - 42" Valve Site - Shop Fabrication**	0.0	100%	100%	15-Oct-15 A	18-Jan-16 A
3781	VS-19200	Hurontario - 42" Valve Site - Shop Fabrication	0.0	100%	100%	15-Oct-15 A	18-Jan-16 A
3782		**Hurontario - 42" Valve Site - Contractor Supplied Materials**	4.0	100%	99%	01-Jun-15 A	21-Apr-16
3783	VS-19210	Hurontario - 42" Valve Site - Contractor Supplied Materials	4.0	100%	99%	01-Jun-15 A	21-Apr-16
3784		**Hurontario - 42" Valve Site - Civil Works**	0.0	100%	39%	29-Feb-16 A	05-Apr-16 A
3785	VS-19220	Hurontario - 42" Valve Site - Civil Works	0.0	100%	39%	29-Feb-16 A	05-Apr-16 A
3786		**Hurontario - 42" Valve Site - Mechanical and Piping**	0.0	100%	100%	04-Mar-16 A	05-Mar-16 A
3787	VS-19230	Hurontario - 42" Valve Site - Mechanical and Piping	0.0	100%	100%	04-Mar-16 A	05-Mar-16 A
3788		**Hurontario - 42" Valve Site - Electrical and Instrumentation**	0.0	100%	91%	29-Feb-16 A	09-Apr-16 A
3789	VS-19240	Hurontario - 42" Valve Site - Electrical and Instrumentation	0.0	100%	91%	29-Feb-16 A	09-Apr-16 A
3790		**Hurontario - 42" Valve Site - Permits**	0.0	100%	100%	07-Mar-16 A	07-Mar-16 A
3791	VS-19400	Hurontario - 42" Valve Site - Permits	0.0	100%	100%	07-Mar-16 A	07-Mar-16 A
3792		**Bramalea - 42" Valve Site 'VS3'**	4.0	100%	67.69%	01-Jun-15 A	22-Apr-16
3793		**Bramalea - 42" Valve Site - Shop Fabrication**	0.0	100%	100%	15-Oct-15 A	18-Jan-16 A
3794	VS-19150	Bramalea - 42" Valve Site - Shop Fabrication	0.0	100%	100%	15-Oct-15 A	18-Jan-16 A
3795		**Bramalea - 42" Valve Site - Contractor Supplied Materials**	5.0	100%	99%	01-Jun-15 A	22-Apr-16
3796	VS-19160	Bramalea - 42" Valve Site- Contractor Supplied Materials	5.0	100%	99%	01-Jun-15 A	22-Apr-16
3797		**Bramalea - 42" Valve Site - Civil Works**	0.0	100%	37%	03-Mar-16 A	08-Apr-16 A
3798	VS-19170	Bramalea - 42" Valve Site - Civil Works	0.0	100%	37%	03-Mar-16 A	08-Apr-16 A
3799		**Bramalea - 42" Valve Site - Mechanical and Piping**	0.0	100%	97%	21-Mar-16 A	09-Apr-16 A
3800	VS-19180	Bramalea - 42" Valve Site - Mechanical and Piping	0.0	100%	97%	21-Mar-16 A	09-Apr-16 A
3801		**Bramalea - 42" Valve Site - Electrical and Instrumentation**	0.0	100%	58%	14-Mar-16 A	16-Apr-16 A
3802	VS-19190	Bramalea - 42" Valve Site - Electrical and Instrumentation	0.0	100%	58%	14-Mar-16 A	16-Apr-16 A
3803		**Bramalea - 42" Valve Site - Permits**	0.0	100%	100%	09-Mar-16 A	09-Mar-16 A
3804	VS-19390	Bramalea - 42" Valve Site - Permits	0.0	100%	100%	09-Mar-16 A	09-Mar-16 A
3805		**Yonge Street Valve Site 'VS4'**	26.9	100%	99.78%	01-Jun-15 A	18-May-16
3806		**Yonge Street Valve Site 'VS4' - Shop Fabrication**	0.0	100%	100%	22-Sep-15 A	22-Oct-15 A
3807	VS-19080	Yonge Street Valve Site - Shop Fabrication	0.0	100%	100%	22-Sep-15 A	22-Oct-15 A
3808		**Yonge Street Valve Site 'VS4' - Contractor Supplied Materials**	3.0	100%	99%	01-Jun-15 A	20-Apr-16
3809	VS-19090	Yonge Street Valve Site - Contractor Supplied Materials	3.0	100%	99%	01-Jun-15 A	20-Apr-16
3810		**Yonge Street Valve Site 'VS4' - Civil Works**	0.0	100%	100%	18-Jan-16 A	02-Apr-16 A
3811	VS-19100	Yonge Street Valve Site - Civil Works	0.0	100%	100%	18-Jan-16 A	02-Apr-16 A
3812		**Yonge Street Valve Site 'VS4' - Mechanical and Piping**	26.9	100%	98%	26-Jan-16 A	18-May-16



Actual Work | Critical Remaining Work | Summary
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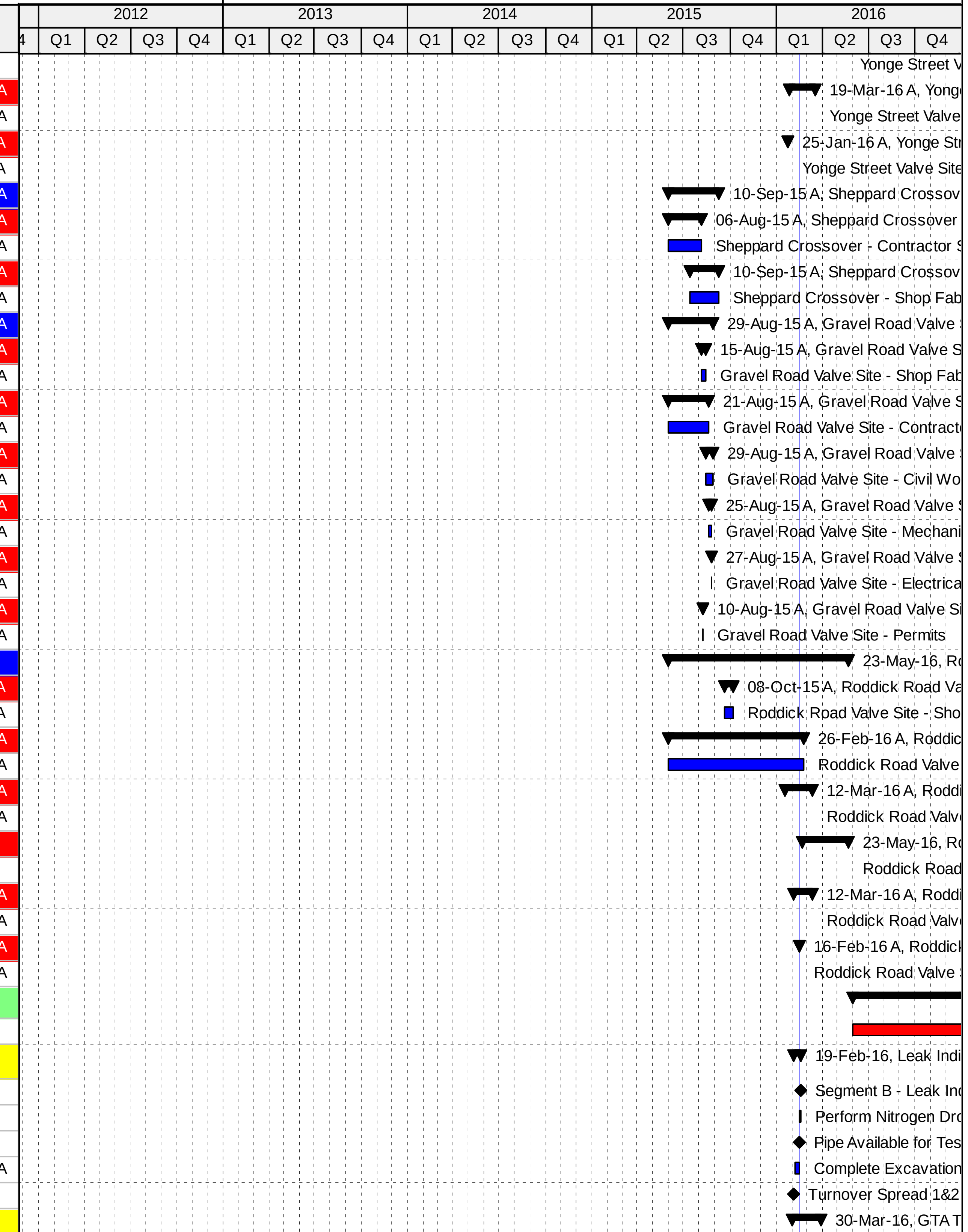
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3813	VS-19110	Yonge Street Valve Site - Mechanical and Piping	26.9	100%	98%	26-Jan-16 A	18-May-16
3814		**Yonge Street Valve Site 'VS4' - Electrical and Instrumentation**	0.0	100%	100%	26-Jan-16 A	19-Mar-16 A
3815	VS-19120	Yonge Street Valve Site - Electrical and Instrumentation	0.0	100%	100%	26-Jan-16 A	19-Mar-16 A
3816		**Yonge Street Valve Site 'VS4' - Permits**	0.0	100%	100%	25-Jan-16 A	25-Jan-16 A
3817	VS-19380	Yonge Street Valve Site - Permits	0.0	100%	100%	25-Jan-16 A	25-Jan-16 A
3818		**Sheppard Crossover Fabrication 'VS5'**	0.0	100%	100%	01-Jun-15 A	10-Sep-15 A
3819		**Sheppard Crossover Fabrication 'VS5' - Shop Fabrication**	0.0	100%	100%	01-Jun-15 A	06-Aug-15 A
3820	VS-19130	Sheppard Crossover - Contractor Supplied Materials	0.0	100%	100%	01-Jun-15 A	06-Aug-15 A
3821		**Sheppard Crossover Fabrication 'VS5' - Contractor Supplied Materials**	0.0	100%	100%	15-Jul-15 A	10-Sep-15 A
3822	VS-19140	Sheppard Crossover - Shop Fabrication	0.0	100%	100%	15-Jul-15 A	10-Sep-15 A
3823		**Gravel Road Valve Site 'VS6'**	0.0	100%	100%	01-Jun-15 A	29-Aug-15 A
3824		**Gravel Road Valve Site 'VS6' - Shop Fabrication**	0.0	100%	100%	05-Aug-15 A	15-Aug-15 A
3825	VS-19330	Gravel Road Valve Site - Shop Fabrication	0.0	100%	100%	05-Aug-15 A	15-Aug-15 A
3826		**Gravel Road Valve Site 'VS6' - Contractor Supplied Materials**	0.0	100%	100%	01-Jun-15 A	21-Aug-15 A
3827	VS-19320	Gravel Road Valve Site - Contractor Supplied Materials	0.0	100%	100%	01-Jun-15 A	21-Aug-15 A
3828		**Gravel Road Valve Site 'VS6' - Civil Works**	0.0	100%	100%	15-Aug-15 A	29-Aug-15 A
3829	VS-19340	Gravel Road Valve Site - Civil Works	0.0	100%	100%	15-Aug-15 A	29-Aug-15 A
3830		**Gravel Road Valve Site 'VS6' - Mechanical and Piping**	0.0	100%	100%	21-Aug-15 A	25-Aug-15 A
3831	VS-19350	Gravel Road Valve Site - Mechanical and Piping	0.0	100%	100%	21-Aug-15 A	25-Aug-15 A
3832		**Gravel Road Valve Site 'VS6' - Electrical and Instrumentation**	0.0	100%	100%	26-Aug-15 A	27-Aug-15 A
3833	VS-19360	Gravel Road Valve Site - Electrical and Instrumentation	0.0	100%	100%	26-Aug-15 A	27-Aug-15 A
3834		**Gravel Road Valve Site 'VS6' - Permits**	0.0	100%	100%	10-Aug-15 A	10-Aug-15 A
3835	VS-19420	Gravel Road Valve Site - Permits	0.0	100%	100%	10-Aug-15 A	10-Aug-15 A
3836		**Roddick Road Valve Site 'VS7'**	30.9	100%	99.95%	01-Jun-15 A	23-May-16
3837		**Roddick Road Valve Site 'VS7' - Shop Fabrication**	0.0	100%	100%	22-Sep-15 A	08-Oct-15 A
3838	VS-19030	Roddick Road Valve Site - Shop Fabrication	0.0	100%	100%	22-Sep-15 A	08-Oct-15 A
3839		**Roddick Road Valve Site 'VS7' - Contractor Supplied Materials**	0.0	100%	100%	01-Jun-15 A	26-Feb-16 A
3840	VS-19040	Roddick Road Valve Site - Contractor Supplied Materials	0.0	100%	100%	01-Jun-15 A	26-Feb-16 A
3841		**Roddick Road Valve Site 'VS7' - Civil Works**	0.0	100%	100%	18-Jan-16 A	12-Mar-16 A
3842	VS-19050	Roddick Road Valve Site - Civil Works	0.0	100%	100%	18-Jan-16 A	12-Mar-16 A
3843		**Roddick Road Valve Site 'VS7' - Mechanical and Piping**	30.9	100%	99%	22-Feb-16 A	23-May-16
3844	VS-19060	Roddick Road Valve Site - Mechanical and Piping	30.9	100%	99%	22-Feb-16 A	23-May-16
3845		**Roddick Road Valve Site 'VS7' - Electrical and Instrumentation**	0.0	100%	100%	05-Feb-16 A	12-Mar-16 A
3846	VS-19070	Roddick Road Valve Site - Electrical and Instrumentation	0.0	100%	100%	05-Feb-16 A	12-Mar-16 A
3847		**Roddick Road Valve Site 'VS7' - Permits**	0.0	100%	100%	16-Feb-16 A	16-Feb-16 A
3848	VS-19370	Roddick Road Valve Site - Permits	0.0	100%	100%	16-Feb-16 A	16-Feb-16 A
3849		**Closeout**	120.0	0%	0%	01-Jun-16	09-Jan-17
3850	CLS_00010	Project Closeout - 6 months	120.0	0%	0%	01-Jun-16	09-Jan-17
3851		**Leak Indication Investigation**	3.0	0%	0%	05-Feb-16 A	19-Feb-16
3852	LII_1040	Segment B - Leak Indication Investigation Complete	0.0	0%	0%		19-Feb-16
3853	LII_1030	Perform Nitrogen Drop Test	3.0	0%	0%	17-Feb-16	19-Feb-16
3854	LII_1020	Pipe Available for Testing	0.0	0%	0%		17-Feb-16
3855	LII_1010	Complete Excavations, Weld on Test Heads	0.0	65.45%	100%	08-Feb-16 A	16-Feb-16 A
3856	LII_1000	Turnover Spread 1&2 to the Project	0.0	100%	100%	05-Feb-16 A	
3857		**GTA Tie-in**	18.8	0%	0%	02-Feb-16 A	30-Mar-16



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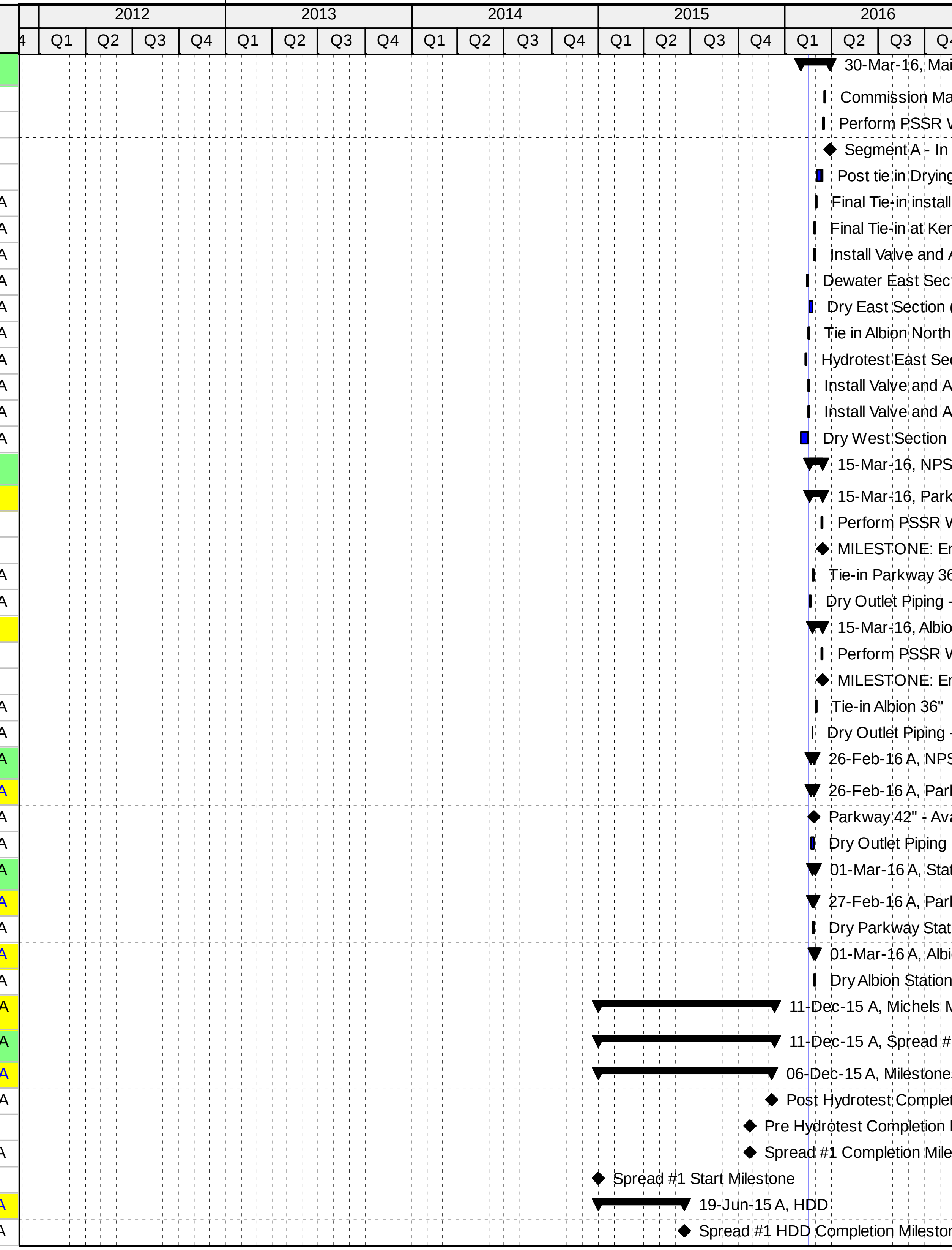
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3858	**Mainline 42"**		18.8	0%	0%	02-Feb-16 A	30-Mar-16
3859	TIE6550	Commission Mainline	2.0	75%	0%	18-Mar-16	21-Mar-16
3860	TIE6540	Perform PSSR Walkdown - Phase 2	2.0	100%	0%	16-Mar-16	18-Mar-16
3861	TIE6530	Segment A - In Service	0.0	0%	0%		30-Mar-16
3862	TIE1090	Post tie in Drying - Spread 3	6.0	100%	80%	04-Mar-16 A	16-Mar-16
3863	TIE1080	Final Tie-in install at Parkway 42"	0.0	100%	100%	29-Feb-16 A	03-Mar-16 A
3864	TIE1070	Final Tie-in at Kennedy 42"	0.0	100%	100%	26-Feb-16 A	01-Mar-16 A
3865	TIE1065	Install Valve and Actuator - Bramalea	0.0	100%	100%	27-Feb-16 A	29-Feb-16 A
3866	TIE1055	Dewater East Section	0.0	100%	100%	14-Feb-16 A	16-Feb-16 A
3867	TIE1050	Dry East Section (Kennedy to Albion Stn)	0.0	100%	100%	20-Feb-16 A	26-Feb-16 A
3868	TIE1040	Tie in Albion North to South (to enable drying)	0.0	100%	100%	16-Feb-16 A	19-Feb-16 A
3869	TIE1020	Hydrotest East Section	0.0	100%	100%	10-Feb-16 A	13-Feb-16 A
3870	TIE1015	Install Valve and Actuator - Hurontario	0.0	100%	100%	17-Feb-16 A	19-Feb-16 A
3871	TIE1010	Install Valve and Actuator - Heritage	0.0	100%	100%	17-Feb-16 A	19-Feb-16 A
3872	TIE1000	Dry West Section	0.0	100%	100%	02-Feb-16 A	15-Feb-16 A
3873	**NPS 36"**		2.3	0%	0%	18-Feb-16 A	15-Mar-16
3874	**Parkway 36" Tie-ins**		2.3	0%	0%	18-Feb-16 A	15-Mar-16
3875	TIE6510	Perform PSSR Walkdown - Phase 1A	2.0	100%	0%	14-Mar-16	15-Mar-16
3876	TIE3020	MILESTONE: Energize Fuel Gas	0.0	100%	0%		15-Mar-16
3877	TIE3010	Tie-in Parkway 36"	0.0	100%	100%	26-Feb-16 A	27-Feb-16 A
3878	TIE3000	Dry Outlet Piping - Downstream of Regulators	0.0	100%	100%	18-Feb-16 A	21-Feb-16 A
3879	**Albion 36" Tie-ins**		2.0	0%	0%	23-Feb-16 A	15-Mar-16
3880	TIE6520	Perform PSSR Walkdown - Phase 1A	1.6	100%	0%	14-Mar-16	15-Mar-16
3881	TIE3520	MILESTONE: Energize Fuel Gas	0.0	100%	0%		15-Mar-16
3882	TIE3510	Tie-in Albion 36"	0.0	100%	100%	02-Mar-16 A	03-Mar-16 A
3883	TIE3500	Dry Outlet Piping - Downstream of Regulators	0.0	100%	100%	23-Feb-16 A	25-Feb-16 A
3884	**NPS 42"**		0.0	0%	0%	23-Feb-16 A	26-Feb-16 A
3885	**Parkway 42" Tie-ins**		0.0	0%	0%	23-Feb-16 A	26-Feb-16 A
3886	TIE4010	Parkway 42" - Available for Tie-In	0.0	100%	100%		26-Feb-16 A
3887	TIE4000	Dry Outlet Piping	0.0	100%	100%	23-Feb-16 A	26-Feb-16 A
3888	**Station Piping Drying**		0.0	0%	0%	26-Feb-16 A	01-Mar-16 A
3889	**Parkway**		0.0	0%	0%	26-Feb-16 A	27-Feb-16 A
3890	TIE6000	Dry Parkway Station Piping	0.0	100%	100%	26-Feb-16 A	27-Feb-16 A
3891	**Albion**		0.0	0%	0%	28-Feb-16 A	01-Mar-16 A
3892	TIE6500	Dry Albion Station Piping	0.0	100%	100%	28-Feb-16 A	01-Mar-16 A
3893	**Michels Mainline - Spread 1**		0.0	0%	0%	01-Jan-15 A	11-Dec-15 A
3894	**Spread #1**		0.0	0%	0%	01-Jan-15 A	11-Dec-15 A
3895	**Milestones**		0.0	0%	0%	02-Jan-15 A	06-Dec-15 A
3896	A12781	Post Hydrotest Completion Milestone	0.0	0%	100%		06-Dec-15 A
3897	A12772	Pre Hydrotest Completion Milestone	0.0	0%	100%	26-Oct-15 A	
3898	A12771	Spread #1 Completion Milestone	0.0	100%	100%		26-Oct-15 A
3899	A12770	Spread #1 Start Milestone	0.0	100%	100%	02-Jan-15 A	
3900	**HDD**		0.0	0%	0%	01-Jan-15 A	19-Jun-15 A
3901	A3772	Spread #1 HDD Completion Milestone	0.0	100%	100%		19-Jun-15 A



Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

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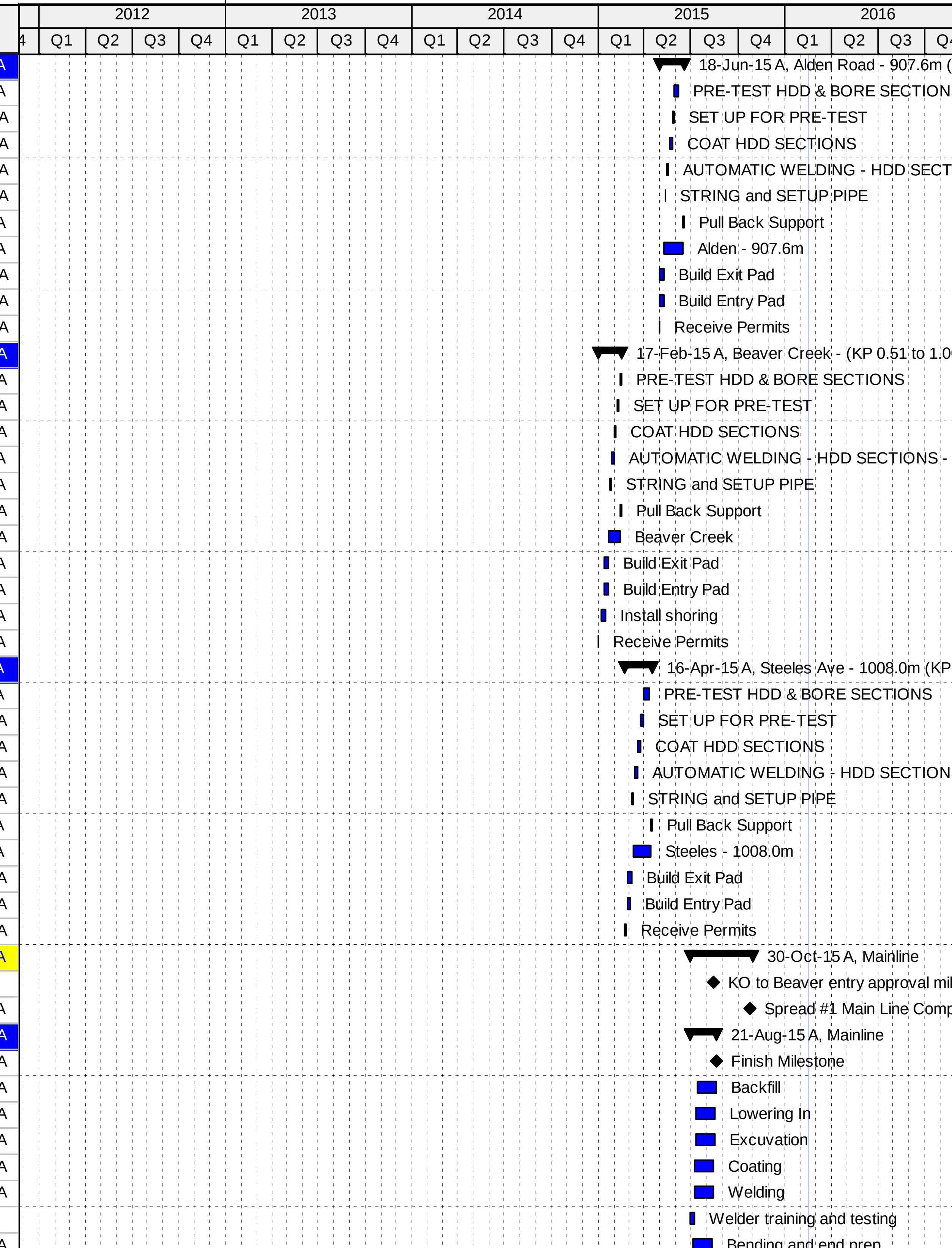
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3902	**Alden Road - 907.6m (KP 1.00 to 1.93)**		0.0	0%	0%	01-May-15 A	18-Jun-15 A
3903	A6735	PRE-TEST HDD & BORE SECTIONS	0.0	100%	100%	30-May-15 A	08-Jun-15 A
3904	A6730	SET UP FOR PRE-TEST	0.0	100%	100%	26-May-15 A	29-May-15 A
3905	A6710	COAT HDD SECTIONS	0.0	100%	100%	20-May-15 A	25-May-15 A
3906	A6700	AUTOMATIC WELDING - HDD SECTIONS - 1008m	0.0	100%	100%	14-May-15 A	19-May-15 A
3907	A6690	STRING and SETUP PIPE	0.0	100%	100%	11-May-15 A	13-May-15 A
3908	A6680	Pull Back Support	0.0	100%	100%	17-Jun-15 A	18-Jun-15 A
3909	A6679	Alden - 907.6m	0.0	100%	100%	09-May-15 A	16-Jun-15 A
3910	A6673	Build Exit Pad	0.0	100%	100%	02-May-15 A	08-May-15 A
3911	A6672	Build Entry Pad	0.0	100%	100%	02-May-15 A	08-May-15 A
3912	A6670	Receive Permits	0.0	100%	100%	01-May-15 A	01-May-15 A
3913	**Beaver Creek - (KP 0.51 to 1.00)**		0.0	0%	0%	01-Jan-15 A	17-Feb-15 A
3914	A6260	PRE-TEST HDD & BORE SECTIONS	0.0	100%	100%	12-Feb-15 A	14-Feb-15 A
3915	A6250	SET UP FOR PRE-TEST	0.0	100%	100%	07-Feb-15 A	09-Feb-15 A
3916	A6240	COAT HDD SECTIONS	0.0	100%	100%	31-Jan-15 A	03-Feb-15 A
3917	A6230	AUTOMATIC WELDING - HDD SECTIONS - 673m	0.0	100%	100%	26-Jan-15 A	31-Jan-15 A
3918	A6220	STRING and SETUP PIPE	0.0	100%	100%	23-Jan-15 A	26-Jan-15 A
3919	A6210	Pull Back Support	0.0	100%	100%	14-Feb-15 A	17-Feb-15 A
3920	A6200	Beaver Creek	0.0	100%	100%	22-Jan-15 A	13-Feb-15 A
3921	A6190	Build Exit Pad	0.0	100%	100%	14-Jan-15 A	20-Jan-15 A
3922	A6180	Build Entry Pad	0.0	100%	100%	14-Jan-15 A	20-Jan-15 A
3923	A6171	Install shoring	0.0	100%	100%	08-Jan-15 A	14-Jan-15 A
3924	A6170	Receive Permits	0.0	100%	100%	01-Jan-15 A	02-Jan-15 A
3925	**Steeles Ave - 1008.0m (KP 2.43 to 3.44)**		0.0	0%	0%	21-Feb-15 A	16-Apr-15 A
3926	A4110	PRE-TEST HDD & BORE SECTIONS	0.0	100%	100%	31-Mar-15 A	11-Apr-15 A
3927	A4105	SET UP FOR PRE-TEST	0.0	100%	100%	25-Mar-15 A	30-Mar-15 A
3928	A4100	COAT HDD SECTIONS	0.0	100%	100%	19-Mar-15 A	25-Mar-15 A
3929	A4090	AUTOMATIC WELDING - HDD SECTIONS - 1008m	0.0	100%	100%	12-Mar-15 A	18-Mar-15 A
3930	A4080	STRING and SETUP PIPE	0.0	100%	100%	09-Mar-15 A	12-Mar-15 A
3931	A4070	Pull Back Support	0.0	100%	100%	13-Apr-15 A	16-Apr-15 A
3932	A4069	Steeles - 1008.0m	0.0	100%	100%	09-Mar-15 A	13-Apr-15 A
3933	A4065	Build Exit Pad	0.0	100%	100%	28-Feb-15 A	07-Mar-15 A
3934	A4063	Build Entry Pad	0.0	100%	100%	27-Feb-15 A	05-Mar-15 A
3935	A4060	Receive Permits	0.0	100%	100%	21-Feb-15 A	23-Feb-15 A
3936	**Mainline**		0.0	0%	0%	29-Jun-15 A	30-Oct-15 A
3937	A12780	KO to Beaver entry approval milestone	0.0	100%	100%	14-Aug-15 A	
3938	A12010	Spread #1 Main Line Completion Milestone	0.0	100%	100%		26-Oct-15 A
3939	**Mainline**		0.0	0%	0%	29-Jun-15 A	21-Aug-15 A
3940	A13210	Finish Milestone	0.0	0%	100%		21-Aug-15 A
3941	A13200	Backfill	0.0	0%	100%	13-Jul-15 A	20-Aug-15 A
3942	A13190	Lowering In	0.0	0%	100%	11-Jul-15 A	18-Aug-15 A
3943	A13180	Excuvation	0.0	0%	100%	10-Jul-15 A	17-Aug-15 A
3944	A13170	Coating	0.0	0%	100%	09-Jul-15 A	15-Aug-15 A
3945	A13160	Welding	0.0	0%	100%	08-Jul-15 A	14-Aug-15 A
3946	A13150	Welder training and testing	0.0	0%	100%	30-Jun-15 A	07-Jul-15 A
3947	A13140	Bending and end prep	0.0	0%	100%	06-Jul-15 A	12-Aug-15 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3948	A13130	String Pipe	0.0	0%	100%	03-Jul-15 A	12-Aug-15 A
3949	A13120	Clearing and grading	0.0	0%	100%	03-Jul-15 A	12-Aug-15 A
3950	A13110	Place matting	0.0	0%	100%	02-Jul-15 A	25-Jul-15 A
3951	A13100	Topsoil removal	0.0	0%	100%	01-Jul-15 A	08-Aug-15 A
3952	A13090	Hydrovac and Brushing	0.0	0%	100%	30-Jun-15 A	07-Aug-15 A
3953	A13080	ROW sweep and signage	0.0	0%	100%	29-Jun-15 A	14-Jul-15 A
3954	**KO to Beaver Creek Entry**		0.0	0%	0%	18-Sep-15 A	02-Oct-15 A
3955	A4655	Place and backfill	0.0	100%	100%	23-Sep-15 A	02-Oct-15 A
3956	A4650	Complete Tie-in section welding from Kick-off to Beaver HD	0.0	100%	100%	21-Sep-15 A	23-Sep-15 A
3957	A4630	Survey and excavate	0.0	100%	100%	18-Sep-15 A	21-Sep-15 A
3958	**KP 0 to KP 3.43 North of Steeles HDD**		0.0	0%	0%	23-Jul-15 A	30-Oct-15 A
3959	A4781	XX - Receive Additional land for pipe install (Denison) - Not I	0.0	100%	100%	01-Aug-15 A	20-Aug-15 A
3960	A4771	XX - Excuvate on south end of Denison For tie-ins	0.0	100%	100%	22-Aug-15 A	22-Aug-15 A
3961	A4764	Clean Up	0.0	100%	100%	31-Aug-15 A	30-Oct-15 A
3962	A4763	REMOVE MATTING	0.0	100%	100%	24-Aug-15 A	29-Oct-15 A
3963	A4762	Complete Tie-ins South of Denison - (x3)	0.0	100%	100%	09-Sep-15 A	12-Sep-15 A
3964	A4660	Complete Tie-ins North of Denison - (x5)	0.0	0%	100%	26-Aug-15 A	01-Sep-15 A
3965	A4640	Complete Tie-ins from Beaver HDD to Alden HDD	0.0	100%	100%	23-Jul-15 A	28-Jul-15 A
3966	**KP 7.6 to KP 3.43 South of Steeles HDD**		0.0	0%	0%	30-Jul-15 A	30-Oct-15 A
3967	A12930	Complete Poor Boy Welds - Bridlewood (x8)	0.0	100%	100%	07-Aug-15 A	11-Aug-15 A
3968	A12920	Complete Poor Boy Welds - Huntingwood (x6)	0.0	100%	100%	03-Aug-15 A	06-Aug-15 A
3969	A12910	Complete Poor Boy Welds - Finch (x6)	0.0	100%	100%	17-Aug-15 A	22-Sep-15 A
3970	A12760	Clean Up	0.0	100%	100%	31-Aug-15 A	30-Oct-15 A
3971	A12750	REMOVE MATTING	0.0	100%	100%	09-Oct-15 A	30-Oct-15 A
3972	A12748	Complete Tie-ins from Bridlewood Bore to End - (x2)	0.0	100%	100%	13-Aug-15 A	14-Aug-15 A
3973	A12747	Complete Tie-ins from Huntingwood Bore to Bridlewood Bor	0.0	0%	100%	27-Aug-15 A	27-Aug-15 A
3974	A12746	Complete Tie-ins from Collingsbrook Bore to Huntingwood E	0.0	100%	100%	25-Aug-15 A	26-Aug-15 A
3975	A12745	Complete Tie-ins from Collingsbrook Bore to Huntingwood E	0.0	0%	100%	15-Sep-15 A	26-Sep-15 A
3976	A12744	Complete Tie-ins from Pinemeadow Bore to Collingsbrook E	0.0	100%	100%	17-Sep-15 A	01-Oct-15 A
3977	A12743	Complete Tie-ins from Finch Bore to Pinemeadow Bore - (x:	0.0	100%	100%	23-Sep-15 A	26-Sep-15 A
3978	A12742	Complete Tie-ins from Finch Bore to Pinemeadow Bore - (x:	0.0	100%	100%	17-Oct-15 A	20-Oct-15 A
3979	A12741	Complete Tie-ins from Huntingdale Bore to Finch Bore - (xX	0.0	0%	100%	17-Oct-15 A	19-Oct-15 A
3980	A12740	Complete Tie-ins from Huntingdale Bore to Finch Bore - (x2	0.0	100%	100%	02-Oct-15 A	06-Oct-15 A
3981	A12730	Complete Tie-ins from Beverly Glen Bore to Huntingdale Bo	0.0	100%	100%	06-Oct-15 A	08-Oct-15 A
3982	A12725	Complete Tie-ins from McNicoll Bore to Beverly Glen Bore -	0.0	0%	100%	28-Aug-15 A	09-Sep-15 A
3983	A12720	Complete Tie-ins from McNicoll Bore to Beverly Glen Bore -	0.0	100%	100%	10-Sep-15 A	19-Sep-15 A
3984	A12710	Complete Tie-ins from Hunstmill Bore to McNicoll Bore - (x0	0.0	100%	100%	01-Sep-15 A	10-Sep-15 A
3985	A12700	Complete Tie-ins from Steeles Ave Exit to Hunstmill Bore - (	0.0	100%	100%	30-Jul-15 A	11-Aug-15 A
3986	**Track Bores**		0.0	0%	0%	04-May-15 A	22-Oct-15 A
3987	A12000	Spread #1 Bore Completion Milestone	0.0	100%	100%		15-Oct-15 A
3988	**HUNTSMILL - 33m (KP 4.24)**		0.0	0%	0%	23-Jun-15 A	17-Aug-15 A
3989	A9991	Remove slide rail shoring	0.0	100%	100%	13-Aug-15 A	17-Aug-15 A
3990	A9986	Install wing sections	0.0	100%	100%	30-Jul-15 A	12-Aug-15 A
3991	A9985	HUNTSMILL Bore (PR) - 33m	0.0	100%	100%	23-Jul-15 A	30-Jul-15 A
3992	A9984	Set up slide rail shoring (7m)	0.0	100%	100%	11-Jul-15 A	23-Jul-15 A
3993	A9980	Recerive Permits - HUNTSMILL	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A

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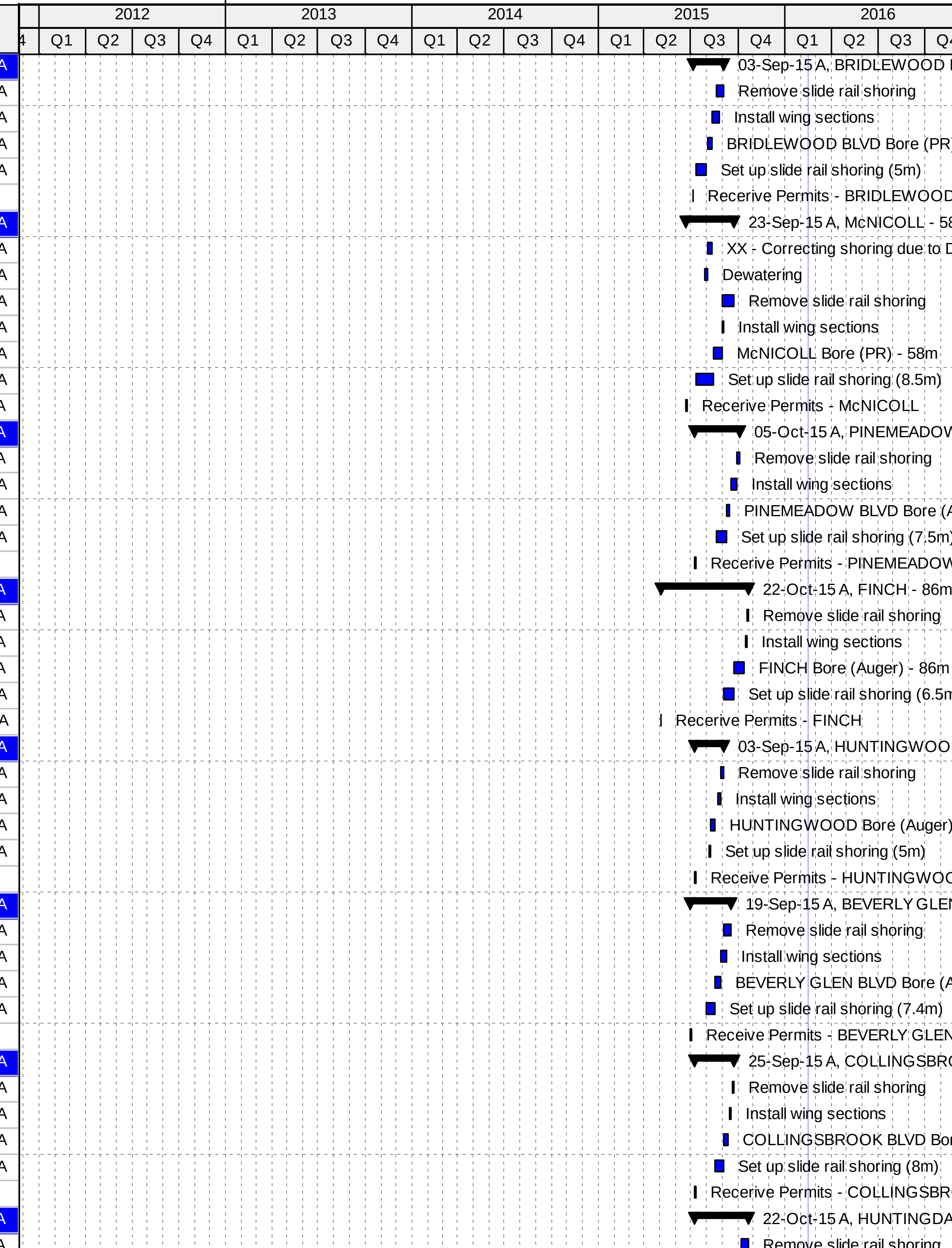
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
3994	**BRIDLEWOOD BLVD - 32m (KP 7.31)**		0.0	0%	0%	06-Jul-15 A	03-Sep-15 A
3995	A10300	Remove slide rail shoring	0.0	100%	100%	19-Aug-15 A	03-Sep-15 A
3996	A10190	Install wing sections	0.0	100%	100%	13-Aug-15 A	25-Aug-15 A
3997	A10140	BRIDLEWOOD BLVD Bore (PR) - 32m	0.0	100%	100%	03-Aug-15 A	12-Aug-15 A
3998	A10130	Set up slide rail shoring (5m)	0.0	100%	100%	11-Jul-15 A	01-Aug-15 A
3999	A10120	Recerive Permits - BRIDLEWOOD BLVD	0.0	100%	100%	06-Jul-15 A	07-Jul-15 A
4000	**McNICOLL - 58m (KP 4.42)**		0.0	0%	0%	23-Jun-15 A	23-Sep-15 A
4001	A9993	XX - Correcting shoring due to Dewatering	0.0	100%	100%	04-Aug-15 A	13-Aug-15 A
4002	A9990	Dewatering	0.0	100%	100%	29-Jul-15 A	04-Aug-15 A
4003	A9975	Remove slide rail shoring	0.0	100%	100%	02-Sep-15 A	23-Sep-15 A
4004	A9974	Install wing sections	0.0	100%	100%	01-Sep-15 A	03-Sep-15 A
4005	A9973	McNICOLL Bore (PR) - 58m	0.0	100%	100%	14-Aug-15 A	01-Sep-15 A
4006	A9972	Set up slide rail shoring (8.5m)	0.0	100%	100%	10-Jul-15 A	14-Aug-15 A
4007	A9970	Recerive Permits - McNICOLL	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4008	**PINEMEADOW BLVD - 34m (KP 5.97)**		0.0	0%	0%	10-Jul-15 A	05-Oct-15 A
4009	A10340	Remove slide rail shoring	0.0	100%	100%	29-Sep-15 A	05-Oct-15 A
4010	A10193	Install wing sections	0.0	100%	100%	19-Sep-15 A	28-Sep-15 A
4011	A10183	PINEMEADOW BLVD Bore (Auger) - 34m	0.0	100%	100%	08-Sep-15 A	15-Sep-15 A
4012	A10182	Set up slide rail shoring (7.5m)	0.0	100%	100%	19-Aug-15 A	10-Sep-15 A
4013	A10180	Recerive Permits - PINEMEADOW BLVD	0.0	100%	100%	10-Jul-15 A	11-Jul-15 A
4014	**FINCH - 86m (KP 5.59) (7.5m) (SR)**		0.0	0%	0%	04-May-15 A	22-Oct-15 A
4015	A9965	Remove slide rail shoring	0.0	100%	100%	20-Oct-15 A	22-Oct-15 A
4016	A9964	Install wing sections	0.0	100%	100%	17-Oct-15 A	19-Oct-15 A
4017	A9963	FINCH Bore (Auger) - 86m	0.0	100%	100%	23-Sep-15 A	15-Oct-15 A
4018	A9962	Set up slide rail shoring (6.5m)	0.0	100%	100%	04-Sep-15 A	22-Sep-15 A
4019	A9960	Recerive Permits - FINCH	0.0	100%	100%	04-May-15 A	05-May-15 A
4020	**HUNTINGWOOD - 33m (KP 6.90)**		0.0	0%	0%	10-Jul-15 A	03-Sep-15 A
4021	A10225	Remove slide rail shoring	0.0	100%	100%	29-Aug-15 A	03-Sep-15 A
4022	A10224	Install wing sections	0.0	100%	100%	24-Aug-15 A	29-Aug-15 A
4023	A10223	HUNTINGWOOD Bore (Auger) - 33m	0.0	100%	100%	08-Aug-15 A	17-Aug-15 A
4024	A10222	Set up slide rail shoring (5m)	0.0	100%	100%	05-Aug-15 A	08-Aug-15 A
4025	A10220	Receive Permits - HUNTINGWOOD	0.0	100%	100%	10-Jul-15 A	11-Jul-15 A
4026	**BEVERLY GLEN BLVD - 45m (KP 5.12)**		0.0	0%	0%	01-Jul-15 A	19-Sep-15 A
4027	A10420	Remove slide rail shoring	0.0	100%	100%	03-Sep-15 A	19-Sep-15 A
4028	A10210	Install wing sections	0.0	100%	100%	29-Aug-15 A	09-Sep-15 A
4029	A10100	BEVERLY GLEN BLVD Bore (Auger) - 45m	0.0	100%	100%	18-Aug-15 A	28-Aug-15 A
4030	A10090	Set up slide rail shoring (7.4m)	0.0	100%	100%	30-Jul-15 A	18-Aug-15 A
4031	A10080	Receive Permits - BEVERLY GLEN BLVD	0.0	100%	100%	01-Jul-15 A	02-Jul-15 A
4032	**COLLINGSBROOK BLVD - 29m (KP 6.41)**		0.0	0%	0%	10-Jul-15 A	25-Sep-15 A
4033	A10320	Remove slide rail shoring	0.0	100%	100%	21-Sep-15 A	25-Sep-15 A
4034	A10200	Install wing sections	0.0	100%	100%	14-Sep-15 A	18-Sep-15 A
4035	A10170	COLLINGSBROOK BLVD Bore (Auger) - 29m	0.0	100%	100%	03-Sep-15 A	11-Sep-15 A
4036	A10160	Set up slide rail shoring (8m)	0.0	100%	100%	18-Aug-15 A	03-Sep-15 A
4037	A10150	Recerive Permits - COLLINGSBROOK BLVD	0.0	100%	100%	10-Jul-15 A	11-Jul-15 A
4038	**HUNTINGDALE BLVD - 33m (KP 5.43)**		0.0	0%	0%	10-Jul-15 A	22-Oct-15 A
4039	A10380	Remove slide rail shoring	0.0	100%	100%	08-Oct-15 A	22-Oct-15 A



Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4040	A10110	Install wing sections	0.0	100%	100%	28-Sep-15 A	08-Oct-15 A
4041	A10070	HUNTINGDALE BLVD Bore (Auger) - 34m	0.0	100%	100%	19-Sep-15 A	28-Sep-15 A
4042	A10060	Set up slide rail shoring (7.2m)	0.0	100%	100%	03-Sep-15 A	17-Sep-15 A
4043	A10050	Recerive Permits - HUNTINGDALE BLVD	0.0	100%	100%	10-Jul-15 A	11-Jul-15 A
4044	DENISON - 41m (KP 2.02)		0.0	0%	0%	04-May-15 A	18-Sep-15 A
4045	A9955	Remove slide rail shoring	0.0	100%	100%	27-Aug-15 A	16-Sep-15 A
4046	A9954	Install wing sections	0.0	100%	100%	01-Sep-15 A	10-Sep-15 A
4047	A9953	DENISON Bore (Auger) - 41m	0.0	100%	100%	22-Aug-15 A	27-Aug-15 A
4048	A9952	Set up slide rail and TB shoring (6.5m)	0.0	100%	100%	12-Aug-15 A	19-Aug-15 A
4049	A9950	Receive Permits - DENISON	0.0	100%	100%	04-May-15 A	05-May-15 A
4050	XX - Hotline and Parking Lot Issue		0.0	0%	0%	26-Aug-15 A	18-Sep-15 A
4051	A10055	Backfill location	0.0	0%	100%	08-Sep-15 A	18-Sep-15 A
4052	A10045	Install Hotline	0.0	0%	100%	04-Sep-15 A	08-Sep-15 A
4053	A10035	Bacfill for hot line	0.0	0%	100%	03-Sep-15 A	03-Sep-15 A
4054	A10025	Install piping	0.0	0%	100%	02-Sep-15 A	02-Sep-15 A
4055	A10015	Remove portion of hotline for pipe install	0.0	0%	100%	01-Sep-15 A	02-Sep-15 A
4056	A10010	Prefab Activities	0.0	0%	100%	26-Aug-15 A	31-Aug-15 A
4057	A10005	Excuvate Hot Line	0.0	0%	100%	26-Aug-15 A	31-Aug-15 A
4058	A10004	Start MIlestone	0.0	0%	100%	26-Aug-15 A	
4059	FOURTEENTH AVE - 39m (KP 0.90)		0.0	0%	0%	06-Jul-15 A	11-Jul-15 A
4060	A13220	Fourteenth Ave Bore	0.0	100%	100%	06-Jul-15 A	11-Jul-15 A
4061	Tie-In at Sheppard		0.0	0%	0%	24-Aug-15 A	30-Sep-15 A
4062	A12800	Sheppard Crossing (Cold Option)	0.0	100%	100%	02-Sep-15 A	30-Sep-15 A
4063	A12790	Pre-Civil work for Tie-in	0.0	100%	100%	24-Aug-15 A	01-Sep-15 A
4064	Hydrotesting		0.0	0%	0%	23-Oct-15 A	30-Nov-15 A
4065	A13060	Spread #1 Hydro Testing Complete Milestone	0.0	0%	100%		30-Nov-15 A
4066	A12950	Spread #1 Hydrotesting - BY OTHERS - Place Holder	0.0	0%	100%	07-Nov-15 A	29-Nov-15 A
4067	A12945	Spread #1 Hydro Testing Start Milestone	0.0	0%	100%	07-Nov-15 A	
4068	A12942	Remove heads	0.0	0%	100%	26-Oct-15 A	26-Oct-15 A
4069	A12941	Complete sizing plate run	0.0	0%	100%	26-Oct-15 A	26-Oct-15 A
4070	A12940	Weld heads for sizing plate run	0.0	0%	100%	23-Oct-15 A	23-Oct-15 A
4071	Final Tie Ins		0.0	0%	0%	30-Nov-15 A	11-Dec-15 A
4072	A13240	Remove matting at tie in locations	0.0	0%	100%	07-Dec-15 A	11-Dec-15 A
4073	A13230	Final clean up after tie-ins	0.0	0%	100%	07-Dec-15 A	11-Dec-15 A
4074	A13070	Final Tie-in at sheppard Valve	0.0	0%	100%	30-Nov-15 A	03-Dec-15 A
4075	**Michels Mainline - Spread 2**		0.0	0%	0%	01-Jan-15 A	02-Feb-16 A
4076	**Spread #2**		0.0	0%	0%	01-Jan-15 A	02-Feb-16 A
4077	A13640	2016 Start Milestone	0.0	0%	100%	06-Jan-16 A	
4078	Milestones		0.0	0%	0%	01-Jan-15 A	02-Feb-16 A
4079	A12490	Post Hydrotest Completion Milestone	0.0	0%	100%		02-Feb-16 A
4080	A12425	Pre Hydrotest Completion Milestone	0.0	0%	100%		19-Dec-15 A
4081	A12420	Spread #2 completion and ready for construction pigs.	0.0	100%	100%		18-Dec-15 A
4082	General Milestones		0.0	0%	0%	01-Jan-15 A	04-Jan-16 A
4083	A12250	Tie In Complete Milestone	0.0	100%	100%		19-Dec-15 A
4084	A12050	Spread #2 Open Cut Completion Milestone	0.0	100%	100%		06-Nov-15 A

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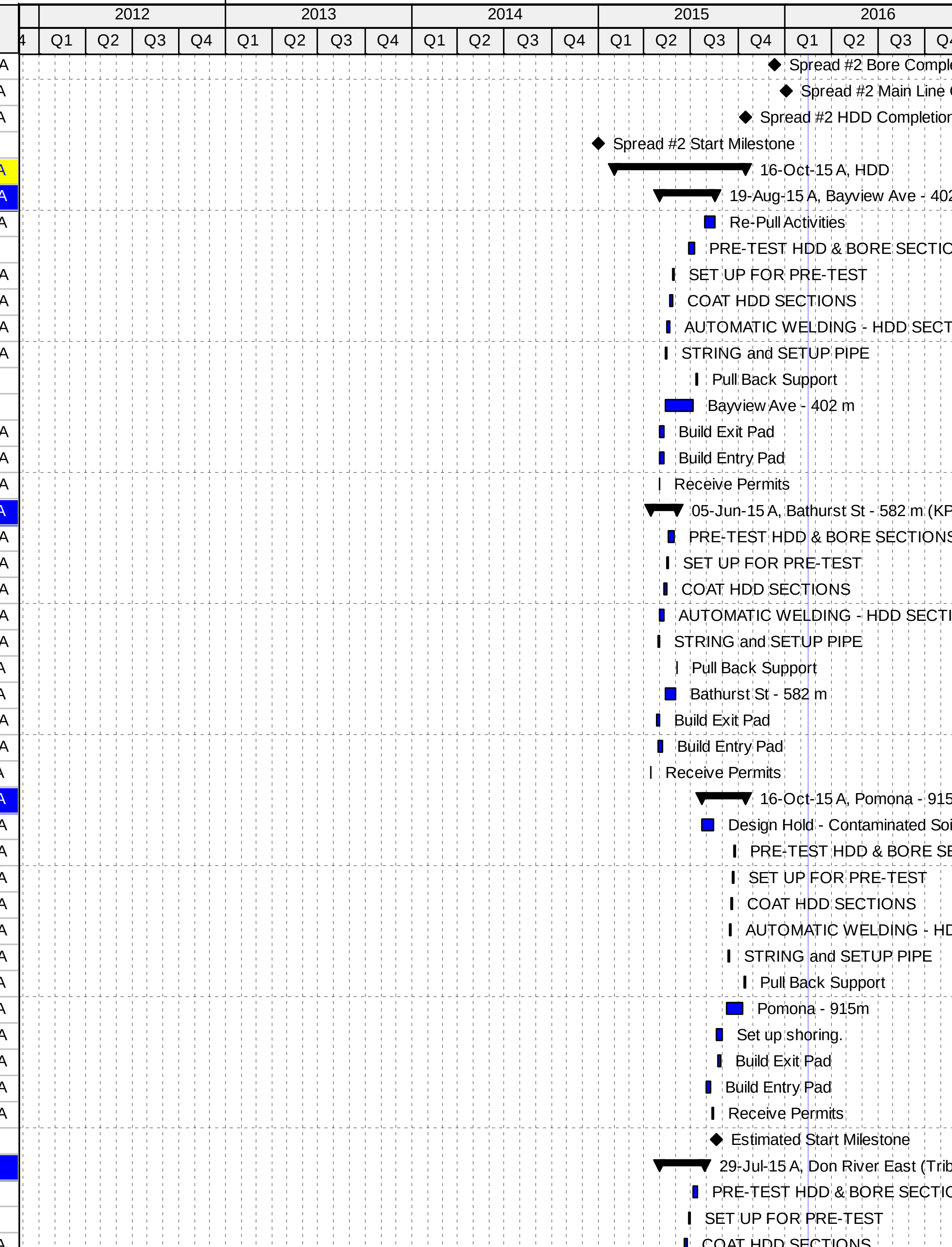
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4085	A12048	Spread #2 Bore Completion Milestone	0.0	100%	100%		12-Dec-15 A
4086	A12046	Spread #2 Main Line Completion Milestone	0.0	100%	100%		04-Jan-16 A
4087	A12044	Spread #2 HDD Completion Milestone	0.0	100%	100%		16-Oct-15 A
4088	A12040	Spread #2 Start Milestone	0.0	100%	100%	01-Jan-15 A	
4089		**HDD**	0.0	0%	0%	02-Feb-15 A	16-Oct-15 A
4090		**Bayview Ave - 402 m (KP 10.11 to 9.7)**	0.0	0%	0%	01-May-15 A	19-Aug-15 A
4091	A3245	Re-Pull Activities	0.0	100%	100%	29-Jul-15 A	19-Aug-15 A
4092	A3240	PRE-TEST HDD & BORE SECTIONS	0.0	100%	100%	26-Jun-15 A	07-Jul-15 A
4093	A3235	SET UP FOR PRE-TEST	0.0	100%	100%	27-May-15 A	30-May-15 A
4094	A3230	COAT HDD SECTIONS	0.0	100%	100%	21-May-15 A	26-May-15 A
4095	A3220	AUTOMATIC WELDING - HDD SECTIONS - 402m	0.0	100%	100%	15-May-15 A	20-May-15 A
4096	A3217	STRING and SETUP PIPE	0.0	100%	100%	12-May-15 A	14-May-15 A
4097	A3215	Pull Back Support	0.0	100%	100%	10-Jul-15 A	13-Jul-15 A
4098	A2869	Bayview Ave - 402 m	0.0	100%	100%	11-May-15 A	06-Jul-15 A
4099	A2864	Build Exit Pad	0.0	100%	100%	02-May-15 A	08-May-15 A
4100	A2863	Build Entry Pad	0.0	100%	100%	02-May-15 A	08-May-15 A
4101	A2860	Receive Permits	0.0	100%	100%	01-May-15 A	01-May-15 A
4102		**Bathurst St - 582 m (KP 6.15 to 5.5)**	0.0	0%	0%	13-Apr-15 A	05-Jun-15 A
4103	A3280	PRE-TEST HDD & BORE SECTIONS	0.0	100%	100%	19-May-15 A	28-May-15 A
4104	A3275	SET UP FOR PRE-TEST	0.0	100%	100%	14-May-15 A	19-May-15 A
4105	A3270	COAT HDD SECTIONS	0.0	100%	100%	08-May-15 A	14-May-15 A
4106	A3260	AUTOMATIC WELDING - HDD SECTIONS - 583m	0.0	100%	100%	02-May-15 A	08-May-15 A
4107	A3250	STRING and SETUP PIPE	0.0	100%	100%	29-Apr-15 A	02-May-15 A
4108	A2880	Pull Back Support	0.0	100%	100%	04-Jun-15 A	05-Jun-15 A
4109	A2879	Bathurst St - 582 m	0.0	100%	100%	11-May-15 A	02-Jun-15 A
4110	A2875	Build Exit Pad	0.0	100%	100%	24-Apr-15 A	02-May-15 A
4111	A2873	Build Entry Pad	0.0	100%	100%	29-Apr-15 A	06-May-15 A
4112	A2870	Receive Permits	0.0	100%	100%	13-Apr-15 A	14-Apr-15 A
4113		**Pomona - 915m (KP 9.17 to 8.27)**	0.0	0%	0%	24-Jul-15 A	16-Oct-15 A
4114	A3365	Design Hold - Contaminated Soil Issues	0.0	100%	100%	24-Jul-15 A	14-Aug-15 A
4115	A3360	PRE-TEST HDD & BORE SECTIONS	0.0	100%	100%	23-Sep-15 A	25-Sep-15 A
4116	A3355	SET UP FOR PRE-TEST	0.0	100%	100%	21-Sep-15 A	22-Sep-15 A
4117	A3350	COAT HDD SECTIONS	0.0	100%	100%	18-Sep-15 A	19-Sep-15 A
4118	A3340	AUTOMATIC WELDING - HDD SECTIONS - 915m	0.0	100%	100%	16-Sep-15 A	17-Sep-15 A
4119	A3330	STRING and SETUP PIPE	0.0	100%	100%	11-Sep-15 A	15-Sep-15 A
4120	A2990	Pull Back Support	0.0	100%	100%	13-Oct-15 A	16-Oct-15 A
4121	A2909	Pomona - 915m	0.0	100%	100%	10-Sep-15 A	10-Oct-15 A
4122	A2907	Set up shoring.	0.0	100%	100%	19-Aug-15 A	31-Aug-15 A
4123	A2906	Build Exit Pad	0.0	100%	100%	22-Aug-15 A	29-Aug-15 A
4124	A2905	Build Entry Pad	0.0	100%	100%	31-Jul-15 A	07-Aug-15 A
4125	A2901	Receive Permits	0.0	100%	100%	13-Aug-15 A	13-Aug-15 A
4126	A2900	Estimated Start Milestone	0.0	100%	100%	19-Aug-15 A	
4127		**Don River East (Tribs 1 & 3) - 673 m (KP 6.7 to 7.35)**	0.0	0%	0%	01-May-15 A	29-Jul-15 A
4128	A3320	PRE-TEST HDD & BORE SECTIONS	0.0	100%	100%	06-Jul-15 A	15-Jul-15 A
4129	A3315	SET UP FOR PRE-TEST	0.0	100%	100%	26-Jun-15 A	01-Jul-15 A
4130	A3310	COAT HDD SECTIONS	0.0	100%	100%	19-Jun-15 A	25-Jun-15 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4131	A3300	AUTOMATIC WELDING - HDD SECTIONS - 673m	0.0	100%	100%	13-Jun-15 A	19-Jun-15 A
4132	A3295	STRING and SETUP PIPE	0.0	100%	100%	09-Jun-15 A	12-Jun-15 A
4133	A3294	Pull Back Support	0.0	100%	100%	25-Jul-15 A	29-Jul-15 A
4134	A3293	Don River East (Tribs 1 & 3) - 673 m	0.0	100%	100%	22-Jun-15 A	24-Jul-15 A
4135	A2894	Build Exit Pad	0.0	100%	100%	04-Jun-15 A	11-Jun-15 A
4136	A2893	Build Entry Pad	0.0	100%	100%	03-Jun-15 A	10-Jun-15 A
4137	A2890	Receive Permits	0.0	100%	100%	01-May-15 A	01-May-15 A
4138	**Highway 404 (KP 13.8 to 13.03)**		0.0	0%	0%	02-Feb-15 A	30-Mar-15 A
4139	A6360	PRE-TEST HDD & BORE SECTIONS	0.0	100%	100%	16-Mar-15 A	24-Mar-15 A
4140	A6350	SET UP FOR PRE-TEST	0.0	100%	100%	10-Mar-15 A	14-Mar-15 A
4141	A6340	COAT HDD SECTIONS	0.0	100%	100%	03-Mar-15 A	09-Mar-15 A
4142	A6330	AUTOMATIC WELDING - HDD SECTIONS - 673m	0.0	100%	100%	24-Feb-15 A	02-Mar-15 A
4143	A6320	STRING and SETUP PIPE	0.0	100%	100%	19-Feb-15 A	23-Feb-15 A
4144	A6310	Pull Back Support	0.0	100%	100%	27-Mar-15 A	30-Mar-15 A
4145	A6300	Highway 404	0.0	100%	100%	18-Feb-15 A	26-Mar-15 A
4146	A6290	Build Exit Pad	0.0	100%	100%	10-Feb-15 A	17-Feb-15 A
4147	A6280	Build Entry Pad	0.0	100%	100%	10-Feb-15 A	17-Feb-15 A
4148	A6271	Install Shoring	0.0	100%	100%	05-Feb-15 A	10-Feb-15 A
4149	A6270	Receive Permits	0.0	100%	100%	02-Feb-15 A	03-Feb-15 A
4150	**West Don River 463m (KP 2.06 to 1.61)**		0.0	0%	0%	24-Jul-15 A	04-Sep-15 A
4151	A12355	Release to Michels	0.0	100%	100%	24-Jul-15 A	18-Aug-15 A
4152	A12345	PRE-TEST HDD & BORE SECTIONS	0.0	100%	100%	29-Aug-15 A	31-Aug-15 A
4153	A12342	SET UP FOR PRE-TEST	0.0	100%	100%	29-Aug-15 A	31-Aug-15 A
4154	A12335	COAT HDD SECTIONS	0.0	100%	100%	28-Aug-15 A	29-Aug-15 A
4155	A12325	AUTOMATIC WELDING - HDD SECTIONS - 583m	0.0	100%	100%	26-Aug-15 A	28-Aug-15 A
4156	A12315	STRING and SETUP PIPE	0.0	100%	100%	24-Aug-15 A	25-Aug-15 A
4157	A12308	Pull Back Support	0.0	100%	100%	02-Sep-15 A	04-Sep-15 A
4158	A12306	West Don River - 582 m	0.0	100%	100%	22-Aug-15 A	01-Sep-15 A
4159	A12304	Build Exit Pad	0.0	100%	100%	20-Aug-15 A	21-Aug-15 A
4160	A12302	Build Entry Pad	0.0	100%	100%	20-Aug-15 A	21-Aug-15 A
4161	A12300	Receive Permits	0.0	100%	100%	18-Aug-15 A	18-Aug-15 A
4162	**Mainline**		0.0	0%	0%	21-Jul-15 A	22-Jan-16 A
4163	**Mainline**		0.0	0%	0%	21-Jul-15 A	22-Jan-16 A
4164	A12730	Clean Up	0.0	100%	100%	02-Nov-15 A	22-Jan-16 A
4165	A12415	LOWER IN & Backfill	0.0	100%	100%	25-Jul-15 A	06-Aug-15 A
4166	A12405	TRENCH	0.0	100%	100%	23-Jul-15 A	06-Aug-15 A
4167	A12395	COAT	0.0	100%	100%	22-Jul-15 A	05-Aug-15 A
4168	A12385	AUTOMATIC WELDING - MAINLINE	0.0	100%	100%	22-Jul-15 A	05-Aug-15 A
4169	A12375	BENDING and SET UP	0.0	100%	100%	21-Jul-15 A	04-Aug-15 A
4170	A12365	STRING PIPE	0.0	100%	100%	21-Jul-15 A	04-Aug-15 A
4171	**Langstaff to Ponoma Exit (300m)**		0.0	0%	0%	19-Aug-15 A	02-Nov-15 A
4172	A12585	Lower in and backfill	0.0	100%	100%	22-Aug-15 A	02-Nov-15 A
4173	A12575	Coat	0.0	100%	100%	21-Aug-15 A	02-Nov-15 A
4174	A12565	String and Weld	0.0	100%	100%	20-Aug-15 A	02-Nov-15 A
4175	A12555	Start Milestone	0.0	100%	100%	19-Aug-15 A	
4176	**East of German Mills to Bayview Exit (400m)**		0.0	0%	0%	28-Sep-15 A	03-Oct-15 A

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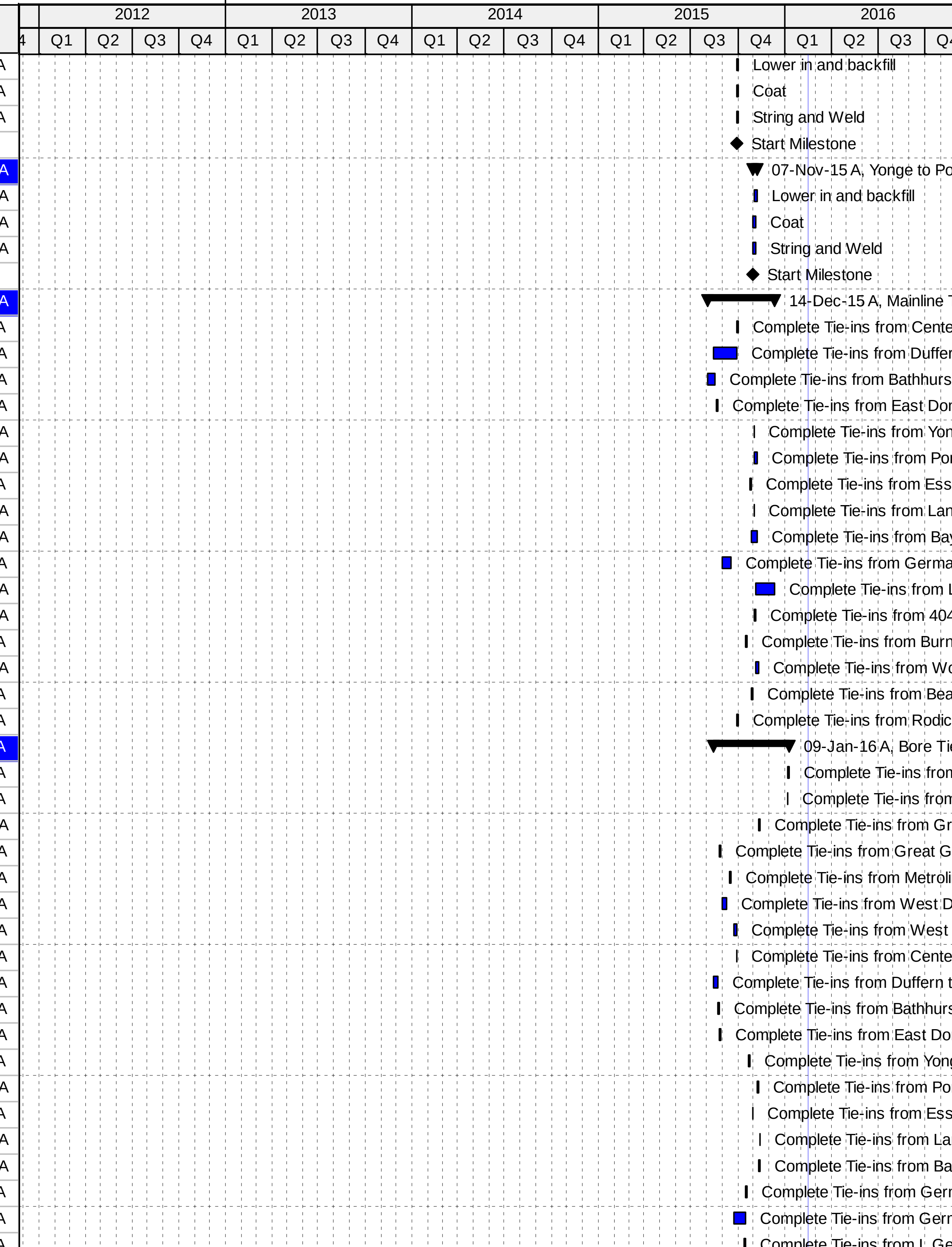
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4177	A12625	Lower in and backfill	0.0	100%	100%	30-Sep-15 A	03-Oct-15 A
4178	A12615	Coat	0.0	100%	100%	29-Sep-15 A	02-Oct-15 A
4179	A12605	String and Weld	0.0	100%	100%	28-Sep-15 A	01-Oct-15 A
4180	A12595	Start Milestone	0.0	100%	100%	28-Sep-15 A	
4181	**Yonge to Ponoma Entry (330m)**		0.0	0%	0%	30-Oct-15 A	07-Nov-15 A
4182	A12465	Lower in and backfill	0.0	100%	100%	02-Nov-15 A	07-Nov-15 A
4183	A12455	Coat	0.0	100%	100%	31-Oct-15 A	05-Nov-15 A
4184	A12445	String and Weld	0.0	100%	100%	30-Oct-15 A	05-Nov-15 A
4185	A12435	Start Milestone	0.0	100%	100%	30-Oct-15 A	
4186	**Mainline Tie-in Welds**		0.0	0%	0%	04-Aug-15 A	14-Dec-15 A
4187	A12715	Complete Tie-ins from Center to West Don - (x4)	0.0	100%	100%	28-Sep-15 A	01-Oct-15 A
4188	A12705	Complete Tie-ins from Dufferin to Center - (x8)	0.0	100%	100%	14-Aug-15 A	30-Sep-15 A
4189	A12695	Complete Tie-ins from Bathhurst to Dufferin - (x10)	0.0	100%	100%	04-Aug-15 A	18-Aug-15 A
4190	A12689	Complete Tie-ins from East Don to Bathhurst - (x3)	0.0	100%	100%	19-Aug-15 A	22-Aug-15 A
4191	A12687	Complete Tie-ins from Yonge to East Don - (x2)	0.0	100%	100%	02-Nov-15 A	03-Nov-15 A
4192	A12685	Complete Tie-ins from Pomona to Yonge - (x4)	0.0	0%	100%	03-Nov-15 A	07-Nov-15 A
4193	A12684	Complete Tie-ins from Essex to Pomona - (x2)	0.0	0%	100%	26-Oct-15 A	27-Oct-15 A
4194	A12683	Complete Tie-ins from Langstaff to Essex - (x1)	0.0	100%	100%	02-Nov-15 A	02-Nov-15 A
4195	A12682	Complete Tie-ins from Bayview to Langstaff - (x4)	0.0	0%	100%	29-Oct-15 A	07-Nov-15 A
4196	A12681	Complete Tie-ins from German to Bayview - (x15)	0.0	100%	100%	31-Aug-15 A	19-Sep-15 A
4197	A12680	Complete Tie-ins from Leslie to L German Mills Creek - (x4)	0.0	100%	100%	06-Nov-15 A	14-Dec-15 A
4198	A12679	Complete Tie-ins from 404 to Leslie (x3)	0.0	0%	100%	02-Nov-15 A	06-Nov-15 A
4199	A12678	Complete Tie-ins from Burncrest CP to CP /Golf Net (x5)	0.0	100%	100%	17-Oct-15 A	20-Oct-15 A
4200	A12677	Complete Tie-ins from Woodbine to Burncrest CP (x3)	0.0	0%	100%	06-Nov-15 A	11-Nov-15 A
4201	A12676	Complete Tie-ins from Beaver Trib 3A to Woodbine (x3)	0.0	0%	100%	28-Oct-15 A	31-Oct-15 A
4202	A12674	Complete Tie-ins from Rodick to Beaver Trib 3A - (x6)	0.0	100%	100%	28-Sep-15 A	03-Oct-15 A
4203	**Bore Tie-in Welds**		0.0	0%	0%	14-Aug-15 A	09-Jan-16 A
4204	A12205	Complete Tie-ins from CNR Keele to End - (xX - 4)	0.0	0%	100%	07-Jan-16 A	09-Jan-16 A
4205	A12200	Complete Tie-ins from CNR Keele to End - (x5 - X)	0.0	100%	100%	06-Jan-16 A	07-Jan-16 A
4206	A12191	Complete Tie-ins from Great Gulf West to CNR Keele (x0 -	0.0	0%	100%	12-Nov-15 A	14-Nov-15 A
4207	A12180	Complete Tie-ins from Great Gulf East to Great Gulf West -	0.0	100%	100%	25-Aug-15 A	28-Aug-15 A
4208	A12179	Complete Tie-ins from Metrolinx 2 to GGE (x2 - 0)	0.0	0%	100%	16-Sep-15 A	19-Sep-15 A
4209	A12175	Complete Tie-ins from West Don to Metrolinx 2 (xX - 3)	0.0	0%	100%	31-Aug-15 A	10-Sep-15 A
4210	A12170	Complete Tie-ins from West Don to Metrolinx 2 (x2 - X)	0.0	0%	100%	25-Sep-15 A	28-Sep-15 A
4211	A12160	Complete Tie-ins from Center to West Don - (x0 - 2)	0.0	100%	100%	28-Sep-15 A	29-Sep-15 A
4212	A12150	Complete Tie-ins from Dufferin to Center - (x8)	0.0	100%	100%	14-Aug-15 A	22-Aug-15 A
4213	A12140	Complete Tie-ins from Bathhurst to Dufferin - (x2)	0.0	100%	100%	24-Aug-15 A	25-Aug-15 A
4214	A12130	Complete Tie-ins from East Don to Bathhurst - (x2)	0.0	100%	100%	26-Aug-15 A	27-Aug-15 A
4215	A12120	Complete Tie-ins from Yonge to East Don - (x2)	0.0	100%	100%	22-Oct-15 A	23-Oct-15 A
4216	A12110	Complete Tie-ins from Pomona to Yonge - (x0 - 2)	0.0	100%	100%	09-Nov-15 A	10-Nov-15 A
4217	A12106	Complete Tie-ins from Essex to Pomona - (x1 - 1)	0.0	0%	100%	30-Oct-15 A	31-Oct-15 A
4218	A12105	Complete Tie-ins from Langstaff to Essex - (x2 - 0)	0.0	0%	100%	13-Nov-15 A	14-Nov-15 A
4219	A12090	Complete Tie-ins from Bayview to Langstaff - (x0 - 3)	0.0	100%	100%	11-Nov-15 A	14-Nov-15 A
4220	A12087	Complete Tie-ins from German Mills Cr to Bayview (xX - 2)	0.0	0%	100%	17-Oct-15 A	18-Oct-15 A
4221	A12086	Complete Tie-ins from German Mills Cr to Bayview (x6 - X)	0.0	0%	100%	24-Sep-15 A	17-Oct-15 A
4222	A12079	Complete Tie-ins from L German Mills Cr to German Mills C	0.0	0%	100%	14-Oct-15 A	16-Oct-15 A



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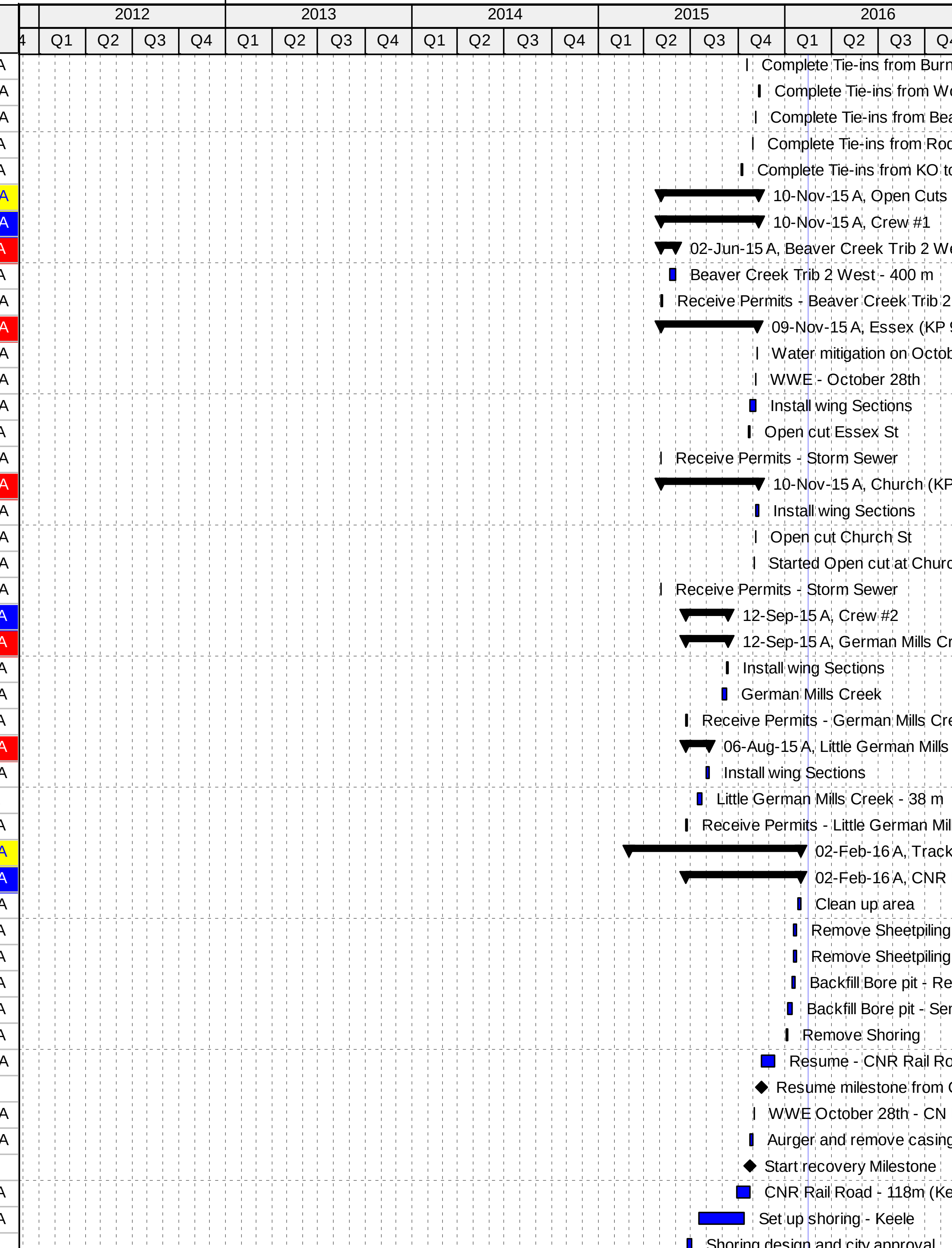
4223	A12064	Complete Tie-ins from Burncrest CP to CP /Golf Net (x1 - 1)	0.0	0%	100%	19-Oct-15 A	20-Oct-15 A
4224	A12063	Complete Tie-ins from Woodbine to Burncrest CP (x1 - 1)	0.0	0%	100%	11-Nov-15 A	13-Nov-15 A
4225	A12062	Complete Tie-ins from Beaver Trib 3A to Woodbine (x1 - 1)	0.0	0%	100%	04-Nov-15 A	05-Nov-15 A
4226	A12061	Complete Tie-ins from Rodick to Concrete Section (x1 - 2)	0.0	0%	100%	30-Oct-15 A	31-Oct-15 A
4227	A12060	Complete Tie-ins from KO to Rodick - (x4)	0.0	100%	100%	08-Oct-15 A	10-Oct-15 A
4228	**Open Cuts**		0.0	0%	0%	04-May-15 A	10-Nov-15 A
4229	**Crew #1**		0.0	0%	0%	04-May-15 A	10-Nov-15 A
4230	**Beaver Creek Trib 2 West (KP 14.8)**		0.0	0%	0%	05-May-15 A	02-Jun-15 A
4231	A2425	Beaver Creek Trib 2 West - 400 m	0.0	100%	100%	22-May-15 A	02-Jun-15 A
4232	A2420	Receive Permits - Beaver Creek Trib 2 West	0.0	100%	100%	05-May-15 A	06-May-15 A
4233	**Essex (KP 9.37)**		0.0	0%	0%	04-May-15 A	09-Nov-15 A
4234	A12246	Water mitigation on October 29th (WWE oct 28)	0.0	0%	100%	09-Nov-15 A	09-Nov-15 A
4235	A12236	WWE - October 28th	0.0	0%	100%	06-Nov-15 A	06-Nov-15 A
4236	A12226	Install wing Sections	0.0	100%	100%	26-Oct-15 A	05-Nov-15 A
4237	A12216	Open cut Essex St	0.0	100%	100%	23-Oct-15 A	24-Oct-15 A
4238	A12215	Receive Permits - Storm Sewer	0.0	100%	100%	04-May-15 A	05-May-15 A
4239	**Church (KP 8.29)**		0.0	0%	0%	04-May-15 A	10-Nov-15 A
4240	A12295	Install wing Sections	0.0	100%	100%	06-Nov-15 A	10-Nov-15 A
4241	A12285	Open cut Church St	0.0	100%	100%	04-Nov-15 A	06-Nov-15 A
4242	A12281	Started Open cut at Church found object and put on hold / S	0.0	0%	100%	02-Nov-15 A	03-Nov-15 A
4243	A12280	Receive Permits - Storm Sewer	0.0	100%	100%	04-May-15 A	05-May-15 A
4244	**Crew #2**		0.0	0%	0%	23-Jun-15 A	12-Sep-15 A
4245	**German Mills Creek (KP 10.47)**		0.0	0%	0%	23-Jun-15 A	12-Sep-15 A
4246	A2755	Install wing Sections	0.0	100%	100%	10-Sep-15 A	12-Sep-15 A
4247	A2735	German Mills Creek	0.0	100%	100%	31-Aug-15 A	09-Sep-15 A
4248	A2730	Receive Permits - German Mills Creek	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4249	**Little German Mills Creek (KP 11.99)**		0.0	0%	0%	23-Jun-15 A	06-Aug-15 A
4250	A2765	Install wing Sections	0.0	100%	100%	01-Aug-15 A	06-Aug-15 A
4251	A2745	Little German Mills Creek - 38 m	0.0	100%	100%	13-Jul-15 A	21-Jul-15 A
4252	A2740	Receive Permits - Little German Mills Creek	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4253	**Track Bores**		0.0	0%	0%	01-Mar-15 A	02-Feb-16 A
4254	**CNR Rail Road Keele - 118m (KP 0.05)**		0.0	0%	0%	23-Jun-15 A	02-Feb-16 A
4255	A10825	Clean up area	0.0	0%	100%	27-Jan-16 A	02-Feb-16 A
4256	A10820	Remove Sheetpiling - Receiving	0.0	0%	100%	18-Jan-16 A	24-Jan-16 A
4257	A10810	Remove Sheetpiling - Sending	0.0	0%	100%	18-Jan-16 A	24-Jan-16 A
4258	A10795	Backfill Bore pit - Reveiving	0.0	0%	100%	16-Jan-16 A	20-Jan-16 A
4259	A10790	Backfill Bore pit - Sending	0.0	0%	100%	08-Jan-16 A	14-Jan-16 A
4260	A10760	Remove Shoring	0.0	0%	100%	04-Jan-16 A	08-Jan-16 A
4261	A10750	Resume - CNR Rail Road - 110 m (Keele)	0.0	0%	100%	16-Nov-15 A	13-Dec-15 A
4262	A10722	Resume milestone from CN hold - Assume Auth comes afte	0.0	0%	100%	16-Nov-15 A	
4263	A10721	WWE October 28th - CN Put halted (Bore type change, HD	0.0	0%	100%	02-Nov-15 A	02-Nov-15 A
4264	A10720	Aurger and remove casing	0.0	0%	100%	26-Oct-15 A	01-Nov-15 A
4265	A10710	Start recovery Milestone	0.0	0%	100%	26-Oct-15 A	
4266	A10700	CNR Rail Road - 118m (Keele)	0.0	0%	100%	30-Sep-15 A	24-Oct-15 A
4267	A10692	Set up shoring - Keele	0.0	100%	100%	18-Jul-15 A	13-Oct-15 A
4268	A10691	Shoring design and city approval	0.0	100%	100%	24-Jun-15 A	02-Jul-15 A



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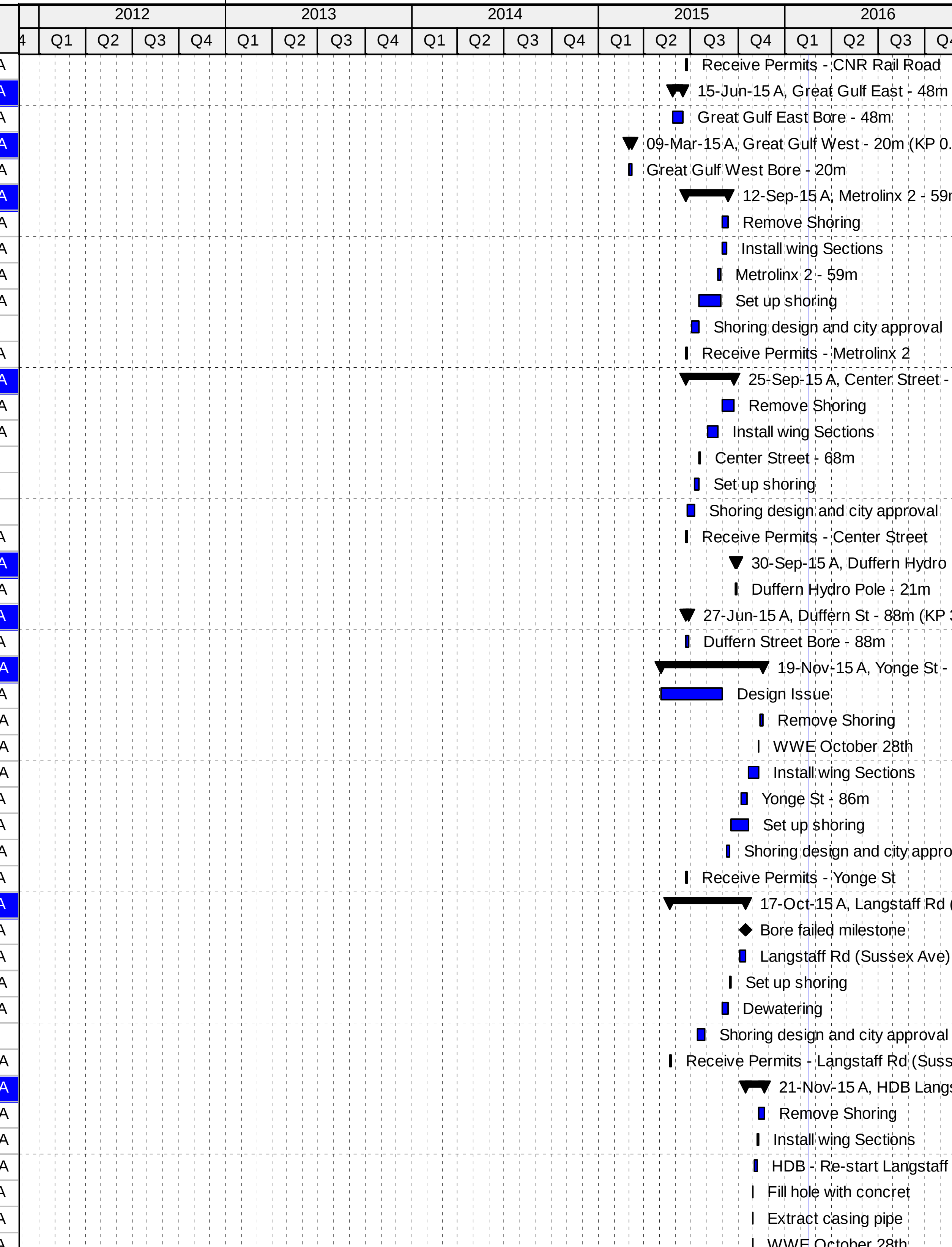
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4269	A10690	Receive Permits - CNR Rail Road	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4270		**Great Gulf East - 48m (KP 0.32)**	0.0	0%	0%	26-May-15 A	15-Jun-15 A
4271	A12230	Great Gulf East Bore - 48m	0.0	100%	100%	26-May-15 A	15-Jun-15 A
4272		**Great Gulf West - 20m (KP 0.89)**	0.0	0%	0%	01-Mar-15 A	09-Mar-15 A
4273	A12240	Great Gulf West Bore - 20m	0.0	100%	100%	01-Mar-15 A	09-Mar-15 A
4274		**Metrolinx 2 - 59m (KP 1.3)**	0.0	0%	0%	23-Jun-15 A	12-Sep-15 A
4275	A10746	Remove Shoring	0.0	100%	100%	01-Sep-15 A	12-Sep-15 A
4276	A10745	Install wing Sections	0.0	100%	100%	31-Aug-15 A	10-Sep-15 A
4277	A10743	Metrolinx 2 - 59m	0.0	100%	100%	22-Aug-15 A	30-Aug-15 A
4278	A10742	Set up shoring	0.0	100%	100%	17-Jul-15 A	29-Aug-15 A
4279	A10741	Shoring design and city approval	0.0	100%	100%	02-Jul-15 A	16-Jul-15 A
4280	A10740	Receive Permits - Metrolinx 2	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4281		**Center Street - 68m (KP 2.68)**	0.0	0%	0%	23-Jun-15 A	25-Sep-15 A
4282	A10620	Remove Shoring	0.0	100%	100%	31-Aug-15 A	25-Sep-15 A
4283	A10600	Install wing Sections	0.0	100%	100%	04-Aug-15 A	24-Aug-15 A
4284	A10590	Center Street - 68m	0.0	100%	100%	17-Jul-15 A	21-Jul-15 A
4285	A10582	Set up shoring	0.0	100%	100%	09-Jul-15 A	16-Jul-15 A
4286	A10581	Shoring design and city approval	0.0	100%	100%	25-Jun-15 A	07-Jul-15 A
4287	A10580	Receive Permits - Center Street	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4288		**Duffern Hydro Pole - 21m**	0.0	0%	0%	26-Sep-15 A	30-Sep-15 A
4289	A13100	Duffern Hydro Pole - 21m	0.0	0%	100%	26-Sep-15 A	30-Sep-15 A
4290		**Duffern St - 88m (KP 3.42)**	0.0	0%	0%	21-Jun-15 A	27-Jun-15 A
4291	A12430	Duffern Street Bore - 88m	0.0	100%	100%	21-Jun-15 A	27-Jun-15 A
4292		**Yonge St - 86m (KP 8.16)**	0.0	0%	0%	04-May-15 A	19-Nov-15 A
4293	A10500	Design Issue	0.0	100%	100%	04-May-15 A	31-Aug-15 A
4294	A10497	Remove Shoring	0.0	0%	100%	13-Nov-15 A	19-Nov-15 A
4295	A10496	WWE October 28th	0.0	100%	100%	10-Nov-15 A	11-Nov-15 A
4296	A10495	Install wing Sections	0.0	100%	100%	21-Oct-15 A	10-Nov-15 A
4297	A10493	Yonge St - 86m	0.0	100%	100%	08-Oct-15 A	20-Oct-15 A
4298	A10492	Set up shoring	0.0	100%	100%	17-Sep-15 A	21-Oct-15 A
4299	A10491	Shoring design and city approval	0.0	100%	100%	08-Sep-15 A	16-Sep-15 A
4300	A10490	Receive Permits - Yonge St	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4301		**Langstaff Rd (Sussex Ave) - 45m (KP 9.67) Failed**	0.0	0%	0%	22-May-15 A	17-Oct-15 A
4302	A10456	Bore failed milestone	0.0	0%	100%		17-Oct-15 A
4303	A10446	Langstaff Rd (Sussex Ave) - 45m, Hit rock 23m into bore. -	0.0	100%	100%	06-Oct-15 A	17-Oct-15 A
4304	A10445	Set up shoring	0.0	100%	100%	14-Sep-15 A	18-Sep-15 A
4305	A10443	Dewatering	0.0	100%	100%	31-Aug-15 A	12-Sep-15 A
4306	A10441	Shoring design and city approval	0.0	100%	100%	14-Jul-15 A	28-Jul-15 A
4307	A10440	Receive Permits - Langstaff Rd (Sussex Ave)	0.0	100%	100%	22-May-15 A	23-May-15 A
4308		**HDB Langstaff Rd (Sussex Ave) - 45m (KP 9.67) 2nd Attempt**	0.0	0%	0%	17-Oct-15 A	21-Nov-15 A
4309	A13280	Remove Shoring	0.0	0%	100%	12-Nov-15 A	21-Nov-15 A
4310	A13270	Install wing Sections	0.0	0%	100%	09-Nov-15 A	11-Nov-15 A
4311	A13260	HDB - Re-start Langstaff Bore as HDB - 45m	0.0	0%	100%	03-Nov-15 A	09-Nov-15 A
4312	A13250	Fill hole with concret	0.0	0%	100%	31-Oct-15 A	31-Oct-15 A
4313	A13240	Extract casing pipe	0.0	0%	100%	30-Oct-15 A	31-Oct-15 A
4314	A13236	WWE October 28th	0.0	0%	100%	30-Oct-15 A	30-Oct-15 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4315	A13235	Mobilize extractor	0.0	0%	100%	26-Oct-15 A	29-Oct-15 A
4316	A13230	Iniating recovery plan	0.0	0%	100%	17-Oct-15 A	24-Oct-15 A
4317	**Leslie St & Little German Mills Trib 1 - 250m (KP 12.24) - Failed**		0.0	0%	0%	04-May-15 A	06-Nov-15 A
4318	A10546	WWE October 28	0.0	100%	100%	05-Nov-15 A	06-Nov-15 A
4319	A10545	Leslie St & Little German Mills Trib 1 - 250m, FAILED	0.0	100%	100%	21-Oct-15 A	05-Nov-15 A
4320	A10544	Set up shoring	0.0	100%	100%	20-Aug-15 A	07-Oct-15 A
4321	A10543	Shoring design and city approval	0.0	100%	100%	28-Jul-15 A	11-Aug-15 A
4322	A10542	York Region - Sewerline Approval for Sheet Pile	0.0	100%	100%	08-May-15 A	13-Aug-15 A
4323	A10540	Receive Permits - Leslie St & Little German Mills Trib 1	0.0	100%	100%	04-May-15 A	05-May-15 A
4324	**Leslie St & Little German Mills Trib 1 - 250m (KP 12.24) - N/A**		0.0	0%	0%	04-Nov-15 A	07-Dec-15 A
4325	A13490	Remove Sheetpiles	0.0	0%	100%	07-Dec-15 A	07-Dec-15 A
4326	A13480	Back fill Bore pit	0.0	0%	100%	07-Dec-15 A	07-Dec-15 A
4327	A13470	Remove Slide Rail Shoring	0.0	0%	100%	07-Dec-15 A	07-Dec-15 A
4328	A13465	Install wing Sections - West	0.0	0%	100%	07-Dec-15 A	07-Dec-15 A
4329	A13460	Install wing Sections - East	0.0	0%	100%	07-Dec-15 A	07-Dec-15 A
4330	A13400	Demob Machine from site	0.0	0%	100%	07-Dec-15 A	07-Dec-15 A
4331	A13390	Demob Machine from hole	0.0	0%	100%	07-Dec-15 A	07-Dec-15 A
4332	A13380	Fabricate pipe	0.0	0%	100%	21-Nov-15 A	25-Nov-15 A
4333	A13370	Leslie St & Little German Mills Trib 1 - 250m - Direct Pipe	0.0	0%	100%	29-Nov-15 A	07-Dec-15 A
4334	A13360	Mobilize direct pipe machine into pit	0.0	0%	100%	21-Nov-15 A	29-Nov-15 A
4335	A13350	Prep sending pit for direct pipe machine	0.0	0%	100%	23-Nov-15 A	24-Nov-15 A
4336	A13340	Remove casing and add fill cement	0.0	0%	100%	20-Nov-15 A	22-Nov-15 A
4337	A13301	Install soil plug	0.0	0%	100%	04-Nov-15 A	07-Nov-15 A
4338	A13300	Remove auger	0.0	0%	100%	05-Nov-15 A	13-Nov-15 A
4339	**Leslie St & Little German Mills Trib 1 - 250m (KP 12.24) - Revised**		0.0	0%	0%	06-Dec-15 A	16-Jan-16 A
4340	A13630	Remove Sheetpiles	0.0	0%	100%	06-Jan-16 A	16-Jan-16 A
4341	A13620	Backfill Sheet Piling (East) - 2m cover for testing	0.0	0%	100%	14-Dec-15 A	16-Dec-15 A
4342	A13610	Remove Slide Rail (West - 4 x 20' bays)	0.0	0%	100%	14-Dec-15 A	17-Dec-15 A
4343	A13600	East Side Tie-ins (2 welds)	0.0	0%	100%	11-Dec-15 A	13-Dec-15 A
4344	A13590	West Side Tie-ins (4-welds)	0.0	0%	100%	12-Dec-15 A	14-Dec-15 A
4345	A13580	Remove MTBM	0.0	0%	100%	12-Dec-15 A	12-Dec-15 A
4346	A13570	Direct Pipe Demob	0.0	0%	100%	12-Dec-15 A	13-Dec-15 A
4347	A13560	Leslie St & Little German Mills Trib 1 - 259m - Mining	0.0	0%	100%	06-Dec-15 A	11-Dec-15 A
4348	A13550	Remove Pigging Head (Leslie)	0.0	0%	100%	12-Dec-15 A	13-Dec-15 A
4349	A13540	Blow Down	0.0	0%	100%	12-Dec-15 A	12-Dec-15 A
4350	A13530	Run Gauge Plate	0.0	0%	100%	12-Dec-15 A	12-Dec-15 A
4351	A13520	Pre-pack Line	0.0	0%	100%	12-Dec-15 A	12-Dec-15 A
4352	A13510	Run Construction Pig	0.0	0%	100%	12-Dec-15 A	12-Dec-15 A
4353	A13500	Install Pigging Head (Leslie East)	0.0	0%	100%	10-Dec-15 A	11-Dec-15 A
4354	**Woodbine (Woodbine to Miller) - 95m**		0.0	0%	0%	04-May-15 A	15-Nov-15 A
4355	A10866	Remove Shoring - East	0.0	0%	100%	13-Nov-15 A	15-Nov-15 A
4356	A10858	Remove Shoring - West	0.0	0%	100%	11-Nov-15 A	12-Nov-15 A
4357	A10856	Install wing Sections	0.0	100%	100%	26-Oct-15 A	10-Nov-15 A
4358	A10855	Woodbine bore - 95m	0.0	100%	100%	10-Sep-15 A	25-Oct-15 A
4359	A10854	Set up shoring Receiving	0.0	100%	100%	15-Oct-15 A	01-Nov-15 A
4360	A10853	Set up shoring Sending	0.0	100%	100%	20-Aug-15 A	10-Sep-15 A

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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4361	A10852	Shoring design and city approval	0.0	100%	100%	08-Aug-15 A	03-Sep-15 A
4362	A10851	Hold for Miller Group Approval	0.0	100%	100%	07-May-15 A	08-Aug-15 A
4363	A10850	Receive Permits - Miller Parking Lots & Hydro Lines	0.0	100%	100%	04-May-15 A	05-May-15 A
4364		**Burncrest (Burncrest to Pit #2) - 127m**	0.0	0%	0%	19-Oct-15 A	26-Nov-15 A
4365	A13170	Remove Sheetpiling	0.0	0%	100%	16-Nov-15 A	26-Nov-15 A
4366	A13160	Backfill bore pit West	0.0	0%	100%	12-Nov-15 A	14-Nov-15 A
4367	A13150	Remove Shoring - East	0.0	0%	100%	11-Nov-15 A	15-Nov-15 A
4368	A13140	Install wing Sections	0.0	0%	100%	06-Nov-15 A	11-Nov-15 A
4369	A13130	Burncrest Bore - 127m	0.0	0%	100%	27-Oct-15 A	06-Nov-15 A
4370	A13110	Set up shoring - Sending - (SR)	0.0	0%	100%	19-Oct-15 A	23-Oct-15 A
4371		**Miller - 204m (KP 14.30) (Wetland to Golf Net)**	0.0	0%	0%	22-May-15 A	23-Oct-15 A
4372	A10806	Remove Shoring	0.0	100%	100%	19-Oct-15 A	23-Oct-15 A
4373	A10804	Install wing Sections	0.0	100%	100%	15-Oct-15 A	19-Oct-15 A
4374	A10803	Miller Parking Lot - 204m	0.0	100%	100%	01-Sep-15 A	06-Oct-15 A
4375	A10802	Set up shoring	0.0	100%	100%	16-Jul-15 A	09-Sep-15 A
4376	A10801	Shoring design and city approval	0.0	100%	100%	01-Jul-15 A	15-Jul-15 A
4377	A10800	Receive Permits - Woodbine Ave & Burncrest - 220m	0.0	100%	100%	22-May-15 A	23-May-15 A
4378		**Roddick Road - 108m (KP 15.16)**	0.0	0%	0%	04-May-15 A	31-Oct-15 A
4379	A12440	Release for contaminated soil Milestone	0.0	100%	100%		13-Aug-15 A
4380	A10667	WWE October 28th	0.0	0%	100%	30-Oct-15 A	31-Oct-15 A
4381	A10657	Remove Shoring	0.0	100%	100%	16-Oct-15 A	30-Oct-15 A
4382	A10656	Install wing Sections	0.0	100%	100%	06-Oct-15 A	25-Oct-15 A
4383	A10655	Roddick Road - 108m	0.0	100%	100%	09-Sep-15 A	06-Oct-15 A
4384	A10653	Set up shoring - Sending	0.0	100%	100%	25-Aug-15 A	01-Sep-15 A
4385	A10652	Set up shoring - Receiving	0.0	100%	100%	24-Jul-15 A	30-Jul-15 A
4386	A10651	Shoring design and city approval	0.0	100%	100%	21-Jul-15 A	23-Jul-15 A
4387	A10650	Receive Permits - Roddick Road	0.0	100%	100%	04-May-15 A	05-May-15 A
4388		**Old Hwy 7 - Slip Bore - 16m**	0.0	0%	0%	26-Sep-15 A	30-Sep-15 A
4389	A13090	Old Hwy 7 - 16m	0.0	0%	100%	26-Sep-15 A	30-Sep-15 A
4390		**NPS36 Sectionalizing Valves**	0.0	0%	0%	04-Jan-16 A	19-Jan-16 A
4391		**Roddick Road (15+223)**	0.0	0%	0%	04-Jan-16 A	19-Jan-16 A
4392	A12760	U/S Buttonville Stn Inlet 15+223	0.0	100%	100%		18-Jan-16 A
4393	A12500	Complete final backfill and cleanup	0.0	0%	100%	16-Jan-16 A	18-Jan-16 A
4394	A12480	Complete concrete / steel work	0.0	100%	100%	11-Jan-16 A	19-Jan-16 A
4395	A12470	Install valve and tie in	0.0	100%	100%	08-Jan-16 A	09-Jan-16 A
4396	A12460	Cut and prep pipe for tie-in	0.0	100%	100%	07-Jan-16 A	08-Jan-16 A
4397	A12450	Excavate location	0.0	100%	100%	04-Jan-16 A	07-Jan-16 A
4398		**West of Yonge St (7+760)**	0.0	0%	0%	04-Jan-16 A	19-Jan-16 A
4399	A12755	West of Younge Street 7+760	0.0	100%	100%		18-Jan-16 A
4400	A12751	Complete final backfill and cleanup	0.0	0%	100%	16-Jan-16 A	18-Jan-16 A
4401	A12750	Complete concrete / steel work	0.0	100%	100%	11-Jan-16 A	19-Jan-16 A
4402	A12740	Install valve and tie in	0.0	100%	100%	08-Jan-16 A	09-Jan-16 A
4403	A12410	Cut and prep pipe for tie-in	0.0	100%	100%	07-Jan-16 A	08-Jan-16 A
4404	A12400	Excavate location	0.0	100%	100%	04-Jan-16 A	07-Jan-16 A
4405		**Hydrotesting**	0.0	0%	0%	16-Nov-15 A	12-Jan-16 A
4406		**Pig Runs**	0.0	0%	0%	16-Nov-15 A	18-Dec-15 A

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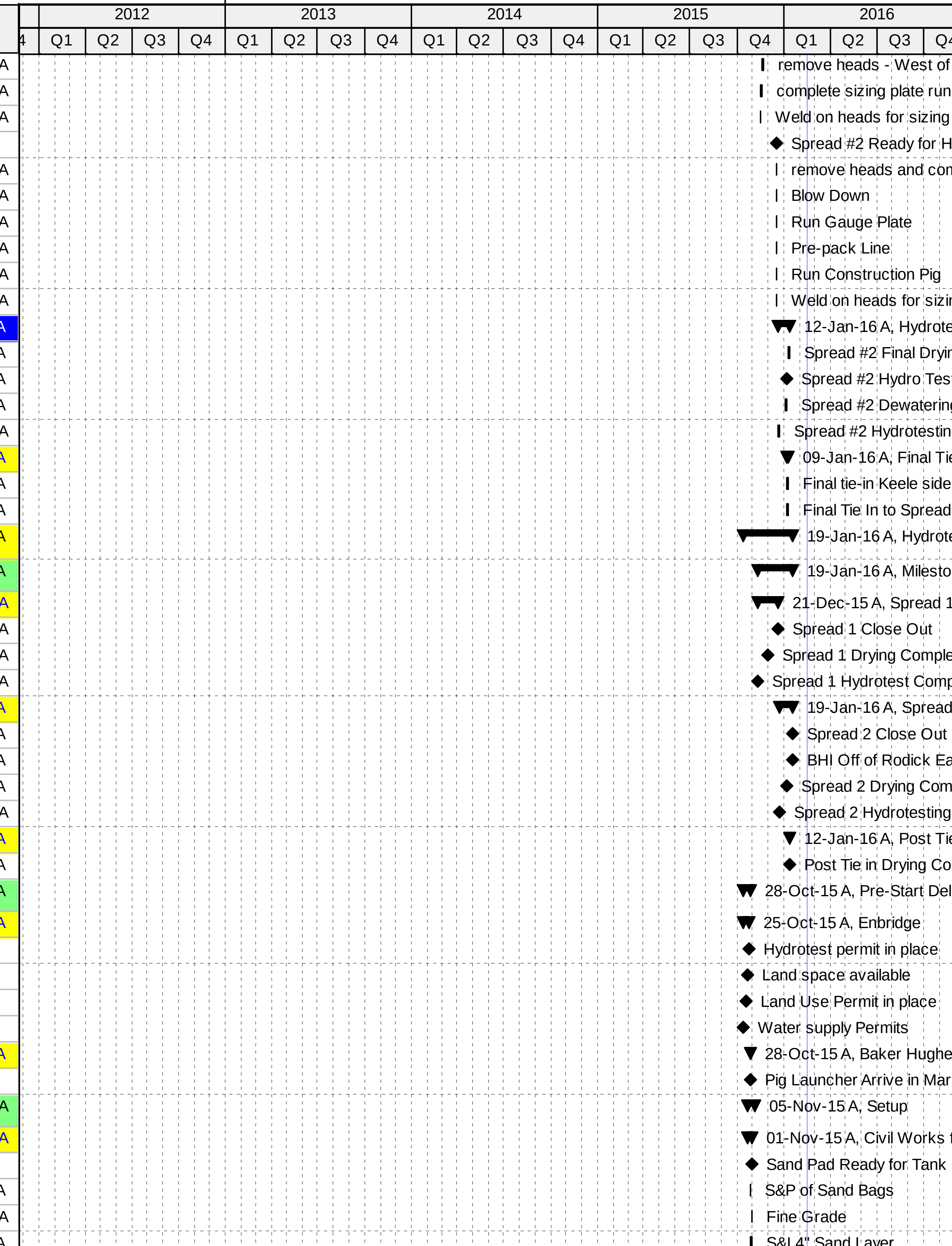
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4407	A12971	remove heads - West of Leslie	0.0	0%	100%	20-Nov-15 A	21-Nov-15 A
4408	A12961	complete sizing plate run - West of Leslie	0.0	0%	100%	18-Nov-15 A	19-Nov-15 A
4409	A12951	Weld on heads for sizing plate run - West of Leslie	0.0	0%	100%	16-Nov-15 A	17-Nov-15 A
4410	A12949	Spread #2 Ready for Hydro Testing Milestone	0.0	0%	100%	18-Dec-15 A	
4411	A12948	remove heads and complete final main line weld - East of Le	0.0	0%	100%	18-Dec-15 A	18-Dec-15 A
4412	A12947	Blow Down	0.0	0%	100%	18-Dec-15 A	18-Dec-15 A
4413	A12946	Run Gauge Plate	0.0	0%	100%	17-Dec-15 A	18-Dec-15 A
4414	A12945	Pre-pack Line	0.0	0%	100%	17-Dec-15 A	17-Dec-15 A
4415	A12942	Run Construction Pig	0.0	0%	100%	17-Dec-15 A	17-Dec-15 A
4416	A12941	Weld on heads for sizing plate run - East of Leslie	0.0	0%	100%	17-Dec-15 A	17-Dec-15 A
4417	**Hydrotest**		0.0	0%	0%	20-Dec-15 A	12-Jan-16 A
4418	A13120	Spread #2 Final Drying - BY OTHERS - Place Holder	0.0	0%	100%	09-Jan-16 A	12-Jan-16 A
4419	A13060	Spread #2 Hydro Testing Complete Milestone	0.0	0%	100%		07-Jan-16 A
4420	A12960	Spread #2 Dewatering / Drying - BY OTHERS - Place Holde	0.0	0%	100%	04-Jan-16 A	07-Jan-16 A
4421	A12950	Spread #2 Hydrotesting - BY OTHERS - Place Holder	0.0	0%	100%	20-Dec-15 A	24-Dec-15 A
4422	**Final Tie Ins**		0.0	0%	0%	08-Jan-16 A	09-Jan-16 A
4423	A13080	Final tie-in Keele side	0.0	0%	100%	08-Jan-16 A	09-Jan-16 A
4424	A13070	Final Tie In to Spread #1	0.0	0%	100%	08-Jan-16 A	09-Jan-16 A
4425	**Hydrotesting - Spread 1&2**		0.0	0%	0%	14-Oct-15 A	19-Jan-16 A
4426	**Milestones**		0.0	0%	0%	12-Nov-15 A	19-Jan-16 A
4427	**Spread 1**		0.0	0%	0%	12-Nov-15 A	21-Dec-15 A
4428	128	Spread 1 Close Out	0.0	100%	100%		21-Dec-15 A
4429	105	Spread 1 Drying Complete and Accepted	0.0	100%	100%		30-Nov-15 A
4430	104	Spread 1 Hydrotest Complete and Accepted	0.0	100%	100%		12-Nov-15 A
4431	**Spread 2**		0.0	0%	0%	23-Dec-15 A	19-Jan-16 A
4432	129	Spread 2 Close Out	0.0	100%	100%		19-Jan-16 A
4433	108	BHI Off of Rodick East Site	0.0	100%	100%		19-Jan-16 A
4434	107	Spread 2 Drying Complete and Accepted	0.0	100%	100%		06-Jan-16 A
4435	106	Spread 2 Hydrotesting Complete and Accepted	0.0	100%	100%		23-Dec-15 A
4436	**Post Tie in Drying**		0.0	0%	0%	12-Jan-16 A	12-Jan-16 A
4437	117	Post Tie in Drying Complete	0.0	100%	100%		12-Jan-16 A
4438	**Pre-Start Deliverables**		0.0	0%	0%	14-Oct-15 A	28-Oct-15 A
4439	**Enbridge**		0.0	0%	0%	14-Oct-15 A	25-Oct-15 A
4440	7	Hydrotest permit in place	0.0	100%	100%	25-Oct-15 A	
4441	6	Land space available	0.0	100%	100%	22-Oct-15 A	
4442	4	Land Use Permit in place	0.0	100%	100%	19-Oct-15 A	
4443	2	Water supply Permits	0.0	100%	100%	14-Oct-15 A	
4444	**Baker Hughes**		0.0	0%	0%	28-Oct-15 A	28-Oct-15 A
4445	9	Pig Launcher Arrive in Markham	0.0	100%	100%	28-Oct-15 A	
4446	**Setup**		0.0	0%	0%	22-Oct-15 A	05-Nov-15 A
4447	**Civil Works for lake**		0.0	0%	0%	22-Oct-15 A	01-Nov-15 A
4448	17	Sand Pad Ready for Tank Construction	0.0	100%	100%	01-Nov-15 A	
4449	16	S&P of Sand Bags	0.0	100%	100%	28-Oct-15 A	28-Oct-15 A
4450	15	Fine Grade	0.0	100%	100%	31-Oct-15 A	01-Nov-15 A
4451	14	S&I 4" Sand Layer	0.0	100%	100%	29-Oct-15 A	31-Oct-15 A



Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4452	13	Level and Proof Roll existing site Dig Suction Trench	0.0	100%	100%	27-Oct-15 A	29-Oct-15 A
4453	12	Construct Fence	0.0	100%	100%	22-Oct-15 A	22-Oct-15 A
4454	11	Civil Contractor Orientation	0.0	100%	100%	22-Oct-15 A	22-Oct-15 A
4455	**Rig in Spread 1&2**		0.0	0%	0%	26-Oct-15 A	05-Nov-15 A
4456	32	Heating and Hoarding of pipeline	0.0	100%	100%	30-Oct-15 A	02-Nov-15 A
4457	31	Install pipeline temperature monitoring	0.0	100%	100%	28-Oct-15 A	29-Oct-15 A
4458	30	Function Test Equipment	0.0	100%	100%	31-Oct-15 A	31-Oct-15 A
4459	29	Run Flooding Hoses/Test pipe/BHI aux eqpt	0.0	100%	100%	30-Oct-15 A	31-Oct-15 A
4460	28	Spot Equipment	0.0	100%	100%	28-Oct-15 A	30-Oct-15 A
4461	27	Crane Support (to work with 24 hour notice)	0.0	100%	100%	28-Oct-15 A	01-Nov-15 A
4462	26	Instal pipeline from lake to Rodick West	0.0	100%	100%	03-Nov-15 A	05-Nov-15 A
4463	25	Construct Lake 2	0.0	100%	100%	03-Nov-15 A	04-Nov-15 A
4464	24	Construct Lake 1	0.0	100%	100%	02-Nov-15 A	03-Nov-15 A
4465	23	Install Frac Tanks for initial Tank Fill	0.0	100%	100%	28-Oct-15 A	29-Oct-15 A
4466	22	Install pipeline from Hydrant to Tanks	0.0	100%	100%	28-Oct-15 A	30-Oct-15 A
4467	21	Install Hydrant heating (if required)	0.0	100%	100%	26-Oct-15 A	27-Oct-15 A
4468	20	BHI Orientation	0.0	100%	100%	26-Oct-15 A	26-Oct-15 A
4469	**Sheppard St Preparations**		0.0	0%	0%	28-Oct-15 A	31-Oct-15 A
4470	38	Spot BHI equipment on site	0.0	100%	100%	30-Oct-15 A	31-Oct-15 A
4471	37	Mobilize Pig Receiver and Test Cap to location	0.0	100%	100%	29-Oct-15 A	30-Oct-15 A
4472	36	Install Matting over live line	0.0	100%	100%	28-Oct-15 A	28-Oct-15 A
4473	35	Install Sound Curtains	0.0	100%	100%	28-Oct-15 A	29-Oct-15 A
4474	34	Lay Matting at additional property	0.0	100%	100%	28-Oct-15 A	29-Oct-15 A
4475	**Testing**		0.0	0%	0%	01-Nov-15 A	09-Jan-16 A
4476	**Spread 1**		0.0	0%	0%	01-Nov-15 A	26-Nov-15 A
4477	**Deliverables**		0.0	0%	0%	02-Nov-15 A	11-Nov-15 A
4478	8	Spread 1 Pipeline Handed over (Tie to Michels Schedule)	0.0	100%	100%	11-Nov-15 A	
4479	5	Pipeline Construction pigging complete (Tie to Michels Sche	0.0	100%	100%	02-Nov-15 A	
4480	3	Water Disposal Permits in place	0.0	100%	100%	11-Nov-15 A	
4481	**Flood**		0.0	0%	0%	01-Nov-15 A	07-Nov-15 A
4482	47	Flood line DirectionA to B (based on 9 m3/min)	0.0	100%	100%	06-Nov-15 A	07-Nov-15 A
4483	46	Fill Lake	0.0	100%	100%	04-Nov-15 A	05-Nov-15 A
4484	45	Air pack on pipeline	0.0	100%	100%	06-Nov-15 A	06-Nov-15 A
4485	44	Weld on Test Head at Sheppherd	0.0	100%	100%	04-Nov-15 A	06-Nov-15 A
4486	43	Weld on Test head at Rodick	0.0	100%	100%	03-Nov-15 A	04-Nov-15 A
4487	42	Cut and bevel test head off of Pig Launcher	0.0	100%	100%	03-Nov-15 A	03-Nov-15 A
4488	41	Load pigs into test head	0.0	100%	100%	01-Nov-15 A	01-Nov-15 A
4489	40	Weld Test Head onto Pig Launcher for Loading	0.0	100%	100%	01-Nov-15 A	01-Nov-15 A
4490	**Hydrostatic Test**		0.0	0%	0%	07-Nov-15 A	12-Nov-15 A
4491	57	Dewater into Lake	0.0	100%	100%	11-Nov-15 A	12-Nov-15 A
4492	56	Depressurization	0.0	100%	100%	10-Nov-15 A	10-Nov-15 A
4493	55	Leak Test hold	0.0	100%	100%	10-Nov-15 A	10-Nov-15 A
4494	54	Bleed to Leak Test Pressure	0.0	100%	100%	09-Nov-15 A	10-Nov-15 A
4495	53	Strength test	0.0	100%	100%	09-Nov-15 A	09-Nov-15 A
4496	52	Stabilization	0.0	100%	100%	09-Nov-15 A	09-Nov-15 A

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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4497	51	Pressurization 25-100% (With Holds)	0.0	100%	100%	08-Nov-15 A	09-Nov-15 A
4498	50	25% Stabilization	0.0	100%	100%	07-Nov-15 A	08-Nov-15 A
4499	49	Pressurization to 25%	0.0	100%	100%	07-Nov-15 A	07-Nov-15 A
4500	Dry		0.0	0%	0%	12-Nov-15 A	26-Nov-15 A
4501	65	Waste Disposal of used pigs	0.0	100%	100%	14-Nov-15 A	26-Nov-15 A
4502	64	Air Drying (with Pigs) to -42oC (5 ppm)	0.0	100%	100%	14-Nov-15 A	26-Nov-15 A
4503	63	Connect Compressors	0.0	100%	100%	12-Nov-15 A	12-Nov-15 A
4504	62	Weld on Receiver at Sheppherd	0.0	100%	100%	14-Nov-15 A	14-Nov-15 A
4505	61	Weld Pig launcher at Rodick	0.0	100%	100%	13-Nov-15 A	13-Nov-15 A
4506	60	Remove Test Head at Rodick	0.0	100%	100%	12-Nov-15 A	12-Nov-15 A
4507	59	Remove Test Head at Sheppherd	0.0	100%	100%	12-Nov-15 A	12-Nov-15 A
4508	Spread 2		0.0	0%	0%	11-Nov-15 A	09-Jan-16 A
4509	Deliverables		0.0	0%	0%	11-Nov-15 A	17-Dec-15 A
4510	69	Spread 2 Pipeline Handed over (Tie to Michels Schedule)	0.0	100%	100%	17-Dec-15 A	
4511	68	Spread 2 pipeline Construction pigging complete (Tie to Mic	0.0	100%	100%	17-Dec-15 A	
4512	67	Spread 2 Water Disposal Permit in place	0.0	100%	100%	11-Nov-15 A	
4513	Flood		0.0	0%	0%	09-Dec-15 A	20-Dec-15 A
4514	79	Fill Lake	0.0	100%	100%	18-Dec-15 A	20-Dec-15 A
4515	78	Flood Spread 2 from Tanks	0.0	100%	100%	18-Dec-15 A	20-Dec-15 A
4516	77	Weld on Test Head at Keele	0.0	100%	100%	17-Dec-15 A	17-Dec-15 A
4517	76	Weld on Test head at Rodick	0.0	100%	100%	16-Dec-15 A	16-Dec-15 A
4518	75	Cut Test head from Launcher and bevel	0.0	100%	100%	15-Dec-15 A	15-Dec-15 A
4519	74	Load pigs into test head	0.0	100%	100%	15-Dec-15 A	15-Dec-15 A
4520	73	Weld Test Head onto Pig Launcher for Loading	0.0	100%	100%	09-Dec-15 A	09-Dec-15 A
4521	72	Install pipeline temperature monitoring	0.0	100%	100%	17-Dec-15 A	17-Dec-15 A
4522	71	BHI Re-Mobilization to site	0.0	100%	100%	15-Dec-15 A	
4523	Hydrostatic Test		0.0	0%	0%	20-Dec-15 A	30-Dec-15 A
4524	89	Dewater to tanks and ground	0.0	100%	100%	28-Dec-15 A	30-Dec-15 A
4525	88	Depressurization	0.0	100%	100%	22-Dec-15 A	23-Dec-15 A
4526	87	Leak Test hold	0.0	100%	100%	22-Dec-15 A	22-Dec-15 A
4527	86	Bleed to Leak Test Pressure	0.0	100%	100%	22-Dec-15 A	22-Dec-15 A
4528	85	Strength test	0.0	100%	100%	22-Dec-15 A	22-Dec-15 A
4529	84	Stabilization	0.0	100%	100%	22-Dec-15 A	22-Dec-15 A
4530	83	Pressurization 25-100% (With Holds)	0.0	100%	100%	22-Dec-15 A	22-Dec-15 A
4531	82	25% Stabilization	0.0	100%	100%	20-Dec-15 A	22-Dec-15 A
4532	81	Pressurization to 25%	0.0	100%	100%	20-Dec-15 A	20-Dec-15 A
4533	Dry		0.0	0%	0%	30-Dec-15 A	09-Jan-16 A
4534	97	Waste Disposal of used pigs	0.0	100%	100%	01-Jan-16 A	09-Jan-16 A
4535	96	Drying (with Pigs) to -42oC (5 ppm)	0.0	100%	100%	04-Jan-16 A	06-Jan-16 A
4536	95	Connect Compressors	0.0	100%	100%	31-Dec-15 A	31-Dec-15 A
4537	94	Weld on Pig Receiver at Keele	0.0	100%	100%	30-Dec-15 A	31-Dec-15 A
4538	93	Weld on Pig Launcher at Roddick	0.0	100%	100%	30-Dec-15 A	31-Dec-15 A
4539	92	Remove Test Head at Roddick	0.0	100%	100%	30-Dec-15 A	30-Dec-15 A
4540	91	Remove Test Head at Keele	0.0	100%	100%	30-Dec-15 A	30-Dec-15 A
4541	Documentation		0.0	0%	0%	30-Nov-15 A	15-Jan-16 A

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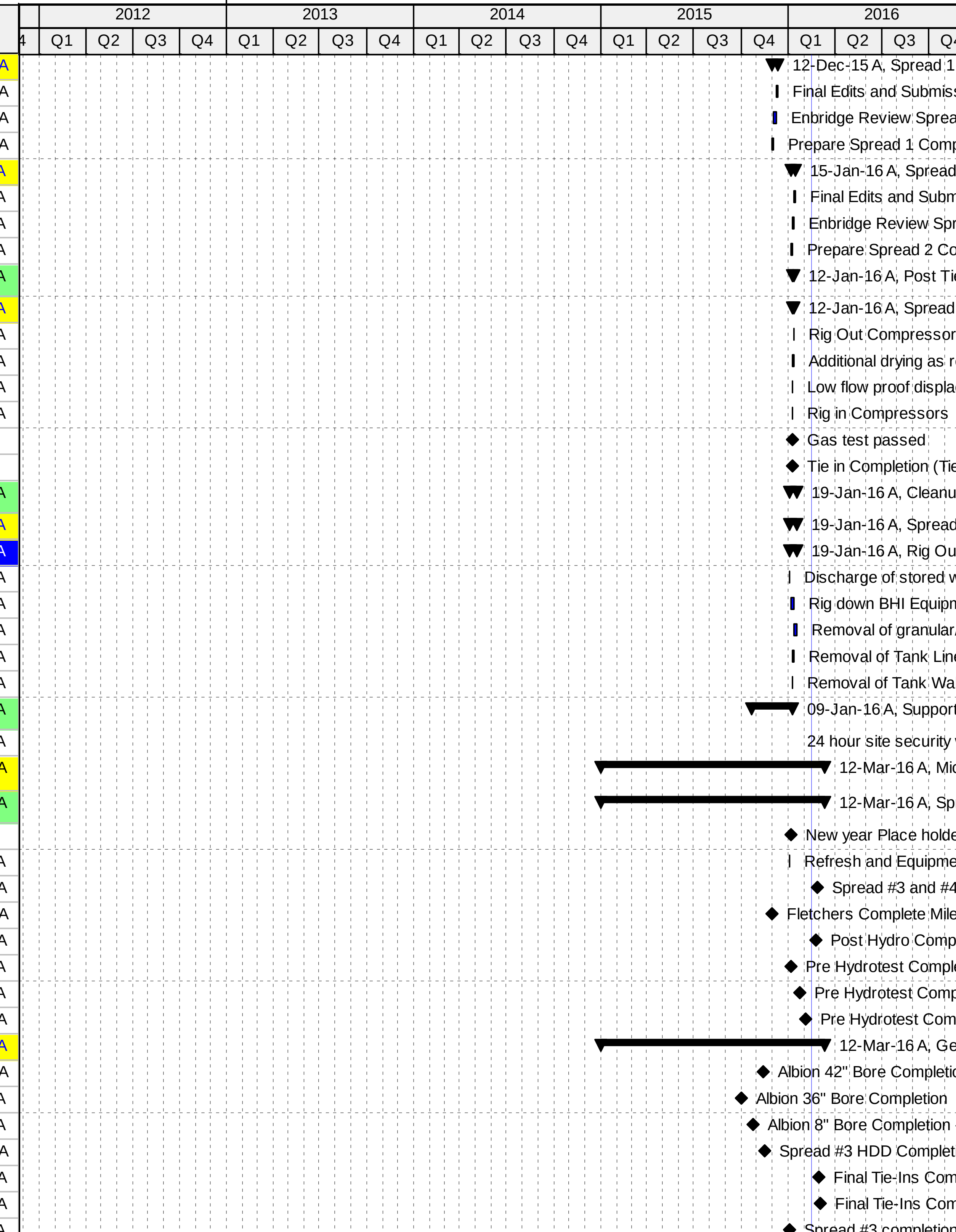
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4542	**Spread 1**		0.0	0%	0%	30-Nov-15 A	12-Dec-15 A
4543	121	Final Edits and Submission Spread 1	0.0	100%	100%	09-Dec-15 A	12-Dec-15 A
4544	120	Enbridge Review Spread 1 Completion Package	0.0	100%	100%	05-Dec-15 A	09-Dec-15 A
4545	119	Prepare Spread 1 Completion package	0.0	100%	100%	30-Nov-15 A	04-Dec-15 A
4546	**Spread 2**		0.0	0%	0%	07-Jan-16 A	15-Jan-16 A
4547	124	Final Edits and Submission Spread 2	0.0	100%	100%	14-Jan-16 A	15-Jan-16 A
4548	123	Enbridge Review Spread 2 Completion Package	0.0	100%	100%	11-Jan-16 A	13-Jan-16 A
4549	122	Prepare Spread 2 Completion package	0.0	100%	100%	07-Jan-16 A	10-Jan-16 A
4550	**Post Tie In Drying**		0.0	0%	0%	09-Jan-16 A	12-Jan-16 A
4551	**Spread 1&2**		0.0	0%	0%	09-Jan-16 A	12-Jan-16 A
4552	116	Rig Out Compressors	0.0	100%	100%	12-Jan-16 A	12-Jan-16 A
4553	115	Additional drying as required	0.0	100%	100%	10-Jan-16 A	12-Jan-16 A
4554	114	Low flow proof displacement	0.0	100%	100%	10-Jan-16 A	10-Jan-16 A
4555	113	Rig in Compressors	0.0	100%	100%	09-Jan-16 A	10-Jan-16 A
4556	112	Gas test passed	0.0	100%	100%	09-Jan-16 A	
4557	111	Tie in Completion (Tie to Michels)	0.0	100%	100%	09-Jan-16 A	
4558	**Cleanup & Restoration**		0.0	0%	0%	04-Jan-16 A	19-Jan-16 A
4559	**Spread 1&2**		0.0	0%	0%	04-Jan-16 A	19-Jan-16 A
4560	**Rig Out**		0.0	0%	0%	04-Jan-16 A	19-Jan-16 A
4561	99	Discharge of stored water	0.0	100%	100%	04-Jan-16 A	05-Jan-16 A
4562	103	Rig down BHI Equipment	0.0	100%	100%	08-Jan-16 A	11-Jan-16 A
4563	102	Removal of granular/sand	0.0	100%	100%	12-Jan-16 A	19-Jan-16 A
4564	101	Removal of Tank Liners/Pads	0.0	100%	100%	11-Jan-16 A	11-Jan-16 A
4565	100	Removal of Tank Walls	0.0	100%	100%	09-Jan-16 A	10-Jan-16 A
4566	**Support**		0.0	0%	0%	22-Oct-15 A	09-Jan-16 A
4567	18	24 hour site security when no personnel present	0.0	100%	100%	22-Oct-15 A	09-Jan-16 A
4568	**Michels Mainline - Spread 3**		0.0	0%	0%	02-Jan-15 A	12-Mar-16 A
4569	**Spread 3 and 4 Milestones**		0.0	0%	0%	02-Jan-15 A	12-Mar-16 A
4570	A13595	New year Place holder	0.0	0%	100%	06-Jan-16 A	
4571	A13590	Refresh and Equipment Re-Mobilization	0.0	0%	100%	04-Jan-16 A	05-Jan-16 A
4572	A13321	Spread #3 and #4 Completion Milestone - Valves Installed	0.0	0%	100%		29-Feb-16 A
4573	A13311	Fletchers Complete Milestone	0.0	0%	100%		30-Nov-15 A
4574	A13301	Post Hydro Completion Milestone - ALL SECTIONS	0.0	0%	100%		26-Feb-16 A
4575	A13300	Pre Hydrotest Completion Section 4 Milestone	0.0	0%	100%		08-Jan-16 A
4576	A13290	Pre Hydrotest Completion Section 1 Milestone	0.0	0%	100%		25-Jan-16 A
4577	A13280	Pre Hydrotest Completion Section 2 Milestone	0.0	0%	100%		04-Feb-16 A
4578	**General Milestones**		0.0	0%	0%	02-Jan-15 A	12-Mar-16 A
4579	A3795	Albion 42" Bore Completion	0.0	0%	100%		13-Nov-15 A
4580	A3794	Albion 36" Bore Completion	0.0	0%	100%		03-Oct-15 A
4581	A3793	Albion 8" Bore Completion - Second Attempt	0.0	0%	100%		24-Oct-15 A
4582	A3790	Spread #3 HDD Completion Milestone	0.0	100%	100%		17-Nov-15 A
4583	A13610	Final Tie-Ins Complete Milestone - Section 2	0.0	0%	100%		01-Mar-16 A
4584	A13600	Final Tie-Ins Complete Milestone - Section 1	0.0	0%	100%		03-Mar-16 A
4585	A13371	Spread #3 completion and ready for construction pigs. Sect	0.0	0%	100%		05-Jan-16 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4586	A13361	Spread #3 completion and ready for construction pigs. Sect	0.0	0%	100%		25-Jan-16 A
4587	A13351	Spread #3 completion and ready for construction pigs. Sect	0.0	0%	100%		04-Feb-16 A
4588	A12470	Tie In Completion Milestone	0.0	100%	100%		01-Feb-16 A
4589	A12070	Spread #3 Open Cut Completion Milestone	0.0	100%	100%		21-Jan-16 A
4590	A12060	Spread #3 Main Line Completion Milestone	0.0	100%	100%		27-Jan-16 A
4591	A12045	Spread #3 Shoring Removed Completion Milestone	0.0	0%	100%		08-Feb-16 A
4592	A12035	Spread #3 Bore Completion Milestone	0.0	100%	100%		24-Jan-16 A
4593	A12032	Spread #4 Mainline Completion Milestone	0.0	100%	100%		19-Jan-16 A
4594	A12031	Spread #3 Completion Milestone	0.0	100%	100%		12-Mar-16 A
4595	A12030	Spread #3/4 Start Milestone	0.0	100%	100%	02-Jan-15 A	
4596	**HDD**		0.0	0%	0%	03-Jan-15 A	17-Nov-15 A
4597	**Mavis Road (KP 11.65 to 11.15)**		0.0	0%	0%	01-May-15 A	17-Jun-15 A
4598	A3580	PRE-TEST HDD & BORE SECTIONS	0.0	100%	100%	30-May-15 A	08-Jun-15 A
4599	A3575	SET UP FOR PRE-TEST	0.0	100%	100%	26-May-15 A	29-May-15 A
4600	A3570	COAT HDD SECTIONS	0.0	100%	100%	20-May-15 A	25-May-15 A
4601	A3560	AUTOMATIC WELDING - HDD SECTIONS - 517m	0.0	100%	100%	14-May-15 A	19-May-15 A
4602	A3550	STRING and SETUP PIPE	0.0	100%	100%	11-May-15 A	13-May-15 A
4603	A3460	Pull Back Support	0.0	100%	100%	16-Jun-15 A	17-Jun-15 A
4604	A3459	Mavis Road - 517m	0.0	100%	100%	09-May-15 A	15-Jun-15 A
4605	A3456	Build Exit Pad	0.0	100%	100%	02-May-15 A	08-May-15 A
4606	A3455	Build Entry Pad	0.0	100%	100%	02-May-15 A	08-May-15 A
4607	A3450	Receive Permits	0.0	100%	100%	01-May-15 A	01-May-15 A
4608	**Bramalea Rd - 526 m - (KP 19.88 to 19.35)**		0.0	0%	0%	15-Apr-15 A	05-Aug-15 A
4609	A3620	PRE-TEST HDD & BORE SECTIONS	0.0	100%	100%	23-Jun-15 A	02-Jul-15 A
4610	A3615	SET UP FOR PRE-TEST	0.0	100%	100%	19-May-15 A	23-May-15 A
4611	A3610	COAT HDD SECTIONS	0.0	100%	100%	20-Jul-15 A	25-Jul-15 A
4612	A3600	AUTOMATIC WELDING - HDD SECTIONS - 526m	0.0	100%	100%	30-Apr-15 A	06-May-15 A
4613	A3590	STRING and SETUP PIPE	0.0	100%	100%	27-Apr-15 A	30-Apr-15 A
4614	A3480	Pull Back Support	0.0	100%	100%	31-Jul-15 A	05-Aug-15 A
4615	A3479	Bramalea Rd - 526 m	0.0	100%	100%	20-May-15 A	29-Jul-15 A
4616	A3476	Build Exit Pad	0.0	100%	100%	16-Apr-15 A	24-Apr-15 A
4617	A3475	Build Entry Pad	0.0	100%	100%	16-Apr-15 A	24-Apr-15 A
4618	A3470	Receive Permits	0.0	100%	100%	15-Apr-15 A	16-Apr-15 A
4619	**Hwy 410 - 532 m (KP 4.8 to 4.42)**		0.0	0%	0%	01-May-15 A	19-Aug-15 A
4620	A3660	PRE-TEST HDD & BORE SECTIONS	0.0	100%	100%	13-Jul-15 A	21-Jul-15 A
4621	A3655	SET UP FOR PRE-TEST	0.0	100%	100%	07-Jul-15 A	10-Jul-15 A
4622	A3650	COAT HDD SECTIONS	0.0	100%	100%	03-Jun-15 A	09-Jun-15 A
4623	A3640	AUTOMATIC WELDING - HDD SECTIONS - 532m	0.0	100%	100%	23-May-15 A	29-May-15 A
4624	A3630	STRING and SETUP PIPE	0.0	100%	100%	15-May-15 A	19-May-15 A
4625	A3500	Pull Back Support	0.0	100%	100%	18-Aug-15 A	19-Aug-15 A
4626	A3499	Hwy 410 - 532 m	0.0	100%	100%	15-May-15 A	17-Aug-15 A
4627	A3496	Build Exit Pad	0.0	100%	100%	02-May-15 A	08-May-15 A
4628	A3495	Build Entry Pad	0.0	100%	100%	02-May-15 A	08-May-15 A
4629	A3490	Receive Permits	0.0	100%	100%	01-May-15 A	01-May-15 A
4630	**Mississauga Rd, Levi Creek, Financial Dr - 1013 m (KP 8.85 to KP 7.8**		0.0	0%	0%	01-May-15 A	17-Sep-15 A

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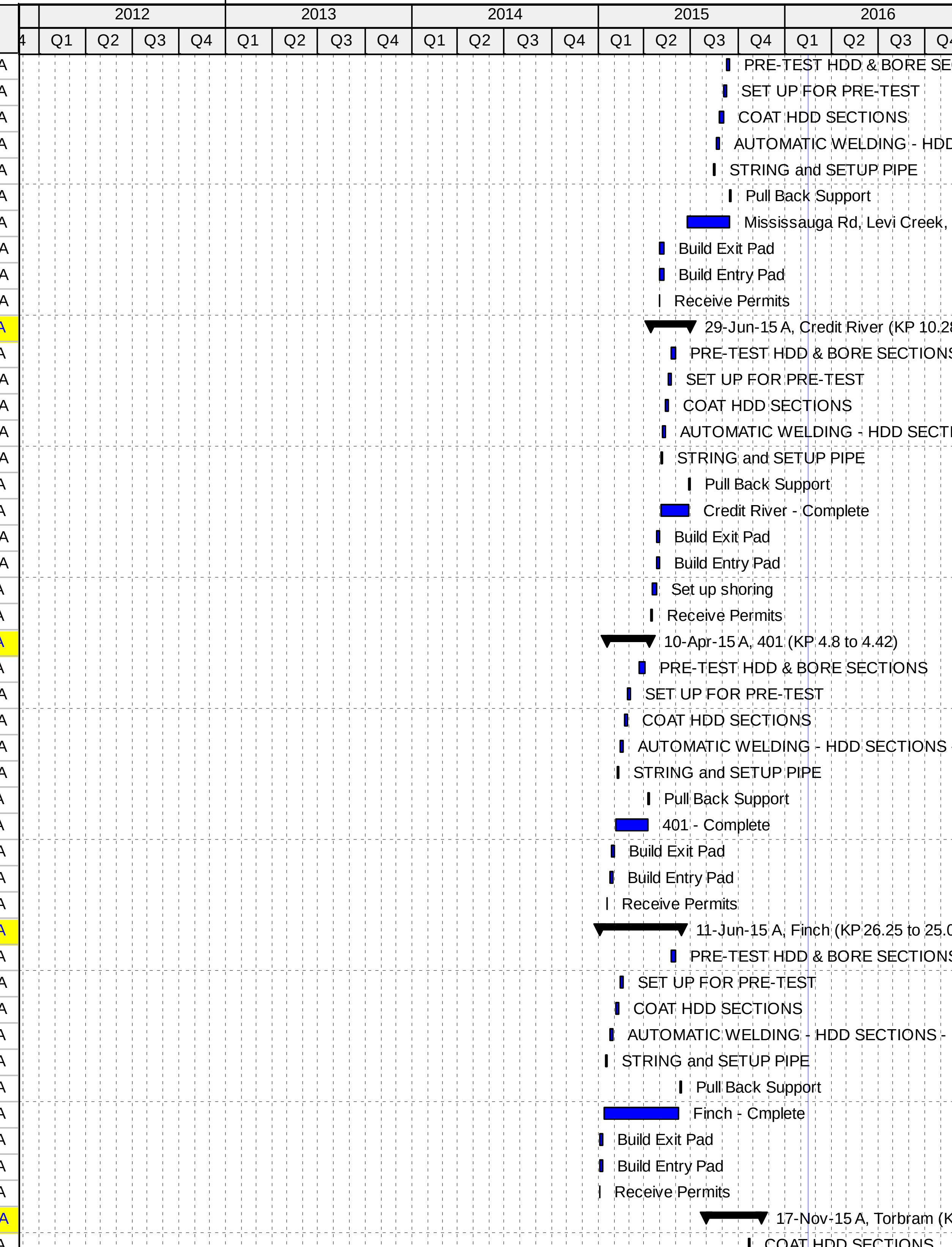
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4631	A3700	PRE-TEST HDD & BORE SECTIONS	0.0	100%	100%	10-Sep-15 A	14-Sep-15 A
4632	A3695	SET UP FOR PRE-TEST	0.0	100%	100%	04-Sep-15 A	09-Sep-15 A
4633	A3690	COAT HDD SECTIONS	0.0	100%	100%	27-Aug-15 A	03-Sep-15 A
4634	A3680	AUTOMATIC WELDING - HDD SECTIONS - 1013m	0.0	100%	100%	21-Aug-15 A	26-Aug-15 A
4635	A3670	STRING and SETUP PIPE	0.0	100%	100%	14-Aug-15 A	18-Aug-15 A
4636	A3520	Pull Back Support	0.0	100%	100%	15-Sep-15 A	17-Sep-15 A
4637	A3519	Mississauga Rd, Levi Creek, Financial Dr - 1013 m	0.0	100%	100%	23-Jun-15 A	14-Sep-15 A
4638	A3512	Build Exit Pad	0.0	100%	100%	02-May-15 A	08-May-15 A
4639	A3511	Build Entry Pad	0.0	100%	100%	02-May-15 A	08-May-15 A
4640	A3510	Receive Permits	0.0	100%	100%	01-May-15 A	01-May-15 A
4641	**Credit River (KP 10.28 to 9.89)**		0.0	0%	0%	15-Apr-15 A	29-Jun-15 A
4642	A6460	PRE-TEST HDD & BORE SECTIONS	0.0	100%	100%	23-May-15 A	02-Jun-15 A
4643	A6450	SET UP FOR PRE-TEST	0.0	100%	100%	19-May-15 A	23-May-15 A
4644	A6440	COAT HDD SECTIONS	0.0	100%	100%	13-May-15 A	19-May-15 A
4645	A6430	AUTOMATIC WELDING - HDD SECTIONS - 1013m	0.0	100%	100%	07-May-15 A	13-May-15 A
4646	A6420	STRING and SETUP PIPE	0.0	100%	100%	04-May-15 A	07-May-15 A
4647	A6410	Pull Back Support	0.0	100%	100%	26-Jun-15 A	29-Jun-15 A
4648	A6400	Credit River - Complete	0.0	100%	100%	04-May-15 A	26-Jun-15 A
4649	A6390	Build Exit Pad	0.0	100%	100%	24-Apr-15 A	02-May-15 A
4650	A6380	Build Entry Pad	0.0	100%	100%	24-Apr-15 A	02-May-15 A
4651	A6371	Set up shoring	0.0	100%	100%	16-Apr-15 A	24-Apr-15 A
4652	A6370	Receive Permits	0.0	100%	100%	15-Apr-15 A	16-Apr-15 A
4653	**401 (KP 4.8 to 4.42)**		0.0	0%	0%	18-Jan-15 A	10-Apr-15 A
4654	A6560	PRE-TEST HDD & BORE SECTIONS	0.0	100%	100%	23-Mar-15 A	02-Apr-15 A
4655	A6550	SET UP FOR PRE-TEST	0.0	100%	100%	28-Feb-15 A	05-Mar-15 A
4656	A6540	COAT HDD SECTIONS	0.0	100%	100%	21-Feb-15 A	27-Feb-15 A
4657	A6530	AUTOMATIC WELDING - HDD SECTIONS - 1013m	0.0	100%	100%	13-Feb-15 A	19-Feb-15 A
4658	A6520	STRING and SETUP PIPE	0.0	100%	100%	06-Feb-15 A	10-Feb-15 A
4659	A6510	Pull Back Support	0.0	100%	100%	07-Apr-15 A	10-Apr-15 A
4660	A6500	401 - Complete	0.0	100%	100%	04-Feb-15 A	07-Apr-15 A
4661	A6490	Build Exit Pad	0.0	100%	100%	26-Jan-15 A	31-Jan-15 A
4662	A6480	Build Entry Pad	0.0	100%	100%	24-Jan-15 A	30-Jan-15 A
4663	A6470	Receive Permits	0.0	100%	100%	18-Jan-15 A	19-Jan-15 A
4664	**Finch (KP 26.25 to 25.05)**		0.0	0%	0%	03-Jan-15 A	11-Jun-15 A
4665	A6660	PRE-TEST HDD & BORE SECTIONS	0.0	100%	100%	23-May-15 A	01-Jun-15 A
4666	A6650	SET UP FOR PRE-TEST	0.0	100%	100%	13-Feb-15 A	17-Feb-15 A
4667	A6640	COAT HDD SECTIONS	0.0	100%	100%	03-Feb-15 A	09-Feb-15 A
4668	A6630	AUTOMATIC WELDING - HDD SECTIONS - 1013m	0.0	100%	100%	25-Jan-15 A	30-Jan-15 A
4669	A6620	STRING and SETUP PIPE	0.0	100%	100%	16-Jan-15 A	19-Jan-15 A
4670	A6610	Pull Back Support	0.0	100%	100%	09-Jun-15 A	11-Jun-15 A
4671	A6600	Finch - Cmplete	0.0	100%	100%	11-Jan-15 A	08-Jun-15 A
4672	A6590	Build Exit Pad	0.0	100%	100%	05-Jan-15 A	10-Jan-15 A
4673	A6580	Build Entry Pad	0.0	100%	100%	04-Jan-15 A	10-Jan-15 A
4674	A6570	Receive Permits	0.0	100%	100%	03-Jan-15 A	04-Jan-15 A
4675	**Torbram (KP 21.24 to 20.81)**		0.0	0%	0%	01-Aug-15 A	17-Nov-15 A
4676	A6785	COAT HDD SECTIONS	0.0	100%	100%	21-Oct-15 A	24-Oct-15 A



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4677	A6775	AUTOMATIC WELDING - HDD SECTIONS - 1013m	0.0	100%	100%	19-Oct-15 A	20-Oct-15 A
4678	A6765	STRING and SETUP PIPE	0.0	100%	100%	14-Oct-15 A	17-Oct-15 A
4679	A6755	Pull Back Support	0.0	100%	100%	16-Nov-15 A	17-Nov-15 A
4680	A6749	Torbram	0.0	100%	100%	30-Oct-15 A	15-Nov-15 A
4681	A6747	WWE October 29th	0.0	0%	100%	29-Oct-15 A	29-Oct-15 A
4682	A6746	Build Exit Pad	0.0	100%	100%	24-Sep-15 A	30-Sep-15 A
4683	A6744	Build Entry Pad	0.0	100%	100%	17-Aug-15 A	22-Aug-15 A
4684	A6743	Receive Permits	0.0	100%	100%	14-Aug-15 A	15-Aug-15 A
4685	A6740	Access granted to site	0.0	100%	100%	01-Aug-15 A	14-Aug-15 A
4686	**Mainline**		0.0	0%	0%	09-Jun-15 A	07-Feb-16 A
4687	**Original Mainline**		0.0	0%	0%	09-Jun-15 A	31-Jul-15 A
4688	A1591	LOWER IN & Backfill	0.0	100%	100%	21-Jul-15 A	31-Jul-15 A
4689	A1590	TRENCH	0.0	100%	100%	21-Jul-15 A	31-Jul-15 A
4690	A1589	COAT	0.0	100%	100%	20-Jul-15 A	31-Jul-15 A
4691	A1587	AUTOMATIC WELDING	0.0	100%	100%	20-Jul-15 A	31-Jul-15 A
4692	A1586	BENDING and SET UP	0.0	100%	100%	20-Jul-15 A	31-Jul-15 A
4693	A1585	STRING PIPE	0.0	100%	100%	20-Jul-15 A	30-Jul-15 A
4694	A1584	TOPSOIL SALVAGE and REPLACE	0.0	100%	100%	12-Jun-15 A	31-Jul-15 A
4695	A1583	INSTALL MATTING	0.0	100%	100%	12-Jun-15 A	31-Jul-15 A
4696	A1582	CLEARING AND GRADING	0.0	100%	100%	12-Jun-15 A	31-Jul-15 A
4697	A1581	HYDROVAC	0.0	100%	100%	10-Jun-15 A	31-Jul-15 A
4698	A1580	R.O.W SWEEPS, LOCATES, SIGNAGE & ACCESS	0.0	100%	100%	09-Jun-15 A	31-Jul-15 A
4699	**Mainline**		0.0	0%	0%	11-Aug-15 A	07-Feb-16 A
4700	A5420	Clean Up and Restoration	0.0	100%	100%	30-Nov-15 A	07-Feb-16 A
4701	A5360	LOWER IN & Backfill	0.0	100%	100%	16-Sep-15 A	27-Jan-16 A
4702	A5350	TRENCH	0.0	100%	100%	14-Sep-15 A	25-Jan-16 A
4703	A5340	COAT	0.0	100%	100%	17-Aug-15 A	25-Jan-16 A
4704	A5330	AUTOMATIC WELDING	0.0	100%	100%	14-Aug-15 A	06-Dec-15 A
4705	A5310	BENDING and SET UP	0.0	100%	100%	11-Aug-15 A	06-Dec-15 A
4706	A5300	STRING PIPE	0.0	100%	100%	11-Aug-15 A	06-Dec-15 A
4707	**Mainline Tie-ins Welds**		0.0	0%	0%	14-Sep-15 A	16-Jan-16 A
4708	A13050	Complete tie in welds from Hwy 407 Bore to Derry Road Bo	0.0	100%	100%	13-Nov-15 A	14-Nov-15 A
4709	A13040	Complete tie in welds from Lisgar Bore to Hwy 407 Bore - (>	0.0	100%	100%	26-Oct-15 A	27-Oct-15 A
4710	A13030	Complete tie in welds from 401 to 9th - (x3)	0.0	100%	100%	11-Jan-16 A	13-Jan-16 A
4711	A13010	Complete tie in welds from Winston Church Bore to 401 HD	0.0	100%	100%	28-Sep-15 A	02-Oct-15 A
4712	A12990	Complete tie in welds from Meadow Pine to Winston - (x19)	0.0	100%	100%	09-Nov-15 A	26-Nov-15 A
4713	A12980	Complete tie in welds from Mississauga HDD Entry to Meac	0.0	100%	100%	15-Dec-15 A	18-Dec-15 A
4714	A12960	Complete tie in welds from Mavis HDD Entry to Credit River	0.0	100%	100%	28-Sep-15 A	30-Sep-15 A
4715	A12930	Complete tie in welds from Hurontario Bore to Mississauga	0.0	100%	100%	26-Oct-15 A	30-Oct-15 A
4716	A12920	Complete tie in welds from Kennedy Rd Bore to Hurontario I	0.0	100%	100%	26-Oct-15 A	28-Oct-15 A
4717	A12910	Complete tie in welds from 410 HDD Exit to Kennedy Rd Bo	0.0	100%	100%	09-Nov-15 A	15-Nov-15 A
4718	A12890	Complete tie in welds from Dixie Road Bore to Tomken Rd -	0.0	100%	100%	14-Sep-15 A	19-Sep-15 A
4719	A12880	Complete tie in welds from Bramalea HDD Entry to Spring C	0.0	100%	100%	28-Sep-15 A	15-Nov-15 A
4720	A12870	Complete tie in welds from Torbram HDD Entry to Bramalea	0.0	100%	100%	13-Jan-16 A	16-Jan-16 A
4721	A12860	Complete tie in welds from Airport Rd to Torbram HDD Exit -	0.0	100%	100%	26-Oct-15 A	30-Oct-15 A

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4722	A12850	Complete tie in welds from KO to Airport Rd- (x6)	0.0	100%	100%	11-Jan-16 A	16-Jan-16 A
4723	**Bore Tie-ins Welds**		0.0	0%	0%	05-Sep-15 A	01-Feb-16 A
4724	A12460	Complete tie in welds from Derry Road Bore to KP 0- (x5)	0.0	100%	100%	05-Jan-16 A	11-Jan-16 A
4725	A12455	Complete tie in welds from CP Derry to Derry Road - (x0 x 3)	0.0	0%	100%	02-Dec-15 A	05-Dec-15 A
4726	A12454	Complete tie in welds from CP Derry to Derry Road - (x4 x 0)	0.0	0%	100%	09-Nov-15 A	12-Nov-15 A
4727	A12451	Complete tie in welds from Hwy 407 Bore to CP Derry - (x0	0.0	0%	100%	18-Dec-15 A	19-Dec-15 A
4728	A12450	Complete tie in welds from Hwy 407 Bore to CP Derry - (x3	0.0	100%	100%	14-Dec-15 A	17-Dec-15 A
4729	A12448	Complete tie in welds from 9th to Hwy 407 Bore - (x0 x 4)	0.0	0%	100%	08-Dec-15 A	11-Dec-15 A
4730	A12447	Complete tie in welds from 9th to Hwy 407 Bore - (x4 x 0)	0.0	0%	100%	09-Nov-15 A	12-Nov-15 A
4731	A12446	Complete tie in welds from Lisgar Bore to 9th - (x0 x 1)	0.0	0%	100%	09-Nov-15 A	09-Nov-15 A
4732	A12445	Complete tie in welds from Lisgar Bore to 9th - (x1 x 0)	0.0	100%	100%	11-Jan-16 A	12-Jan-16 A
4733	A12440	Complete tie in welds from Argentia Bore to Lisgar Bore - (x	0.0	100%	100%	22-Jan-16 A	23-Jan-16 A
4734	A12433	Complete tie in welds from 10th to Argentia Bore - (x0 x2)	0.0	0%	100%	22-Jan-16 A	23-Jan-16 A
4735	A12432	Complete tie in welds from 10th to Argentia Bore - (x2 x 0)	0.0	0%	100%	11-Dec-15 A	12-Dec-15 A
4736	A12431	Complete tie in welds from 401 HDD Exit to 10th - (x0 x2)	0.0	0%	100%	07-Dec-15 A	09-Dec-15 A
4737	A12430	Complete tie in welds from 401 HDD Exit to 10th - (x2 x 0)	0.0	100%	100%	20-Nov-15 A	21-Nov-15 A
4738	A12410	Complete tie in welds from Meadowpine Bore - Winston Chu	0.0	100%	100%	09-Sep-15 A	12-Sep-15 A
4739	A12401	Complete tie in welds from Heritage Bore to Meadowpine Bo	0.0	0%	100%	21-Sep-15 A	25-Sep-15 A
4740	A12400	Complete tie in welds from Heritage Bore to Meadowpine Bo	0.0	100%	100%	14-Dec-15 A	19-Dec-15 A
4741	A12390	Complete tie in welds from Mullet Cr to Heritage Bore - (x4	0.0	100%	100%	14-Dec-15 A	18-Dec-15 A
4742	A12387	Complete tie in welds from PenGilly to Mississauga HDD Ex	0.0	0%	100%	26-Oct-15 A	28-Oct-15 A
4743	A12386	Complete tie in welds from PenGilly to Mississauga HDD Ex	0.0	0%	100%	21-Sep-15 A	22-Sep-15 A
4744	A12385	Complete tie in welds from Credit River to PenGilly - (x6)	0.0	0%	100%	05-Sep-15 A	12-Sep-15 A
4745	A12350	Complete tie in welds from McLaughlin Bore to Mavis HDD I	0.0	100%	100%	09-Nov-15 A	11-Nov-15 A
4746	A12345	Complete tie in welds from Fletchers Cr Bore to McLaughlin	0.0	100%	100%	23-Nov-15 A	28-Nov-15 A
4747	A12340	Complete tie in welds from Hurontario Bore to Fletchers Cr	0.0	100%	100%	07-Dec-15 A	09-Dec-15 A
4748	A12331	Complete tie in welds from Kennedy Rd Bore to Hurontario I	0.0	0%	100%	26-Oct-15 A	30-Oct-15 A
4749	A12330	Complete tie in welds from Kennedy Rd Bore to Hurontario I	0.0	100%	100%	25-Nov-15 A	26-Nov-15 A
4750	A12314	Complete tie in welds from Tomken to 410 HDD Entry - (x7)	0.0	100%	100%	26-Oct-15 A	31-Oct-15 A
4751	A12312	Complete tie in welds from Etobicoke Creek to Tomken Rd -	0.0	0%	100%	11-Jan-16 A	13-Jan-16 A
4752	A12311	Complete tie in welds from Dixie Road Bore to Etobicoke Cr	0.0	0%	100%	17-Dec-15 A	19-Dec-15 A
4753	A12310	Complete tie in welds from Dixie Road Bore to Etobicoke Cr	0.0	100%	100%	22-Jan-16 A	26-Jan-16 A
4754	A12303	Complete tie in welds from Etobicoke Trib 3 to Dixie Road B	0.0	0%	100%	22-Jan-16 A	26-Jan-16 A
4755	A12302	Complete tie in welds from Etobicoke Trib 3 to Dixie Road B	0.0	0%	100%	02-Dec-15 A	05-Dec-15 A
4756	A12301	Complete tie in welds from Spring Creek to Etobicoke Trib 3	0.0	0%	100%	09-Nov-15 A	10-Nov-15 A
4757	A12300	Complete tie in welds from Bramalea HDD Entry to Spring C	0.0	100%	100%	13-Nov-15 A	14-Nov-15 A
4758	A12296	Complete tie in welds from Mertolinx 1 to BRAMALEA HDD I	0.0	0%	100%	30-Nov-15 A	05-Dec-15 A
4759	A12295	Complete tie in welds from CNR Torbram to Metrolinx 1 - (x	0.0	0%	100%	20-Jan-16 A	22-Jan-16 A
4760	A12290	Complete tie in welds from Torbram to CNR Torbram - (x0 x	0.0	100%	100%	18-Jan-16 A	19-Jan-16 A
4761	A12281	Complete tie in welds from Airport Rd to Torbram HDD Exit -	0.0	0%	100%	11-Jan-16 A	12-Jan-16 A
4762	A12280	Complete tie in welds from Airport Rd to Torbram HDD Exit -	0.0	100%	100%	30-Nov-15 A	01-Dec-15 A
4763	A12274	Complete tie in welds from CNR Airport to Airport Rd- (x0 x	0.0	100%	100%	14-Jan-16 A	19-Jan-16 A
4764	A12273	Complete tie in welds from CNR Airport to Airport Rd- (x2 x	0.0	0%	100%	27-Jan-16 A	30-Jan-16 A
4765	A12272	Complete tie in welds from CNR Goreway to CNR Airport - (	0.0	100%	100%	29-Jan-16 A	01-Feb-16 A
4766	A12271	Complete tie in welds from CNR Goreway to CNR Airport - (	0.0	0%	100%	22-Jan-16 A	23-Jan-16 A
4767	A12270	Complete tie in welds from Goreway Bore to CNR Goreway	0.0	100%	100%	18-Jan-16 A	19-Jan-16 A

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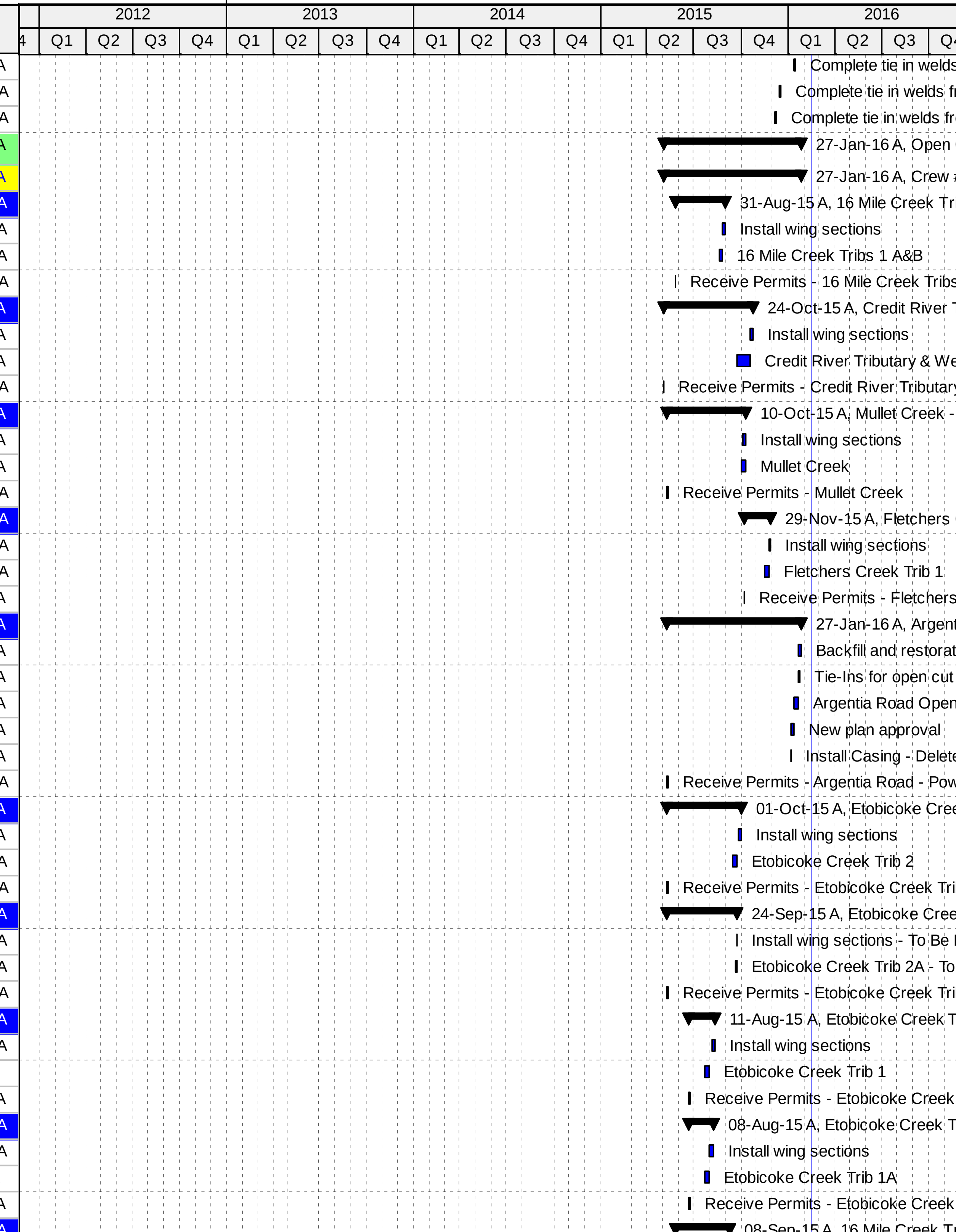
4768	A12269	Complete tie in welds from Goreway Bore to CNR Goreway	0.0	0%	100%	13-Jan-16 A	15-Jan-16 A
4769	A12260	Complete tie in welds from Mimico Creek to Goreway Bore	0.0	100%	100%	14-Dec-15 A	17-Dec-15 A
4770	A12250	Complete tie in welds from KO to Finch Entry - (x2 x 2)	0.0	100%	100%	07-Dec-15 A	10-Dec-15 A
4771	**Open Cuts**		0.0	0%	0%	04-May-15 A	27-Jan-16 A
4772	**Crew #1**		0.0	0%	0%	04-May-15 A	27-Jan-16 A
4773	**16 Mile Creek Trib 1 A/B (KP 1.62/56)**		0.0	0%	0%	27-May-15 A	31-Aug-15 A
4774	A2625	Install wing sections	0.0	100%	100%	26-Aug-15 A	31-Aug-15 A
4775	A2555	16 Mile Creek Tribs 1 A&B	0.0	100%	100%	20-Aug-15 A	25-Aug-15 A
4776	A2550	Receive Permits - 16 Mile Creek Tribs 1 A&B	0.0	100%	100%	27-May-15 A	28-May-15 A
4777	**Credit River Tributary and Wetland (KP 10.28)**		0.0	0%	0%	04-May-15 A	24-Oct-15 A
4778	A2595	Install wing sections	0.0	100%	100%	20-Oct-15 A	24-Oct-15 A
4779	A2515	Credit River Tributary & Wetland Dewater	0.0	100%	100%	24-Sep-15 A	19-Oct-15 A
4780	A2510	Receive Permits - Credit River Tributary & Wetland	0.0	100%	100%	04-May-15 A	05-May-15 A
4781	**Mullet Creek - 36m (KP 3.13)**		0.0	0%	0%	11-May-15 A	10-Oct-15 A
4782	A2605	Install wing sections	0.0	100%	100%	05-Oct-15 A	10-Oct-15 A
4783	A2525	Mullet Creek	0.0	100%	100%	02-Oct-15 A	10-Oct-15 A
4784	A2520	Receive Permits - Mullet Creek	0.0	100%	100%	11-May-15 A	12-May-15 A
4785	**Fletchers Creek Trib 1 - 20m (KP 12.67)**		0.0	0%	0%	07-Oct-15 A	29-Nov-15 A
4786	A5935	Install wing sections	0.0	100%	100%	25-Nov-15 A	29-Nov-15 A
4787	A5925	Fletchers Creek Trib 1	0.0	100%	100%	18-Nov-15 A	25-Nov-15 A
4788	A5920	Receive Permits - Fletchers Creek Trib 1	0.0	100%	100%	07-Oct-15 A	08-Oct-15 A
4789	**Argentia Road - 62m KP 3.8**		0.0	0%	0%	11-May-15 A	27-Jan-16 A
4790	A11320	Backfill and restoration	0.0	0%	100%	22-Jan-16 A	27-Jan-16 A
4791	A11160	Tie-Ins for open cut	0.0	100%	100%	22-Jan-16 A	23-Jan-16 A
4792	A11070	Argentia Road Open Cut	0.0	100%	100%	13-Jan-16 A	21-Jan-16 A
4793	A11066	New plan approval	0.0	0%	100%	08-Jan-16 A	13-Jan-16 A
4794	A11065	Install Casing - Deleted task	0.0	0%	100%	06-Jan-16 A	08-Jan-16 A
4795	A11060	Receive Permits - Argentia Road - Power pole and Water lir	0.0	100%	100%	11-May-15 A	12-May-15 A
4796	**Etobicoke Creek Trib 2 - 35m (KP 15.26)**		0.0	0%	0%	11-May-15 A	01-Oct-15 A
4797	A2865	Install wing sections	0.0	100%	100%	25-Sep-15 A	01-Oct-15 A
4798	A2805	Etobicoke Creek Trib 2	0.0	100%	100%	16-Sep-15 A	24-Sep-15 A
4799	A2800	Receive Permits - Etobicoke Creek Trib 2	0.0	100%	100%	11-May-15 A	12-May-15 A
4800	**Etobicoke Creek Trib 2A - 35m (KP 15.41)**		0.0	0%	0%	11-May-15 A	24-Sep-15 A
4801	A2855	Install wing sections - To Be Removed, Complete with Mainl	0.0	100%	100%	23-Sep-15 A	24-Sep-15 A
4802	A2795	Etobicoke Creek Trib 2A - To Be Removed, Complete with M	0.0	100%	100%	21-Sep-15 A	22-Sep-15 A
4803	A2790	Receive Permits - Etobicoke Creek Trib 2A	0.0	100%	100%	11-May-15 A	12-May-15 A
4804	**Etobicoke Creek Trib 1 - 43m (KP 14.45)**		0.0	0%	0%	23-Jun-15 A	11-Aug-15 A
4805	A2885	Install wing sections	0.0	100%	100%	05-Aug-15 A	11-Aug-15 A
4806	A2825	Etobicoke Creek Trib 1	0.0	100%	100%	23-Jul-15 A	31-Jul-15 A
4807	A2820	Receive Permits - Etobicoke Creek Trib 1	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4808	**Etobicoke Creek Trib 1A**		0.0	0%	0%	23-Jun-15 A	08-Aug-15 A
4809	A2875	Install wing sections	0.0	100%	100%	01-Aug-15 A	08-Aug-15 A
4810	A2815	Etobicoke Creek Trib 1A	0.0	100%	100%	22-Jul-15 A	30-Jul-15 A
4811	A2810	Receive Permits - Etobicoke Creek Trib 1A	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4812	**16 Mile Creek Trib 1C (KP 2.45)**		0.0	0%	0%	27-May-15 A	08-Sep-15 A



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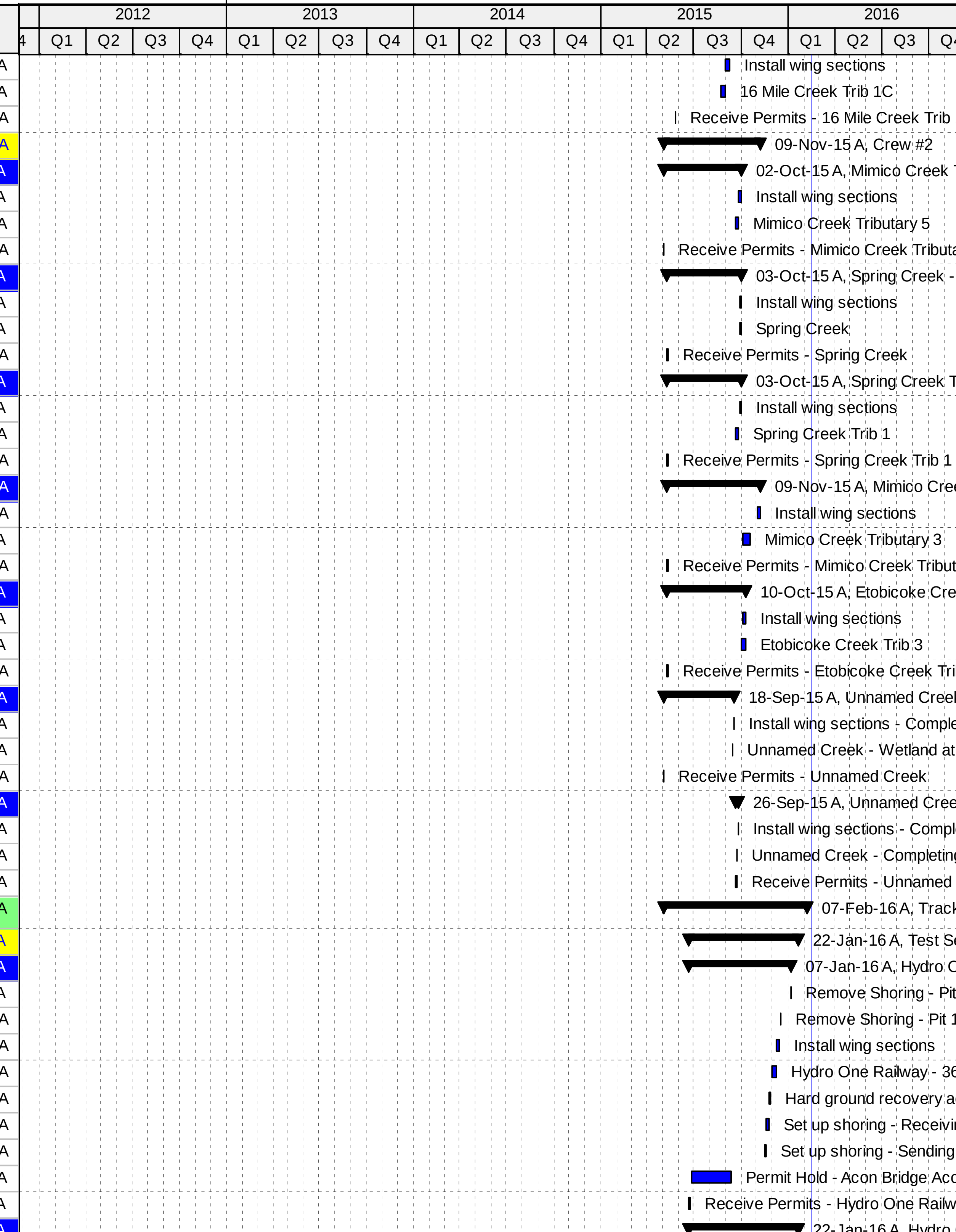
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4813	A2615	Install wing sections	0.0	100%	100%	01-Sep-15 A	08-Sep-15 A
4814	A2545	16 Mile Creek Trib 1C	0.0	100%	100%	22-Aug-15 A	31-Aug-15 A
4815	A2540	Receive Permits - 16 Mile Creek Trib 1C	0.0	100%	100%	27-May-15 A	28-May-15 A
4816		**Crew #2**	0.0	0%	0%	04-May-15 A	09-Nov-15 A
4817		**Mimico Creek Trib 5 - 43m (KP 24.33)**	0.0	0%	0%	04-May-15 A	02-Oct-15 A
4818	A2725	Install wing sections	0.0	100%	100%	26-Sep-15 A	02-Oct-15 A
4819	A2655	Mimico Creek Tributary 5	0.0	100%	100%	21-Sep-15 A	26-Sep-15 A
4820	A2650	Receive Permits - Mimico Creek Tributary 5	0.0	100%	100%	04-May-15 A	05-May-15 A
4821		**Spring Creek - 63m (KP 19.19)**	0.0	0%	0%	11-May-15 A	03-Oct-15 A
4822	A2765	Install wing sections	0.0	100%	100%	29-Sep-15 A	03-Oct-15 A
4823	A2695	Spring Creek	0.0	100%	100%	28-Sep-15 A	03-Oct-15 A
4824	A2690	Receive Permits - Spring Creek	0.0	100%	100%	11-May-15 A	12-May-15 A
4825		**Spring Creek Trib 1 - 35m (KP 18.96)**	0.0	0%	0%	11-May-15 A	03-Oct-15 A
4826	A2775	Install wing sections	0.0	100%	100%	28-Sep-15 A	03-Oct-15 A
4827	A2705	Spring Creek Trib 1	0.0	100%	100%	21-Sep-15 A	26-Sep-15 A
4828	A2700	Receive Permits - Spring Creek Trib 1	0.0	100%	100%	11-May-15 A	12-May-15 A
4829		**Mimico Creek Trib 3 - 40m (KP 21.54)**	0.0	0%	0%	11-May-15 A	09-Nov-15 A
4830	A2745	Install wing sections	0.0	100%	100%	03-Nov-15 A	09-Nov-15 A
4831	A2675	Mimico Creek Tributary 3	0.0	100%	100%	06-Oct-15 A	20-Oct-15 A
4832	A2670	Receive Permits - Mimico Creek Tributary 3	0.0	100%	100%	11-May-15 A	12-May-15 A
4833		**Etobicoke Creek Trib 3 (KP 17.98)**	0.0	0%	0%	11-May-15 A	10-Oct-15 A
4834	A2835	Install wing sections	0.0	100%	100%	05-Oct-15 A	10-Oct-15 A
4835	A2715	Etobicoke Creek Trib 3	0.0	100%	100%	02-Oct-15 A	10-Oct-15 A
4836	A2710	Receive Permits - Etobicoke Creek Trib 3	0.0	100%	100%	11-May-15 A	12-May-15 A
4837		**Unnamed Creek (Wetlands & Bramelea)**	0.0	0%	0%	04-May-15 A	18-Sep-15 A
4838	A2755	Install wing sections - Completing With Mainline	0.0	100%	100%	17-Sep-15 A	18-Sep-15 A
4839	A2685	Unnamed Creek - Wetland at Bramelea - Completing With M	0.0	100%	100%	15-Sep-15 A	16-Sep-15 A
4840	A2680	Receive Permits - Unnamed Creek	0.0	100%	100%	04-May-15 A	05-May-15 A
4841		**Unnamed Creek (KP 19.92)**	0.0	0%	0%	21-Sep-15 A	26-Sep-15 A
4842	A2845	Install wing sections - Completing With Mainline	0.0	100%	100%	25-Sep-15 A	26-Sep-15 A
4843	A2785	Unnamed Creek - Completing With Mainline	0.0	100%	100%	23-Sep-15 A	24-Sep-15 A
4844	A2780	Receive Permits - Unnamed Creek	0.0	100%	100%	21-Sep-15 A	22-Sep-15 A
4845		**Track Bores**	0.0	0%	0%	04-May-15 A	07-Feb-16 A
4846		**Test Section #3**	0.0	0%	0%	23-Jun-15 A	22-Jan-16 A
4847		**Hydro One Railway - 36" - 36m - KP 0.14**	0.0	0%	0%	23-Jun-15 A	07-Jan-16 A
4848	A11980	Remove Shoring - Pit 2	0.0	0%	100%	06-Jan-16 A	07-Jan-16 A
4849	A11970	Remove Shoring - Pit 1	0.0	100%	100%	17-Dec-15 A	19-Dec-15 A
4850	A11250	Install wing sections	0.0	100%	100%	10-Dec-15 A	16-Dec-15 A
4851	A11240	Hydro One Railway - 36m - 36" - Hammering, possible delay	0.0	100%	100%	30-Nov-15 A	09-Dec-15 A
4852	A11237	Hard ground recovery activities for 36" and 42"	0.0	0%	100%	26-Nov-15 A	29-Nov-15 A
4853	A11236	Set up shoring - Receiving - (TB)	0.0	0%	100%	20-Nov-15 A	25-Nov-15 A
4854	A11235	Set up shoring - Sending - (TB)	0.0	100%	100%	16-Nov-15 A	19-Nov-15 A
4855	A11231	Permit Hold - Acon Bridge Access	0.0	100%	100%	26-Jun-15 A	11-Sep-15 A
4856	A11230	Receive Permits - Hydro One Railway - 36"	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4857		**Hydro One Railway - 42" - 36m - KP 0.14**	0.0	0%	0%	23-Jun-15 A	22-Jan-16 A



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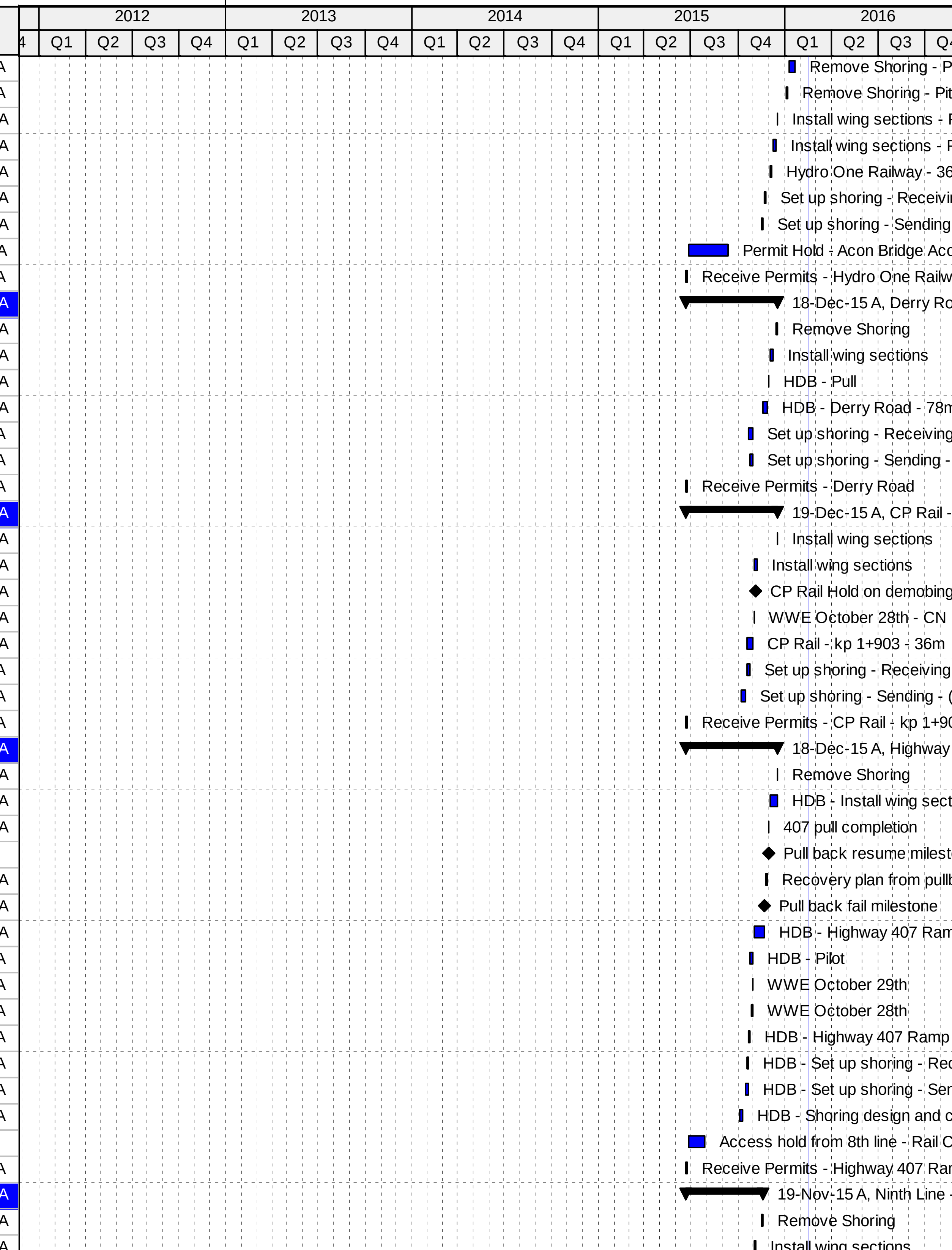
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4858	A11990	Remove Shoring - Pit 2	0.0	100%	100%	09-Jan-16 A	22-Jan-16 A
4859	A11350	Remove Shoring - Pit 1	0.0	0%	100%	05-Jan-16 A	08-Jan-16 A
4860	A11340	Install wing sections - Pit 2	0.0	0%	100%	17-Dec-15 A	19-Dec-15 A
4861	A11280	Install wing sections - Pit 1	0.0	100%	100%	10-Dec-15 A	16-Dec-15 A
4862	A11270	Hydro One Railway - 36m - 42" - Hammering, possible dela	0.0	100%	100%	03-Dec-15 A	06-Dec-15 A
4863	A11266	Set up shoring - Receiving - (TB)	0.0	0%	100%	23-Nov-15 A	26-Nov-15 A
4864	A11265	Set up shoring - Sending - (TB)	0.0	100%	100%	16-Nov-15 A	19-Nov-15 A
4865	A11261	Permit Hold - Acon Bridge Access	0.0	100%	100%	26-Jun-15 A	11-Sep-15 A
4866	A11260	Receive Permits - Hydro One Railway - 42"	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4867	**Derry Road - 78m KP 0.61**		0.0	0%	0%	23-Jun-15 A	18-Dec-15 A
4868	A11950	Remove Shoring	0.0	100%	100%	14-Dec-15 A	18-Dec-15 A
4869	A11220	Install wing sections	0.0	100%	100%	03-Dec-15 A	09-Dec-15 A
4870	A11215	HDB - Pull	0.0	0%	100%	30-Nov-15 A	01-Dec-15 A
4871	A11210	HDB - Derry Road - 78m	0.0	100%	100%	19-Nov-15 A	27-Nov-15 A
4872	A11205	Set up shoring - Receiving - (SR)	0.0	0%	100%	23-Oct-15 A	30-Oct-15 A
4873	A11204	Set up shoring - Sending - (SR)	0.0	100%	100%	26-Oct-15 A	31-Oct-15 A
4874	A11200	Receive Permits - Derry Road	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4875	**CP Rail - kp 1+903 - 36m KP 1.9**		0.0	0%	0%	23-Jun-15 A	19-Dec-15 A
4876	A11195	Install wing sections	0.0	0%	100%	17-Dec-15 A	19-Dec-15 A
4877	A11190	Install wing sections	0.0	100%	100%	03-Nov-15 A	07-Nov-15 A
4878	A11182	CP Rail Hold on demobing equipment to Heritage	0.0	0%	100%		04-Nov-15 A
4879	A11181	WWE October 28th - CN Hold start for equipment demob a	0.0	0%	100%	02-Nov-15 A	02-Nov-15 A
4880	A11180	CP Rail - kp 1+903 - 36m	0.0	100%	100%	20-Oct-15 A	01-Nov-15 A
4881	A11175	Set up shoring - Receiving - (SR)	0.0	0%	100%	20-Oct-15 A	24-Oct-15 A
4882	A11174	Set up shoring - Sending - (TB)	0.0	100%	100%	09-Oct-15 A	17-Oct-15 A
4883	A11170	Receive Permits - CP Rail - kp 1+903	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4884	**Highway 407 Ramp - 122m KP 2.18**		0.0	0%	0%	23-Jun-15 A	18-Dec-15 A
4885	A11890	Remove Shoring	0.0	100%	100%	17-Dec-15 A	18-Dec-15 A
4886	A11889	HDB - Install wing sections	0.0	0%	100%	04-Dec-15 A	17-Dec-15 A
4887	A11368	407 pull completion	0.0	0%	100%	30-Nov-15 A	30-Nov-15 A
4888	A11358	Pull back resume milestone	0.0	0%	100%	30-Nov-15 A	
4889	A11348	Recovery plan from pullback failure	0.0	0%	100%	24-Nov-15 A	29-Nov-15 A
4890	A11338	Pull back fail milestone	0.0	0%	100%		23-Nov-15 A
4891	A11328	HDB - Highway 407 Ramp Ream and Bore - 122m - 2nd att	0.0	0%	100%	02-Nov-15 A	23-Nov-15 A
4892	A11318	HDB - Pilot	0.0	0%	100%	26-Oct-15 A	31-Oct-15 A
4893	A11122	WWE October 29th	0.0	0%	100%	29-Oct-15 A	30-Oct-15 A
4894	A11121	WWE October 28th	0.0	0%	100%	28-Oct-15 A	29-Oct-15 A
4895	A11120	HDB - Highway 407 Ramp - 122m (PR) - Failed first attemp	0.0	100%	100%	23-Oct-15 A	24-Oct-15 A
4896	A11115	HDB - Set up shoring - Receiving - (SR)	0.0	0%	100%	19-Oct-15 A	22-Oct-15 A
4897	A11114	HDB - Set up shoring - Sending - (SR)	0.0	100%	100%	17-Oct-15 A	21-Oct-15 A
4898	A11112	HDB - Shoring design and city approval	0.0	100%	100%	05-Oct-15 A	09-Oct-15 A
4899	A11111	Access hold from 8th line - Rail Crossing	0.0	100%	100%	26-Jun-15 A	29-Jul-15 A
4900	A11110	Receive Permits - Highway 407 Ramp	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4901	**Ninth Line - 48m KP 2.6**		0.0	0%	0%	23-Jun-15 A	19-Nov-15 A
4902	A11870	Remove Shoring	0.0	100%	100%	16-Nov-15 A	19-Nov-15 A
4903	A11130	Install wing sections	0.0	100%	100%	02-Nov-15 A	06-Nov-15 A



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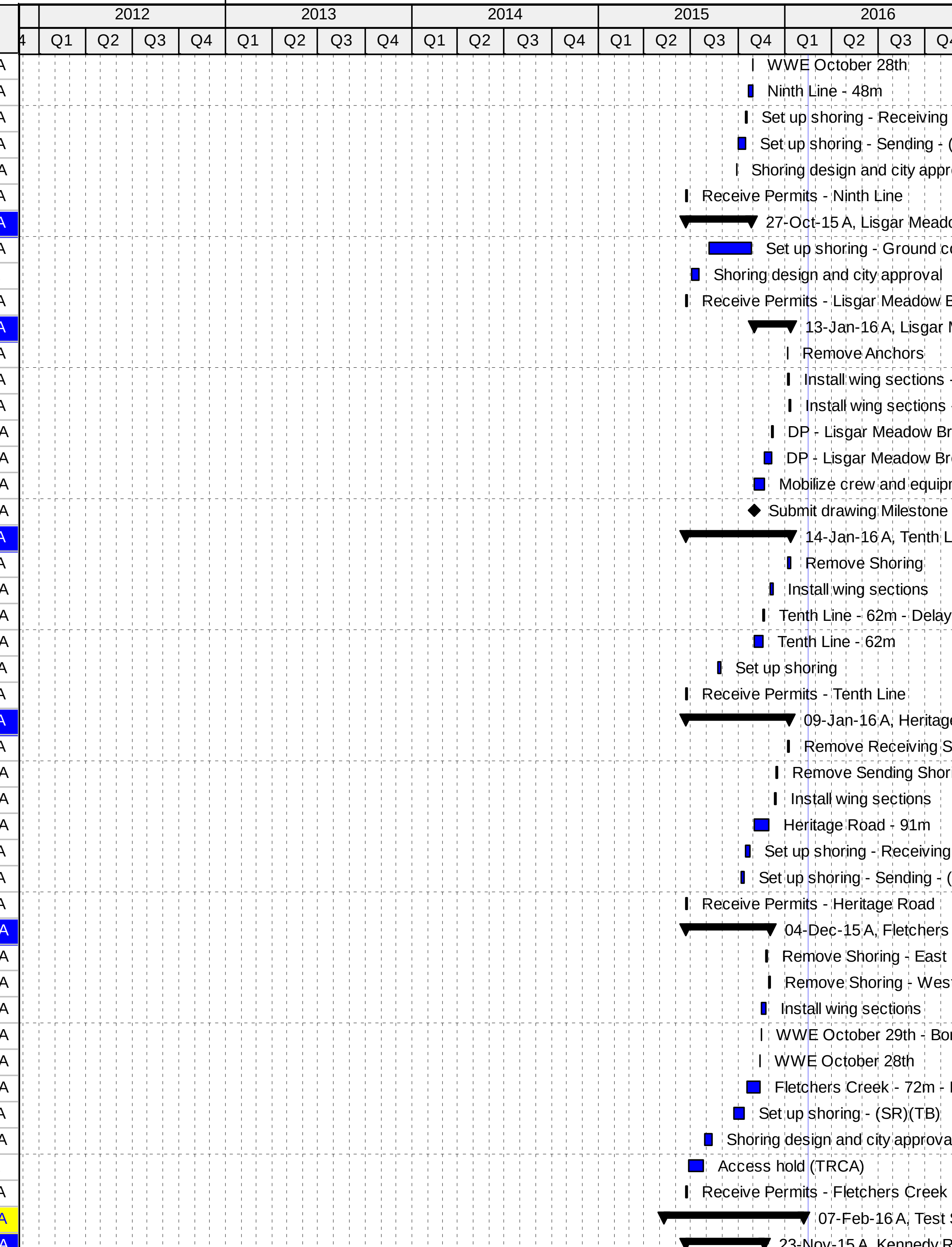
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4904	A11091	WWE October 28th	0.0	0%	100%	30-Oct-15 A	31-Oct-15 A
4905	A11090	Ninth Line - 48m	0.0	100%	100%	21-Oct-15 A	30-Oct-15 A
4906	A11085	Set up shoring - Receiving - (SR)(TB)	0.0	0%	100%	17-Oct-15 A	20-Oct-15 A
4907	A11084	Set up shoring - Sending - (SR)(TB)	0.0	100%	100%	01-Oct-15 A	17-Oct-15 A
4908	A11082	Shoring design and city approval	0.0	100%	100%	28-Sep-15 A	28-Sep-15 A
4909	A11080	Receive Permits - Ninth Line	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4910	**Lisgar Meadow Brook - 240m, 42" KP 3.09 - Track Bore**		0.0	0%	0%	23-Jun-15 A	27-Oct-15 A
4911	A10952	Set up shoring - Ground condition issues - Failed ground cc	0.0	100%	100%	05-Aug-15 A	27-Oct-15 A
4912	A10951	Shoring design and city approval	0.0	100%	100%	03-Jul-15 A	18-Jul-15 A
4913	A10950	Receive Permits - Lisgar Meadow Brook	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4914	**Lisgar Meadow Brook - 396m, 42" KP 3.09 - Direct Pipe**		0.0	0%	0%	02-Nov-15 A	13-Jan-16 A
4915	A13518	Remove Anchors	0.0	0%	100%	06-Jan-16 A	07-Jan-16 A
4916	A13507	Install wing sections - West	0.0	0%	100%	08-Jan-16 A	09-Jan-16 A
4917	A13506	Install wing sections - East	0.0	0%	100%	11-Jan-16 A	13-Jan-16 A
4918	A13505	DP - Lisgar Meadow Brook - 396m, 42" - Machine Delays	0.0	0%	100%	08-Dec-15 A	11-Dec-15 A
4919	A13504	DP - Lisgar Meadow Brook - 396m, 42"	0.0	0%	100%	23-Nov-15 A	07-Dec-15 A
4920	A13502	Mobilize crew and equipment	0.0	0%	100%	02-Nov-15 A	21-Nov-15 A
4921	A13500	Submit drawing Milestone	0.0	0%	100%		02-Nov-15 A
4922	**Tenth Line - 62m KP 4.19**		0.0	0%	0%	23-Jun-15 A	14-Jan-16 A
4923	A12120	Remove Shoring	0.0	100%	100%	06-Jan-16 A	14-Jan-16 A
4924	A12110	Install wing sections	0.0	100%	100%	04-Dec-15 A	09-Dec-15 A
4925	A12105	Tenth Line - 62m - Delay from sheetpiling issues.	0.0	0%	100%	19-Nov-15 A	22-Nov-15 A
4926	A12100	Tenth Line - 62m	0.0	100%	100%	03-Nov-15 A	19-Nov-15 A
4927	A12090	Set up shoring	0.0	100%	100%	24-Aug-15 A	30-Aug-15 A
4928	A12080	Receive Permits - Tenth Line	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4929	**Heritage Road - 91m KP 6.5**		0.0	0%	0%	23-Jun-15 A	09-Jan-16 A
4930	A11860	Remove Receiving Shoring	0.0	0%	100%	06-Jan-16 A	09-Jan-16 A
4931	A11850	Remove Sending Shoring	0.0	100%	100%	16-Dec-15 A	19-Dec-15 A
4932	A11030	Install wing sections	0.0	100%	100%	11-Dec-15 A	16-Dec-15 A
4933	A11020	Heritage Road - 91m	0.0	100%	100%	03-Nov-15 A	02-Dec-15 A
4934	A11015	Set up shoring - Receiving - (SR)	0.0	0%	100%	16-Oct-15 A	24-Oct-15 A
4935	A11014	Set up shoring - Sending - (SR)	0.0	100%	100%	07-Oct-15 A	15-Oct-15 A
4936	A11010	Receive Permits - Heritage Road	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4937	**Fletchers Creek - 72m KP 12.81**		0.0	0%	0%	23-Jun-15 A	04-Dec-15 A
4938	A11910	Remove Shoring - East	0.0	100%	100%	25-Nov-15 A	29-Nov-15 A
4939	A11310	Remove Shoring - West	0.0	0%	100%	30-Nov-15 A	04-Dec-15 A
4940	A11290	Install wing sections	0.0	100%	100%	17-Nov-15 A	25-Nov-15 A
4941	A11152	WWE October 29th - Bore	0.0	0%	100%	16-Nov-15 A	16-Nov-15 A
4942	A11151	WWE October 28th	0.0	0%	100%	14-Nov-15 A	15-Nov-15 A
4943	A11150	Fletchers Creek - 72m - Hard ground. Currently having to \	0.0	100%	100%	19-Oct-15 A	14-Nov-15 A
4944	A11144	Set up shoring - (SR)(TB)	0.0	100%	100%	25-Sep-15 A	14-Oct-15 A
4945	A11142	Shoring design and city approval	0.0	100%	100%	28-Jul-15 A	12-Aug-15 A
4946	A11141	Access hold (TRCA)	0.0	100%	100%	26-Jun-15 A	25-Jul-15 A
4947	A11140	Receive Permits - Fletchers Creek	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4948	**Test Section #2**		0.0	0%	0%	11-May-15 A	07-Feb-16 A
4949	**Kennedy Road - 60m KP 14.97**		0.0	0%	0%	23-Jun-15 A	23-Nov-15 A



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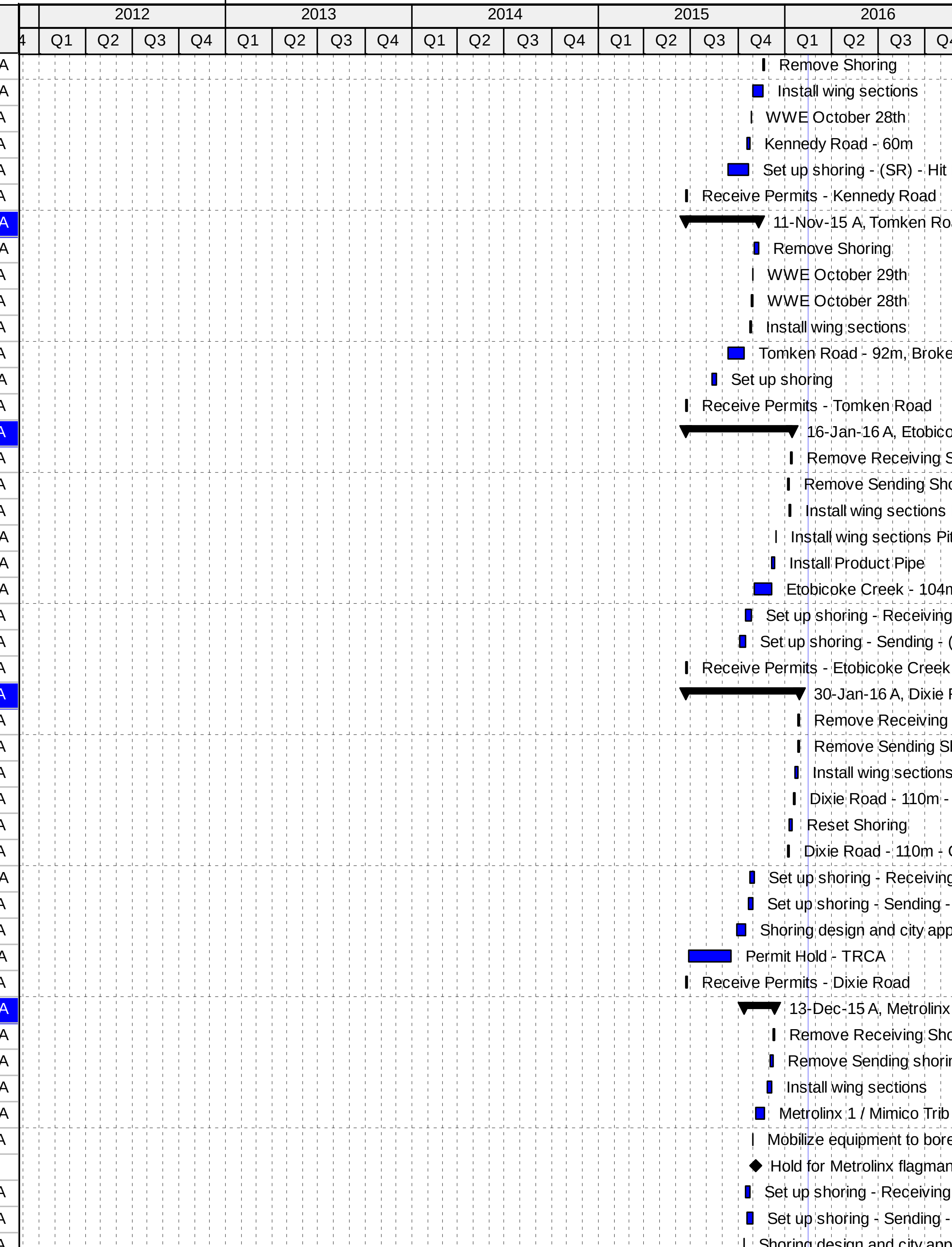
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4950	A11810	Remove Shoring	0.0	100%	100%	18-Nov-15 A	23-Nov-15 A
4951	A11580	Install wing sections	0.0	100%	100%	29-Oct-15 A	18-Nov-15 A
4952	A11571	WWE October 28th	0.0	0%	100%	27-Oct-15 A	27-Oct-15 A
4953	A11570	Kennedy Road - 60m	0.0	100%	100%	19-Oct-15 A	26-Oct-15 A
4954	A11562	Set up shoring - (SR) - Hit Pure Rock, Bringing in Rock Bre	0.0	100%	100%	12-Sep-15 A	21-Oct-15 A
4955	A11560	Receive Permits - Kennedy Road	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4956		**Tomken Road - 92m KP 16.39**	0.0	0%	0%	23-Jun-15 A	11-Nov-15 A
4957	A11790	Remove Shoring	0.0	100%	100%	02-Nov-15 A	11-Nov-15 A
4958	A11630	WWE October 29th	0.0	0%	100%	30-Oct-15 A	31-Oct-15 A
4959	A11590	WWE October 28th	0.0	0%	100%	29-Oct-15 A	30-Oct-15 A
4960	A11550	Install wing sections	0.0	100%	100%	26-Oct-15 A	29-Oct-15 A
4961	A11540	Tomken Road - 92m, Broke off head at 35m	0.0	100%	100%	11-Sep-15 A	14-Oct-15 A
4962	A11532	Set up shoring	0.0	100%	100%	12-Aug-15 A	20-Aug-15 A
4963	A11530	Receive Permits - Tomken Road	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4964		**Etobicoke Creek - 104m KP 17.2**	0.0	0%	0%	23-Jun-15 A	16-Jan-16 A
4965	A11780	Remove Receiving Shoring	0.0	0%	100%	13-Jan-16 A	16-Jan-16 A
4966	A11770	Remove Sending Shoring	0.0	100%	100%	08-Jan-16 A	09-Jan-16 A
4967	A11522	Install wing sections Pit 2	0.0	0%	100%	11-Jan-16 A	12-Jan-16 A
4968	A11512	Install wing sections Pit 1	0.0	100%	100%	14-Dec-15 A	16-Dec-15 A
4969	A11511	Install Product Pipe	0.0	0%	100%	07-Dec-15 A	12-Dec-15 A
4970	A11510	Etobicoke Creek - 104m (Expecting Rock) - Casing Only	0.0	100%	100%	03-Nov-15 A	06-Dec-15 A
4971	A11503	Set up shoring - Receiving - (SR)	0.0	0%	100%	17-Oct-15 A	28-Oct-15 A
4972	A11502	Set up shoring - Sending - (SR)- Ran into extensive rock 1r	0.0	100%	100%	05-Oct-15 A	16-Oct-15 A
4973	A11500	Receive Permits - Etobicoke Creek	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4974		**Dixie Road - 110m KP 17.87**	0.0	0%	0%	23-Jun-15 A	30-Jan-16 A
4975	A11750	Remove Receiving Shoring - CW	0.0	100%	100%	26-Jan-16 A	30-Jan-16 A
4976	A11520	Remove Sending Shoring - CW	0.0	0%	100%	26-Jan-16 A	29-Jan-16 A
4977	A11490	Install wing sections	0.0	100%	100%	22-Jan-16 A	26-Jan-16 A
4978	A11485	Dixie Road - 110m - Product Pipe	0.0	0%	100%	18-Jan-16 A	21-Jan-16 A
4979	A11481	Reset Shoring	0.0	0%	100%	11-Jan-16 A	16-Jan-16 A
4980	A11480	Dixie Road - 110m - Casing Pipe	0.0	100%	100%	06-Jan-16 A	10-Jan-16 A
4981	A11476	Set up shoring - Receiving - (SR)	0.0	0%	100%	24-Oct-15 A	02-Nov-15 A
4982	A11475	Set up shoring - Sending - (SR)	0.0	100%	100%	21-Oct-15 A	31-Oct-15 A
4983	A11474	Shoring design and city approval	0.0	100%	100%	28-Sep-15 A	17-Oct-15 A
4984	A11471	Permit Hold - TRCA	0.0	100%	100%	26-Jun-15 A	18-Sep-15 A
4985	A11470	Receive Permits - Dixie Road	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
4986		**Metrolinx 1 / Mimico Trib 1 - 71m KP 20.45**	0.0	0%	0%	13-Oct-15 A	13-Dec-15 A
4987	A12800	Remove Receiving Shoring	0.0	0%	100%	08-Dec-15 A	13-Dec-15 A
4988	A12790	Remove Sending shoring	0.0	100%	100%	04-Dec-15 A	08-Dec-15 A
4989	A12780	Install wing sections	0.0	100%	100%	27-Nov-15 A	06-Dec-15 A
4990	A12770	Metrolinx 1 / Mimico Trib 1 - 71m, 42" - Hard ground, fightin(	0.0	100%	100%	05-Nov-15 A	23-Nov-15 A
4991	A12763	Mobilize equipment to bore hole	0.0	0%	100%	29-Oct-15 A	30-Oct-15 A
4992	A12762	Hold for Metrolinx flagman	0.0	0%	100%	05-Nov-15 A	
4993	A12761	Set up shoring - Receiving - (SR)	0.0	0%	100%	17-Oct-15 A	24-Oct-15 A
4994	A12760	Set up shoring - Sending - (SR)	0.0	100%	100%	19-Oct-15 A	30-Oct-15 A
4995	A12750	Shoring design and city approval	0.0	100%	100%	14-Oct-15 A	15-Oct-15 A



Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

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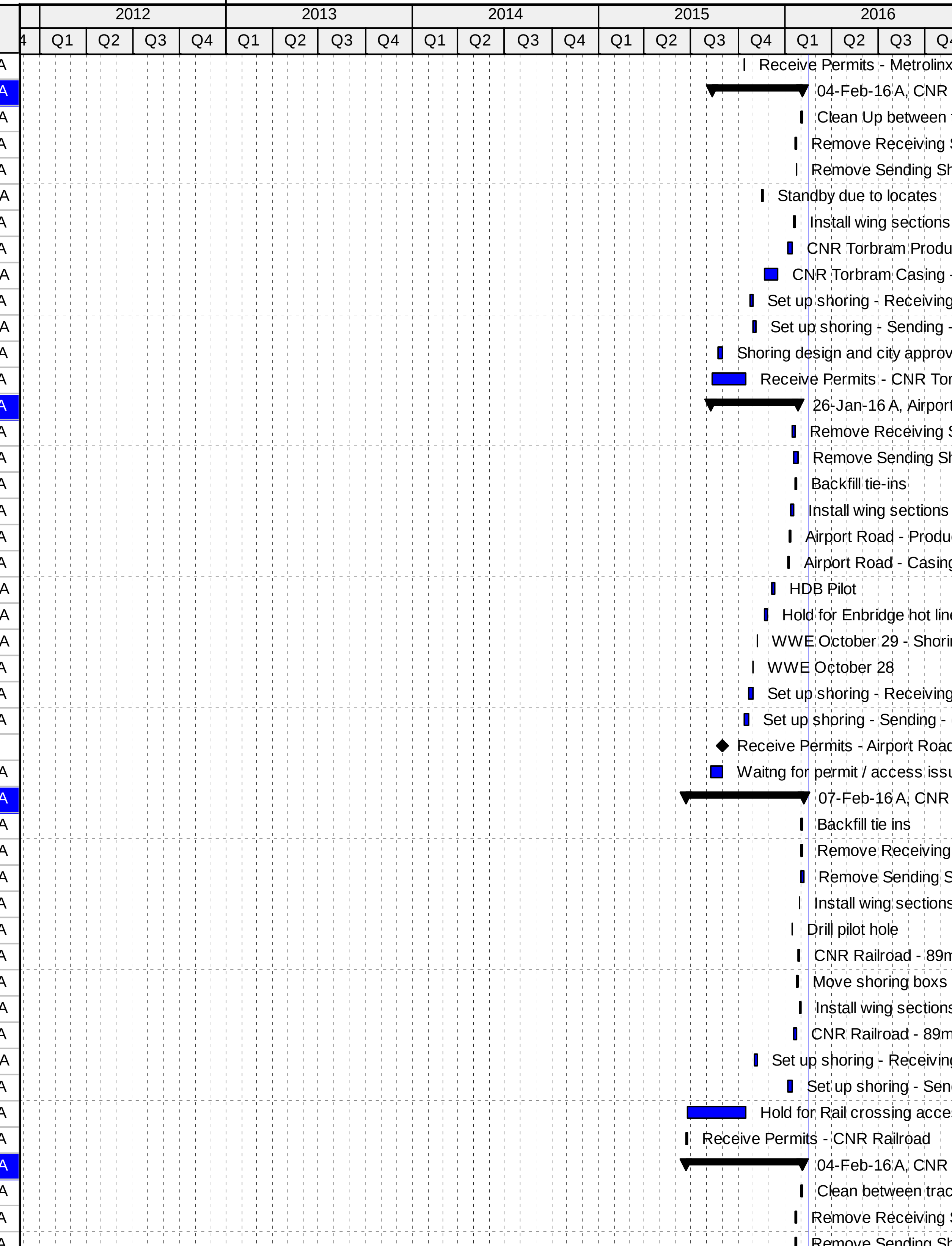
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
4996	A12740	Receive Permits - Metrolinx 1 / Mimico Trib 1 - 71m, 42"	0.0	100%	100%	13-Oct-15 A	13-Oct-15 A
4997	**CNR Torbram - 85m KP 20.64**		0.0	0%	0%	13-Aug-15 A	04-Feb-16 A
4998	A10926	Clean Up between tracks and ufill east side	0.0	0%	100%	01-Feb-16 A	04-Feb-16 A
4999	A10916	Remove Receiving Shoring	0.0	0%	100%	23-Jan-16 A	24-Jan-16 A
5000	A10915	Remove Sending Shoring	0.0	0%	100%	23-Jan-16 A	24-Jan-16 A
5001	A10913	Standby due to locates	0.0	0%	100%	17-Nov-15 A	21-Nov-15 A
5002	A10906	Install wing sections	0.0	0%	100%	18-Jan-16 A	22-Jan-16 A
5003	A10905	CNR Torbram Product Pipe - 85m	0.0	100%	100%	06-Jan-16 A	17-Jan-16 A
5004	A10904	CNR Torbram Casing - 85m	0.0	100%	100%	23-Nov-15 A	19-Dec-15 A
5005	A10903	Set up shoring - Receiving - (SR)	0.0	100%	100%	26-Oct-15 A	30-Oct-15 A
5006	A10902	Set up shoring - Sending - (SR)(TB)	0.0	100%	100%	31-Oct-15 A	05-Nov-15 A
5007	A10901	Shoring design and city approval	0.0	100%	100%	22-Aug-15 A	01-Sep-15 A
5008	A10900	Receive Permits - CNR Torbram - 85m, 42" Rail HOLD	0.0	100%	100%	13-Aug-15 A	16-Oct-15 A
5009	**Airport Road - 99m - KP 22.37**		0.0	0%	0%	08-Aug-15 A	26-Jan-16 A
5010	A11740	Remove Receiving Shoring	0.0	0%	100%	15-Jan-16 A	21-Jan-16 A
5011	A11730	Remove Sending Shoring	0.0	100%	100%	19-Jan-16 A	26-Jan-16 A
5012	A11640	Backfill tie-ins	0.0	0%	100%	20-Jan-16 A	23-Jan-16 A
5013	A11460	Install wing sections	0.0	100%	100%	14-Jan-16 A	18-Jan-16 A
5014	A11450	Airport Road - Product Pipe - 99m	0.0	100%	100%	09-Jan-16 A	14-Jan-16 A
5015	A11448	Airport Road - Casing Pipe - 99m	0.0	0%	100%	06-Jan-16 A	09-Jan-16 A
5016	A11447	HDB Pilot	0.0	0%	100%	07-Dec-15 A	12-Dec-15 A
5017	A11446	Hold for Enbridge hot line	0.0	0%	100%	23-Nov-15 A	27-Nov-15 A
5018	A11445	WWE October 29 - Shoring is 90%	0.0	0%	100%	09-Nov-15 A	09-Nov-15 A
5019	A11444	WWE October 28	0.0	0%	100%	30-Oct-15 A	31-Oct-15 A
5020	A11443	Set up shoring - Receiving - (SR)	0.0	0%	100%	22-Oct-15 A	30-Oct-15 A
5021	A11442	Set up shoring - Sending - (SR)	0.0	100%	100%	14-Oct-15 A	22-Oct-15 A
5022	A11441	Receive Permits - Airport Road	0.0	100%	100%	01-Sep-15 A	
5023	A11440	Waitng for permit / access issues	0.0	100%	100%	08-Aug-15 A	01-Sep-15 A
5024	**CNR Railroad - 89m (CNR - Airport KP 22.87)**		0.0	0%	0%	23-Jun-15 A	07-Feb-16 A
5025	A11414	Backfill tie ins	0.0	100%	100%	02-Feb-16 A	04-Feb-16 A
5026	A11406	Remove Receiving Shoring	0.0	0%	100%	01-Feb-16 A	05-Feb-16 A
5027	A11405	Remove Sending Shoring	0.0	0%	100%	02-Feb-16 A	07-Feb-16 A
5028	A11404	Install wing sections - Receiving	0.0	0%	100%	30-Jan-16 A	31-Jan-16 A
5029	A11402	Drill pilot hole	0.0	0%	100%	15-Jan-16 A	16-Jan-16 A
5030	A11397	CNR Railroad - 89m (CNR 20+434) - Pedigree - PRODUCT	0.0	0%	100%	27-Jan-16 A	30-Jan-16 A
5031	A11396	Move shoring boxs	0.0	0%	100%	25-Jan-16 A	27-Jan-16 A
5032	A11395	Install wing sections - Sending	0.0	100%	100%	31-Jan-16 A	02-Feb-16 A
5033	A11394	CNR Railroad - 89m (CNR 20+434) - Pedigree - CASING	0.0	100%	100%	18-Jan-16 A	24-Jan-16 A
5034	A11393	Set up shoring - Receiving - (SR)	0.0	100%	100%	02-Nov-15 A	07-Nov-15 A
5035	A11392	Set up shoring - Sending - (SR) - WWE#34 add one day.	0.0	100%	100%	07-Jan-16 A	15-Jan-16 A
5036	A11391	Hold for Rail crossing access	0.0	100%	100%	25-Jun-15 A	16-Oct-15 A
5037	A11390	Receive Permits - CNR Railroad	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
5038	**CNR Railroad - 71m (CNR - Goreway KP 23.42)**		0.0	0%	0%	23-Jun-15 A	04-Feb-16 A
5039	A11650	Clean between tracks	0.0	0%	100%	01-Feb-16 A	04-Feb-16 A
5040	A11430	Remove Receiving Shoring	0.0	0%	100%	22-Jan-16 A	24-Jan-16 A
5041	A11420	Remove Sending Shoring	0.0	0%	100%	22-Jan-16 A	24-Jan-16 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5042	A11419	Install wing sections	0.0	0%	100%	18-Jan-16 A	22-Jan-16 A
5043	A11418	CNR Railroad - 71m - Product Pipe	0.0	0%	100%	11-Jan-16 A	17-Jan-16 A
5044	A11417	CNR Railroad - 71m - Casing	0.0	0%	100%	16-Dec-15 A	19-Dec-15 A
5045	A11416	Set up shoring - Receiving - (TB)	0.0	0%	100%	14-Dec-15 A	15-Dec-15 A
5046	A11415	Set up shoring - Sending - (TB)	0.0	100%	100%	30-Oct-15 A	07-Nov-15 A
5047	A11413	WWE October 29	0.0	100%	100%	29-Oct-15 A	29-Oct-15 A
5048	A11412	WWE October 28	0.0	100%	100%	28-Oct-15 A	28-Oct-15 A
5049	A11411	Hold for Rail crossing access	0.0	100%	100%	25-Jun-15 A	16-Oct-15 A
5050	A11410	Receive Permits - CNR Railroad	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
5051	**Goreway Drive - 62m KP 23.78**		0.0	0%	0%	11-May-15 A	12-Jan-16 A
5052	A11377	Remove Receiving Shoring	0.0	0%	100%	07-Jan-16 A	12-Jan-16 A
5053	A11367	Remove Sending Shoring	0.0	0%	100%	04-Jan-16 A	07-Jan-16 A
5054	A11365	Install wing sections	0.0	100%	100%	09-Dec-15 A	16-Dec-15 A
5055	A11364	Goreway Drive - 62m	0.0	100%	100%	14-Nov-15 A	08-Dec-15 A
5056	A11363	Set up shoring - Receiving - (SR)	0.0	100%	100%	02-Nov-15 A	07-Nov-15 A
5057	A11362	Set up shoring - Sending - (SR)	0.0	100%	100%	30-Oct-15 A	12-Nov-15 A
5058	A11361	Holding for Finch HDD pull. String in the way	0.0	100%	100%	15-May-15 A	17-Jun-15 A
5059	A11360	Receive Permits - Goreway Drive	0.0	100%	100%	11-May-15 A	12-May-15 A
5060	**Mimico Creek - 60m - KP 23.97**		0.0	0%	0%	22-Jun-15 A	12-Dec-15 A
5061	A12179	Remove Shoring	0.0	0%	100%	04-Dec-15 A	12-Dec-15 A
5062	A12169	Install wing sections	0.0	0%	100%	27-Nov-15 A	09-Dec-15 A
5063	A12160	Mimico Creek - 60m	0.0	100%	100%	17-Nov-15 A	26-Nov-15 A
5064	A12152	WWE October 29	0.0	0%	100%	03-Nov-15 A	04-Nov-15 A
5065	A12151	WWE October 28	0.0	0%	100%	02-Nov-15 A	03-Nov-15 A
5066	A12150	Set up shoring - Receiving - (SR)	0.0	100%	100%	23-Oct-15 A	02-Nov-15 A
5067	A12142	WWE October 29	0.0	0%	100%	30-Oct-15 A	31-Oct-15 A
5068	A12141	WWE October 28	0.0	0%	100%	29-Oct-15 A	30-Oct-15 A
5069	A12140	Set up shoring - Sending - (SR)	0.0	100%	100%	23-Oct-15 A	29-Oct-15 A
5070	A12130	Receive Permits - Mimico Creek	0.0	100%	100%	22-Jun-15 A	23-Jun-15 A
5071	**NPS42 Bore Crew #3**		0.0	0%	0%	23-Jun-15 A	20-Nov-15 A
5072	**CNR Rail (Albion Station) - 8" - 51m**		0.0	0%	0%	06-Oct-15 A	24-Oct-15 A
5073	A13330	Complete Bore - 8" - Attempt #2 - 51m	0.0	0%	100%	21-Oct-15 A	24-Oct-15 A
5074	A13310	Complete Bore - 8" - Attempt #1 - 51m	0.0	0%	100%	06-Oct-15 A	17-Oct-15 A
5075	**CNR Rail (Albion Station) - 36" - 51mKP 0 Spread 4**		0.0	0%	0%	23-Jun-15 A	11-Nov-15 A
5076	A11315	WWE October 28	0.0	0%	100%	10-Nov-15 A	11-Nov-15 A
5077	A11305	Remove Shoring	0.0	100%	100%	24-Oct-15 A	10-Nov-15 A
5078	A11304	Install wing sections	0.0	100%	100%	19-Oct-15 A	24-Oct-15 A
5079	A11303	CNR Rail (Albion Station) - 36" - 51m	0.0	100%	100%	23-Sep-15 A	03-Oct-15 A
5080	A11302	Set up shoring	0.0	100%	100%	22-Jul-15 A	15-Sep-15 A
5081	A11301	Shoring design and city approval	0.0	100%	100%	07-Jul-15 A	20-Jul-15 A
5082	A11300	Receive Permits - CNR Rail (Albion Station) - 36"	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
5083	**CNR Rail (Albion Station) - 42" - 62m KP 0 Spread 4**		0.0	0%	0%	23-Jun-15 A	20-Nov-15 A
5084	A11339	Install wing sections	0.0	0%	100%	14-Nov-15 A	20-Nov-15 A
5085	A11337	CNR Rail (Albion Station) - 62m	0.0	0%	100%	06-Nov-15 A	13-Nov-15 A
5086	A11336	Resume bore milestone - was 6m from finishing casing	0.0	0%	100%	06-Nov-15 A	
5087	A11335	WWE October 28 - Stopped by CN Hold from 30th onwards	0.0	100%	100%	29-Oct-15 A	30-Oct-15 A

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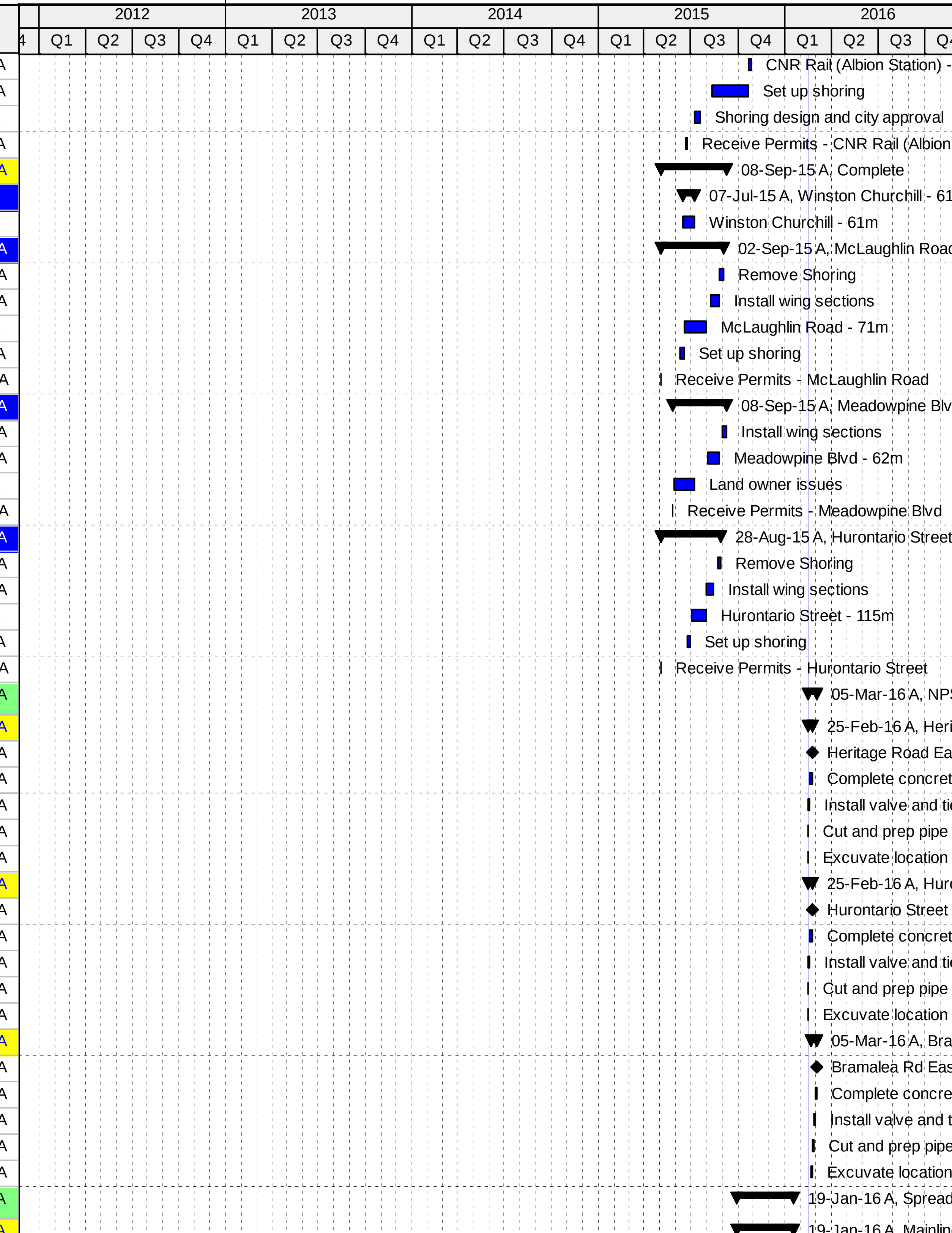
5088	A11333	CNR Rail (Albion Station) - 62m	0.0	100%	100%	22-Oct-15 A	28-Oct-15 A
5089	A11332	Set up shoring	0.0	100%	100%	13-Aug-15 A	21-Oct-15 A
5090	A11331	Shoring design and city approval	0.0	100%	100%	07-Jul-15 A	20-Jul-15 A
5091	A11330	Receive Permits - CNR Rail (Albion Station) - 42"	0.0	100%	100%	23-Jun-15 A	24-Jun-15 A
5092	**Complete**		0.0	0%	0%	04-May-15 A	08-Sep-15 A
5093	**Winston Churchill - 61m KP 5.07**		0.0	0%	0%	15-Jun-15 A	07-Jul-15 A
5094	A13250	Winston Churchill - 61m	0.0	100%	100%	15-Jun-15 A	07-Jul-15 A
5095	**McLaughlin Road - 71m KP 12.18 (SR)**		0.0	0%	0%	04-May-15 A	02-Sep-15 A
5096	A11830	Remove Shoring	0.0	100%	100%	27-Aug-15 A	02-Sep-15 A
5097	A11000	Install wing sections	0.0	100%	100%	08-Aug-15 A	26-Aug-15 A
5098	A10990	McLaughlin Road - 71m	0.0	100%	100%	19-Jun-15 A	30-Jul-15 A
5099	A10981	Set up shoring	0.0	100%	100%	10-Jun-15 A	18-Jun-15 A
5100	A10980	Receive Permits - McLaughlin Road	0.0	100%	100%	04-May-15 A	05-May-15 A
5101	**Meadowpine Blvd - 62m KP 5.28**		0.0	0%	0%	26-May-15 A	08-Sep-15 A
5102	A11100	Install wing sections	0.0	100%	100%	31-Aug-15 A	08-Sep-15 A
5103	A11050	Meadowpine Blvd - 62m	0.0	100%	100%	04-Aug-15 A	25-Aug-15 A
5104	A11044	Land owner issues	0.0	100%	100%	30-May-15 A	09-Jul-15 A
5105	A11040	Receive Permits - Meadowpine Blvd	0.0	100%	100%	26-May-15 A	27-May-15 A
5106	**Hurontario Street - 115m KP 13.56 (SR)**		0.0	0%	0%	04-May-15 A	28-Aug-15 A
5107	A11820	Remove Shoring	0.0	100%	100%	24-Aug-15 A	28-Aug-15 A
5108	A11620	Install wing sections	0.0	100%	100%	01-Aug-15 A	15-Aug-15 A
5109	A11610	Hurontario Street - 115m	0.0	100%	100%	02-Jul-15 A	30-Jul-15 A
5110	A11601	Set up shoring	0.0	100%	100%	23-Jun-15 A	30-Jun-15 A
5111	A11600	Receive Permits - Hurontario Street	0.0	100%	100%	04-May-15 A	05-May-15 A
5112	**NPS42 Sectionalizing Valves**		0.0	0%	0%	15-Feb-16 A	05-Mar-16 A
5113	**Heritage Rd East (6+570)**		0.0	0%	0%	15-Feb-16 A	25-Feb-16 A
5114	A13195	Heritage Road East 6+570	0.0	100%	100%		25-Feb-16 A
5115	A13190	Complete concrete / steel work	0.0	100%	100%	19-Feb-16 A	24-Feb-16 A
5116	A13180	Install valve and tie in	0.0	100%	100%	17-Feb-16 A	19-Feb-16 A
5117	A13170	Cut and prep pipe for tie-in	0.0	100%	100%	16-Feb-16 A	17-Feb-16 A
5118	A13160	Excuvate location	0.0	100%	100%	15-Feb-16 A	16-Feb-16 A
5119	**Hurontario St (13+403)**		0.0	0%	0%	15-Feb-16 A	25-Feb-16 A
5120	A13145	Hurontario Street 13+403	0.0	100%	100%		25-Feb-16 A
5121	A13140	Complete concrete / steel work	0.0	100%	100%	19-Feb-16 A	24-Feb-16 A
5122	A13130	Install valve and tie in	0.0	100%	100%	17-Feb-16 A	19-Feb-16 A
5123	A13120	Cut and prep pipe for tie-in	0.0	100%	100%	16-Feb-16 A	17-Feb-16 A
5124	A13110	Excuvate location	0.0	100%	100%	15-Feb-16 A	16-Feb-16 A
5125	**Bramalea Rd East (19+898)**		0.0	0%	0%	22-Feb-16 A	05-Mar-16 A
5126	A13095	Bramalea Rd East 19+898	0.0	100%	100%		05-Mar-16 A
5127	A13090	Complete concrete / steel work	0.0	100%	100%	29-Feb-16 A	05-Mar-16 A
5128	A12370	Install valve and tie in	0.0	100%	100%	27-Feb-16 A	29-Feb-16 A
5129	A12369	Cut and prep pipe for tie-in	0.0	100%	100%	25-Feb-16 A	26-Feb-16 A
5130	A12360	Excuvate location	0.0	100%	100%	22-Feb-16 A	25-Feb-16 A
5131	**Spread #4**		0.0	0%	0%	29-Sep-15 A	19-Jan-16 A
5132	**Mainline**		0.0	0%	0%	29-Sep-15 A	19-Jan-16 A



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5133	A1980	Clean Up and Restoration	0.0	100%	100%	11-Dec-15 A	19-Jan-16 A
5134	A1910	LOWER IN & Backfill - Spread 4	0.0	100%	100%	09-Dec-15 A	18-Dec-15 A
5135	A1900	TRENCH - Spread 4	0.0	100%	100%	07-Dec-15 A	18-Dec-15 A
5136	A1890	COAT - Spread 4	0.0	100%	100%	16-Oct-15 A	17-Oct-15 A
5137	A1880	AUTOMATIC WELDING - Spread 4	0.0	100%	100%	16-Oct-15 A	17-Oct-15 A
5138	A1870	END PREP - Spread 4	0.0	100%	100%	14-Oct-15 A	15-Oct-15 A
5139	A1860	BENDING and SET UP - Spread 4	0.0	100%	100%	10-Oct-15 A	13-Oct-15 A
5140	A1850	STRING PIPE - Spread 4	0.0	100%	100%	07-Oct-15 A	09-Oct-15 A
5141	A1845	CLEARING AND GRADING - Spread 4	0.0	100%	100%	01-Oct-15 A	06-Oct-15 A
5142	A1840	TOPSOIL SALVAGE and REPLACE - Spread 4	0.0	100%	100%	01-Oct-15 A	06-Oct-15 A
5143	A1830	HYDROVAC	0.0	100%	100%	29-Sep-15 A	30-Sep-15 A
5144		**Sectionalizing Valves**	0.0	0%	0%	29-Sep-15 A	19-Oct-15 A
5145		**Gravel Road**	0.0	0%	0%	29-Sep-15 A	19-Oct-15 A
5146	A13246	Gravel Road 0+400	0.0	100%	100%		19-Oct-15 A
5147	A13245	Complete concrete / steel work	0.0	100%	100%	10-Oct-15 A	19-Oct-15 A
5148	A13235	Install valve and tie in	0.0	100%	100%	06-Oct-15 A	09-Oct-15 A
5149	A13225	Cut and prep pipe for tie-in	0.0	100%	100%	03-Oct-15 A	05-Oct-15 A
5150	A13215	Excuvate location	0.0	100%	100%	29-Sep-15 A	02-Oct-15 A
5151		**Spread #3 Hydro Test Schedule**	0.0	0%	0%	05-Jan-16 A	26-Feb-16 A
5152		**Section 2 - Kennedy to Parkway**	0.0	0%	0%	15-Jan-16 A	15-Feb-16 A
5153	A1250	Tie-in Ready Milestone Section #1	0.0	0%	100%		15-Feb-16 A
5154	A1249	DRYING BY OTHERS - Section #1	0.0	0%	100%	02-Feb-16 A	15-Feb-16 A
5155	A1248	HYDROTEST BY OTHERS - Section #1	0.0	0%	100%	29-Jan-16 A	01-Feb-16 A
5156	A1244	remove heads	0.0	0%	100%	16-Jan-16 A	17-Jan-16 A
5157	A1242	complete sizing plate run	0.0	0%	100%	16-Jan-16 A	17-Jan-16 A
5158	A1241	Weld on heads for sizing plate run	0.0	0%	100%	15-Jan-16 A	16-Jan-16 A
5159		**Section 1 - Albion to Kennedy**	0.0	0%	0%	02-Feb-16 A	26-Feb-16 A
5160	A1215	Tie-in Ready Milestone Section #2	0.0	0%	100%		26-Feb-16 A
5161	A1160	DRYING BY OTHERS - Section #2	0.0	0%	100%	21-Feb-16 A	26-Feb-16 A
5162	A1150	HYDROTEST BY OTHERS - Section #2	0.0	0%	100%	10-Feb-16 A	13-Feb-16 A
5163	A1147	remove heads	0.0	0%	100%	04-Feb-16 A	04-Feb-16 A
5164	A1146	complete sizing plate run	0.0	0%	100%	03-Feb-16 A	03-Feb-16 A
5165	A1145	Weld on heads for sizing plate run	0.0	0%	100%	02-Feb-16 A	02-Feb-16 A
5166		**Section #4 - 36"**	0.0	0%	0%	05-Jan-16 A	24-Jan-16 A
5167	A1440	Tie-in ready milestone Section #4	0.0	0%	100%		24-Jan-16 A
5168	A1435	DRYING BY OTHERS - Section #4	0.0	0%	100%	22-Jan-16 A	24-Jan-16 A
5169	A1430	HYDROTEST BY OTHERS - Section #4	0.0	0%	100%	16-Jan-16 A	22-Jan-16 A
5170	A13481	remove heads	0.0	0%	100%	08-Jan-16 A	08-Jan-16 A
5171	A13471	complete sizing plate run	0.0	0%	100%	06-Jan-16 A	07-Jan-16 A
5172	A13461	Weld on heads for sizing plate run	0.0	0%	100%	05-Jan-16 A	06-Jan-16 A
5173		**Final Tie Ins**	0.0	0%	0%	03-Feb-16 A	12-Mar-16 A
5174	A13560	SP#4 Final tie-in at Gravel Rd	0.0	0%	100%	03-Feb-16 A	05-Feb-16 A
5175	A13540	SP#3 Final tie-in at Parkway	0.0	0%	100%	29-Feb-16 A	03-Mar-16 A
5176	A13535	Hand Over for Post Drying Milestone	0.0	0%	100%		03-Mar-16 A
5177	A13534	Albion Spoil Removal	0.0	0%	100%	10-Mar-16 A	12-Mar-16 A

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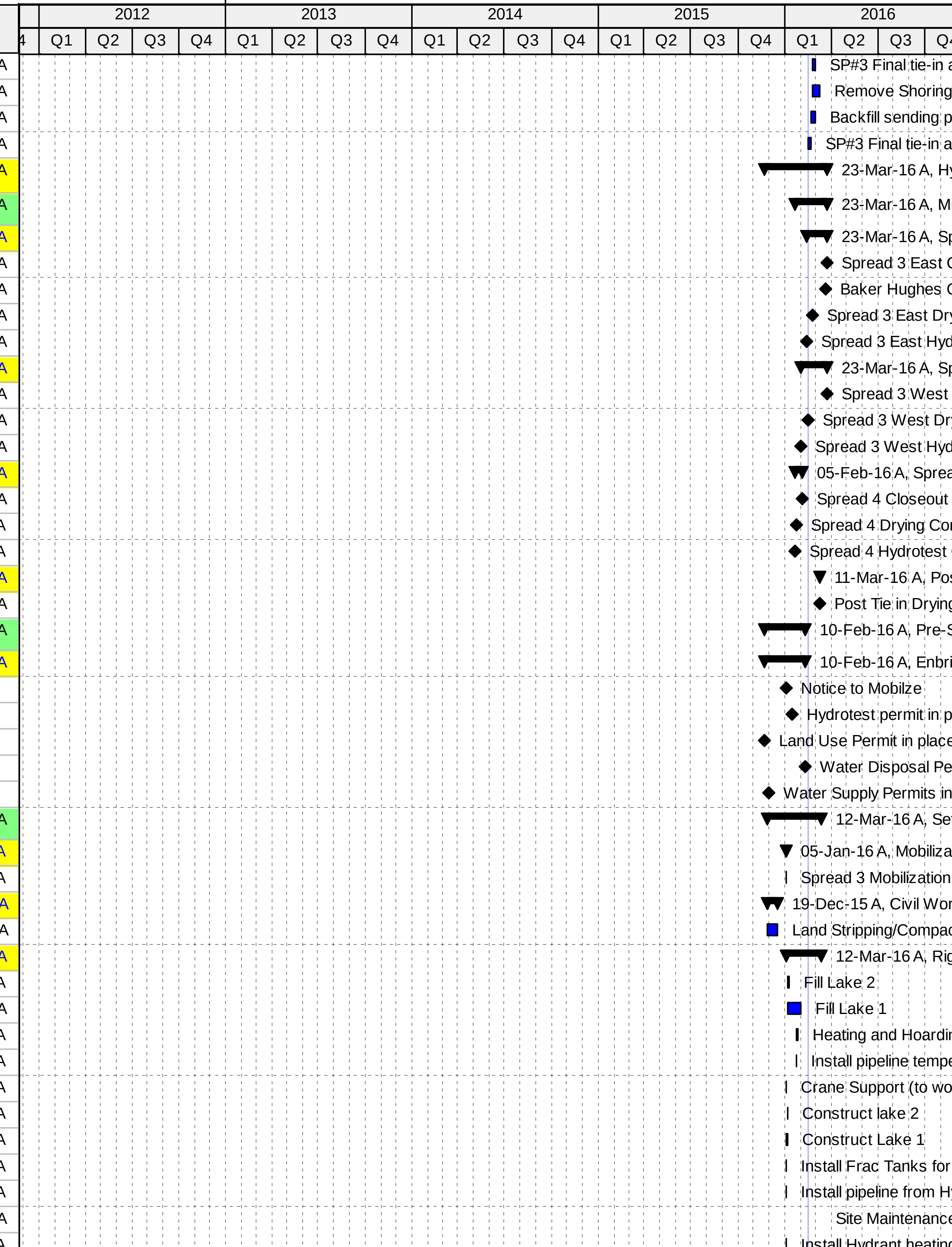
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5178	A13530	SP#3 Final tie-in at Kennedy Dr	0.0	0%	100%	26-Feb-16 A	01-Mar-16 A
5179	A13524	Remove Shoring - Sending - Test Point	0.0	0%	100%	25-Feb-16 A	09-Mar-16 A
5180	A13522	Backfill sending pit - Test Point	0.0	0%	100%	22-Feb-16 A	29-Feb-16 A
5181	A13520	SP#3 Final tie-in at Albion Station	0.0	0%	100%	16-Feb-16 A	22-Feb-16 A
5182	**Hydrotesting - Spread 3&4**		0.0	0%	0%	23-Nov-15 A	23-Mar-16 A
5183	**Milestones**		0.0	0%	0%	22-Jan-16 A	23-Mar-16 A
5184	**Spread 3 East**		0.0	0%	0%	14-Feb-16 A	23-Mar-16 A
5185	135	Spread 3 East Close out	0.0	100%	100%		23-Mar-16 A
5186	120	Baker Hughes Off Kennedy Site	0.0	100%	100%		22-Mar-16 A
5187	115	Spread 3 East Drying Completion	0.0	100%	100%		26-Feb-16 A
5188	114	Spread 3 East Hydrotest Completion	0.0	100%	100%		14-Feb-16 A
5189	**Spread 3 West**		0.0	0%	0%	01-Feb-16 A	23-Mar-16 A
5190	136	Spread 3 West Close Out	0.0	100%	100%		23-Mar-16 A
5191	117	Spread 3 West Drying Completion	0.0	100%	100%		15-Feb-16 A
5192	116	Spread 3 West Hydrotest Completion	0.0	100%	100%		01-Feb-16 A
5193	**Spread 4**		0.0	0%	0%	22-Jan-16 A	05-Feb-16 A
5194	137	Spread 4 Closeout	0.0	100%	100%		05-Feb-16 A
5195	119	Spread 4 Drying Complete	0.0	100%	100%		24-Jan-16 A
5196	118	Spread 4 Hydrotest Complete	0.0	100%	100%		22-Jan-16 A
5197	**Post Tie in Drying**		0.0	0%	0%	11-Mar-16 A	11-Mar-16 A
5198	92	Post Tie in Drying Complete	0.0	100%	100%		11-Mar-16 A
5199	**Pre-Start Deliverables**		0.0	0%	0%	23-Nov-15 A	10-Feb-16 A
5200	**Enbridge**		0.0	0%	0%	23-Nov-15 A	10-Feb-16 A
5201	8	Notice to Mobilze	0.0	100%	100%	05-Jan-16 A	
5202	5	Hydrotest permit in place	0.0	100%	100%	15-Jan-16 A	
5203	4	Land Use Permit in place	0.0	100%	100%	23-Nov-15 A	
5204	3	Water Disposal Permits in place	0.0	100%	100%	10-Feb-16 A	
5205	2	Water Supply Permits in Place	0.0	100%	100%	30-Nov-15 A	
5206	**Setup**		0.0	0%	0%	27-Nov-15 A	12-Mar-16 A
5207	**Mobilization**		0.0	0%	0%	05-Jan-16 A	05-Jan-16 A
5208	12	Spread 3 Mobilization	0.0	100%	100%	05-Jan-16 A	05-Jan-16 A
5209	**Civil Works for lake**		0.0	0%	0%	27-Nov-15 A	19-Dec-15 A
5210	10	Land Stripping/Compaction/Grading	0.0	100%	100%	27-Nov-15 A	19-Dec-15 A
5211	**Rig in Spread 3 Kennedy**		0.0	0%	0%	04-Jan-16 A	12-Mar-16 A
5212	25	Fill Lake 2	0.0	100%	100%	08-Jan-16 A	10-Jan-16 A
5213	24	Fill Lake 1	0.0	100%	100%	06-Jan-16 A	02-Feb-16 A
5214	23	Heating and Hoarding of pipeline	0.0	100%	100%	25-Jan-16 A	26-Jan-16 A
5215	22	Install pipeline temperature monitoring	0.0	100%	100%	25-Jan-16 A	25-Jan-16 A
5216	20	Crane Support (to work with 24 hour notice)	0.0	100%	100%	05-Jan-16 A	05-Jan-16 A
5217	19	Construct lake 2	0.0	100%	100%	07-Jan-16 A	08-Jan-16 A
5218	18	Construct Lake 1	0.0	100%	100%	05-Jan-16 A	06-Jan-16 A
5219	17	Install Frac Tanks for initial Tank Fill	0.0	100%	100%	05-Jan-16 A	05-Jan-16 A
5220	16	Install pipeline from Hydrant to Tanks	0.0	100%	100%	05-Jan-16 A	05-Jan-16 A
5221	15	Site Maintenance (Snow Removal)	0.0	100%	100%	04-Jan-16 A	12-Mar-16 A
5222	14	Install Hydrant heating (if required)	0.0	100%	100%	04-Jan-16 A	04-Jan-16 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5223	**Rig in Spread 3 Parkway**		0.0	0%	0%	21-Jan-16 A	26-Jan-16 A
5224	7	Spread 3 West Handed Over (Tie to Michels)	0.0	100%	100%	25-Jan-16 A	
5225	54	Weld on Cap	0.0	100%	100%	23-Jan-16 A	23-Jan-16 A
5226	31	Spot and Rig in BH Equipment	0.0	100%	100%	25-Jan-16 A	26-Jan-16 A
5227	30	Excavate temperature monitoring pits	0.0	100%	100%	21-Jan-16 A	23-Jan-16 A
5228	**Rig in Spread 3 Albion**		0.0	0%	0%	04-Feb-16 A	05-Feb-16 A
5229	6	Spread 3 East Handed Over (Tie to Michels)	0.0	100%	100%	04-Feb-16 A	
5230	37	Weld on Cap	0.0	100%	100%	04-Feb-16 A	04-Feb-16 A
5231	28	Spot and Rig in BH Equipment	0.0	100%	100%	04-Feb-16 A	05-Feb-16 A
5232	27	Excavate temperature monitoring pits	0.0	100%	100%	04-Feb-16 A	05-Feb-16 A
5233	**Testing**		0.0	0%	0%	08-Jan-16 A	26-Feb-16 A
5234	**Spread 4**		0.0	0%	0%	08-Jan-16 A	24-Jan-16 A
5235	**Deliverables**		0.0	0%	0%	08-Jan-16 A	08-Jan-16 A
5236	A1000	Spread 4 Handed Over (Tie to Michels)	0.0	100%	100%	08-Jan-16 A	
5237	**Flood**		0.0	0%	0%	19-Jan-16 A	19-Jan-16 A
5238	94	Flood Spread 4	0.0	100%	100%	19-Jan-16 A	19-Jan-16 A
5239	**Hydrostatic Test**		0.0	0%	0%	16-Jan-16 A	22-Jan-16 A
5240	99	Stabilization	0.0	100%	100%	21-Jan-16 A	21-Jan-16 A
5241	98	Pressurization (With Holds)	0.0	100%	100%	21-Jan-16 A	21-Jan-16 A
5242	97	25% Stabilization	0.0	100%	100%	20-Jan-16 A	21-Jan-16 A
5243	96	Pressurize to 25%	0.0	100%	100%	20-Jan-16 A	20-Jan-16 A
5244	95	Mobilize Test Pump to Parkway	0.0	100%	100%	16-Jan-16 A	16-Jan-16 A
5245	105	Dewater from Parkway to Gravel Road	0.0	100%	100%	22-Jan-16 A	22-Jan-16 A
5246	103	Depressurization	0.0	100%	100%	22-Jan-16 A	22-Jan-16 A
5247	102	Leak Test hold	0.0	100%	100%	22-Jan-16 A	22-Jan-16 A
5248	101	Bleed to Leak Test Pressure	0.0	100%	100%	21-Jan-16 A	22-Jan-16 A
5249	100	Strength test	0.0	100%	100%	21-Jan-16 A	21-Jan-16 A
5250	**Dry**		0.0	0%	0%	22-Jan-16 A	24-Jan-16 A
5251	112	Air Drying (with Pigs) to -42oC	0.0	100%	100%	23-Jan-16 A	24-Jan-16 A
5252	111	Connect Compressors	0.0	100%	100%	23-Jan-16 A	23-Jan-16 A
5253	110	Install Launcher at Gravel Road	0.0	100%	100%	23-Jan-16 A	23-Jan-16 A
5254	109	Install Receiver at Parkway	0.0	100%	100%	23-Jan-16 A	23-Jan-16 A
5255	108	Remove Test Cap at Parkway	0.0	100%	100%	22-Jan-16 A	23-Jan-16 A
5256	107	Remove Test Head from Gravel Road	0.0	100%	100%	22-Jan-16 A	23-Jan-16 A
5257	**Spread 3 West**		0.0	0%	0%	23-Jan-16 A	15-Feb-16 A
5258	**Flood**		0.0	0%	0%	23-Jan-16 A	29-Jan-16 A
5259	55	Flood Line to Parkway	0.0	100%	100%	28-Jan-16 A	29-Jan-16 A
5260	53	Weld on Test head	0.0	100%	100%	25-Jan-16 A	26-Jan-16 A
5261	52A	Cut and Bevel Test Head Off Launcher	0.0	0%	100%	25-Jan-16 A	25-Jan-16 A
5262	52	Load pigs into test head	0.0	100%	100%	24-Jan-16 A	24-Jan-16 A
5263	51	Weld Test Head onto Launcher	0.0	100%	100%	23-Jan-16 A	23-Jan-16 A
5264	**Hydrostatic Test**		0.0	0%	0%	29-Jan-16 A	01-Feb-16 A
5265	66	Dewater from Parkway to Kennedy	0.0	100%	100%	31-Jan-16 A	01-Feb-16 A
5266	64	Depressurization	0.0	100%	100%	31-Jan-16 A	31-Jan-16 A
5267	63	Leak Test hold	0.0	100%	100%	31-Jan-16 A	31-Jan-16 A

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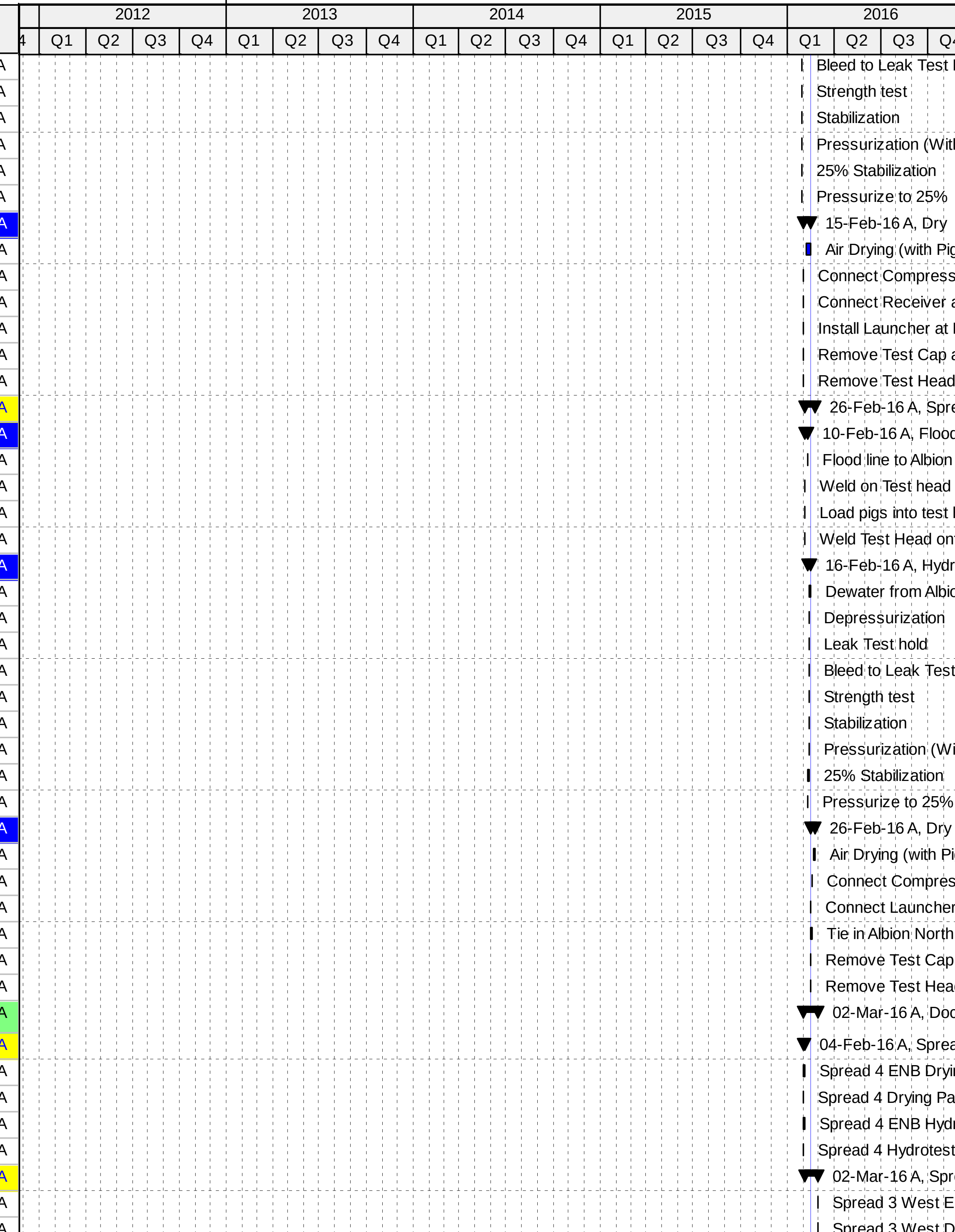
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5268	62	Bleed to Leak Test Pressure	0.0	100%	100%	30-Jan-16 A	31-Jan-16 A
5269	61	Strength test	0.0	100%	100%	30-Jan-16 A	30-Jan-16 A
5270	60	Stabilization	0.0	100%	100%	30-Jan-16 A	30-Jan-16 A
5271	59	Pressurization (With Holds)	0.0	100%	100%	30-Jan-16 A	30-Jan-16 A
5272	58	25% Stabilization	0.0	100%	100%	29-Jan-16 A	30-Jan-16 A
5273	57	Pressurize to 25%	0.0	100%	100%	29-Jan-16 A	29-Jan-16 A
5274	**Dry**		0.0	0%	0%	02-Feb-16 A	15-Feb-16 A
5275	80	Air Drying (with Pigs) to -42oC	0.0	100%	100%	08-Feb-16 A	15-Feb-16 A
5276	79	Connect Compressors	0.0	100%	100%	02-Feb-16 A	02-Feb-16 A
5277	78	Connect Receiver at Parkway	0.0	100%	100%	02-Feb-16 A	02-Feb-16 A
5278	77	Install Launcher at Kennedy	0.0	100%	100%	02-Feb-16 A	02-Feb-16 A
5279	76	Remove Test Cap at Parkway	0.0	100%	100%	02-Feb-16 A	02-Feb-16 A
5280	75	Remove Test Head at Kennedy	0.0	100%	100%	02-Feb-16 A	02-Feb-16 A
5281	**Spread 3 East**		0.0	0%	0%	05-Feb-16 A	26-Feb-16 A
5282	**Flood**		0.0	0%	0%	05-Feb-16 A	10-Feb-16 A
5283	38	Flood line to Albion	0.0	100%	100%	09-Feb-16 A	10-Feb-16 A
5284	36	Weld on Test head	0.0	100%	100%	06-Feb-16 A	06-Feb-16 A
5285	34	Load pigs into test head	0.0	100%	100%	05-Feb-16 A	06-Feb-16 A
5286	33	Weld Test Head onto Launcher	0.0	100%	100%	05-Feb-16 A	05-Feb-16 A
5287	**Hydrostatic Test**		0.0	0%	0%	10-Feb-16 A	16-Feb-16 A
5288	49	Dewater from Albion to Kennedy	0.0	100%	100%	14-Feb-16 A	16-Feb-16 A
5289	47	Depressurization	0.0	100%	100%	13-Feb-16 A	13-Feb-16 A
5290	46	Leak Test hold	0.0	100%	100%	12-Feb-16 A	13-Feb-16 A
5291	45	Bleed to Leak Test Pressure	0.0	100%	100%	12-Feb-16 A	12-Feb-16 A
5292	44	Strength test	0.0	100%	100%	12-Feb-16 A	12-Feb-16 A
5293	43	Stabilization	0.0	100%	100%	12-Feb-16 A	12-Feb-16 A
5294	42	Pressurization (With Holds)	0.0	100%	100%	12-Feb-16 A	12-Feb-16 A
5295	41	25% Stabilization	0.0	100%	100%	10-Feb-16 A	12-Feb-16 A
5296	40	Pressurize to 25%	0.0	100%	100%	10-Feb-16 A	10-Feb-16 A
5297	**Dry**		0.0	0%	0%	16-Feb-16 A	26-Feb-16 A
5298	73	Air Drying (with Pigs) to -42oC	0.0	100%	100%	22-Feb-16 A	26-Feb-16 A
5299	72	Connect Compressors	0.0	100%	100%	19-Feb-16 A	19-Feb-16 A
5300	71	Connect Launcher at Kennedy	0.0	100%	100%	16-Feb-16 A	17-Feb-16 A
5301	70	Tie in Albion North to South and Install EGD Receiver	0.0	100%	100%	16-Feb-16 A	19-Feb-16 A
5302	69	Remove Test Cap at Albion	0.0	100%	100%	16-Feb-16 A	16-Feb-16 A
5303	68	Remove Test Head from Kennedy	0.0	100%	100%	16-Feb-16 A	16-Feb-16 A
5304	**Documentation**		0.0	0%	0%	01-Feb-16 A	02-Mar-16 A
5305	**Spread 4**		0.0	0%	0%	01-Feb-16 A	04-Feb-16 A
5306	133	Spread 4 ENB Drying Review	0.0	100%	100%	03-Feb-16 A	04-Feb-16 A
5307	132	Spread 4 Drying Package	0.0	100%	100%	01-Feb-16 A	02-Feb-16 A
5308	131	Spread 4 ENB Hydrotest pack Review	0.0	100%	100%	03-Feb-16 A	04-Feb-16 A
5309	130	Spread 4 Hydrotest package	0.0	100%	100%	01-Feb-16 A	02-Feb-16 A
5310	**Spread 3 West**		0.0	0%	0%	04-Feb-16 A	02-Mar-16 A
5311	129	Spread 3 West ENB Drying Review	0.0	100%	100%	29-Feb-16 A	02-Mar-16 A
5312	128	Spread 3 West Drying Package	0.0	100%	100%	29-Feb-16 A	29-Feb-16 A



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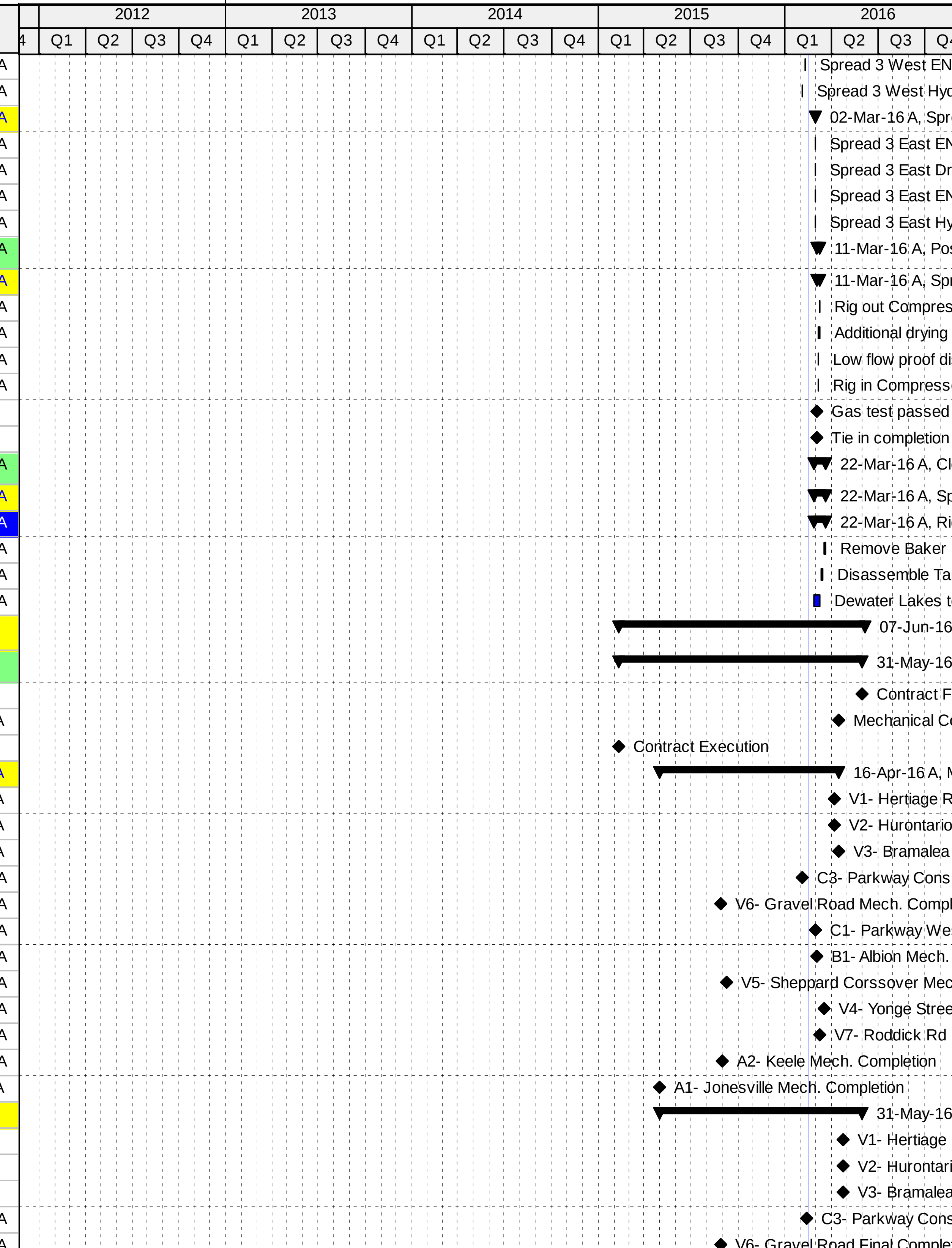
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5313	127	Spread 3 West ENB Hydrotest pack Review	0.0	100%	100%	10-Feb-16 A	11-Feb-16 A
5314	126	Spread 3 West Hydrotest Package	0.0	100%	100%	04-Feb-16 A	04-Feb-16 A
5315	**Spread 3 East**		0.0	0%	0%	29-Feb-16 A	02-Mar-16 A
5316	125	Spread 3 East ENB Drying Review	0.0	100%	100%	29-Feb-16 A	02-Mar-16 A
5317	124	Spread 3 East Drying Package	0.0	100%	100%	29-Feb-16 A	29-Feb-16 A
5318	123	Spread 3 East ENB Hydrotest pack Review	0.0	100%	100%	29-Feb-16 A	02-Mar-16 A
5319	122	Spread 3 East Hydrotest package	0.0	100%	100%	29-Feb-16 A	29-Feb-16 A
5320	**Post Tie in Drying**		0.0	0%	0%	04-Mar-16 A	11-Mar-16 A
5321	**Spread 3 & 4**		0.0	0%	0%	04-Mar-16 A	11-Mar-16 A
5322	91	Rig out Compressors	0.0	100%	100%	10-Mar-16 A	11-Mar-16 A
5323	90	Additional drying as required	0.0	100%	100%	08-Mar-16 A	10-Mar-16 A
5324	89	Low flow proof displacement	0.0	100%	100%	07-Mar-16 A	08-Mar-16 A
5325	88	Rig in Compressors	0.0	100%	100%	07-Mar-16 A	07-Mar-16 A
5326	87	Gas test passed	0.0	100%	100%	04-Mar-16 A	
5327	86	Tie in completion (Tie to Michels)	0.0	100%	100%	04-Mar-16 A	
5328	**Cleanup and Restoration**		0.0	0%	0%	29-Feb-16 A	22-Mar-16 A
5329	**Spread 3 & 4**		0.0	0%	0%	29-Feb-16 A	22-Mar-16 A
5330	**Rig out**		0.0	0%	0%	29-Feb-16 A	22-Mar-16 A
5331	84	Remove Baker Hughes equipment from site	0.0	100%	100%	18-Mar-16 A	22-Mar-16 A
5332	83	Disassemble Tanks	0.0	100%	100%	14-Mar-16 A	17-Mar-16 A
5333	82	Dewater Lakes to ground	0.0	100%	100%	29-Feb-16 A	11-Mar-16 A
5334	**Aecon - Facilities**		44.0	0%	0%	10-Feb-15 A	07-Jun-16
5335	**Project Milestones**		32.0	0%	0%	10-Feb-15 A	31-May-16
5336	CM-200	Contract Final Completion	0.0	100%	0%		31-May-16
5337	CM-150	Mechanical Completion	0.0	100%	100%		16-Apr-16 A
5338	CM-100	Contract Execution	0.0	100%	100%	10-Feb-15 A	
5339	**Mech. Completion**		0.0	0%	0%	30-Apr-15 A	16-Apr-16 A
5340	MC-210	V1- Hertiage Rd Mech. Completion	0.0	100%	100%		08-Apr-16 A
5341	MC-200	V2- Hurontario Mech. Completion	0.0	100%	100%		09-Apr-16 A
5342	MC-190	V3- Bramalea Mech. Completion	0.0	100%	100%		16-Apr-16 A
5343	MC-180	C3- Parkway Cons Mech. Completion	0.0	100%	100%		05-Feb-16 A
5344	MC-170	V6- Gravel Road Mech. Completion	0.0	100%	100%		29-Aug-15 A
5345	MC-160	C1- Parkway West Mech. Completion	0.0	100%	100%		29-Feb-16 A
5346	MC-150	B1- Albion Mech. Completion	0.0	100%	100%		05-Mar-16 A
5347	MC-140	V5- Sheppard Corssover Mech. Completion	0.0	100%	100%		10-Sep-15 A
5348	MC-130	V4- Yonge Street Mech. Completion	0.0	100%	100%		19-Mar-16 A
5349	MC-120	V7- Roddick Rd Mech. Completion	0.0	100%	100%		09-Mar-16 A
5350	MC-110	A2- Keele Mech. Completion	0.0	100%	100%		31-Aug-15 A
5351	MC-100	A1- Jonesville Mech. Completion	0.0	100%	100%		30-Apr-15 A
5352	**Final Completion**		32.0	0%	0%	30-Apr-15 A	31-May-16
5353	PM-210	V1- Hertiage Rd Final Completion	0.0	100%	0%		25-Apr-16
5354	PM-200	V2- Hurontario Final Completion	0.0	100%	0%		25-Apr-16
5355	PM-190	V3- Bramalea Final Completion	0.0	100%	0%		23-Apr-16
5356	PM-180	C3- Parkway Cons Final Completion	0.0	100%	100%		12-Feb-16 A
5357	PM-170	V6- Gravel Road Final Completion	0.0	100%	100%		29-Aug-15 A



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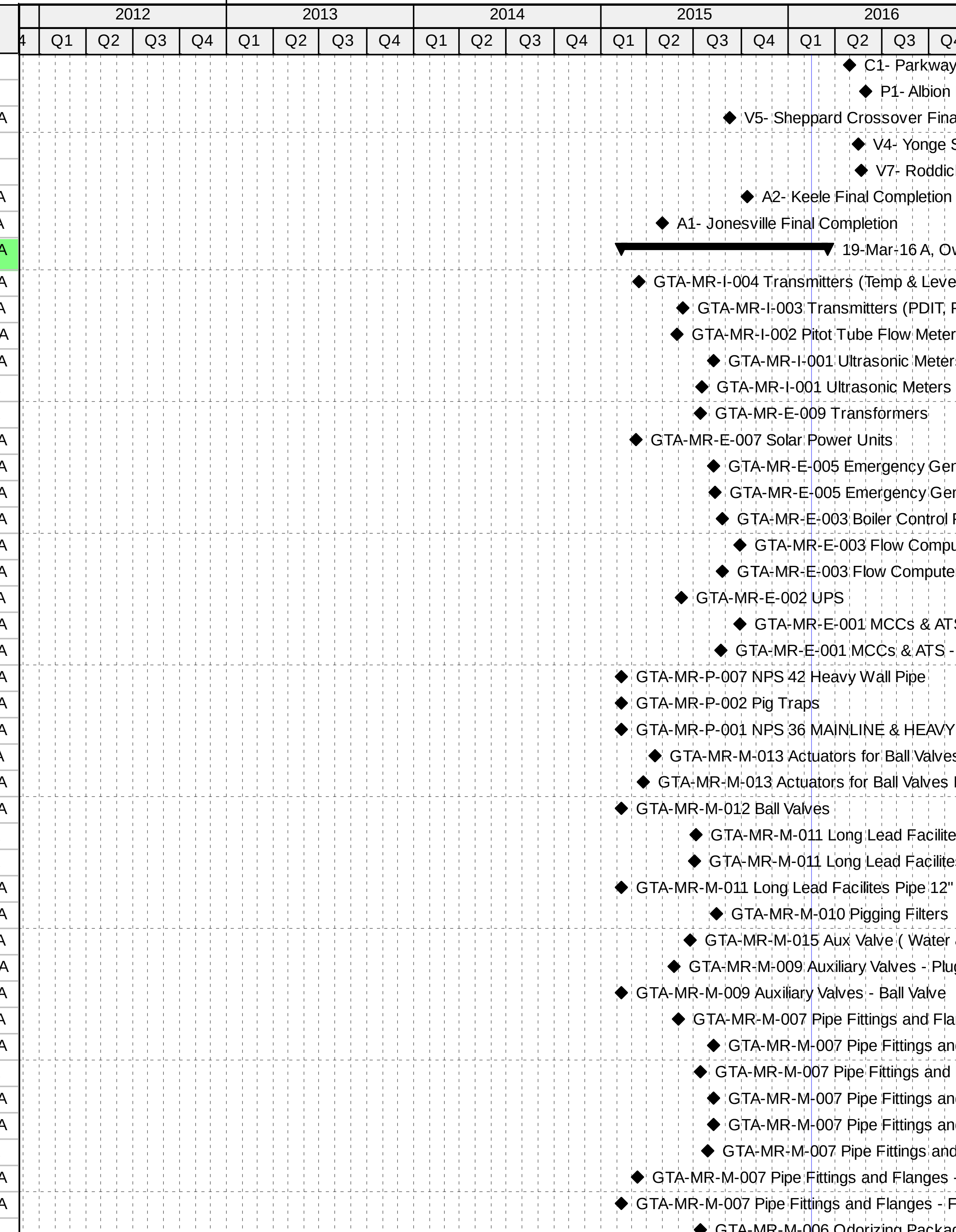
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5358	PM-160	C1- Parkway West Final Completion	0.0	100%	0%		29-Apr-16*
5359	PM-150	P1- Albion Final Completion	0.0	100%	0%		31-May-16
5360	PM-140	V5- Sheppard Crossover Final Completion	0.0	100%	100%		10-Sep-15 A
5361	PM-130	V4- Yonge Street Final Completion	0.0	100%	0%		18-May-16
5362	PM-120	V7- Roddick Rd Final Completion	0.0	100%	0%		23-May-16
5363	PM-110	A2- Keele Final Completion	0.0	100%	100%		14-Oct-15 A
5364	PM-100	A1- Jonesville Final Completion	0.0	100%	100%		30-Apr-15 A
5365		**Owner Material Milestones**	0.0	0%	0%	10-Feb-15 A	19-Mar-16 A
5366	OM-510	GTA-MR-I-004 Transmitters (Temp & Level)	0.0	100%	100%		16-Mar-15 A
5367	OM-500	GTA-MR-I-003 Transmitters (PDIT, PIT, TIT, TE, TW)	0.0	100%	100%		10-Jun-15 A
5368	OM-490	GTA-MR-I-002 Pitot Tube Flow Meters	0.0	100%	100%		29-May-15 A
5369	OM-485	GTA-MR-I-001 Ultrasonic Meters w/ Flow Conditioners 3-2(	0.0	100%	100%		10-Aug-15 A
5370	OM-480	GTA-MR-I-001 Ultrasonic Meters w/ Flow Conditioners - 2-:	0.0	100%	100%		16-Jul-15 A
5371	OM-470	GTA-MR-E-009 Transformers	0.0	100%	100%		14-Jul-15 A
5372	OM-460	GTA-MR-E-007 Solar Power Units	0.0	100%	100%		09-Mar-15 A
5373	OM-455	GTA-MR-E-005 Emergency Generators - 200	0.0	100%	100%		10-Aug-15 A
5374	OM-450	GTA-MR-E-005 Emergency Generators -80	0.0	100%	100%		11-Aug-15 A
5375	OM-445	GTA-MR-E-003 Boiler Control Panels	0.0	100%	100%		27-Aug-15 A
5376	OM-441	GTA-MR-E-003 Flow Computer, RTU & Contactor Panels -	0.0	0%	100%		28-Sep-15 A
5377	OM-440	GTA-MR-E-003 Flow Computer, RTU & Contactor Panels -	0.0	100%	100%		27-Aug-15 A
5378	OM-430	GTA-MR-E-002 UPS	0.0	100%	100%		08-Jun-15 A
5379	OM-425	GTA-MR-E-001 MCCs & ATS - MCC-1 Albion	0.0	100%	100%		28-Sep-15 A
5380	OM-420	GTA-MR-E-001 MCCs & ATS - MCC-1 ParkWay West	0.0	100%	100%		24-Aug-15 A
5381	OM-410	GTA-MR-P-007 NPS 42 Heavy Wall Pipe	0.0	100%	100%		10-Feb-15 A
5382	OM-400	GTA-MR-P-002 Pig Traps	0.0	100%	100%		10-Feb-15 A
5383	OM-390	GTA-MR-P-001 NPS 36 MAINLINE & HEAVY WALL PIPE &	0.0	100%	100%		10-Feb-15 A
5384	OM-380	GTA-MR-M-013 Actuators for Ball Valves Gas	0.0	100%	100%		17-Apr-15 A
5385	OM-370	GTA-MR-M-013 Actuators for Ball Valves Electric	0.0	100%	100%		25-Mar-15 A
5386	OM-360	GTA-MR-M-012 Ball Valves	0.0	100%	100%		10-Feb-15 A
5387	OM-350	GTA-MR-M-011 Long Lead Facilites Pipe 20" - 48" - FBE C	0.0	100%	100%		06-Jul-15 A
5388	OM-340	GTA-MR-M-011 Long Lead Facilites Pipe 20" - 48" Bare	0.0	100%	100%		03-Jul-15 A
5389	OM-330	GTA-MR-M-011 Long Lead Facilites Pipe 12" - 16" - 384mtr	0.0	100%	100%		10-Feb-15 A
5390	OM-320	GTA-MR-M-010 Pigging Filters	0.0	100%	100%		14-Aug-15 A
5391	OM-310	GTA-MR-M-015 Aux Valve (Water & Glycol System)	0.0	100%	100%		23-Jun-15 A
5392	OM-300	GTA-MR-M-009 Auxiliary Valves - Plug Valve	0.0	100%	100%		23-May-15 A
5393	OM-290	GTA-MR-M-009 Auxiliary Valves - Ball Valve	0.0	100%	100%		10-Feb-15 A
5394	OM-280	GTA-MR-M-007 Pipe Fittings and Flanges - Large Fittings	0.0	100%	100%		03-Jun-15 A
5395	OM-274	GTA-MR-M-007 Pipe Fittings and Flanges - Parkway West	0.0	0%	100%		10-Aug-15 A
5396	OM-273	GTA-MR-M-007 Pipe Fittings and Flanges - Sheppard Ave '	0.0	0%	100%		14-Jul-15 A
5397	OM-272	GTA-MR-M-007 Pipe Fittings and Flanges - Albion North MI	0.0	0%	100%		10-Aug-15 A
5398	OM-271	GTA-MR-M-007 Pipe Fittings and Flanges - Gravel RD Trai	0.0	0%	100%		10-Aug-15 A
5399	OM-270	GTA-MR-M-007 Pipe Fittings and Flanges - Keele Transitio	0.0	100%	100%		30-Jul-15 A
5400	OM-260	GTA-MR-M-007 Pipe Fittings and Flanges - Flanges 12" / <	0.0	100%	100%		14-Mar-15 A
5401	OM-250	GTA-MR-M-007 Pipe Fittings and Flanges - Fittings 12" / <1	0.0	100%	100%		11-Feb-15 A
5402	OM-245	GTA-MR-M-006 Odorizing Packages Albion- 2 Pump Table:	0.0	0%	100%		14-Jul-15 A



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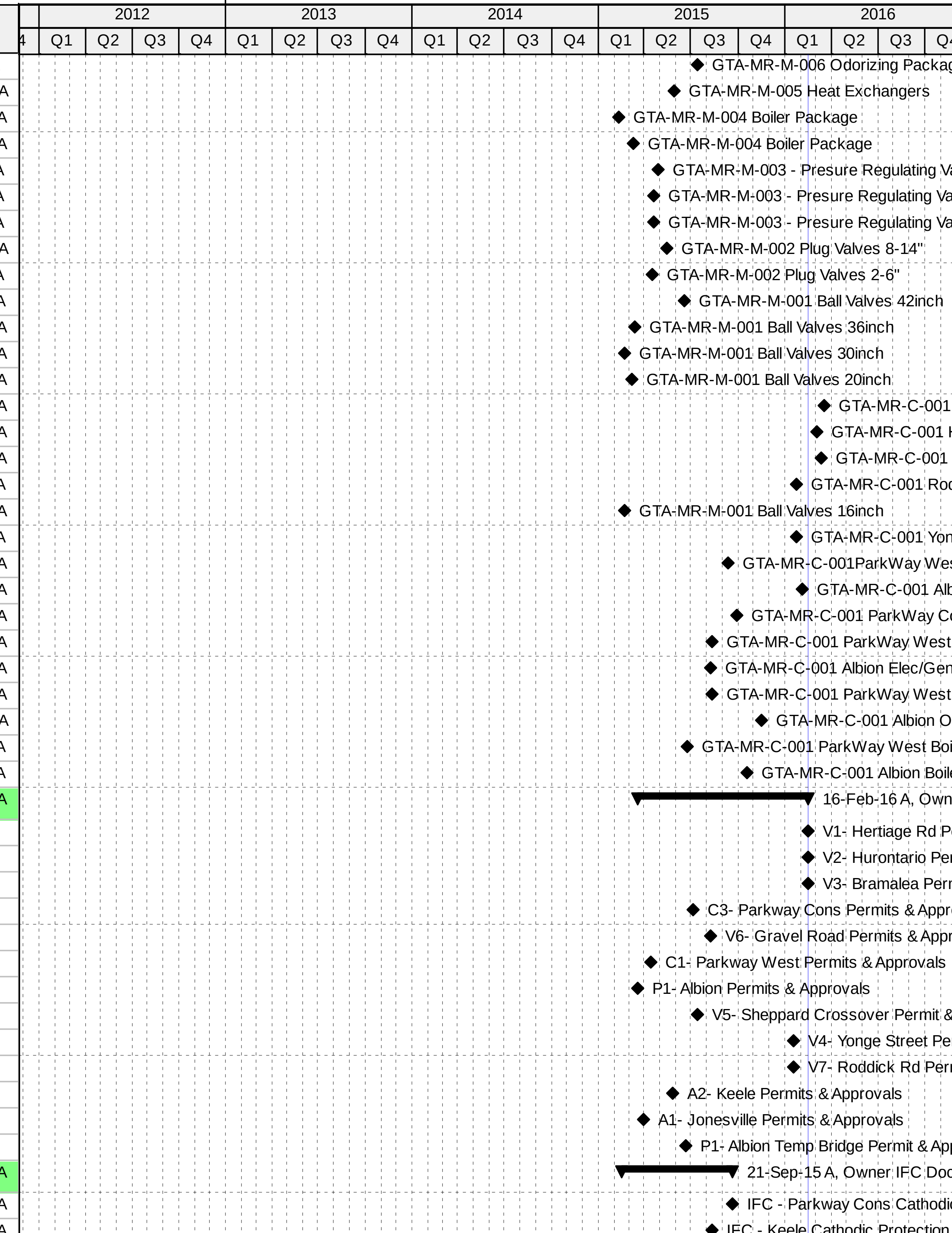
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5403	OM-240	GTA-MR-M-006 Odorizing Packages Parkway- 2 Pump Tal	0.0	100%	100%		14-Jul-15 A
5404	OM-230	GTA-MR-M-005 Heat Exchangers	0.0	100%	100%		30-May-15 A
5405	OM-220	GTA-MR-M-004 Boiler Package	0.0	100%	100%		10-Feb-15 A
5406	OM-210	GTA-MR-M-004 Boiler Package	0.0	100%	100%		11-Mar-15 A
5407	OM-200	GTA-MR-M-003 - Presure Regulating Valves 24inch	0.0	100%	100%		27-Apr-15 A
5408	OM-190	GTA-MR-M-003 - Presure Regulating Valves 20inch	0.0	100%	100%		20-Apr-15 A
5409	OM-180	GTA-MR-M-003 - Presure Regulating Valves 12inch	0.0	100%	100%		20-Apr-15 A
5410	OM-170	GTA-MR-M-002 Plug Valves 8-14"	0.0	100%	100%		15-May-15 A
5411	OM-160	GTA-MR-M-002 Plug Valves 2-6"	0.0	100%	100%		15-Apr-15 A
5412	OM-150	GTA-MR-M-001 Ball Valves 42inch	0.0	100%	100%		17-Jun-15 A
5413	OM-140	GTA-MR-M-001 Ball Valves 36inch	0.0	100%	100%		13-Mar-15 A
5414	OM-130	GTA-MR-M-001 Ball Valves 30inch	0.0	100%	100%		20-Feb-15 A
5415	OM-120	GTA-MR-M-001 Ball Valves 20inch	0.0	100%	100%		06-Mar-15 A
5416	OM-114	GTA-MR-C-001 Bramalea Elec BLDG	0.0	0%	100%		19-Mar-16 A
5417	OM-113	GTA-MR-C-001 HurOntario Elec BLDG	0.0	0%	100%		05-Mar-16 A
5418	OM-112	GTA-MR-C-001 Heritage Elec BLDG	0.0	0%	100%		12-Mar-16 A
5419	OM-111	GTA-MR-C-001 Rodick Elec BLDG	0.0	0%	100%		25-Jan-16 A
5420	OM-110	GTA-MR-M-001 Ball Valves 16inch	0.0	100%	100%		20-Feb-15 A
5421	OM-109	GTA-MR-C-001 Yonge Street Elec BLDG	0.0	0%	100%		25-Jan-16 A
5422	OM-108	GTA-MR-C-001ParkWay West Storage Shed	0.0	100%	100%		12-Sep-15 A
5423	OM-107	GTA-MR-C-001 Albion Storage Shed	0.0	100%	100%		04-Feb-16 A
5424	OM-106	GTA-MR-C-001 ParkWay Cons. BLDG	0.0	100%	100%		30-Sep-15 A
5425	OM-105	GTA-MR-C-001 ParkWay West Elec./Gen. BLDG	0.0	100%	100%		13-Aug-15 A
5426	OM-104	GTA-MR-C-001 Albion Elec/Gen BLDG	0.0	100%	100%		10-Aug-15 A
5427	OM-103	GTA-MR-C-001 ParkWay West Odorant BLDG	0.0	100%	100%		12-Aug-15 A
5428	OM-102	GTA-MR-C-001 Albion Odorant BLDG	0.0	100%	100%		16-Nov-15 A
5429	OM-101	GTA-MR-C-001 ParkWay West Boiler BLDG	0.0	100%	100%		25-Jun-15 A
5430	OM-100	GTA-MR-C-001 Albion Boiler BLDG	0.0	100%	100%		19-Oct-15 A
5431	**Owner Permit Milestones**		0.0	0%	0%	20-Mar-15 A	16-Feb-16 A
5432	OP-210	V1- Hertiage Rd Permits & Approvals	0.0	100%	100%	16-Feb-16 A	
5433	OP-200	V2- Hurontario Permits & Approvals	0.0	100%	100%	16-Feb-16 A	
5434	OP-190	V3- Bramalea Permits & Approvals	0.0	100%	100%	16-Feb-16 A	
5435	OP-180	C3- Parkway Cons Permits & Approvals	0.0	100%	100%	06-Jul-15 A	
5436	OP-170	V6- Gravel Road Permits & Approvals	0.0	100%	100%	10-Aug-15 A	
5437	OP-160	C1- Parkway West Permits & Approvals	0.0	100%	100%	13-Apr-15 A	
5438	OP-150	P1- Albion Permits & Approvals	0.0	100%	100%	20-Mar-15 A	
5439	OP-140	V5- Sheppard Crossover Permit & Approvals	0.0	100%	100%	13-Jul-15 A	
5440	OP-130	V4- Yonge Street Permits & Approvals	0.0	100%	100%	18-Jan-16 A	
5441	OP-120	V7- Roddick Rd Permits & Approvals	0.0	100%	100%	18-Jan-16 A	
5442	OP-110	A2- Keele Permits & Approvals	0.0	100%	100%	28-May-15 A	
5443	OP-100	A1- Jonesville Permits & Approvals	0.0	100%	100%	01-Apr-15 A	
5444	A1110	P1- Albion Temp Bridge Permit & Approval to Proceed	0.0	100%	100%	22-Jun-15 A	
5445	**Owner IFC Doc. Milestones**		0.0	0%	0%	17-Feb-15 A	21-Sep-15 A
5446	FC-250	IFC - Parkway Cons Cathodic Protection	0.0	0%	100%		21-Sep-15 A
5447	FC-240	IFC - Keele Cathodic Protection	0.0	0%	100%		13-Aug-15 A



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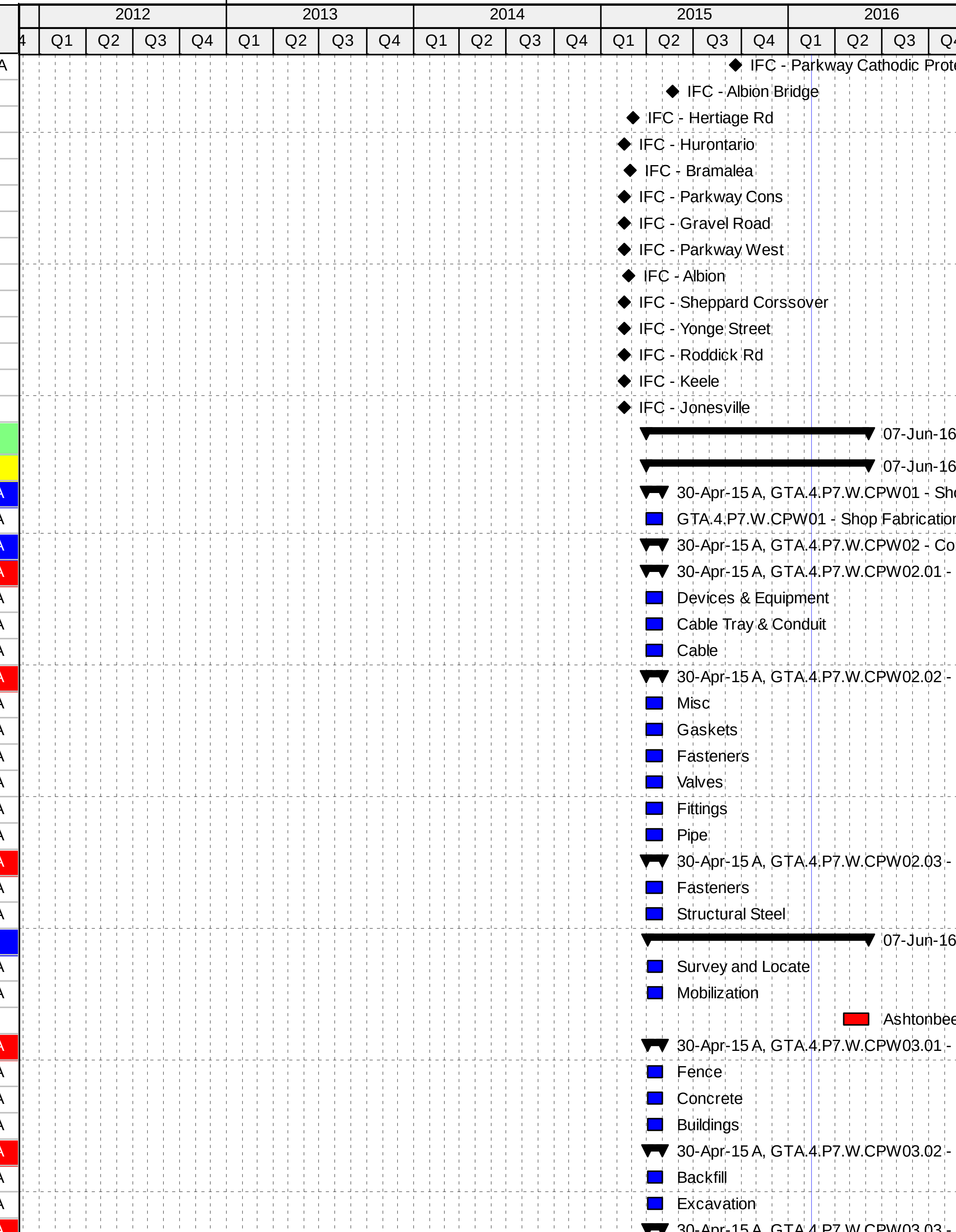
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5448	FC-230	IFC - Parkway Cathodic Protection	0.0	0%	100%		21-Sep-15 A
5449	FC-220	IFC - Albion Bridge	0.0	100%	100%	20-May-15 A	
5450	FC-210	IFC - Hertiage Rd	0.0	100%	100%	04-Mar-15 A	
5451	FC-200	IFC - Hurontario	0.0	100%	100%	17-Feb-15 A	
5452	FC-190	IFC - Bramalea	0.0	100%	100%	27-Feb-15 A	
5453	FC-180	IFC - Parkway Cons	0.0	100%	100%	17-Feb-15 A	
5454	FC-170	IFC - Gravel Road	0.0	100%	100%	17-Feb-15 A	
5455	FC-160	IFC - Parkway West	0.0	100%	100%	17-Feb-15 A	
5456	FC-150	IFC - Albion	0.0	100%	100%	24-Feb-15 A	
5457	FC-140	IFC - Sheppard Corssover	0.0	100%	100%	17-Feb-15 A	
5458	FC-130	IFC - Yonge Street	0.0	100%	100%	17-Feb-15 A	
5459	FC-120	IFC - Roddick Rd	0.0	100%	100%	17-Feb-15 A	
5460	FC-110	IFC - Keele	0.0	100%	100%	17-Feb-15 A	
5461	FC-100	IFC - Jonesville	0.0	100%	100%	17-Feb-15 A	
5462	**Package A**		44.0	0%	0%	01-Apr-15 A	07-Jun-16
5463	**GTA.4.P7.W - Construction of Jonesville Station 'A1' Cancell**		44.0	0%	0%	01-Apr-15 A	07-Jun-16
5464	**GTA.4.P7.W.CPW01 - Shop Fabrication**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5465	1.1.1	GTA.4.P7.W.CPW01 - Shop Fabrication	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5466	**GTA.4.P7.W.CPW02 - Contractor Supplied Materials**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5467	**GTA.4.P7.W.CPW02.01 - Electrical Material**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5468	1.1.2.1.3	Devices & Equipment	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5469	1.1.2.1.2	Cable Tray & Conduit	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5470	1.1.2.1.1	Cable	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5471	**GTA.4.P7.W.CPW02.02 - Piping & Components**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5472	1.1.2.2.6	Misc	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5473	1.1.2.2.5	Gaskets	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5474	1.1.2.2.4	Fasteners	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5475	1.1.2.2.3	Valves	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5476	1.1.2.2.2	Fittings	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5477	1.1.2.2.1	Pipe	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5478	**GTA.4.P7.W.CPW02.03 - Mechanical Material**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5479	1.1.2.3.2	Fasteners	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5480	1.1.2.3.1	Structural Steel	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5481	**GTA.4.P7.W.CPW03 - Civil Works**		44.0	0%	0%	01-Apr-15 A	07-Jun-16
5482	A1000	Survey and Locate	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5483	A01-100	Mobilization	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5484	1.1.10	Ashtonbee Locates & Hydro-Vac	44.0	0%	0%	18-Apr-16	07-Jun-16
5485	**GTA.4.P7.W.CPW03.01 - Demolition**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5486	1.1.3.1.3	Fence	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5487	1.1.3.1.2	Concrete	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5488	1.1.3.1.1	Buildings	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5489	**GTA.4.P7.W.CPW03.02 - Earth Works**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5490	1.1.3.2.2	Backfill	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5491	1.1.3.2.1	Excavation	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5492	**GTA.4.P7.W.CPW03.03 - Footings & Foundations**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A



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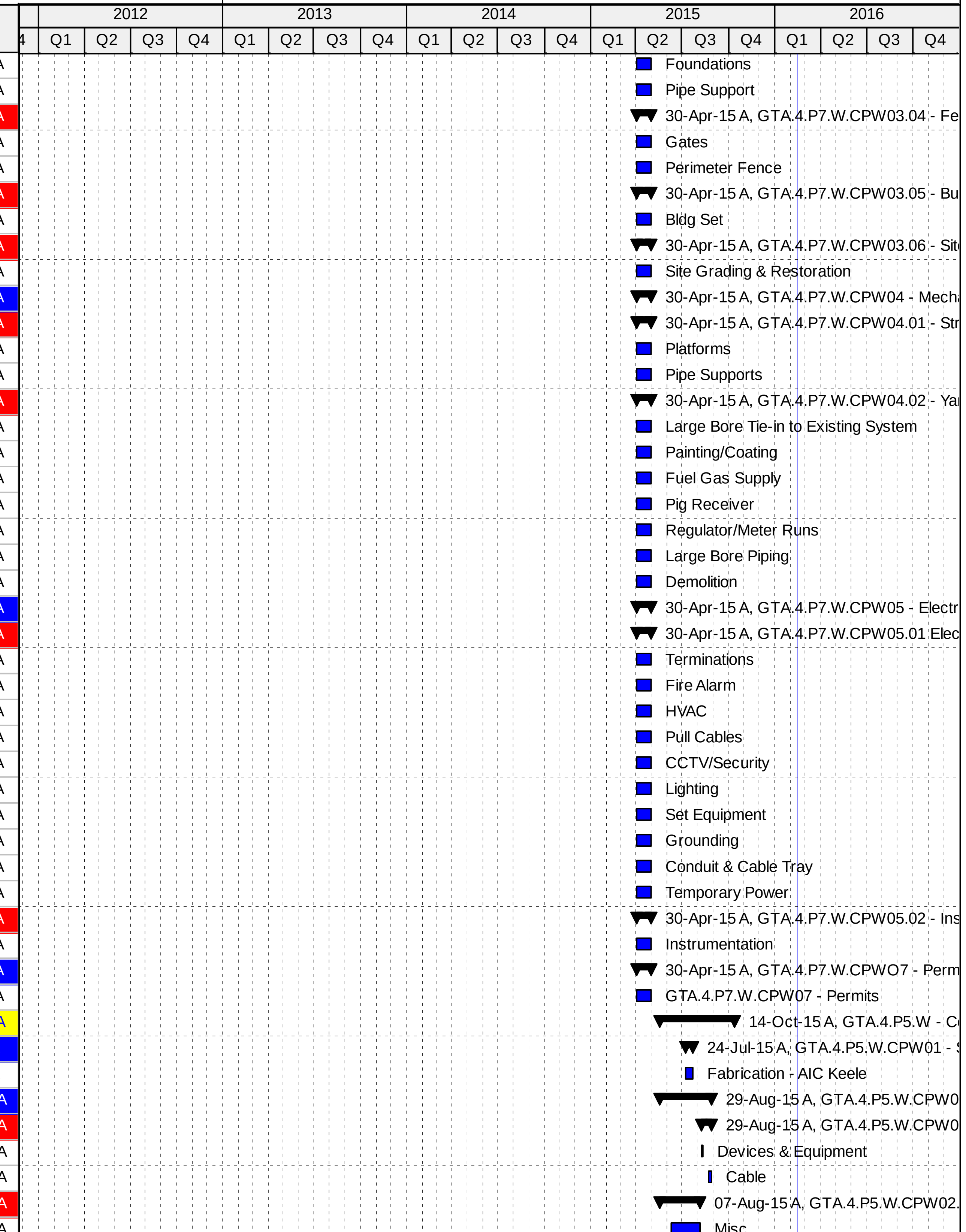
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5493	1.1.3.3.2	Foundations	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5494	1.1.3.3.1	Pipe Support	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5495	**GTA.4.P7.W.CPW03.04 - Fencing**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5496	1.1.3.4.2	Gates	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5497	1.1.3.4.1	Perimeter Fence	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5498	**GTA.4.P7.W.CPW03.05 - Buildings**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5499	1.1.3.5.1	Bldg Set	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5500	**GTA.4.P7.W.CPW03.06 - Site Grading & Restoration**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5501	1.1.3.2.3	Site Grading & Restoration	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5502	**GTA.4.P7.W.CPW04 - Mechanical and Piping**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5503	**GTA.4.P7.W.CPW04.01 - Structural Steel Erection**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5504	1.1.4.1.2	Platforms	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5505	1.1.4.1.1	Pipe Supports	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5506	**GTA.4.P7.W.CPW04.02 - Yard Piping**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5507	A01-200	Large Bore Tie-in to Existing System	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5508	1.1.4.2.6	Painting/Coating	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5509	1.1.4.2.5	Fuel Gas Supply	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5510	1.1.4.2.4	Pig Receiver	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5511	1.1.4.2.3	Regulator/Meter Runs	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5512	1.1.4.2.2	Large Bore Piping	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5513	1.1.4.2.1	Demolition	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5514	**GTA.4.P7.W.CPW05 - Electrical and Instrumentation**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5515	**GTA.4.P7.W.CPW05.01 Electrical works**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5516	1.1.5.1.a10	Terminations	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5517	1.1.5.1.9	Fire Alarm	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5518	1.1.5.1.8	HVAC	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5519	1.1.5.1.7	Pull Cables	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5520	1.1.5.1.6	CCTV/Security	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5521	1.1.5.1.5	Lighting	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5522	1.1.5.1.4	Set Equipment	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5523	1.1.5.1.3	Grounding	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5524	1.1.5.1.2	Conduit & Cable Tray	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5525	1.1.5.1.1	Temporary Power	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5526	**GTA.4.P7.W.CPW05.02 - Instrumentation**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5527	1.1.5.2	Instrumentation	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5528	**GTA.4.P7.W.CPWO7 - Permits**		0.0	0%	0%	01-Apr-15 A	30-Apr-15 A
5529	1.1.7	GTA.4.P7.W.CPW07 - Permits	0.0	100%	100%	01-Apr-15 A	30-Apr-15 A
5530	**GTA.4.P5.W - Construction of Keele Station 'A2'**		0.0	0%	0%	19-May-15 A	14-Oct-15 A
5531	**GTA.4.P5.W.CPW01 - Shop Fabrication**		0.0	0%	0%	07-Jul-15 A	24-Jul-15 A
5532	1.2.1.1	Fabrication - AIC Keele	0.0	100%	100%	07-Jul-15 A	24-Jul-15 A
5533	**GTA.4.P5.W.CPW02 - Contractor Supplied Materials**		0.0	0%	0%	19-May-15 A	29-Aug-15 A
5534	**GTA.4.P5.W.CPW02.01 - Electrical Material**		0.0	0%	0%	10-Aug-15 A	29-Aug-15 A
5535	1.2.2.1.3	Devices & Equipment	0.0	100%	100%	10-Aug-15 A	11-Aug-15 A
5536	1.2.2.1.1	Cable	0.0	100%	100%	24-Aug-15 A	29-Aug-15 A
5537	**GTA.4.P5.W.CPW02.02 - Piping & Components**		0.0	0%	0%	19-May-15 A	07-Aug-15 A
5538	1.2.2.2.6	Misc	0.0	100%	100%	09-Jun-15 A	07-Aug-15 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5539	1.2.2.2.5	Gaskets	0.0	100%	100%	09-Jun-15 A	16-Jul-15 A
5540	1.2.2.2.4	Fasteners	0.0	100%	100%	03-Jun-15 A	16-Jul-15 A
5541	1.2.2.2.3	Valves	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
5542	1.2.2.2.2	Fittings	0.0	100%	100%	19-May-15 A	16-Jul-15 A
5543	1.2.2.2.1	Pipe	0.0	100%	100%	19-May-15 A	16-Jul-15 A
5544	GTA.4.P5.W.CPW02.03 - Mechanical Material		0.0	0%	0%	10-Aug-15 A	22-Aug-15 A
5545	1.2.2.3.2	Fasteners	0.0	100%	100%	10-Aug-15 A	22-Aug-15 A
5546	1.2.2.3.1	Structural Steel	0.0	100%	100%	10-Aug-15 A	22-Aug-15 A
5547	GTA.4.P5.W.CPW03 - Civil Works		0.0	0%	0%	19-May-15 A	14-Oct-15 A
5548	A1010	Survey and Locate	0.0	100%	100%	19-May-15 A	26-Jun-15 A
5549	A02-100	Mobilization	0.0	100%	100%	01-Jun-15 A	06-Jun-15 A
5550	GTA.4.P5.W.CPW03.01 - Demolition		0.0	0%	0%	03-Jun-15 A	02-Jul-15 A
5551	1.2.3.2.3	Demolition	0.0	100%	100%	03-Jun-15 A	02-Jul-15 A
5552	GTA.4.P5.W.CPW03.02 - Earth Works		0.0	0%	0%	17-Jun-15 A	29-Aug-15 A
5553	1.2.3.2.2	Backfill	0.0	100%	100%	07-Aug-15 A	29-Aug-15 A
5554	1.2.3.2.1	Excavation	0.0	100%	100%	17-Jun-15 A	13-Aug-15 A
5555	GTA.4.P5.W.CPW03.03 - Footings & Foundations		0.0	0%	0%	14-Aug-15 A	27-Aug-15 A
5556	1.2.3.3.1	Pipe Support	0.0	100%	100%	14-Aug-15 A	27-Aug-15 A
5557	GTA.4.P5.W.CPW03.04 - Fencing		0.0	0%	0%	16-Sep-15 A	14-Oct-15 A
5558	1.2.3.4.2	Gates	0.0	100%	100%	16-Sep-15 A	14-Oct-15 A
5559	GTA.4.P5.W.CPW03.05 - Site Grading & Restoration		0.0	0%	0%	13-Aug-15 A	04-Sep-15 A
5560	1.2.3.5.1	Site Grading & Restoration	0.0	100%	100%	13-Aug-15 A	04-Sep-15 A
5561	GTA.4.P5.W.CPW04 - Mechanical and Piping		0.0	0%	0%	02-Jun-15 A	02-Sep-15 A
5562	GTA.4.P5.W.CPW04.01 - Structural Steel Erection		0.0	0%	0%	22-Aug-15 A	22-Aug-15 A
5563	1.2.4.1.1	Pipe Supports	0.0	100%	100%	22-Aug-15 A	22-Aug-15 A
5564	GTA.4.P5.W.CPW04.02 - Yard Piping		0.0	0%	0%	02-Jun-15 A	02-Sep-15 A
5565	1.2.4.2.6	Painting/Coating	0.0	100%	100%	21-Jul-15 A	02-Sep-15 A
5566	1.2.4.2.2	Large Bore Piping	0.0	100%	100%	02-Jun-15 A	08-Aug-15 A
5567	1.2.4.2.1	Demolition	0.0	100%	100%	09-Jun-15 A	14-Aug-15 A
5568	GTA.4.P5.W.CPW05 - Electrical and Instrumentation		0.0	0%	0%	01-Jun-15 A	31-Aug-15 A
5569	GTA.4.P5.W.CPW05.01 - Electrical works		0.0	0%	0%	01-Jun-15 A	31-Aug-15 A
5570	1.2.5.1.a1(	Terminations	0.0	100%	100%	28-Aug-15 A	31-Aug-15 A
5571	1.2.5.1.7	Pull Cables	0.0	100%	100%	27-Aug-15 A	31-Aug-15 A
5572	1.2.5.1.3	Grounding	0.0	100%	100%	27-Aug-15 A	31-Aug-15 A
5573	1.2.5.1.1	Temporary Power	0.0	100%	100%	01-Jun-15 A	06-Jun-15 A
5574	GTA.4.P5.W.CPW05.02 - Instrumentation		0.0	0%	0%	12-Aug-15 A	14-Aug-15 A
5575	1.2.5.2	Instrumentation	0.0	100%	100%	12-Aug-15 A	14-Aug-15 A
5576	GTA.4.P5.W.CPW07 - Permits		0.0	0%	0%	01-Jun-15 A	06-Jun-15 A
5577	1.2.7	GTA.4.P5.W.CPW07 - Elect Permits	0.0	100%	100%	01-Jun-15 A	06-Jun-15 A
5578	GTA.4.P5.W.CPW10 - York Sewer Changes		0.0	0%	0%	15-Jun-15 A	28-Aug-15 A
5579	GTA.4.P5.W.CPW10 - York Region Sewer Impacts		0.0	0%	0%	15-Jun-15 A	28-Aug-15 A
5580	1.2.10.1	Additional Work to Protect Sewer Line	0.0	0%	100%	15-Jun-15 A	28-Aug-15 A
5581	GTA.4.P5.W.CPW11 - Cathodic Protection System (Change)		0.0	0%	0%	17-Aug-15 A	29-Aug-15 A
5582	GTA.4.P5.W.CPW11.01 - Cathodic Protection System (Change)		0.0	0%	0%	17-Aug-15 A	29-Aug-15 A
5583	1.2.11.1	Cathodic Protection System	0.0	0%	100%	17-Aug-15 A	29-Aug-15 A
5584	GTA.2.S1.W.VS7 - Roddick Road Valve Site 'VS7'		31.0	0%	0%	01-Jun-15 A	23-May-16

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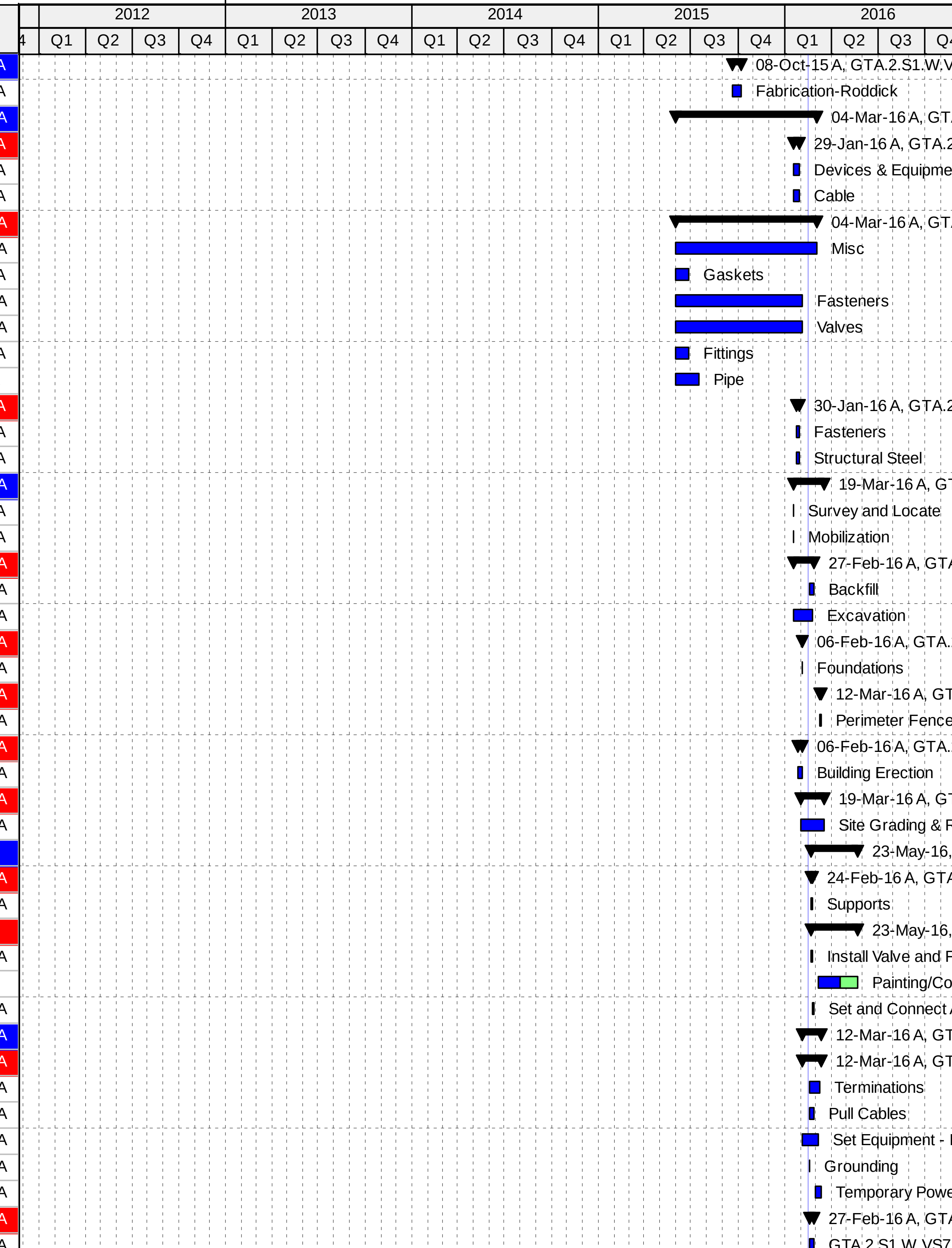
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5585		**GTA.2.S1.W.VS7.CPW01 - Shop Fabrication**	0.0	0%	0%	22-Sep-15 A	08-Oct-15 A
5586	1.3.1.3	Fabrication-Roddick	0.0	100%	100%	22-Sep-15 A	08-Oct-15 A
5587		**GTA.2.S1.W.VS7.CPW02 - Contractor Supplied Materials**	0.0	0%	0%	01-Jun-15 A	04-Mar-16 A
5588		**GTA.2.S1.W.VS7.CPW02.01 - Electrical Material**	0.0	0%	0%	18-Jan-16 A	29-Jan-16 A
5589	1.3.2.1.3	Devices & Equipment	0.0	100%	100%	18-Jan-16 A	29-Jan-16 A
5590	1.3.2.1.1	Cable	0.0	100%	100%	18-Jan-16 A	29-Jan-16 A
5591		**GTA.2.S1.W.VS7.CPW02.02 - Piping & Components**	0.0	0%	0%	01-Jun-15 A	04-Mar-16 A
5592	1.3.2.2.6	Misc	0.0	100%	100%	01-Jun-15 A	04-Mar-16 A
5593	1.3.2.2.5	Gaskets	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
5594	1.3.2.2.4	Fasteners	0.0	100%	100%	01-Jun-15 A	05-Feb-16 A
5595	1.3.2.2.3	Valves	0.0	100%	100%	01-Jun-15 A	05-Feb-16 A
5596	1.3.2.2.2	Fittings	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
5597	1.3.2.2.1	Pipe	0.0	100%	100%	01-Jun-15 A	17-Jul-15 A
5598		**GTA.2.S1.W.VS7.CPW02.03 - Mechanical Material**	0.0	0%	0%	25-Jan-16 A	30-Jan-16 A
5599	1.3.2.3.2	Fasteners	0.0	100%	100%	25-Jan-16 A	30-Jan-16 A
5600	1.3.2.3.1	Structural Steel	0.0	100%	100%	25-Jan-16 A	30-Jan-16 A
5601		**GTA.2.S1.W.VS7.CPW03 - Civil Works**	0.0	0%	0%	18-Jan-16 A	19-Mar-16 A
5602	A1020	Survey and Locate	0.0	100%	100%	18-Jan-16 A	19-Jan-16 A
5603	A03-100	Mobilization	0.0	100%	100%	18-Jan-16 A	18-Jan-16 A
5604		**GTA.2.S1.W.VS7.CPW03.01 - Earth Works**	0.0	0%	0%	20-Jan-16 A	27-Feb-16 A
5605	1.3.3.1.2	Backfill	0.0	100%	100%	18-Feb-16 A	27-Feb-16 A
5606	1.3.3.1.1	Excavation	0.0	100%	100%	20-Jan-16 A	24-Feb-16 A
5607		**GTA.2.S1.W.VS7.CPW03.02 - Footings & Foundations**	0.0	0%	0%	04-Feb-16 A	06-Feb-16 A
5608	1.3.3.2.2	Foundations	0.0	100%	100%	04-Feb-16 A	06-Feb-16 A
5609		**GTA.2.S1.W.VS7.CPW03.03 - Fencing**	0.0	0%	0%	10-Mar-16 A	12-Mar-16 A
5610	1.3.3.3.1	Perimeter Fence	0.0	100%	100%	10-Mar-16 A	12-Mar-16 A
5611		**GTA.2.S1.W.VS7.CPW03.04 - Building Erection**	0.0	0%	0%	26-Jan-16 A	06-Feb-16 A
5612	1.3.3.4	Building Erection	0.0	100%	100%	26-Jan-16 A	06-Feb-16 A
5613		**GTA.2.S1.W.VS7.CPW03.05 - Site Grading & Restoration**	0.0	0%	0%	03-Feb-16 A	19-Mar-16 A
5614	1.3.3.5	Site Grading & Restoration	0.0	100%	100%	03-Feb-16 A	19-Mar-16 A
5615		**GTA.2.S1.W.VS7.CPW04 - Mechanical and Piping**	31.0	0%	0%	22-Feb-16 A	23-May-16
5616		**GTA.2.S1.W.VS7.CPW04.01 - Structural Steel Erection**	0.0	0%	0%	22-Feb-16 A	24-Feb-16 A
5617	1.3.4.1.1	Supports	0.0	100%	100%	22-Feb-16 A	24-Feb-16 A
5618		**GTA.2.S1.W.VS7.CPW04.02 - Yard Piping**	31.0	0%	0%	22-Feb-16 A	23-May-16
5619	A1260	Install Valve and Fabrication By Others	0.0	100%	100%	22-Feb-16 A	24-Feb-16 A
5620	1.3.4.2.2	Painting/Coating	31.0	100%	90%	07-Mar-16 A	23-May-16
5621	1.3.4.2.1	Set and Connect Acutators	0.0	100%	100%	25-Feb-16 A	27-Feb-16 A
5622		**GTA.2.S1.W.VS7.CPW05 - Electrical and Instrumentation**	0.0	0%	0%	05-Feb-16 A	12-Mar-16 A
5623		**GTA.2.S1.W.VS7.CPW05.01 - Electrical Works**	0.0	0%	0%	05-Feb-16 A	12-Mar-16 A
5624	1.3.5.1.9	Terminations	0.0	100%	100%	20-Feb-16 A	09-Mar-16 A
5625	1.3.5.1.6	Pull Cables	0.0	100%	100%	19-Feb-16 A	27-Feb-16 A
5626	1.3.5.1.4	Set Equipment - Roddick	0.0	100%	100%	05-Feb-16 A	08-Mar-16 A
5627	1.3.5.1.3	Grounding	0.0	100%	100%	18-Feb-16 A	20-Feb-16 A
5628	1.3.5.1.2	Temporary Power	0.0	100%	100%	29-Feb-16 A	12-Mar-16 A
5629		**GTA.2.S1.W.VS7.CPW05.02 - Instrumentation**	0.0	0%	0%	20-Feb-16 A	27-Feb-16 A
5630	1.3.5.2	GTA.2.S1.W.VS7.CPW05.02 - Instrumentation	0.0	100%	100%	20-Feb-16 A	27-Feb-16 A



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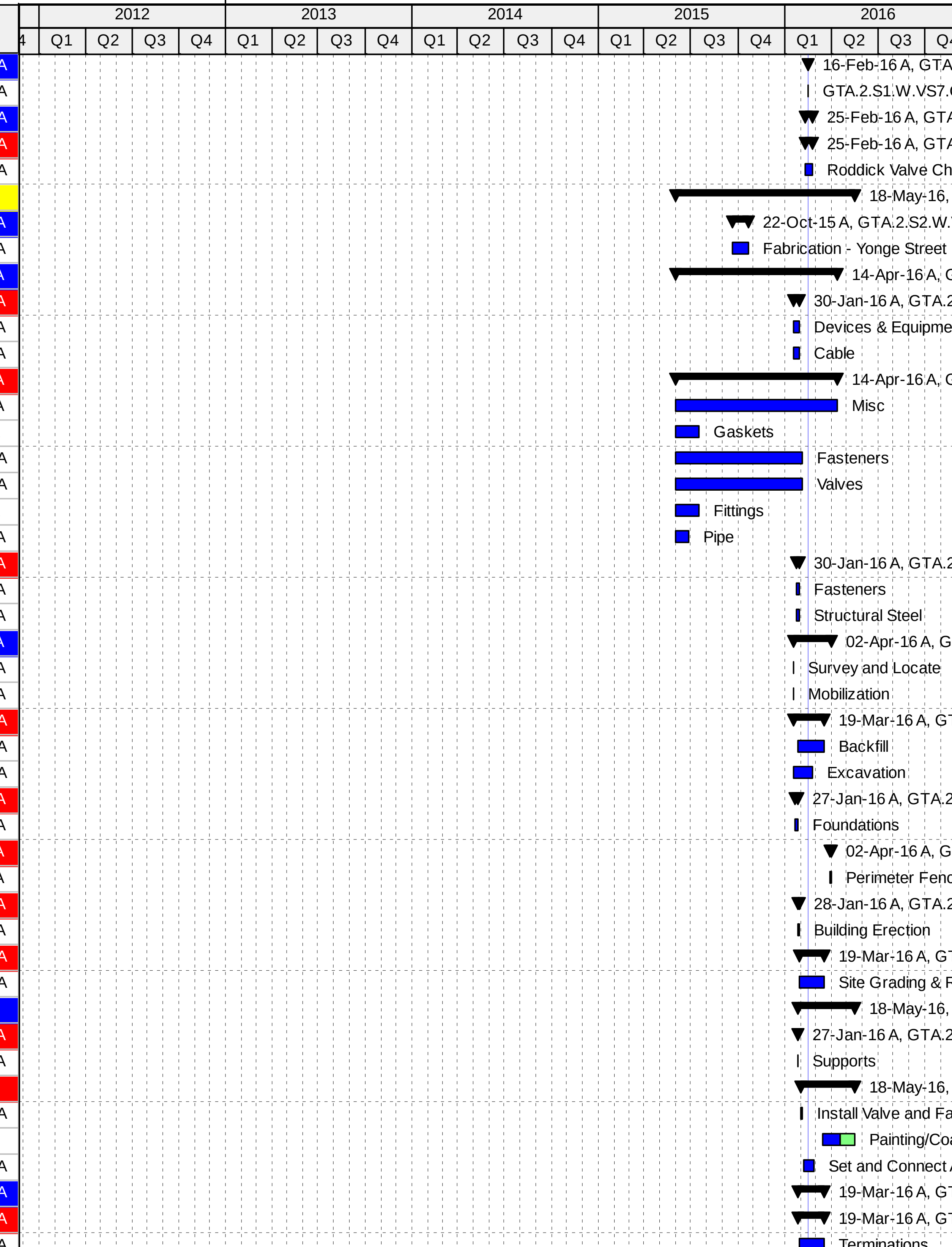
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5631	GTA.2.S1.W.VS7.CPW07 - Permits		0.0	0%	0%	16-Feb-16 A	16-Feb-16 A
5632	1.3.7	GTA.2.S1.W.VS7.CPW07 - Elec Permits	0.0	100%	100%	16-Feb-16 A	16-Feb-16 A
5633	GTA.2.S1.W.VS7.CPW10 - Roddick Valve Change Revisions		0.0	0%	0%	10-Feb-16 A	25-Feb-16 A
5634	GTA.2.S1.W.VS7.CPW10.01 - Roddick Valve Change Revisions		0.0	0%	0%	10-Feb-16 A	25-Feb-16 A
5635	1.3.10.1	Roddick Valve Change Revisions	0.0	0%	100%	10-Feb-16 A	25-Feb-16 A
5636	GTA.2.S2.W.VS4 - Yonge Street Valve Site 'VS4'		27.0	0%	0%	01-Jun-15 A	18-May-16
5637	GTA.2.S2.W.VS4.CPW01 - Shop Fabrication		0.0	0%	0%	22-Sep-15 A	22-Oct-15 A
5638	1.4.1.3	Fabrication - Yonge Street	0.0	100%	100%	22-Sep-15 A	22-Oct-15 A
5639	GTA.2.S2.W.VS4.CPW02 - Contractor Supplied Materials		0.0	0%	0%	01-Jun-15 A	14-Apr-16 A
5640	GTA.2.S2.W.VS4.CPW02.01 - Electrical Material		0.0	0%	0%	18-Jan-16 A	30-Jan-16 A
5641	1.4.2.1.3	Devices & Equipment	0.0	100%	100%	18-Jan-16 A	30-Jan-16 A
5642	1.4.2.1.1	Cable	0.0	100%	100%	18-Jan-16 A	30-Jan-16 A
5643	GTA.2.S2.W.VS4.CPW02.02 - Piping & Components		0.0	0%	0%	01-Jun-15 A	14-Apr-16 A
5644	1.4.2.2.6	Misc	0.0	100%	100%	01-Jun-15 A	14-Apr-16 A
5645	1.4.2.2.5	Gaskets	0.0	100%	100%	01-Jun-15 A	17-Jul-15 A
5646	1.4.2.2.4	Fasteners	0.0	100%	100%	01-Jun-15 A	05-Feb-16 A
5647	1.4.2.2.3	Valves	0.0	100%	100%	01-Jun-15 A	06-Feb-16 A
5648	1.4.2.2.2	Fittings	0.0	100%	100%	01-Jun-15 A	17-Jul-15 A
5649	1.4.2.2.1	Pipe	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
5650	GTA.2.S2.W.VS4.CPW02.03 - Mechanical Material		0.0	0%	0%	25-Jan-16 A	30-Jan-16 A
5651	1.4.2.3.2	Fasteners	0.0	100%	100%	25-Jan-16 A	30-Jan-16 A
5652	1.4.2.3.1	Structural Steel	0.0	100%	100%	25-Jan-16 A	30-Jan-16 A
5653	GTA.2.S2.W.VS4.CPW03 - Civil Works		0.0	0%	0%	18-Jan-16 A	02-Apr-16 A
5654	A1030	Survey and Locate	0.0	100%	100%	18-Jan-16 A	19-Jan-16 A
5655	A04-100	Mobilization	0.0	100%	100%	18-Jan-16 A	18-Jan-16 A
5656	GTA.2.S2.W.VS4.CPW03.01 - Earth Works		0.0	0%	0%	20-Jan-16 A	19-Mar-16 A
5657	1.4.3.1.2	Backfill	0.0	100%	100%	28-Jan-16 A	19-Mar-16 A
5658	1.4.3.1.1	Excavation	0.0	100%	100%	20-Jan-16 A	24-Feb-16 A
5659	GTA.2.S2.W.VS4.CPW03.02 - Footings & Foundations		0.0	0%	0%	22-Jan-16 A	27-Jan-16 A
5660	1.4.3.2.2	Foundations	0.0	100%	100%	22-Jan-16 A	27-Jan-16 A
5661	GTA.2.S2.W.VS4.CPW03.03 - Fencing		0.0	0%	0%	30-Mar-16 A	02-Apr-16 A
5662	1.4.3.3.1	Perimeter Fence	0.0	100%	100%	30-Mar-16 A	02-Apr-16 A
5663	GTA.2.S2.W.VS4.CPW03.04 - Building Erection		0.0	0%	0%	28-Jan-16 A	28-Jan-16 A
5664	1.4.3.4	Building Erection	0.0	100%	100%	28-Jan-16 A	28-Jan-16 A
5665	GTA.2.S2.W.VS4.CPW03.05 - Site Grading & Restoration		0.0	0%	0%	29-Jan-16 A	19-Mar-16 A
5666	1.4.3.5	Site Grading & Restoration	0.0	100%	100%	29-Jan-16 A	19-Mar-16 A
5667	GTA.2.S2.W.VS4.CPW04 - Mechanical and Piping		27.0	0%	0%	26-Jan-16 A	18-May-16
5668	GTA.2.S2.W.VS4.CPW04.01 - Structural Steel Erection		0.0	0%	0%	26-Jan-16 A	27-Jan-16 A
5669	1.4.4.1.1	Supports	0.0	100%	100%	26-Jan-16 A	27-Jan-16 A
5670	GTA.2.S2.W.VS4.CPW04.02 - Yard Piping		27.0	0%	0%	01-Feb-16 A	18-May-16
5671	A1270	Install Valve and Fabrication By Others	0.0	100%	100%	01-Feb-16 A	05-Feb-16 A
5672	1.4.4.2.2	Painting/Coating	27.0	100%	90%	17-Mar-16 A	18-May-16
5673	1.4.4.2.1	Set and Connect Actuators	0.0	100%	100%	09-Feb-16 A	27-Feb-16 A
5674	GTA.2.S2.W.VS4.CPW05 - Electrical and Instrumentation		0.0	0%	0%	26-Jan-16 A	19-Mar-16 A
5675	GTA.2.S2.W.VS4.CPW05.01 - Electrical Works		0.0	0%	0%	26-Jan-16 A	19-Mar-16 A
5676	1.4.5.1.9	Terminations	0.0	100%	100%	30-Jan-16 A	19-Mar-16 A



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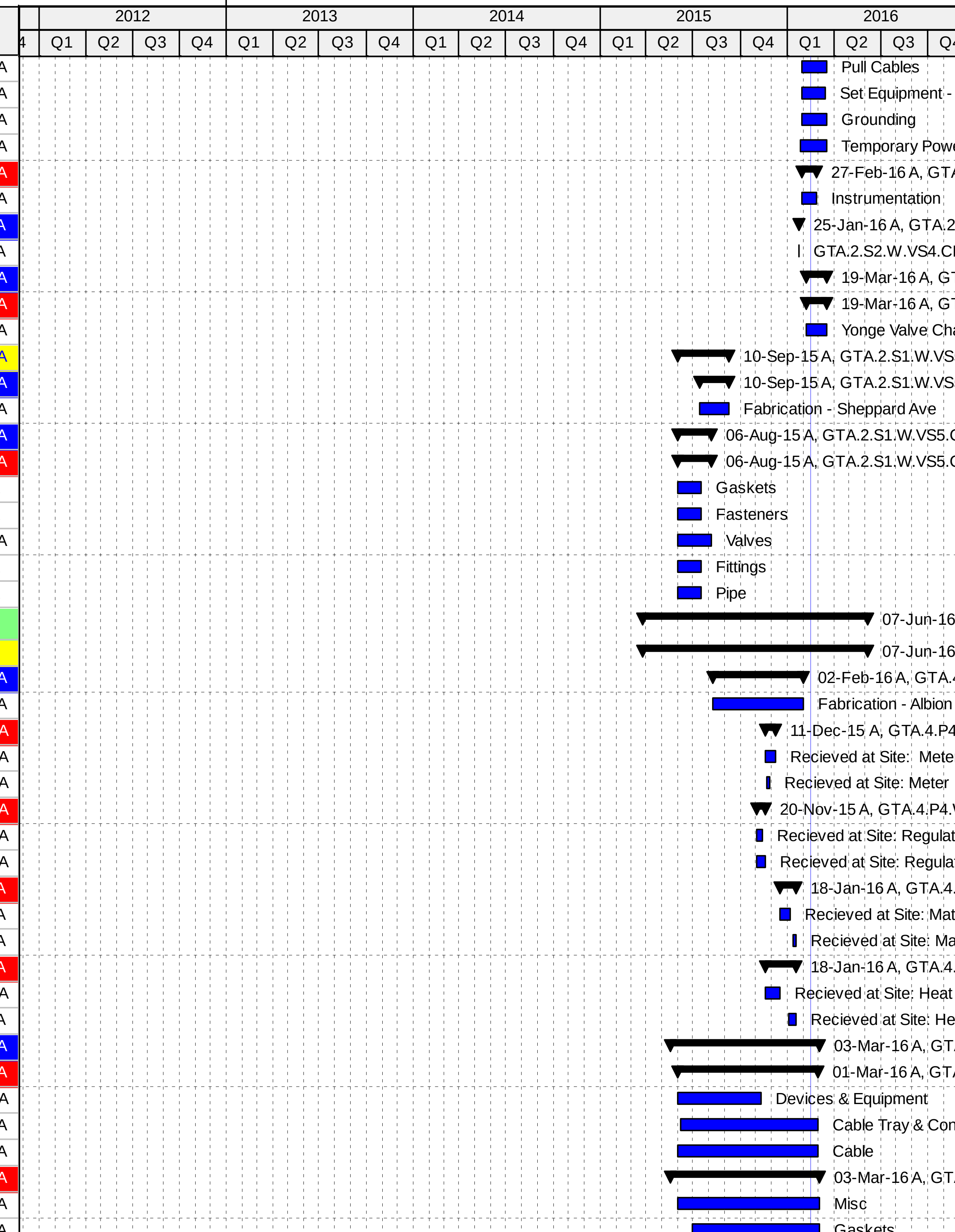
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5677	1.4.5.1.6	Pull Cables	0.0	100%	100%	29-Jan-16 A	18-Mar-16 A
5678	1.4.5.1.4	Set Equipment - Yong	0.0	100%	100%	30-Jan-16 A	17-Mar-16 A
5679	1.4.5.1.3	Grounding	0.0	100%	100%	29-Jan-16 A	18-Mar-16 A
5680	1.4.5.1.1	Temporary Power	0.0	100%	100%	26-Jan-16 A	19-Mar-16 A
5681	GTA.2.S2.W.VS4.CPW05.02 - Instrumentation		0.0	0%	0%	29-Jan-16 A	27-Feb-16 A
5682	1.4.5.2	Instrumentation	0.0	100%	100%	29-Jan-16 A	27-Feb-16 A
5683	GTA.2.S2.W.VS4.CPW07 - Permits		0.0	0%	0%	25-Jan-16 A	25-Jan-16 A
5684	1.4.7	GTA.2.S2.W.VS4.CPW07 - Elec Permits	0.0	100%	100%	25-Jan-16 A	25-Jan-16 A
5685	GTA.2.S2.W.VS4.CPW10 - Yonge Valve Change Revisions		0.0	0%	0%	08-Feb-16 A	19-Mar-16 A
5686	GTA.2.S2.W.VS4.CPW10.01 - Yonge Valve Change Revisions		0.0	0%	0%	08-Feb-16 A	19-Mar-16 A
5687	1.4.10.0	Yonge Valve Change Revisions	0.0	100%	100%	08-Feb-16 A	19-Mar-16 A
5688	GTA.2.S1.W.VS5 - Sheppard Crossover Fabrication 'VS5'		0.0	0%	0%	01-Jun-15 A	10-Sep-15 A
5689	GTA.2.S1.W.VS5.CPW01 - Shop Fabrication		0.0	0%	0%	15-Jul-15 A	10-Sep-15 A
5690	1.5.1.3	Fabrication - Sheppard Ave	0.0	100%	100%	15-Jul-15 A	10-Sep-15 A
5691	GTA.2.S1.W.VS5.CPW02 - Contractor Supplied Materials		0.0	0%	0%	01-Jun-15 A	06-Aug-15 A
5692	GTA.2.S1.W.VS5.CPW02 - Piping & Components		0.0	0%	0%	01-Jun-15 A	06-Aug-15 A
5693	1.5.2.2.5	Gaskets	0.0	100%	100%	01-Jun-15 A	17-Jul-15 A
5694	1.5.2.2.4	Fasteners	0.0	100%	100%	01-Jun-15 A	17-Jul-15 A
5695	1.5.2.2.3	Valves	0.0	100%	100%	01-Jun-15 A	06-Aug-15 A
5696	1.5.2.2.2	Fittings	0.0	100%	100%	01-Jun-15 A	17-Jul-15 A
5697	1.5.2.2.1	Pipe	0.0	100%	100%	01-Jun-15 A	17-Jul-15 A
5698	**Package B**		44.0	0%	0%	25-Mar-15 A	07-Jun-16
5699	GTA.4.P4.W - Construction of Albion Station 'B1'		44.0	0%	0%	25-Mar-15 A	07-Jun-16
5700	GTA.4.P4.W.CPW01 - Shop Fabrication (Less all 42" Piping and Pig Rec		0.0	0%	0%	10-Aug-15 A	02-Feb-16 A
5701	2.1.1.3	Fabrication - Albion	0.0	100%	100%	10-Aug-15 A	02-Feb-16 A
5702	GTA.4.P4.W.CPW01.1 - Meter Run (Parkway)		0.0	0%	0%	19-Nov-15 A	11-Dec-15 A
5703	2.1.1.3.5	Recieved at Site: Meter Run Header Parkway (Spool 14,15	0.0	0%	100%	19-Nov-15 A	11-Dec-15 A
5704	2.1.1.3.1	Recieved at Site: Meter Run (Parkway) (Spool 34,35, 36,37	0.0	0%	100%	23-Nov-15 A	27-Nov-15 A
5705	GTA.4.P4.W.CPW01.2 - Regulator Run		0.0	0%	0%	02-Nov-15 A	20-Nov-15 A
5706	2.1.1.3.6	Recieved at Site: Regulator Run Header (Spool 8 & 13)	0.0	0%	100%	03-Nov-15 A	13-Nov-15 A
5707	2.1.1.3.2	Recieved at Site: Regulator Run (Spool 9,10,11, 12)	0.0	0%	100%	02-Nov-15 A	20-Nov-15 A
5708	GTA.4.P4.W.CPW01.3 - Mater Run (Maple Station)		0.0	0%	0%	18-Dec-15 A	18-Jan-16 A
5709	2.1.1.3.7	Recieved at Site: Mater Run Header (Maple Station) (Spool	0.0	0%	100%	18-Dec-15 A	08-Jan-16 A
5710	2.1.1.3.3	Recieved at Site: Mater Run (Maple Station) (Spool 45-47)	0.0	0%	100%	14-Jan-16 A	18-Jan-16 A
5711	GTA.4.P4.W.CPW01.4 - Heat Exhanger		0.0	0%	0%	20-Nov-15 A	18-Jan-16 A
5712	2.1.1.3.8	Recieved at Site: Heat Exhanger Header Connections (Spo	0.0	0%	100%	20-Nov-15 A	17-Dec-15 A
5713	2.1.1.3.4	Recieved at Site: Heat Exhanger (Spool 28-33)	0.0	0%	100%	04-Jan-16 A	18-Jan-16 A
5714	GTA.4.P4.W.CPW02 - Contractor Supplied Materials		0.0	0%	0%	19-May-15 A	03-Mar-16 A
5715	GTA.4.P4.W.CPW02.01 - Electrical Material		0.0	0%	0%	01-Jun-15 A	01-Mar-16 A
5716	2.1.2.1.3	Devices & Equipment	0.0	100%	100%	01-Jun-15 A	11-Nov-15 A
5717	2.1.2.1.2	Cable Tray & Conduit	0.0	100%	100%	08-Jun-15 A	01-Mar-16 A
5718	2.1.2.1.1	Cable	0.0	100%	100%	01-Jun-15 A	01-Mar-16 A
5719	GTA.4.P4.W.CPW02.02 - Piping & Components		0.0	0%	0%	19-May-15 A	03-Mar-16 A
5720	2.1.2.2.6	Misc	0.0	100%	100%	01-Jun-15 A	03-Mar-16 A
5721	2.1.2.2.5	Gaskets	0.0	100%	100%	29-Jun-15 A	03-Mar-16 A



Actual Work | Critical Remaining Work | Summary
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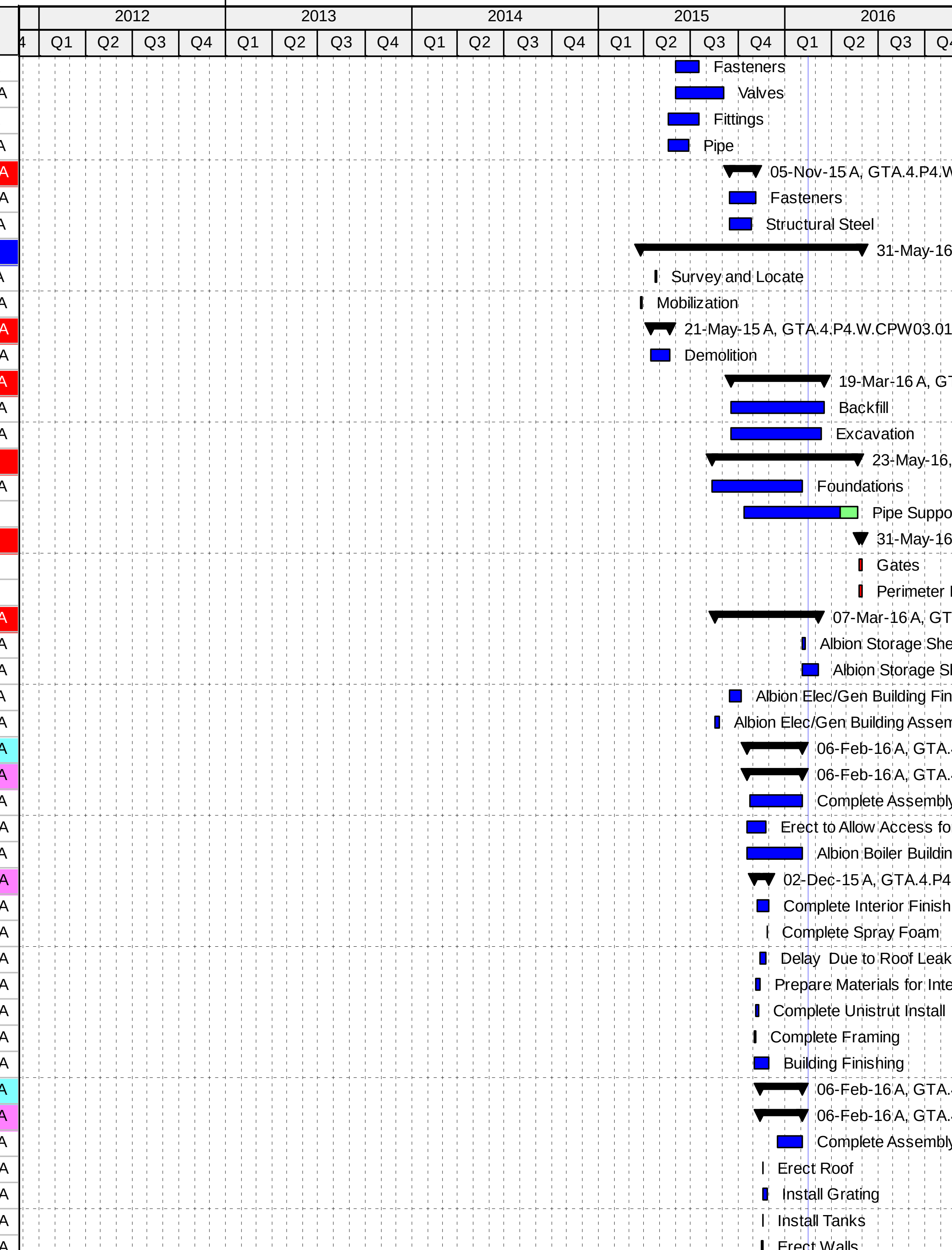
TASK filter: All Activities

GTA - Master Schedule...	Classic Schedule Layout	03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5722	2.1.2.2.4	Fasteners	0.0	100%	100%	01-Jun-15 A	17-Jul-15 A
5723	2.1.2.2.3	Valves	0.0	100%	100%	01-Jun-15 A	04-Sep-15 A
5724	2.1.2.2.2	Fittings	0.0	100%	100%	19-May-15 A	17-Jul-15 A
5725	2.1.2.2.1	Pipe	0.0	100%	100%	19-May-15 A	27-Jun-15 A
5726	**GTA.4.P4.W.CPW02.03 - Mechanical Material**		0.0	0%	0%	14-Sep-15 A	05-Nov-15 A
5727	2.1.2.3.2	Fasteners	0.0	100%	100%	14-Sep-15 A	05-Nov-15 A
5728	2.1.2.3.1	Structural Steel	0.0	100%	100%	14-Sep-15 A	29-Oct-15 A
5729	**GTA.4.P4.W.CPW03 - Civil Works**		38.0	0%	0%	25-Mar-15 A	31-May-16
5730	A1040	Survey and Locate	0.0	100%	100%	21-Apr-15 A	25-Apr-15 A
5731	A06-100	Mobilization	0.0	100%	100%	25-Mar-15 A	28-Mar-15 A
5732	**GTA.4.P4.W.CPW03.01 - Demolition**		0.0	0%	0%	13-Apr-15 A	21-May-15 A
5733	2.1.4.1	Demolition	0.0	100%	100%	13-Apr-15 A	21-May-15 A
5734	**GTA.4.P4.W.CPW03.02 - Earth Works**		0.0	0%	0%	17-Sep-15 A	19-Mar-16 A
5735	2.1.4.2.2	Backfill	0.0	100%	100%	18-Sep-15 A	19-Mar-16 A
5736	2.1.4.2.1	Excavation	0.0	100%	100%	17-Sep-15 A	11-Mar-16 A
5737	**GTA.4.P4.W.CPW03.03 - Footings & Foundations**		31.0	0%	0%	11-Aug-15 A	23-May-16
5738	2.1.4.3.2	Foundations	0.0	100%	100%	11-Aug-15 A	05-Feb-16 A
5739	2.1.4.3.1	Pipe Supports	31.0	100%	94%	15-Oct-15 A	23-May-16
5740	**GTA.4.P4.W.CPW03.04 - Fencing**		6.0	0%	0%	25-May-16	31-May-16
5741	2.1.4.4.2	Gates	4.0	100%	0%	27-May-16	31-May-16
5742	2.1.4.4.1	Perimeter Fence	6.0	100%	0%	25-May-16	31-May-16
5743	**GTA.4.P4.W.CPW03.05 - Building Erection**		0.0	0%	0%	17-Aug-15 A	07-Mar-16 A
5744	2.1.4.9	Albion Storage Shed Finishing	0.0	100%	100%	06-Feb-16 A	10-Feb-16 A
5745	2.1.4.8	Albion Storage Shed Assembly - Hygrade	0.0	100%	100%	05-Feb-16 A	07-Mar-16 A
5746	2.1.4.11	Albion Elec/Gen Building Finishing	0.0	100%	100%	15-Sep-15 A	09-Oct-15 A
5747	2.1.4.10	Albion Elec/Gen Building Assembly - Hygrade	0.0	100%	100%	17-Aug-15 A	27-Aug-15 A
5748	**GTA.4.P4.W.CPW03.05.1 - Boiler BLDG**		0.0	0%	0%	19-Oct-15 A	06-Feb-16 A
5749	**GTA.4.P4.W.CPW03.05 .1.1 - Assembly**		0.0	0%	0%	19-Oct-15 A	06-Feb-16 A
5750	2.1.4	Complete Assembly (Doors, Louvers, Paint, Etc.)	0.0	0%	100%	26-Oct-15 A	06-Feb-16 A
5751	2.1.4	Erect to Allow Access for Other Trades	0.0	0%	100%	19-Oct-15 A	26-Nov-15 A
5752	2.1.4	Albion Boiler Building Assembly - Hygrade	0.0	100%	100%	19-Oct-15 A	06-Feb-16 A
5753	**GTA.4.P4.W.CPW03.05.1.2 - Finishing**		0.0	0%	0%	02-Nov-15 A	02-Dec-15 A
5754	2.1.4	Complete Interior Finish	0.0	0%	100%	09-Nov-15 A	02-Dec-15 A
5755	2.1.4	Complete Spray Foam	0.0	0%	100%	27-Nov-15 A	28-Nov-15 A
5756	2.1.4	Delay Due to Roof Leak	0.0	0%	100%	13-Nov-15 A	26-Nov-15 A
5757	2.1.4	Prepare Materials for Interior Finish	0.0	0%	100%	05-Nov-15 A	13-Nov-15 A
5758	2.1.4	Complete Unistrut Install	0.0	0%	100%	05-Nov-15 A	12-Nov-15 A
5759	2.1.4	Complete Framing	0.0	0%	100%	02-Nov-15 A	06-Nov-15 A
5760	2.1.4	Building Finishing	0.0	100%	100%	02-Nov-15 A	02-Dec-15 A
5761	**GTA.4.P4.W.CPW03.05.2 - Odourant BLDG**		0.0	0%	0%	14-Nov-15 A	06-Feb-16 A
5762	**GTA.4.P4.W.CPW03.05.2.1 - Assembly**		0.0	0%	0%	14-Nov-15 A	06-Feb-16 A
5763	A115	Complete Assembly (Doors, Louvers, Paint, Etc.)	0.0	0%	100%	17-Dec-15 A	06-Feb-16 A
5764	A115	Erect Roof	0.0	0%	100%	20-Nov-15 A	20-Nov-15 A
5765	A115	Install Grating	0.0	0%	100%	20-Nov-15 A	27-Nov-15 A
5766	A115	Install Tanks	0.0	0%	100%	19-Nov-15 A	20-Nov-15 A
5767	A115	Erect Walls	0.0	0%	100%	18-Nov-15 A	19-Nov-15 A

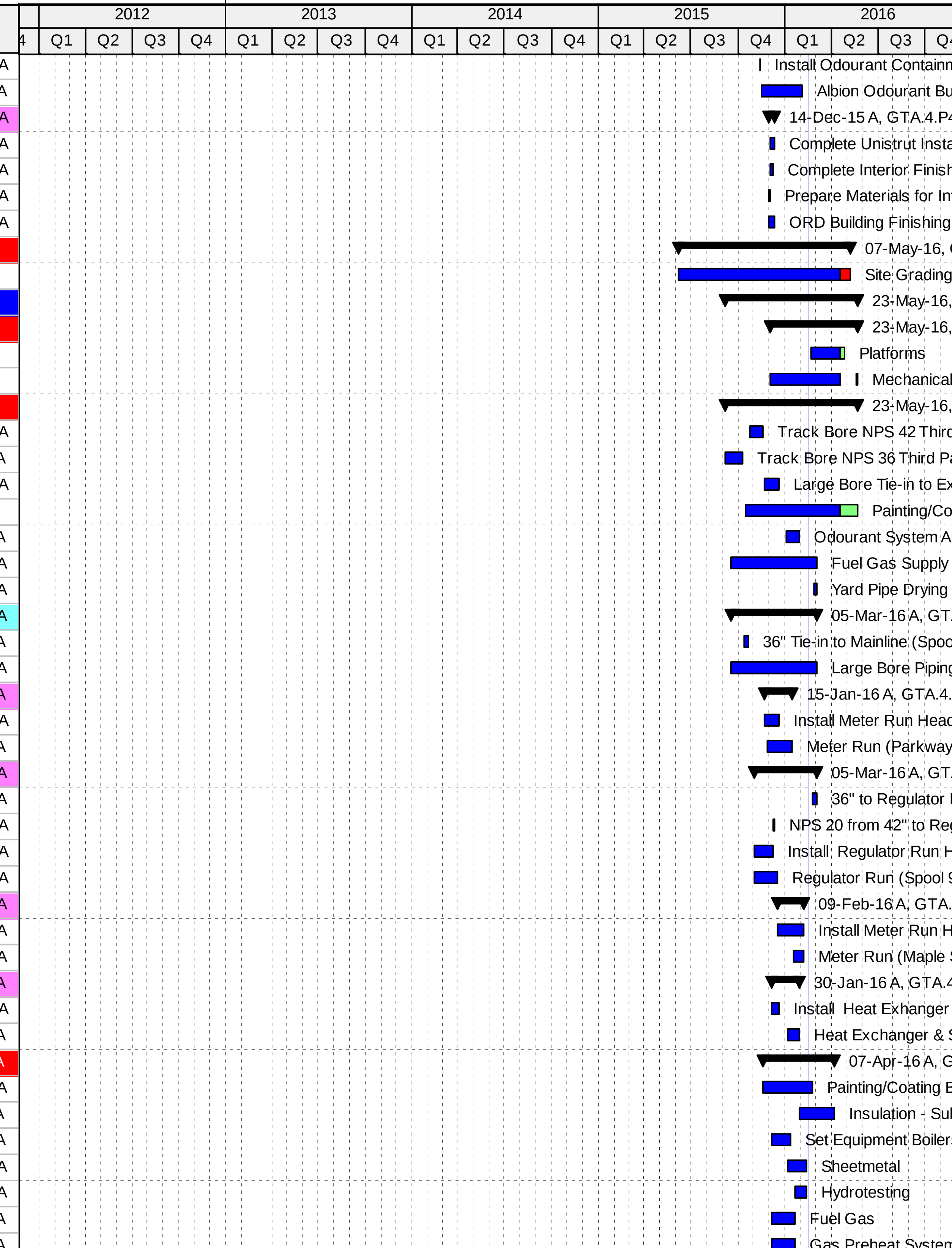


Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule...	Classic Schedule Layout	03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5768	A115	Install Odourant Containment Pan	0.0	0%	100%	14-Nov-15 A	15-Nov-15 A
5769	A115	Albion Odourant Building Assembly - Hygrade	0.0	100%	100%	16-Nov-15 A	06-Feb-16 A
5770	**GTA.4.P4.W.CPW03.05.2.2 Finishing**		0.0	0%	0%	30-Nov-15 A	14-Dec-15 A
5771	A116	Complete Unistrut Install	0.0	0%	100%	05-Dec-15 A	14-Dec-15 A
5772	A116	Complete Interior Finish	0.0	0%	100%	03-Dec-15 A	11-Dec-15 A
5773	A116	Prepare Materials for Interior Finish	0.0	0%	100%	30-Nov-15 A	04-Dec-15 A
5774	A116	ORD Building Finishing	0.0	100%	100%	30-Nov-15 A	14-Dec-15 A
5775	**GTA.4.P4.W.CPW03.06 - Site Grading & Restoration**		18.0	0%	0%	08-Jun-15 A	07-May-16
5776	2.1.4.6	Site Grading & Restoration	18.0	100%	42%	08-Jun-15 A	07-May-16
5777	**GTA.4.P4.W.CPW04 - Mechanical and Piping**		31.0	0%	0%	07-Sep-15 A	23-May-16
5778	**GTA.4.P4.W.CPW04.01 - Structural Steel Erection**		31.0	0%	0%	05-Dec-15 A	23-May-16
5779	2.1.5.1.2	Platforms	10.0	100%	30%	22-Feb-16 A	28-Apr-16
5780	2.1.5.1.1	Mechanical Pipe Supports	4.0	100%	98%	05-Dec-15 A	23-May-16
5781	**GTA.4.P4.W.CPW04.02 - Yard Piping**		31.0	0%	0%	07-Sep-15 A	23-May-16
5782	A1250	Track Bore NPS 42 Third Party 2	0.0	100%	100%	26-Oct-15 A	20-Nov-15 A
5783	A1240	Track Bore NPS 36 Third Party 1	0.0	100%	100%	07-Sep-15 A	10-Oct-15 A
5784	A06-200	Large Bore Tie-in to Existing System By Others	0.0	100%	100%	23-Nov-15 A	22-Dec-15 A
5785	2.1.5.2.8	Painting/Coating Yard Piping	31.0	100%	88%	16-Oct-15 A	23-May-16
5786	2.1.5.2.6	Odourant System Albion	0.0	100%	100%	04-Jan-16 A	30-Jan-16 A
5787	2.1.5.2.5	Fuel Gas Supply	0.0	100%	100%	17-Sep-15 A	05-Mar-16 A
5788	2.1.5.2.10	Yard Pipe Drying Support	0.0	0%	100%	29-Feb-16 A	03-Mar-16 A
5789	**GTA.4.P4.W.CPW04.02.0 - Large Bore Piping**		0.0	0%	0%	18-Sep-15 A	05-Mar-16 A
5790	2.1.5.2.	36" Tie-in to Mainline (Spool 53A)	0.0	0%	100%	15-Oct-15 A	21-Oct-15 A
5791	2.1.5.2.1	Large Bore Piping	0.0	100%	100%	18-Sep-15 A	05-Mar-16 A
5792	**GTA.4.P4.W.CPW04.02.1 - Meter Run (Parkway)**		0.0	0%	0%	24-Nov-15 A	15-Jan-16 A
5793	2.1.5	Install Meter Run Header Parkway (Spool 14,15,16, 40 & 42)	0.0	0%	100%	24-Nov-15 A	22-Dec-15 A
5794	2.1.5	Meter Run (Parkway) (Spool 34,35, 36,37,38, 39)	0.0	100%	100%	28-Nov-15 A	15-Jan-16 A
5795	**GTA.4.P4.W.CPW04.02.2 - Regulator Run**		0.0	0%	0%	03-Nov-15 A	05-Mar-16 A
5796	2.1.5	36" to Regulator Run (Spool 52A)	0.0	0%	100%	26-Feb-16 A	05-Mar-16 A
5797	2.1.5	NPS 20 from 42" to Regulator Run (Spools 06 & 07)	0.0	0%	100%	09-Dec-15 A	14-Dec-15 A
5798	2.1.5	Install Regulator Run Header (Spool 8 & 13)	0.0	0%	100%	03-Nov-15 A	09-Dec-15 A
5799	2.1.5	Regulator Run (Spool 9,10,11, 12 & 52A)	0.0	100%	100%	03-Nov-15 A	19-Dec-15 A
5800	**GTA.4.P4.W.CPW04.02.3 - Mater Run (Maple Station)**		0.0	0%	0%	19-Dec-15 A	09-Feb-16 A
5801	2.1.5	Install Meter Run Header (Maple Station) (Spool 43,44 & 51)	0.0	0%	100%	19-Dec-15 A	09-Feb-16 A
5802	2.1.5	Meter Run (Maple Station) (Spool 45-47)	0.0	100%	100%	19-Jan-16 A	09-Feb-16 A
5803	**GTA.4.P4.W.CPW04.02 4- Heat Exhanger**		0.0	0%	0%	08-Dec-15 A	30-Jan-16 A
5804	2.1.5	Install Heat Exhanger Header Connections (Spool 18-27)	0.0	0%	100%	08-Dec-15 A	22-Dec-15 A
5805	2.1.5	Heat Exchanger & Spools (Spool 28-33)	0.0	100%	100%	08-Jan-16 A	30-Jan-16 A
5806	**GTA.4.P4.W.CPW04.03 - Boiler Room Piping**		0.0	0%	0%	20-Nov-15 A	07-Apr-16 A
5807	2.1.5.3.7	Painting/Coating Boiler Room	0.0	100%	100%	20-Nov-15 A	24-Feb-16 A
5808	2.1.5.3.6	Insulation - Sub	0.0	100%	100%	29-Jan-16 A	07-Apr-16 A
5809	2.1.5.3.5	Set Equipment Boilers and Pumps Albion	0.0	100%	100%	07-Dec-15 A	13-Jan-16 A
5810	2.1.5.3.4	Sheetmetal	0.0	100%	100%	07-Jan-16 A	13-Feb-16 A
5811	2.1.5.3.3	Hydrotesting	0.0	100%	100%	22-Jan-16 A	13-Feb-16 A
5812	2.1.5.3.2	Fuel Gas	0.0	100%	100%	07-Dec-15 A	21-Jan-16 A
5813	2.1.5.3.1	Gas Preheat System	0.0	100%	100%	07-Dec-15 A	21-Jan-16 A



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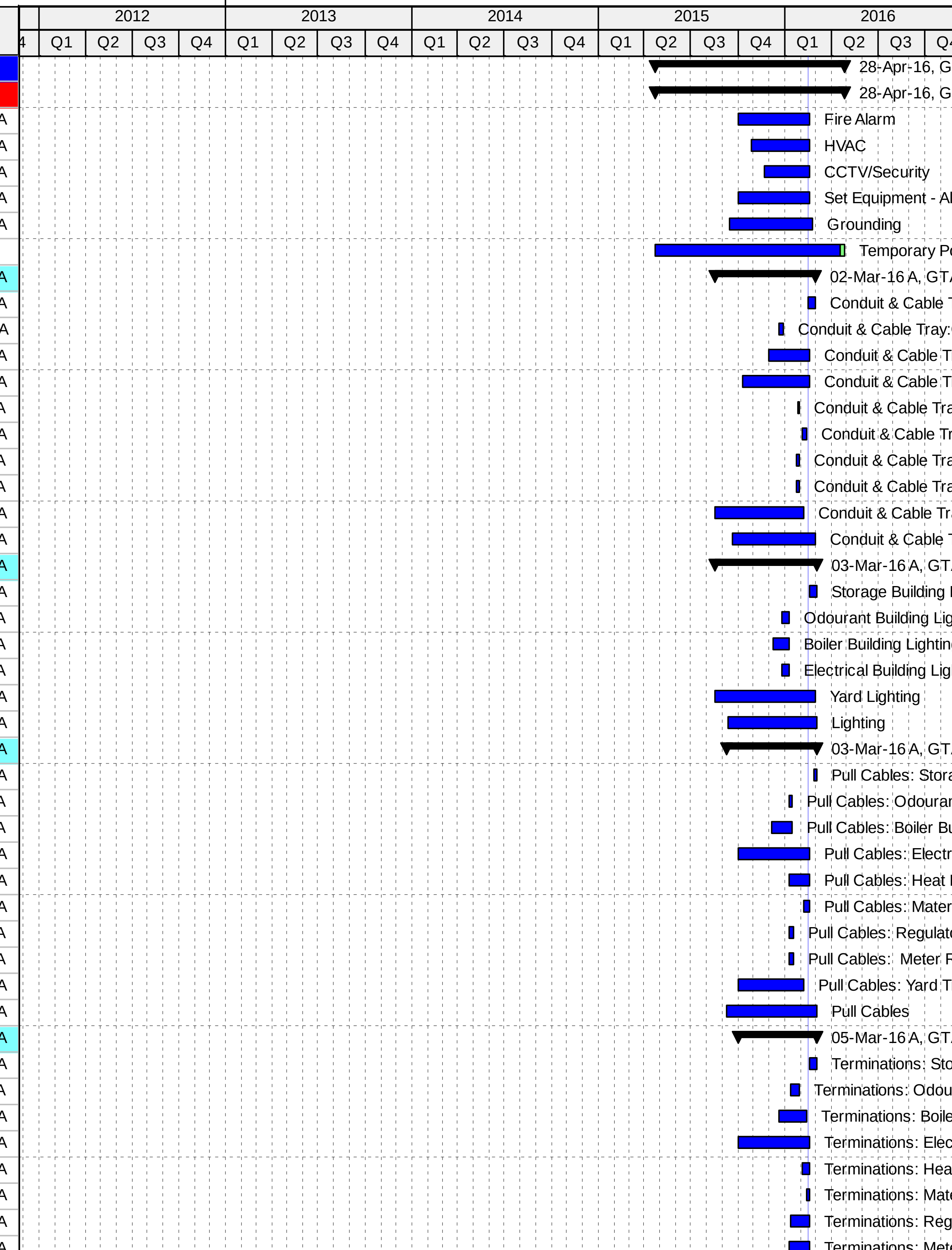
GTA - Master Schedule...	Classic Schedule Layout	03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5814	GTA.4.P4.W.CPW05 - Electrical and Instrumentation		10.0	0%	0%	21-Apr-15 A	28-Apr-16
5815	GTA.4.P4.W.CPW05.01 - Electrical Works		10.0	0%	0%	21-Apr-15 A	28-Apr-16
5816	2.1.6.1.9	Fire Alarm	0.0	100%	100%	03-Oct-15 A	17-Feb-16 A
5817	2.1.6.1.8	HVAC	0.0	100%	100%	29-Oct-15 A	18-Feb-16 A
5818	2.1.6.1.6	CCTV/Security	0.0	100%	100%	23-Nov-15 A	18-Feb-16 A
5819	2.1.6.1.4	Set Equipment - Albion	0.0	100%	100%	03-Oct-15 A	18-Feb-16 A
5820	2.1.6.1.3	Grounding	0.0	100%	100%	14-Sep-15 A	23-Feb-16 A
5821	2.1.6.1.1	Temporary Power	10.0	100%	92%	21-Apr-15 A	28-Apr-16
5822	GTA.4.P4.W.CPW05.10.1 - Conduit & Cable Tray		0.0	0%	0%	17-Aug-15 A	02-Mar-16 A
5823	2.1.6.1.	Conduit & Cable Tray:Storage Building	0.0	0%	100%	15-Feb-16 A	02-Mar-16 A
5824	2.1.6.1.	Conduit & Cable Tray:Odourant Building	0.0	0%	100%	22-Dec-15 A	30-Dec-15 A
5825	2.1.6.1.	Conduit & Cable Tray:Boiler Building	0.0	0%	100%	02-Dec-15 A	20-Feb-16 A
5826	2.1.6.1.	Conduit & Cable Tray:Electrical Building	0.0	0%	100%	10-Oct-15 A	20-Feb-16 A
5827	2.1.6.1.	Conduit & Cable Tray:Heat Exhanger	0.0	0%	100%	26-Jan-16 A	30-Jan-16 A
5828	2.1.6.1.	Conduit & Cable Tray:Mater Run (Maple Station)	0.0	0%	100%	04-Feb-16 A	12-Feb-16 A
5829	2.1.6.1.	Conduit & Cable Tray:Regulator Run	0.0	0%	100%	25-Jan-16 A	30-Jan-16 A
5830	2.1.6.1.	Conduit & Cable Tray:Meter Run (Parkway)	0.0	0%	100%	25-Jan-16 A	30-Jan-16 A
5831	2.1.6.1.	Conduit & Cable Tray: Yard Trenching (A/B/C/D/E/F/G/H/J/k	0.0	0%	100%	17-Aug-15 A	07-Feb-16 A
5832	2.1.6.1.2	Conduit & Cable Tray	0.0	100%	100%	22-Sep-15 A	02-Mar-16 A
5833	GTA.4.P4.W.CPW05.10.2 - Lighting		0.0	0%	0%	17-Aug-15 A	03-Mar-16 A
5834	2.1.6.1.	Storage Building Lighting	0.0	0%	100%	19-Feb-16 A	03-Mar-16 A
5835	2.1.6.1.	Odourant Building Lighting	0.0	0%	100%	28-Dec-15 A	09-Jan-16 A
5836	2.1.6.1.	Boiler Building Lighting	0.0	0%	100%	10-Dec-15 A	09-Jan-16 A
5837	2.1.6.1.	Electrical Building Lighting	0.0	0%	100%	28-Dec-15 A	09-Jan-16 A
5838	2.1.6.1.	Yard Lighting	0.0	0%	100%	17-Aug-15 A	01-Mar-16 A
5839	2.1.6.1.5	Lighting	0.0	100%	100%	11-Sep-15 A	03-Mar-16 A
5840	GTA.4.P4.W.CPW05.10.3 - Pull Cables		0.0	0%	0%	10-Sep-15 A	03-Mar-16 A
5841	2.1.6.1.	Pull Cables: Storage Building	0.0	0%	100%	27-Feb-16 A	03-Mar-16 A
5842	2.1.6.1.	Pull Cables: Odourant Building	0.0	0%	100%	09-Jan-16 A	16-Jan-16 A
5843	2.1.6.1.	Pull Cables: Boiler Building	0.0	0%	100%	07-Dec-15 A	15-Jan-16 A
5844	2.1.6.1.	Pull Cables: Electrical Building	0.0	0%	100%	01-Oct-15 A	20-Feb-16 A
5845	2.1.6.1.	Pull Cables: Heat Exhanger	0.0	0%	100%	11-Jan-16 A	20-Feb-16 A
5846	2.1.6.1.	Pull Cables: Mater Run (Maple Station)	0.0	0%	100%	08-Feb-16 A	20-Feb-16 A
5847	2.1.6.1.	Pull Cables: Regulator Run	0.0	0%	100%	11-Jan-16 A	18-Jan-16 A
5848	2.1.6.1.	Pull Cables: Meter Run (Parkway)	0.0	0%	100%	11-Jan-16 A	18-Jan-16 A
5849	2.1.6.1.	Pull Cables: Yard Trenching (A/B/C/D/E/F/G/H/J/K/L/M/N/P)	0.0	0%	100%	01-Oct-15 A	07-Feb-16 A
5850	2.1.6.1.7	Pull Cables	0.0	100%	100%	10-Sep-15 A	03-Mar-16 A
5851	GTA.4.P4.W.CPW05.10.4 - Terminations		0.0	0%	0%	03-Oct-15 A	05-Mar-16 A
5852	2.1.6.1.	Terminations: Storage Building	0.0	0%	100%	18-Feb-16 A	04-Mar-16 A
5853	2.1.6.1.	Terminations: Odourant Building	0.0	0%	100%	14-Jan-16 A	28-Jan-16 A
5854	2.1.6.1.	Terminations: Boiler Building	0.0	0%	100%	21-Dec-15 A	13-Feb-16 A
5855	2.1.6.1.	Terminations: Electrical Building	0.0	0%	100%	03-Oct-15 A	20-Feb-16 A
5856	2.1.6.1.	Terminations: Heat Exhanger	0.0	0%	100%	05-Feb-16 A	20-Feb-16 A
5857	2.1.6.1.	Terminations: Mater Run (Maple Station)	0.0	0%	100%	12-Feb-16 A	20-Feb-16 A
5858	2.1.6.1.	Terminations: Regulator Run	0.0	0%	100%	13-Jan-16 A	20-Feb-16 A
5859	2.1.6.1.	Terminations: Meter Run (Parkway)	0.0	0%	100%	11-Jan-16 A	20-Feb-16 A



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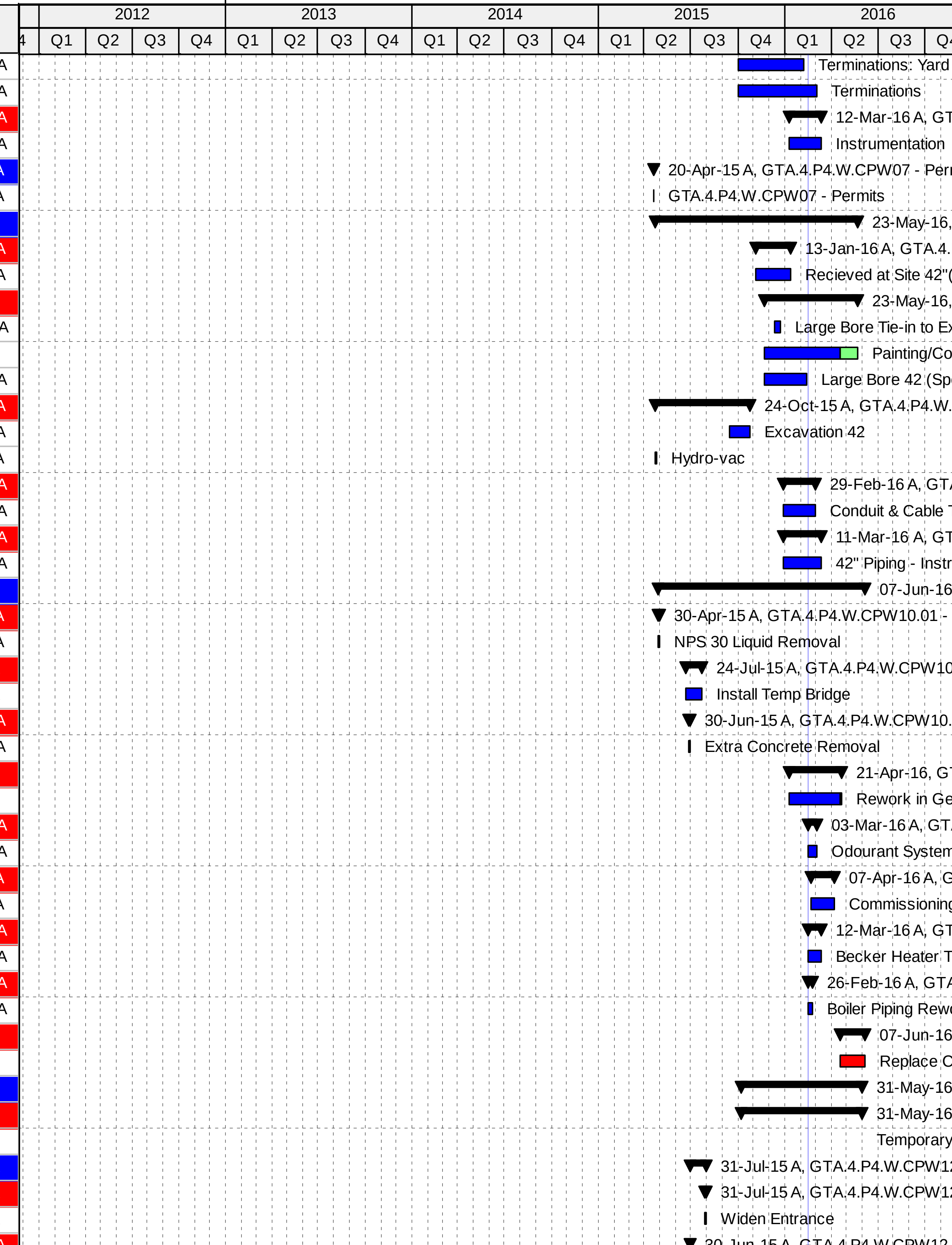
GTA - Master Schedule...	Classic Schedule Layout	03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5860	2.1.6.1.	Terminations: Yard Trenching (A/B/C/D/E/F/G/H/J/K/L/M/N/I	0.0	0%	100%	03-Oct-15 A	07-Feb-16 A
5861	2.1.6.1.	Terminations	0.0	100%	100%	03-Oct-15 A	05-Mar-16 A
5862	**GTA.4.P4.W.CPW05.02 - Instrumentation**		0.0	0%	0%	11-Jan-16 A	12-Mar-16 A
5863	2.1.6.2	Instrumentation	0.0	100%	100%	11-Jan-16 A	12-Mar-16 A
5864	**GTA.4.P4.W.CPW07 - Permits**		0.0	0%	0%	20-Apr-15 A	20-Apr-15 A
5865	2.1.8	GTA.4.P4.W.CPW07 - Permits	0.0	100%	100%	20-Apr-15 A	20-Apr-15 A
5866	**GTA.4.P4.W.CPW08 - 42" Piping Installation**		31.0	0%	0%	21-Apr-15 A	23-May-16
5867	**GTA.4.P4.W.CPW08.01 - 42" Piping - Shop Fabrication**		0.0	0%	0%	06-Nov-15 A	13-Jan-16 A
5868	2.1.3.1.3	Recieved at Site 42"(Spool 1-5, 41,50,52-54,58,59)	0.0	100%	100%	06-Nov-15 A	13-Jan-16 A
5869	**GTA.4.P4.W.CPW08.02 - 42" Piping - Installation**		31.0	0%	0%	21-Nov-15 A	23-May-16
5870	A01-220	Large Bore Tie-in to Existing System By Others	0.0	100%	100%	14-Dec-15 A	23-Dec-15 A
5871	2.1.3.2.2	Painting/Coating	31.0	100%	95%	21-Nov-15 A	23-May-16
5872	2.1.3.2.1	Large Bore 42 (Spool 1-5, 41,50,52-54,58,59)	0.0	100%	100%	21-Nov-15 A	13-Feb-16 A
5873	**GTA.4.P4.W.CPW08.03 - 42" Piping - Civil Works**		0.0	0%	0%	21-Apr-15 A	24-Oct-15 A
5874	2.1.3.3.2	Excavation 42	0.0	100%	100%	16-Sep-15 A	24-Oct-15 A
5875	2.1.3.3.1	Hydro-vac	0.0	100%	100%	21-Apr-15 A	25-Apr-15 A
5876	**GTA.4.P4.W.CPW08.04 - 42" Piping - Electrical Works**		0.0	0%	0%	29-Dec-15 A	29-Feb-16 A
5877	2.1.3.4.2	Conduit & Cable Tray 42	0.0	100%	100%	29-Dec-15 A	29-Feb-16 A
5878	**GTA.4.P4.W.CPW08.05 - 42" Piping - Instrumentation**		0.0	0%	0%	29-Dec-15 A	11-Mar-16 A
5879	2.1.3.5	42" Piping - Instrumentation	0.0	100%	100%	29-Dec-15 A	11-Mar-16 A
5880	**GTA.4.P4.W.CPW10 - Albion Station Change Revisions**		44.0	0%	0%	27-Apr-15 A	07-Jun-16
5881	**GTA.4.P4.W.CPW10.01 - NPS 30 Liquid Removal**		0.0	0%	0%	27-Apr-15 A	30-Apr-15 A
5882	2.1.4.1.1	NPS 30 Liquid Removal	0.0	100%	100%	27-Apr-15 A	30-Apr-15 A
5883	**GTA.4.P4.W.CPW10.02 - Install Temp Bridge**		0.0	0%	0%	22-Jun-15 A	24-Jul-15 A
5884	A1120	Install Temp Bridge	0.0	100%	100%	22-Jun-15 A	24-Jul-15 A
5885	**GTA.4.P4.W.CPW10.03 - Extra Concrete Removal**		0.0	0%	0%	26-Jun-15 A	30-Jun-15 A
5886	A1130	Extra Concrete Removal	0.0	100%	100%	26-Jun-15 A	30-Jun-15 A
5887	**GTA.4.P4.W.CPW10.04 - Generator Room Rework**		4.0	0%	0%	10-Jan-16 A	21-Apr-16
5888	2.1.10.4	Rework in Generator Room	4.0	0%	95%	10-Jan-16 A	21-Apr-16
5889	**GTA.4.P4.W.CPW10.05 - Odourant System Tubing**		0.0	0%	0%	16-Feb-16 A	03-Mar-16 A
5890	2.1.10.5	Odourant System Tubing	0.0	100%	100%	16-Feb-16 A	03-Mar-16 A
5891	**GTA.4.P4.W.CPW10.06 - Commissioning Support**		0.0	0%	0%	22-Feb-16 A	07-Apr-16 A
5892	2.1.10.6	Commissioning Support	0.0	0%	100%	22-Feb-16 A	07-Apr-16 A
5893	**GTA.4.P4.W.CPW10.07 - Becker Heater Tubing**		0.0	0%	0%	16-Feb-16 A	12-Mar-16 A
5894	2.1.10.7	Becker Heater Tubing Rework	0.0	0%	100%	16-Feb-16 A	12-Mar-16 A
5895	**GTA.4.P4.W.CPW10.08 - Boiler Piping Rework**		0.0	0%	0%	16-Feb-16 A	26-Feb-16 A
5896	2.1.10.8	Boiler Piping Rework	0.0	0%	100%	16-Feb-16 A	26-Feb-16 A
5897	**GTA.4.P4.W.CPW10.09 - Replace CVT Boxes**		44.0	0%	0%	18-Apr-16	07-Jun-16
5898	2.1.10.9	Replace CVT Boxes	44.0	0%	0%	18-Apr-16	07-Jun-16
5899	**GTA.4.P4.W.CPW11 - Temp Bridge Maintenance (CO 0005)**		38.0	0%	0%	09-Oct-15 A	31-May-16
5900	**GTA.4.P4.W.CPW11.01 - Temp Bridge Maintenance (CO 0005)**		38.0	0%	0%	09-Oct-15 A	31-May-16
5901	2.1.11.1	Temporary Bridge Maintenance	38.0	0%	90%	09-Oct-15 A	31-May-16
5902	**GTA.4.P4.W.CPW12 - Albion Entrance Widening (CO 0003)**		0.0	0%	0%	29-Jun-15 A	31-Jul-15 A
5903	**GTA.4.P4.W.CPW12.01 - Albion Entrance Widening (CO 0003)**		0.0	0%	0%	27-Jul-15 A	31-Jul-15 A
5904	2.1.12.1	Widen Entrance	0.0	0%	100%	27-Jul-15 A	31-Jul-15 A
5905	**GTA.4.P4.W.CPW12.02 - Albion Replace Culvert (CO 0008)**		0.0	0%	0%	29-Jun-15 A	30-Jun-15 A

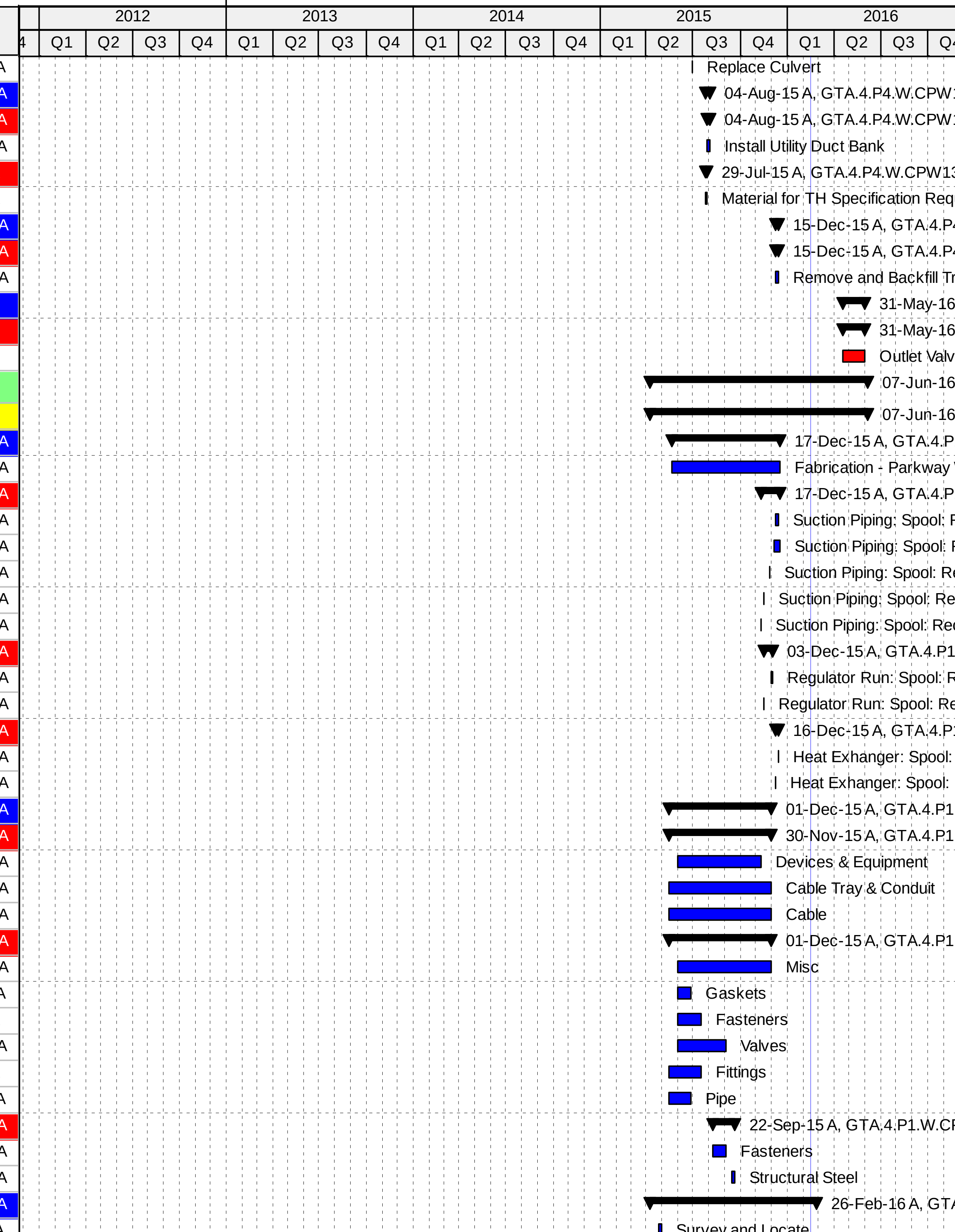


Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5906	2.1.12.2	Replace Culvert	0.0	0%	100%	29-Jun-15 A	30-Jun-15 A
5907	GTA.4.P4.W.CPW13 - Albion Electric Utility Duct (CO 0007)		0.0	0%	0%	27-Jul-15 A	04-Aug-15 A
5908	GTA.4.P4.W.CPW13.01 - Albion Electric Utility Duct (CO 0007)		0.0	0%	0%	30-Jul-15 A	04-Aug-15 A
5909	2.1.13.1	Install Utility Duct Bank	0.0	0%	100%	30-Jul-15 A	04-Aug-15 A
5910	GTA.4.P4.W.CPW13.02 - Albion TH Material Specs		0.0	0%	0%	27-Jul-15 A	29-Jul-15 A
5911	2.1.13.2	Material for TH Specification Requirements	0.0	0%	100%	27-Jul-15 A	29-Jul-15 A
5912	GTA.4.P4.W.CPW14 - Albion Bore Pit Removal (CO-028)		0.0	0%	0%	11-Dec-15 A	15-Dec-15 A
5913	GTA.4.P4.W.CPW14.01 - Albion Bore Pit Removal (CO-028)		0.0	0%	0%	11-Dec-15 A	15-Dec-15 A
5914	2.1.14.1	Remove and Backfill Track Bore Pits	0.0	0%	100%	11-Dec-15 A	15-Dec-15 A
5915	GTA.4.P4.W.CPW16 - Outlet Valve Fencing (CO 0024)		38.0	0%	0%	18-Apr-16	31-May-16
5916	GTA.4.P4.W.CPW16 - Outlet Valve Fencing (CO 0024)		38.0	0%	0%	18-Apr-16	31-May-16
5917	2.1.16.1	Outlet Valve Fencing	38.0	0%	0%	18-Apr-16	31-May-16
5918	**Package C**		44.0	0%	0%	07-Apr-15 A	07-Jun-16
5919	GTA.4.P1.W - Parkway West Gate and Meter Station 'C1'		44.0	0%	0%	07-Apr-15 A	07-Jun-16
5920	GTA.4.P1.W.CPW01 - Shop Fabrication		0.0	0%	0%	20-May-15 A	17-Dec-15 A
5921	3.1.1.3	Fabrication - Parkway West	0.0	100%	100%	20-May-15 A	17-Dec-15 A
5922	GTA.4.P1.W.CPW01.1 -Suction Piping		0.0	0%	0%	11-Nov-15 A	17-Dec-15 A
5923	3.1.1.3.5	Suction Piping: Spool: Recieved at Site GTA-MP2-PP-001-1	0.0	0%	100%	10-Dec-15 A	14-Dec-15 A
5924	3.1.1.3.4	Suction Piping: Spool: Recieved at Site GTA-MP2-PP-001-2	0.0	0%	100%	08-Dec-15 A	17-Dec-15 A
5925	3.1.1.3.3	Suction Piping: Spool: Recieved at Site GTA-MP2-PP-001-3	0.0	0%	100%	27-Nov-15 A	27-Nov-15 A
5926	3.1.1.3.2	Suction Piping: Spool: Recieved at Site GTA-MP2-PP-001-2	0.0	0%	100%	17-Nov-15 A	17-Nov-15 A
5927	3.1.1.3.1	Suction Piping: Spool: Recieved at Site GTA-MP2-PP-001-:	0.0	0%	100%	11-Nov-15 A	11-Nov-15 A
5928	GTA.4.P1.W.CPW01.2 -Regulator Run		0.0	0%	0%	16-Nov-15 A	03-Dec-15 A
5929	3.1.1.3.7	Regulator Run: Spool: Recieved at Site GTA-MP2-PP-001-:	0.0	0%	100%	02-Dec-15 A	03-Dec-15 A
5930	3.1.1.3.6	Regulator Run: Spool: Recieved at Site GTA-MP2-PP-001-:	0.0	0%	100%	16-Nov-15 A	16-Nov-15 A
5931	GTA.4.P1.W.CPW01.3 -Heat Exhanger		0.0	0%	0%	10-Dec-15 A	16-Dec-15 A
5932	3.1.1.3.9	Heat Exhanger: Spool: Recieved at Site GTA-MP2-PP-001-	0.0	0%	100%	16-Dec-15 A	16-Dec-15 A
5933	3.1.1.3.8	Heat Exhanger: Spool: Recieved at Site GTA-MP2-PP-001-	0.0	0%	100%	10-Dec-15 A	10-Dec-15 A
5934	GTA.4.P1.W.CPW02 - Contractor Supplied Materials		0.0	0%	0%	15-May-15 A	01-Dec-15 A
5935	GTA.4.P1.W.CPW02.01 - Electrical Material		0.0	0%	0%	15-May-15 A	30-Nov-15 A
5936	3.1.2.1.3	Devices & Equipment	0.0	100%	100%	01-Jun-15 A	11-Nov-15 A
5937	3.1.2.1.2	Cable Tray & Conduit	0.0	100%	100%	15-May-15 A	30-Nov-15 A
5938	3.1.2.1.1	Cable	0.0	100%	100%	15-May-15 A	30-Nov-15 A
5939	GTA.4.P1.W.CPW02.02 - Piping & Components		0.0	0%	0%	15-May-15 A	01-Dec-15 A
5940	3.1.2.2.6	Misc	0.0	100%	100%	01-Jun-15 A	01-Dec-15 A
5941	3.1.2.2.5	Gaskets	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
5942	3.1.2.2.4	Fasteners	0.0	100%	100%	01-Jun-15 A	17-Jul-15 A
5943	3.1.2.2.3	Valves	0.0	100%	100%	01-Jun-15 A	04-Sep-15 A
5944	3.1.2.2.2	Fittings	0.0	100%	100%	15-May-15 A	17-Jul-15 A
5945	3.1.2.2.1	Pipe	0.0	100%	100%	15-May-15 A	27-Jun-15 A
5946	GTA.4.P1.W.CPW02.03 - Mechanical Material		0.0	0%	0%	10-Aug-15 A	22-Sep-15 A
5947	3.1.2.3.2	Fasteners	0.0	100%	100%	10-Aug-15 A	04-Sep-15 A
5948	3.1.2.3.1	Structural Steel	0.0	100%	100%	14-Sep-15 A	22-Sep-15 A
5949	GTA.4.P1.W.CPW03 - Civil Works		0.0	0%	0%	07-Apr-15 A	26-Feb-16 A
5950	A1050	Survey and Locate	0.0	100%	100%	24-Apr-15 A	30-Apr-15 A

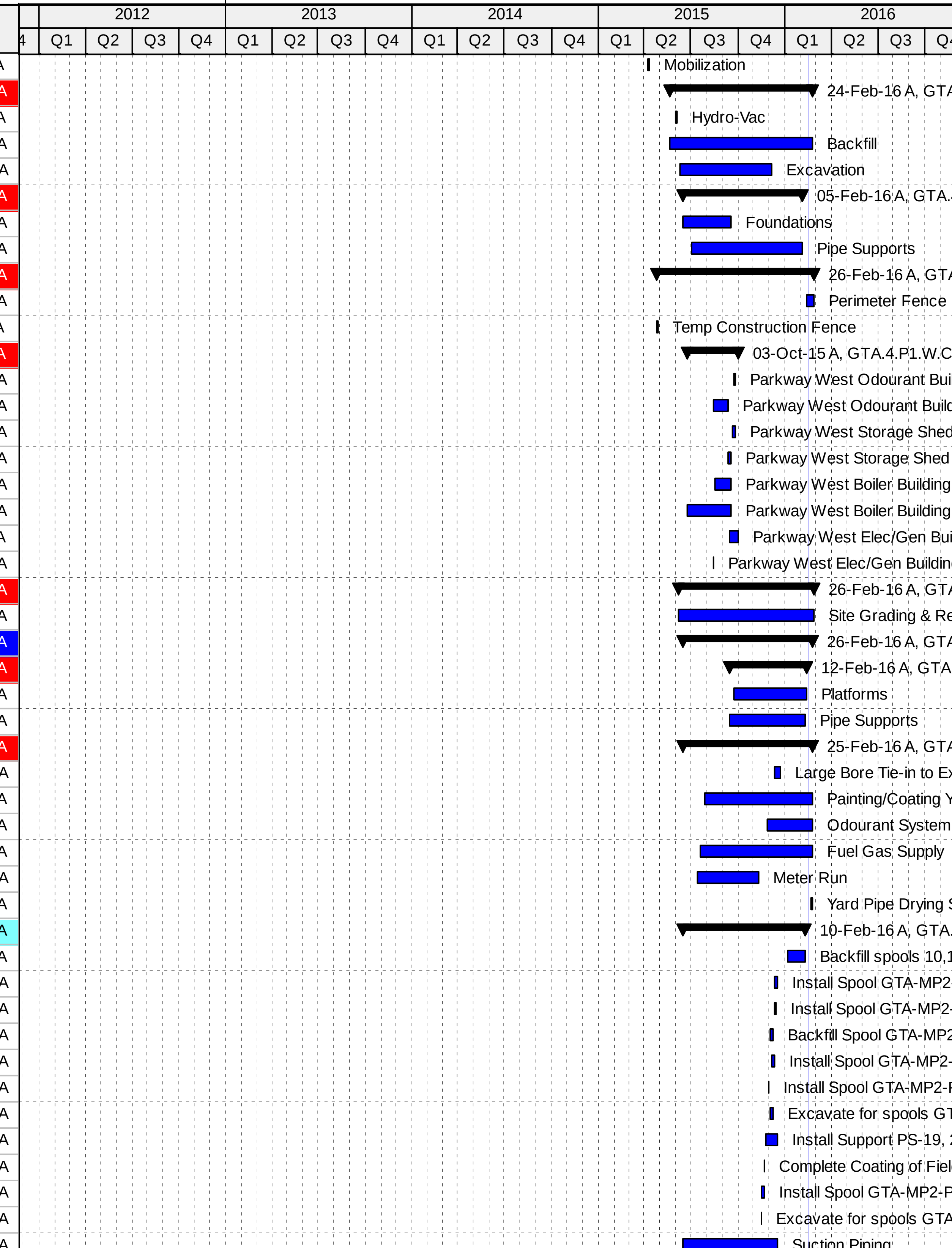


Actual Work | Critical Remaining Work | Summary
Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule...	Classic Schedule Layout	03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5951	A07-100	Mobilization	0.0	100%	100%	07-Apr-15 A	11-Apr-15 A
5952	**GTA.4.P1.W.CPW03.01 - Earth Works**		0.0	0%	0%	21-May-15 A	24-Feb-16 A
5953	3.1.4.1.3	Hydro-Vac	0.0	100%	100%	01-Jun-15 A	04-Jun-15 A
5954	3.1.4.1.2	Backfill	0.0	100%	100%	21-May-15 A	24-Feb-16 A
5955	3.1.4.1.1	Excavation	0.0	100%	100%	10-Jun-15 A	07-Dec-15 A
5956	**GTA.4.P1.W.CPW03.02 - Footings & Foundations**		0.0	0%	0%	15-Jun-15 A	05-Feb-16 A
5957	3.1.4.2.2	Foundations	0.0	100%	100%	15-Jun-15 A	19-Sep-15 A
5958	3.1.4.2.1	Pipe Supports	0.0	100%	100%	02-Jul-15 A	05-Feb-16 A
5959	**GTA.4.P1.W.CPW03.03 - Fencing**		0.0	0%	0%	24-Apr-15 A	26-Feb-16 A
5960	3.1.4.3.2	Perimeter Fence	0.0	100%	100%	12-Feb-16 A	26-Feb-16 A
5961	3.1.4.3.1	Temp Construction Fence	0.0	100%	100%	24-Apr-15 A	28-Apr-15 A
5962	**GTA.4.P1.W.CPW03.04 - Building Erection**		0.0	0%	0%	25-Jun-15 A	03-Oct-15 A
5963	A1230	Parkway West Odourant Building Finishing	0.0	100%	100%	24-Sep-15 A	26-Sep-15 A
5964	A1220	Parkway West Odourant Building Assembly - Hygrade	0.0	100%	100%	15-Aug-15 A	11-Sep-15 A
5965	A1210	Parkway West Storage Shed Finishing	0.0	100%	100%	21-Sep-15 A	26-Sep-15 A
5966	A1200	Parkway West Storage Shed Assembly - Hygrade	0.0	100%	100%	12-Sep-15 A	19-Sep-15 A
5967	A1190	Parkway West Boiler Building Finishing	0.0	100%	100%	19-Aug-15 A	17-Sep-15 A
5968	A1180	Parkway West Boiler Building Assembly - Hygrade	0.0	100%	100%	25-Jun-15 A	19-Sep-15 A
5969	A1170	Parkway West Elec/Gen Building Finishing	0.0	100%	100%	14-Sep-15 A	03-Oct-15 A
5970	3.1.4.4	Parkway West Elec/Gen Building Assembly - Hygrade	0.0	100%	100%	14-Aug-15 A	15-Aug-15 A
5971	**GTA.4.P1.W.CPW03.05 - Site Grading & Restoration**		0.0	0%	0%	08-Jun-15 A	26-Feb-16 A
5972	3.1.4.5	Site Grading & Restoration	0.0	100%	100%	08-Jun-15 A	26-Feb-16 A
5973	**GTA.4.P1.W.CPW04 - Mechanical and Piping**		0.0	0%	0%	15-Jun-15 A	26-Feb-16 A
5974	**GTA.4.P1.W.CPW04.01 - Structural Steel Erection**		0.0	0%	0%	16-Sep-15 A	12-Feb-16 A
5975	3.1.5.1.2	Platforms	0.0	100%	100%	25-Sep-15 A	12-Feb-16 A
5976	3.1.5.1.1	Pipe Supports	0.0	100%	100%	16-Sep-15 A	09-Feb-16 A
5977	**GTA.4.P1.W.CPW04.02 - Yard Piping**		0.0	0%	0%	15-Jun-15 A	25-Feb-16 A
5978	A07-200	Large Bore Tie-in to Existing System By Others	0.0	100%	100%	14-Dec-15 A	23-Dec-15 A
5979	3.1.5.2.7	Painting/Coating Yard Piping	0.0	100%	100%	28-Jul-15 A	25-Feb-16 A
5980	3.1.5.2.5	Odourant System Parkway	0.0	100%	100%	28-Nov-15 A	23-Feb-16 A
5981	3.1.5.2.4	Fuel Gas Supply	0.0	100%	100%	21-Jul-15 A	24-Feb-16 A
5982	3.1.5.2.2	Meter Run	0.0	100%	100%	13-Jul-15 A	12-Nov-15 A
5983	3.1.5.2.10	Yard Pipe Drying Support	0.0	0%	100%	22-Feb-16 A	25-Feb-16 A
5984	**GTA.4.P1.W.CPW04.02.1 - Suction Piping**		0.0	0%	0%	15-Jun-15 A	10-Feb-16 A
5985	3.1.5.2.	Backfill spools 10,11, 24,25,26	0.0	0%	100%	06-Jan-16 A	10-Feb-16 A
5986	3.1.5.2.	Install Spool GTA-MP2-PP-001-24, 25	0.0	0%	100%	14-Dec-15 A	18-Dec-15 A
5987	3.1.5.2.	Install Spool GTA-MP2-PP-001-10, 11	0.0	0%	100%	14-Dec-15 A	16-Dec-15 A
5988	3.1.5.2.	Backfill Spool GTA-MP2-PP-001-9, 27	0.0	0%	100%	04-Dec-15 A	10-Dec-15 A
5989	3.1.5.2.	Install Spool GTA-MP2-PP-001-26	0.0	0%	100%	07-Dec-15 A	12-Dec-15 A
5990	3.1.5.2.	Install Spool GTA-MP2-PP-001-34	0.0	0%	100%	01-Dec-15 A	01-Dec-15 A
5991	3.1.5.2.	Excavate for spools GTA-MP2-PP-001- 25, 24, 26	0.0	0%	100%	04-Dec-15 A	11-Dec-15 A
5992	3.1.5.2.	Install Support PS-19, 20,43,45,46,47,48	0.0	0%	100%	24-Nov-15 A	18-Dec-15 A
5993	3.1.5.2.	Complete Coating of Field Welds	0.0	0%	100%	23-Nov-15 A	23-Nov-15 A
5994	3.1.5.2.	Install Spool GTA-MP2-PP-001-9, 27 & 29	0.0	0%	100%	17-Nov-15 A	21-Nov-15 A
5995	3.1.5.2.	Excavate for spools GTA-MP2-PP-001-9, 27, 29	0.0	0%	100%	16-Nov-15 A	17-Nov-15 A
5996	3.1.5.2.1	Suction Piping	0.0	100%	100%	15-Jun-15 A	18-Dec-15 A

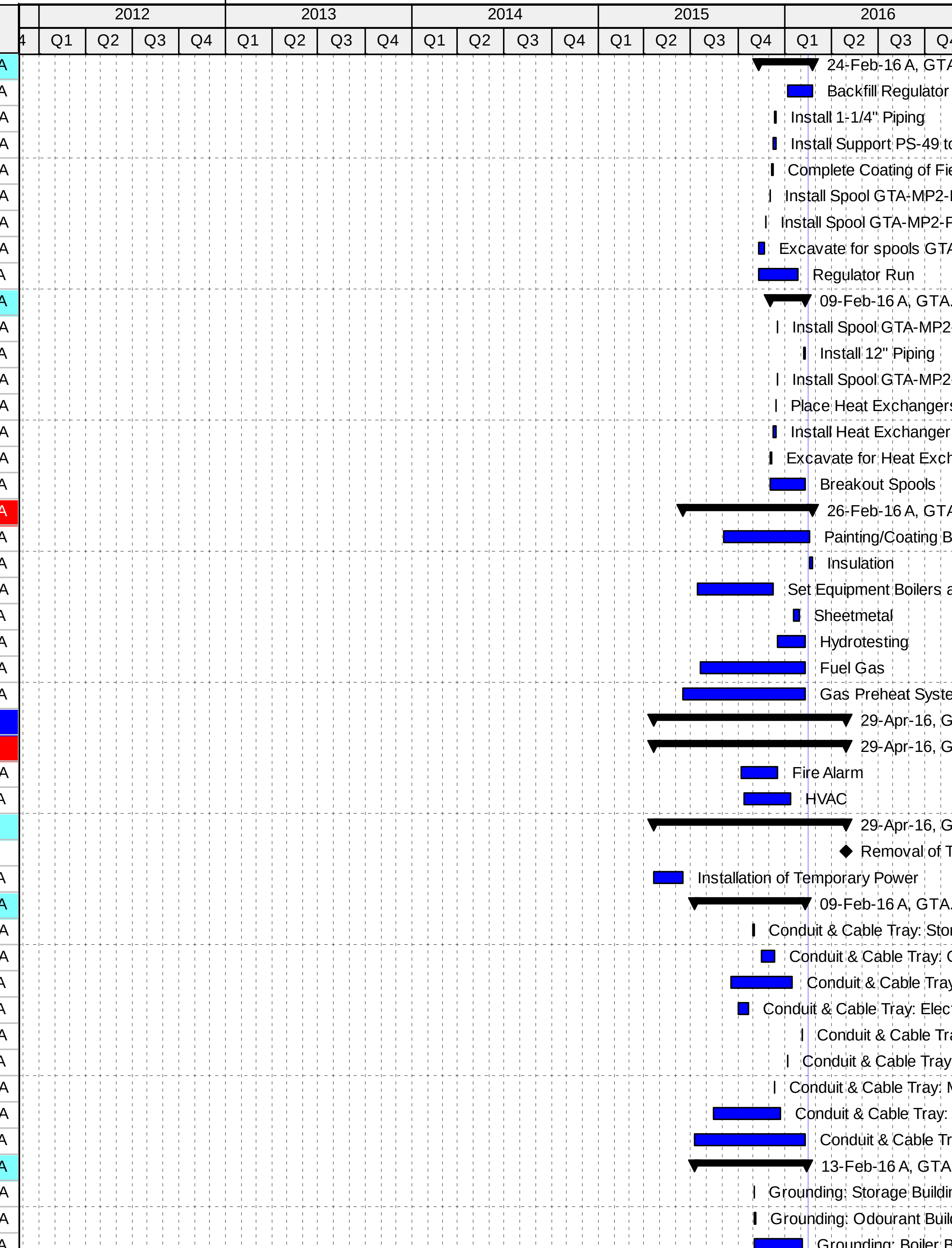


Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule...	Classic Schedule Layout	03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
5997	**GTA.4.P1.W.CPW04.02.2 - Regulator Run**		0.0	0%	0%	12-Nov-15 A	24-Feb-16 A
5998	3.1.5.2.	Backfill Regulator Runs	0.0	0%	100%	06-Jan-16 A	24-Feb-16 A
5999	3.1.5.2.	Install 1-1/4" Piping	0.0	0%	100%	12-Dec-15 A	16-Dec-15 A
6000	3.1.5.2.	Install Support PS-49 to 60	0.0	0%	100%	10-Dec-15 A	16-Dec-15 A
6001	3.1.5.2.	Complete Coating of Field Welds	0.0	0%	100%	08-Dec-15 A	08-Dec-15 A
6002	3.1.5.2.	Install Spool GTA-MP2-PP-001-31 & 32	0.0	0%	100%	03-Dec-15 A	04-Dec-15 A
6003	3.1.5.2.	Install Spool GTA-MP2-PP-001-30 & 33	0.0	0%	100%	25-Nov-15 A	26-Nov-15 A
6004	3.1.5.2.	Excavate for spools GTA-MP2-PP-001-30 to 33	0.0	0%	100%	12-Nov-15 A	23-Nov-15 A
6005	3.1.5.2.3	Regulator Run	0.0	100%	100%	12-Nov-15 A	27-Jan-16 A
6006	**GTA.4.P1.W.CPW04.02.3 - Breakout Spools**		0.0	0%	0%	04-Dec-15 A	09-Feb-16 A
6007	A1310	Install Spool GTA-MP2-PP-001- 22 & 23	0.0	100%	100%	17-Dec-15 A	18-Dec-15 A
6008	3.1.5.2.	Install 12" Piping	0.0	0%	100%	08-Feb-16 A	09-Feb-16 A
6009	3.1.5.2.	Install Spool GTA-MP2-PP-001-14,15	0.0	0%	100%	18-Dec-15 A	19-Dec-15 A
6010	3.1.5.2.	Place Heat Exchangers 1 & 2	0.0	0%	100%	14-Dec-15 A	14-Dec-15 A
6011	3.1.5.2.	Install Heat Exchanger Concrete Supports	0.0	0%	100%	09-Dec-15 A	14-Dec-15 A
6012	3.1.5.2.	Excavate for Heat Exchanger Supports	0.0	0%	100%	04-Dec-15 A	07-Dec-15 A
6013	3.1.5.2.6	Breakout Spools	0.0	100%	100%	04-Dec-15 A	09-Feb-16 A
6014	**GTA.4.P1.W.CPW04.03 - Boiler Room Piping**		0.0	0%	0%	15-Jun-15 A	26-Feb-16 A
6015	3.1.5.3.7	Painting/Coating Boiler Room	0.0	100%	100%	03-Sep-15 A	20-Feb-16 A
6016	3.1.5.3.6	Insulation	0.0	100%	100%	18-Feb-16 A	26-Feb-16 A
6017	3.1.5.3.5	Set Equipment Boilers and Pumps	0.0	100%	100%	14-Jul-15 A	09-Dec-15 A
6018	3.1.5.3.4	Sheetmetal	0.0	100%	100%	18-Jan-16 A	30-Jan-16 A
6019	3.1.5.3.3	Hydrotesting	0.0	100%	100%	17-Dec-15 A	10-Feb-16 A
6020	3.1.5.3.2	Fuel Gas	0.0	100%	100%	21-Jul-15 A	10-Feb-16 A
6021	3.1.5.3.1	Gas Preheat System	0.0	100%	100%	15-Jun-15 A	09-Feb-16 A
6022	**GTA.4.P1.W.CPW05 - Electrical and Instrumentation**		0.0	0%	0%	20-Apr-15 A	29-Apr-16
6023	**GTA.4.P1.W.CPW05.01 - Electrical Works**		0.0	0%	0%	20-Apr-15 A	29-Apr-16
6024	3.1.6.1.8	Fire Alarm	0.0	100%	100%	09-Oct-15 A	19-Dec-15 A
6025	3.1.6.1.7	HVAC	0.0	100%	100%	15-Oct-15 A	11-Jan-16 A
6026	**GTA.4.P1.W.CPW05.01.1 - Temp Power**		0.0	0%	0%	20-Apr-15 A	29-Apr-16
6027	3.1.6.1.	Removal of Temp Power	0.0	0%	0%		29-Apr-16
6028	3.1.6.1.1	Installation of Temporary Power	0.0	100%	100%	20-Apr-15 A	15-Jun-15 A
6029	**GTA.4.P1.W.CPW05.01.2 - Conduit & Cable Tray**		0.0	0%	0%	08-Jul-15 A	09-Feb-16 A
6030	3.1.6.1.	Conduit & Cable Tray: Storage Building	0.0	0%	100%	30-Oct-15 A	02-Nov-15 A
6031	3.1.6.1.	Conduit & Cable Tray: Odourant Building	0.0	0%	100%	16-Nov-15 A	12-Dec-15 A
6032	3.1.6.1.	Conduit & Cable Tray: Boiler Building	0.0	0%	100%	18-Sep-15 A	14-Jan-16 A
6033	3.1.6.1.	Conduit & Cable Tray: Electrical Building	0.0	0%	100%	01-Oct-15 A	23-Oct-15 A
6034	3.1.6.1.	Conduit & Cable Tray: Heat Exchanger	0.0	0%	100%	06-Feb-16 A	06-Feb-16 A
6035	3.1.6.1.	Conduit & Cable Tray: Regulator Run	0.0	0%	100%	07-Jan-16 A	08-Jan-16 A
6036	3.1.6.1.	Conduit & Cable Tray: Meter Run	0.0	0%	100%	11-Dec-15 A	12-Dec-15 A
6037	3.1.6.1.	Conduit & Cable Tray: Yard Trenching (A/B/C/D/E/F/G/H/I/J	0.0	0%	100%	14-Aug-15 A	23-Dec-15 A
6038	3.1.6.1.2	Conduit & Cable Tray	0.0	100%	100%	08-Jul-15 A	09-Feb-16 A
6039	**GTA.4.P1.W.CPW05.01.3 - Grounding**		0.0	0%	0%	09-Jul-15 A	13-Feb-16 A
6040	3.1.6.1.	Grounding: Storage Building	0.0	0%	100%	02-Nov-15 A	03-Nov-15 A
6041	3.1.6.1.	Grounding: Odourant Building	0.0	0%	100%	02-Nov-15 A	06-Nov-15 A
6042	3.1.6.1.	Grounding: Boiler Building	0.0	0%	100%	02-Nov-15 A	04-Feb-16 A



Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

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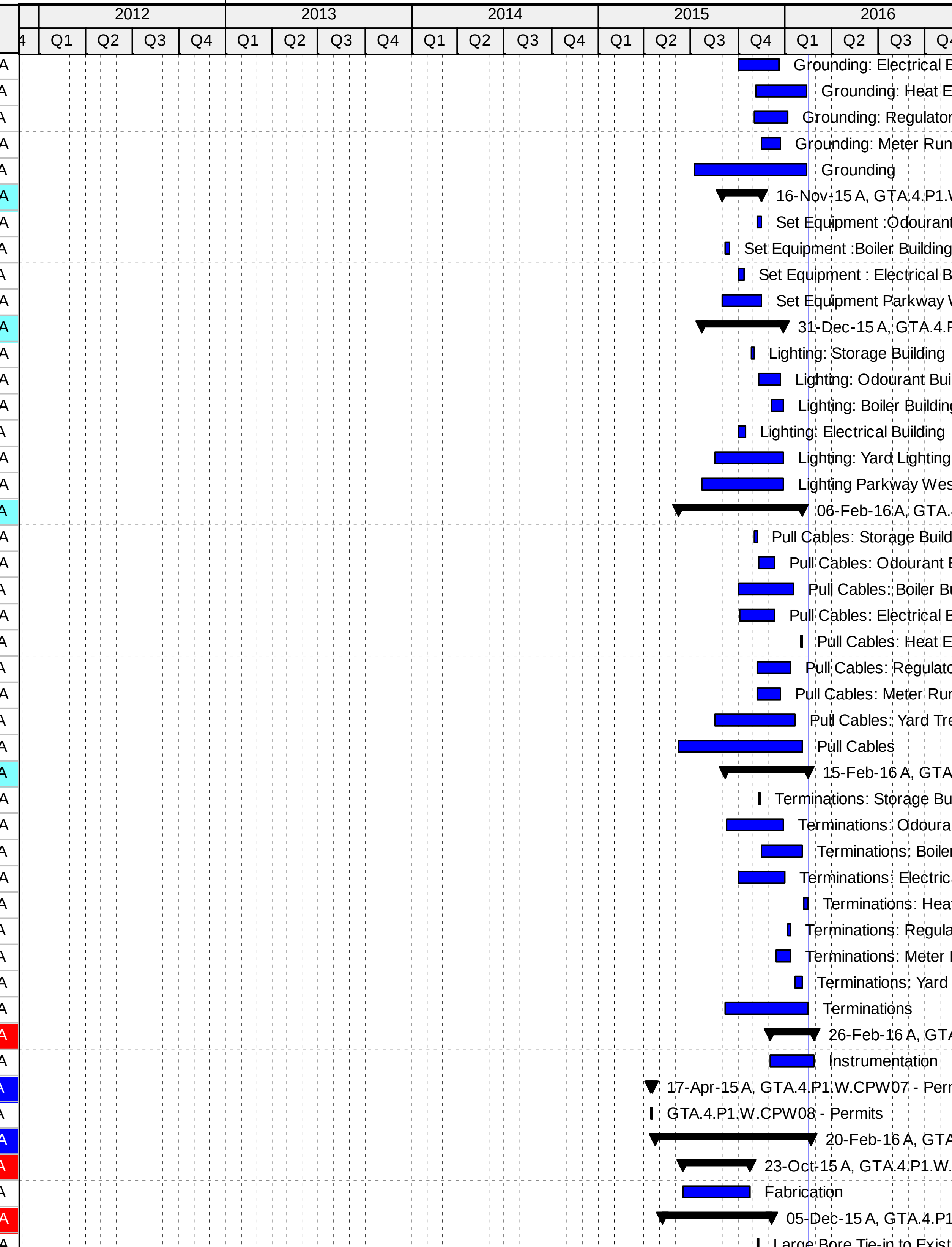
GTA - Master Schedule...	Classic Schedule Layout	03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
6043	3.1.6.1.	Grounding: Electrical Building	0.0	0%	100%	01-Oct-15 A	21-Dec-15 A
6044	3.1.6.1.	Grounding: Heat Exhanger	0.0	0%	100%	04-Nov-15 A	13-Feb-16 A
6045	3.1.6.1.	Grounding: Regulator Run	0.0	0%	100%	03-Nov-15 A	08-Jan-16 A
6046	3.1.6.1.	Grounding: Meter Run	0.0	0%	100%	16-Nov-15 A	23-Dec-15 A
6047	3.1.6.1.3	Grounding	0.0	100%	100%	09-Jul-15 A	13-Feb-16 A
6048	**GTA.4.P1.W.CPW05.01.4 - Set Equipment**		0.0	0%	0%	02-Sep-15 A	16-Nov-15 A
6049	3.1.6.1.	Set Equipment :Odourant Building	0.0	0%	100%	09-Nov-15 A	16-Nov-15 A
6050	3.1.6.1.	Set Equipment :Boiler Building	0.0	0%	100%	07-Sep-15 A	15-Sep-15 A
6051	3.1.6.1.	Set Equipment : Electrical Building	0.0	0%	100%	01-Oct-15 A	14-Oct-15 A
6052	3.1.6.1.4	Set Equipment Parkway West (MCC-1, UPS, RTU Pannels	0.0	100%	100%	02-Sep-15 A	16-Nov-15 A
6053	**GTA.4.P1.W.CPW05.01.5 - Lighting**		0.0	0%	0%	23-Jul-15 A	31-Dec-15 A
6054	3.1.6.1.	Lighting: Storage Building	0.0	0%	100%	28-Oct-15 A	03-Nov-15 A
6055	3.1.6.1.	Lighting: Odourant Building	0.0	0%	100%	10-Nov-15 A	22-Dec-15 A
6056	3.1.6.1.	Lighting: Boiler Building	0.0	0%	100%	07-Dec-15 A	31-Dec-15 A
6057	3.1.6.1.	Lighting: Electrical Building	0.0	0%	100%	01-Oct-15 A	15-Oct-15 A
6058	3.1.6.1.	Lighting: Yard Lighting	0.0	0%	100%	17-Aug-15 A	31-Dec-15 A
6059	3.1.6.1.5	Lighting Parkway West	0.0	100%	100%	23-Jul-15 A	31-Dec-15 A
6060	**GTA.4.P1.W.CPW05.01.6 - Pull Cables**		0.0	0%	0%	08-Jun-15 A	06-Feb-16 A
6061	3.1.6.1.	Pull Cables: Storage Building	0.0	0%	100%	03-Nov-15 A	07-Nov-15 A
6062	3.1.6.1.	Pull Cables: Odourant Building	0.0	0%	100%	11-Nov-15 A	12-Dec-15 A
6063	3.1.6.1.	Pull Cables: Boiler Building Finish Jan 19	0.0	0%	100%	02-Oct-15 A	19-Jan-16 A
6064	3.1.6.1.	Pull Cables: Electrical Building	0.0	0%	100%	06-Oct-15 A	12-Dec-15 A
6065	3.1.6.1.	Pull Cables: Heat Exhanger	0.0	0%	100%	02-Feb-16 A	06-Feb-16 A
6066	3.1.6.1.	Pull Cables: Regulator Run	0.0	0%	100%	09-Nov-15 A	13-Jan-16 A
6067	3.1.6.1.	Pull Cables: Meter Run	0.0	0%	100%	09-Nov-15 A	23-Dec-15 A
6068	3.1.6.1.	Pull Cables: Yard Trenching (A/B/C/D/E/F/G/H/I/J/K/L/M/N/(	0.0	0%	100%	17-Aug-15 A	21-Jan-16 A
6069	3.1.6.1.6	Pull Cables	0.0	100%	100%	08-Jun-15 A	06-Feb-16 A
6070	**GTA.4.P1.W.CPW05.01.7 - Terminations**		0.0	0%	0%	08-Sep-15 A	15-Feb-16 A
6071	3.1.6.1.	Terminations: Storage Building	0.0	0%	100%	12-Nov-15 A	14-Nov-15 A
6072	3.1.6.1.	Terminations: Odourant Building	0.0	0%	100%	08-Sep-15 A	30-Dec-15 A
6073	3.1.6.1.	Terminations: Boiler Building	0.0	0%	100%	17-Nov-15 A	06-Feb-16 A
6074	3.1.6.1.	Terminations: Electrical Building	0.0	0%	100%	01-Oct-15 A	31-Dec-15 A
6075	3.1.6.1.	Terminations: Heat Exhanger	0.0	0%	100%	08-Feb-16 A	15-Feb-16 A
6076	3.1.6.1.	Terminations: Regulator Run	0.0	0%	100%	07-Jan-16 A	14-Jan-16 A
6077	3.1.6.1.	Terminations: Meter Run	0.0	0%	100%	14-Dec-15 A	13-Jan-16 A
6078	3.1.6.1.	Terminations: Yard Trenching (A/B/C/D/E/F/G/H/I/J/K/L/M/N	0.0	0%	100%	22-Jan-16 A	05-Feb-16 A
6079	3.1.6.1.9	Terminations	0.0	100%	100%	08-Sep-15 A	15-Feb-16 A
6080	**GTA.4.P1.W.CPW05.02 - Instrumentation**		0.0	0%	0%	05-Dec-15 A	26-Feb-16 A
6081	3.1.6.2	Instrumentation	0.0	100%	100%	05-Dec-15 A	26-Feb-16 A
6082	**GTA.4.P1.W.CPW07 - Permits**		0.0	0%	0%	15-Apr-15 A	17-Apr-15 A
6083	3.1.8	GTA.4.P1.W.CPW08 - Permits	0.0	100%	100%	15-Apr-15 A	17-Apr-15 A
6084	**GTA.4.P1.W.CPW08 - 42" Piping Installation**		0.0	0%	0%	21-Apr-15 A	20-Feb-16 A
6085	**GTA.4.P1.W.CPW08.01 - 42" Piping - Shop Fabrication**		0.0	0%	0%	15-Jun-15 A	23-Oct-15 A
6086	3.1.3.1.3	Fabrication	0.0	100%	100%	15-Jun-15 A	23-Oct-15 A
6087	**GTA.4.P1.W.CPW08.02 - 42" Piping - Installation**		0.0	0%	0%	08-May-15 A	05-Dec-15 A
6088	A01-230	Large Bore Tie-in to Existing System By Others	0.0	100%	100%	09-Nov-15 A	11-Nov-15 A



Actual Work   Critical Remaining Work   Summary
Remaining Work   Milestone

TASK filter: All Activities

GTA - Master Schedule...	Classic Schedule Layout	03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
6089	3.1.3.2.2	Painting/Coating 42 Parkway West	0.0	100%	100%	20-May-15 A	05-Dec-15 A
6090	3.1.3.2.1	Discharge Piping	0.0	100%	100%	08-May-15 A	08-Nov-15 A
6091	**GTA.4.P1.W.CPW08.03 - 42" Piping - Civil Works**		0.0	0%	0%	21-Apr-15 A	25-Sep-15 A
6092	3.1.3.3.2	Excavation	0.0	100%	100%	04-May-15 A	25-Sep-15 A
6093	3.1.3.3.1	Hydro-vac	0.0	100%	100%	21-Apr-15 A	24-Apr-15 A
6094	**GTA.4.P1.W.CPW08.04 - 42" Piping - Electrical Works**		0.0	0%	0%	14-Dec-15 A	13-Jan-16 A
6095	3.1.3.4.2	Conduit & Cable Tray	0.0	100%	100%	14-Dec-15 A	13-Jan-16 A
6096	**GTA.4.P1.W.CPW08.05 - 42" Piping - Instrumentation**		0.0	0%	0%	22-Dec-15 A	20-Feb-16 A
6097	3.1.3.5	42" Piping - Instrumentation	0.0	100%	100%	22-Dec-15 A	20-Feb-16 A
6098	**GTA.4.P1.W.CPW10 - Cathodic Protection System (Change)**		0.0	0%	0%	20-Nov-15 A	05-Feb-16 A
6099	**GTA.4.P1.W.CPW10.01 - Cathodic Protection System (Change)**		0.0	0%	0%	20-Nov-15 A	05-Feb-16 A
6100	3.1.10.1	Cathodic Protection System	0.0	0%	100%	20-Nov-15 A	05-Feb-16 A
6101	**GTA.4.P1.W.CPW11 - Defective Fittings Rework**		0.0	0%	0%	17-Aug-15 A	15-Sep-15 A
6102	**GTA.4.P1.W.CPW11.01 - Remove & Replace Defective Fittings**		0.0	0%	0%	17-Aug-15 A	15-Sep-15 A
6103	3.1.11.4	Site Blasting/Coating Spool GTA-MP2-PP-001-039	0.0	0%	100%	15-Sep-15 A	15-Sep-15 A
6104	3.1.11.3	Reinstall Spool GTA-MP2-PP-001-039 at Site	0.0	0%	100%	09-Sep-15 A	10-Sep-15 A
6105	3.1.11.2	Fabrication - Remove & Replace Defective 42x20 Tees	0.0	0%	100%	25-Aug-15 A	03-Sep-15 A
6106	3.1.11.1	Remove Spool GTA-MP2-PP-001-039 from Site	0.0	0%	100%	17-Aug-15 A	25-Aug-15 A
6107	**GTA.4.P1.W.CPW12 - Station Outlet Extensions**		0.0	0%	0%	02-Nov-15 A	19-Mar-16 A
6108	**GTA.4.P1.W.CPW12.01 - Station Outlet Extensions**		0.0	0%	0%	02-Nov-15 A	19-Dec-15 A
6109	3.1.12.5	Coat Pipe	0.0	0%	100%	09-Nov-15 A	19-Dec-15 A
6110	3.1.12.4	Install & Weld Pipe	0.0	0%	100%	02-Nov-15 A	18-Dec-15 A
6111	3.1.12.3	Road Rework	0.0	0%	100%	16-Dec-15 A	18-Dec-15 A
6112	3.1.12.2	Backfill	0.0	0%	100%	16-Nov-15 A	15-Dec-15 A
6113	3.1.12.1	Excavation	0.0	0%	100%	02-Nov-15 A	12-Dec-15 A
6114	**GTA.4.P1.W.CPW12.02 - Reinstall Monolithic Isolators**		0.0	0%	0%	20-Feb-16 A	17-Mar-16 A
6115	3.1.12.2.3	Coat Pipe	0.0	0%	100%	14-Mar-16 A	17-Mar-16 A
6116	3.1.12.2.2	Install & Weld Pipe	0.0	0%	100%	20-Feb-16 A	17-Mar-16 A
6117	3.1.12.2.1	Excavation & Backfill	0.0	0%	100%	22-Feb-16 A	27-Feb-16 A
6118	**GTA.4.P1.W.CPW12.03 - NPS 36 Mainline Tie-in**		0.0	0%	0%	08-Mar-16 A	19-Mar-16 A
6119	3.1.12.3.3	Coat Pipe	0.0	0%	100%	14-Mar-16 A	17-Mar-16 A
6120	3.1.12.3.2	Install & Weld Pipe	0.0	0%	100%	08-Mar-16 A	12-Mar-16 A
6121	3.1.12.3.1	Excavation & Backfill	0.0	0%	100%	14-Mar-16 A	19-Mar-16 A
6122	**GTA.4.P1.W.CPW13 - Boiler Piping Rework**		0.0	0%	0%	23-Nov-15 A	19-Dec-15 A
6123	**GTA.4.P1.W.CPW13.01 - Boiler Piping Rework**		0.0	0%	0%	23-Nov-15 A	19-Dec-15 A
6124	3.1.13.1	Rework Boiler Room Piping	0.0	0%	100%	23-Nov-15 A	19-Dec-15 A
6125	**GTA.4.P1.W.CPW14 - Parkway West Change Revisions**		44.0	0%	0%	04-Jan-16 A	07-Jun-16
6126	**GTA.4.P1.W.CPW14.01 - Generator Room Rework**		0.0	0%	0%	04-Jan-16 A	17-Feb-16 A
6127	3.1.14.1	Rework in Generator Room	0.0	0%	100%	04-Jan-16 A	17-Feb-16 A
6128	**GTA.4.P1.W.CPW14.02 - Odourant System Tubing**		0.0	0%	0%	16-Feb-16 A	02-Mar-16 A
6129	3.1.14.2	Odourant System Tubing	0.0	0%	100%	16-Feb-16 A	02-Mar-16 A
6130	**GTA.4.P1.W.CPW14.03 - Commissioning Support**		0.0	0%	0%	19-Jan-16 A	17-Mar-16 A
6131	3.1.14.3	Commissioning Support	0.0	0%	100%	19-Jan-16 A	17-Mar-16 A
6132	**GTA.4.P1.W.CPW14.04 - Becker Heater Tubing**		0.0	0%	0%	16-Feb-16 A	19-Feb-16 A
6133	3.1.14.4	Becker Heater Tubing Rework	0.0	0%	100%	16-Feb-16 A	19-Feb-16 A
6134	**GTA.4.P1.W.CPW14.05 - Replace CVT Boxes**		44.0	0%	0%	18-Apr-16	07-Jun-16

Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

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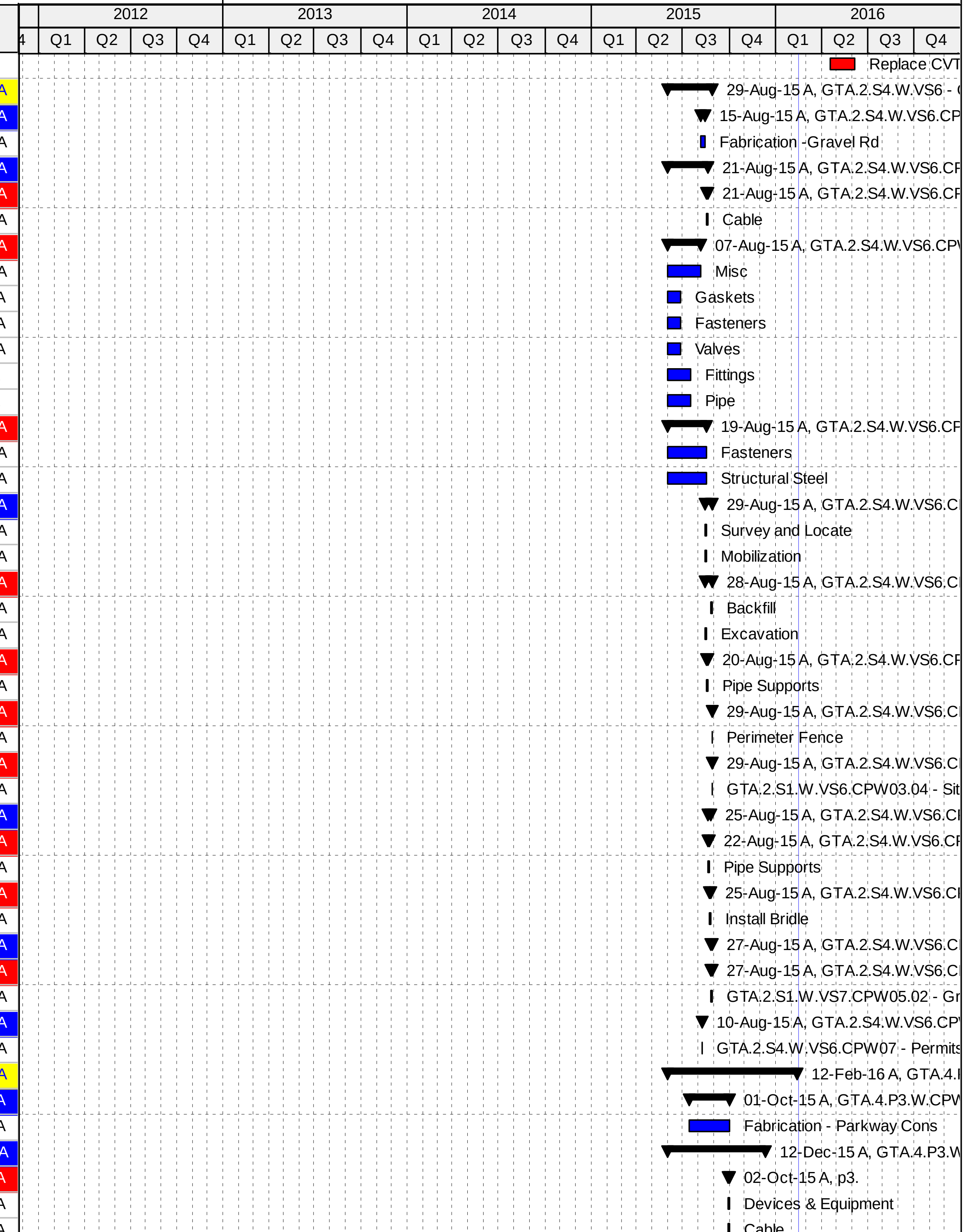
GTA - Master Schedule...	Classic Schedule Layout	03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
6135	3.1.14.5	Replace CVT Boxes	44.0	0%	0%	18-Apr-16	07-Jun-16
6136	GTA.2.S4.W.VS6 - Gravel Road Valve Site 'VS6'		0.0	0%	0%	01-Jun-15 A	29-Aug-15 A
6137	GTA.2.S4.W.VS6.CPW01 - Shop Fabrication		0.0	0%	0%	05-Aug-15 A	15-Aug-15 A
6138	3.2.1.3	Fabrication -Gravel Rd	0.0	100%	100%	05-Aug-15 A	15-Aug-15 A
6139	GTA.2.S4.W.VS6.CPW02 - Contractor Supplied Materials		0.0	0%	0%	01-Jun-15 A	21-Aug-15 A
6140	GTA.2.S4.W.VS6.CPW02.01 - Electrical Material		0.0	0%	0%	17-Aug-15 A	21-Aug-15 A
6141	3.2.2.1.1	Cable	0.0	100%	100%	17-Aug-15 A	21-Aug-15 A
6142	GTA.2.S4.W.VS6.CPW02.02 - Piping & Components		0.0	0%	0%	01-Jun-15 A	07-Aug-15 A
6143	3.2.2.2.6	Misc	0.0	100%	100%	01-Jun-15 A	07-Aug-15 A
6144	3.2.2.2.5	Gaskets	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
6145	3.2.2.2.4	Fasteners	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
6146	3.2.2.2.3	Valves	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
6147	3.2.2.2.2	Fittings	0.0	100%	100%	01-Jun-15 A	17-Jul-15 A
6148	3.2.2.2.1	Pipe	0.0	100%	100%	01-Jun-15 A	17-Jul-15 A
6149	GTA.2.S4.W.VS6.CPW02.03 - Mechanical Material		0.0	0%	0%	01-Jun-15 A	19-Aug-15 A
6150	3.2.2.3.2	Fasteners	0.0	100%	100%	01-Jun-15 A	19-Aug-15 A
6151	3.2.2.3.1	Structural Steel	0.0	100%	100%	01-Jun-15 A	19-Aug-15 A
6152	GTA.2.S4.W.VS6.CPW03 - Civil Works		0.0	0%	0%	15-Aug-15 A	29-Aug-15 A
6153	A1060	Survey and Locate	0.0	100%	100%	15-Aug-15 A	17-Aug-15 A
6154	A08-100	Mobilization	0.0	100%	100%	15-Aug-15 A	17-Aug-15 A
6155	GTA.2.S4.W.VS6.CPW03.01 - Earth Works		0.0	0%	0%	15-Aug-15 A	28-Aug-15 A
6156	3.2.3.1.2	Backfill	0.0	100%	100%	27-Aug-15 A	28-Aug-15 A
6157	3.2.3.1.1	Excavation	0.0	100%	100%	15-Aug-15 A	17-Aug-15 A
6158	GTA.2.S4.W.VS6.CPW03.02 - Footings & Foundations		0.0	0%	0%	18-Aug-15 A	20-Aug-15 A
6159	3.2.3.2.1	Pipe Supports	0.0	100%	100%	18-Aug-15 A	20-Aug-15 A
6160	GTA.2.S4.W.VS6.CPW03.03 - Fencing		0.0	0%	0%	28-Aug-15 A	29-Aug-15 A
6161	3.2.3.3.1	Perimeter Fence	0.0	100%	100%	28-Aug-15 A	29-Aug-15 A
6162	GTA.2.S4.W.VS6.CPW03.04 - Site Grading & Restoration		0.0	0%	0%	28-Aug-15 A	29-Aug-15 A
6163	3.2.3.4	GTA.2.S1.W.VS6.CPW03.04 - Site Grading & Restoration	0.0	100%	100%	28-Aug-15 A	29-Aug-15 A
6164	GTA.2.S4.W.VS6.CPW04 - Mechanical and Piping		0.0	0%	0%	21-Aug-15 A	25-Aug-15 A
6165	GTA.2.S4.W.VS6.CPW04.01 - Structural Steel Erection		0.0	0%	0%	21-Aug-15 A	22-Aug-15 A
6166	3.2.4.1.1	Pipe Supports	0.0	100%	100%	21-Aug-15 A	22-Aug-15 A
6167	GTA.2.S4.W.VS6.CPW04.02 - Yard Piping		0.0	0%	0%	24-Aug-15 A	25-Aug-15 A
6168	3.2.4.2.1	Install Bridle	0.0	100%	100%	24-Aug-15 A	25-Aug-15 A
6169	GTA.2.S4.W.VS6.CPW05 - Electrical and Instrumentation		0.0	0%	0%	26-Aug-15 A	27-Aug-15 A
6170	GTA.2.S4.W.VS6.CPW05.01 - Grounding		0.0	0%	0%	26-Aug-15 A	27-Aug-15 A
6171	3.2.5.1	GTA.2.S1.W.VS7.CPW05.02 - Grounding	0.0	100%	100%	26-Aug-15 A	27-Aug-15 A
6172	GTA.2.S4.W.VS6.CPW07 - Permits		0.0	0%	0%	10-Aug-15 A	10-Aug-15 A
6173	3.2.7	GTA.2.S4.W.VS6.CPW07 - Permits	0.0	100%	100%	10-Aug-15 A	10-Aug-15 A
6174	GTA.4.P3.W - Construction of Parkway Cons Station 'C3'		0.0	0%	0%	01-Jun-15 A	12-Feb-16 A
6175	GTA.4.P3.W.CPW01 - Shop Fabrication		0.0	0%	0%	13-Jul-15 A	01-Oct-15 A
6176	3.3.1.3	Fabrication - Parkway Cons	0.0	100%	100%	13-Jul-15 A	01-Oct-15 A
6177	GTA.4.P3.W.CPW02 - Contractor Supplied Materials		0.0	0%	0%	01-Jun-15 A	12-Dec-15 A
6178	p3.		0.0	0%	0%	28-Sep-15 A	02-Oct-15 A
6179	3.3.2.1.3	Devices & Equipment	0.0	100%	100%	28-Sep-15 A	02-Oct-15 A
6180	3.3.2.1.1	Cable	0.0	100%	100%	28-Sep-15 A	02-Oct-15 A



Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

GTA - Master Schedule...	Classic Schedule Layout	03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
6181	GTA.4.P3.W.CPW02.02 - Piping & Components		0.0	0%	0%	01-Jun-15 A	12-Dec-15 A
6182	3.3.2.2.6	Misc	0.0	100%	100%	01-Jun-15 A	12-Dec-15 A
6183	3.3.2.2.5	Gaskets	0.0	100%	100%	01-Jun-15 A	16-Jul-15 A
6184	3.3.2.2.4	Fasteners	0.0	100%	100%	01-Jun-15 A	16-Jul-15 A
6185	3.3.2.2.3	Valves	0.0	100%	100%	01-Jun-15 A	25-Jul-15 A
6186	3.3.2.2.2	Fittings	0.0	100%	100%	01-Jun-15 A	17-Jul-15 A
6187	3.3.2.2.1	Pipe	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
6188	GTA.4.P3.W.CPW02.03 - Mechanical Material		0.0	0%	0%	21-Sep-15 A	25-Sep-15 A
6189	3.3.2.3.2	Fasteners	0.0	100%	100%	21-Sep-15 A	25-Sep-15 A
6190	3.3.2.3.1	Structural Steel	0.0	100%	100%	21-Sep-15 A	25-Sep-15 A
6191	GTA.4.P3.W.CPW03 - Civil Works		0.0	0%	0%	07-Jul-15 A	19-Dec-15 A
6192	A1070	Survey and Locate	0.0	100%	100%	09-Jul-15 A	17-Aug-15 A
6193	A09-100	Mobilization	0.0	100%	100%	07-Jul-15 A	17-Aug-15 A
6194	GTA.4.P3.W.CPW03.01 - Earth Works		0.0	0%	0%	19-Sep-15 A	17-Dec-15 A
6195	3.3.3.1.2	Backfill	0.0	100%	100%	18-Nov-15 A	17-Dec-15 A
6196	3.3.3.1.1	Excavation	0.0	100%	100%	19-Sep-15 A	26-Sep-15 A
6197	GTA.4.P3.W.CPW03.02 - Footings & Foundations		0.0	0%	0%	01-Oct-15 A	07-Oct-15 A
6198	3.3.3.2.2	Foundations	0.0	100%	100%	01-Oct-15 A	07-Oct-15 A
6199	GTA.4.P3.W.CPW03.03 - Fencing		0.0	0%	0%	18-Dec-15 A	19-Dec-15 A
6200	3.3.3.3.2	Gates	0.0	100%	100%	18-Dec-15 A	19-Dec-15 A
6201	3.3.3.3.1	Perimeter Fence	0.0	100%	100%	18-Dec-15 A	19-Dec-15 A
6202	GTA.4.P3.W.CPW03.04 - Building Erection		0.0	0%	0%	30-Sep-15 A	07-Oct-15 A
6203	3.3.3.4	Building Erection and Finishing	0.0	100%	100%	30-Sep-15 A	07-Oct-15 A
6204	GTA.4.P3.W.CPW03.05 - Site Grading & Restoration		0.0	0%	0%	15-Oct-15 A	18-Dec-15 A
6205	3.3.3.5	Site Grading & Restoration	0.0	100%	100%	15-Oct-15 A	18-Dec-15 A
6206	GTA.4.P3.W.CPW04 - Mechanical and Piping		0.0	0%	0%	30-Jul-15 A	11-Dec-15 A
6207	GTA.4.P3.W.CPW04.01 - Structural Steel Erection		0.0	0%	0%	08-Oct-15 A	28-Nov-15 A
6208	3.3.4.1.1	Pipe Supports	0.0	100%	100%	08-Oct-15 A	28-Nov-15 A
6209	GTA.4.P3.W.CPW04.02 - Yard Piping		0.0	0%	0%	30-Jul-15 A	11-Dec-15 A
6210	A01-240	Large Bore Tie-in to Existing System By Others	0.0	100%	100%	23-Nov-15 A	11-Dec-15 A
6211	3.3.4.2.2	Painting/Coating	0.0	100%	100%	19-Sep-15 A	11-Dec-15 A
6212	3.3.4.2.1	Large Bore Piping	0.0	100%	100%	30-Jul-15 A	19-Sep-15 A
6213	GTA.4.P3.W.CPW05 - Electrical and Instrumentation		0.0	0%	0%	18-Aug-15 A	05-Feb-16 A
6214	GTA.4.P3.W.CPW05.01 - Electrical Works		0.0	0%	0%	18-Aug-15 A	05-Feb-16 A
6215	3.3.5.1.9	Terminations	0.0	100%	100%	08-Oct-15 A	05-Feb-16 A
6216	3.3.5.1.6	Pull Cables	0.0	100%	100%	08-Oct-15 A	30-Nov-15 A
6217	3.3.5.1.4	Set Equipment - Parkway Cons	0.0	100%	100%	08-Oct-15 A	12-Dec-15 A
6218	3.3.5.1.3	Grounding	0.0	100%	100%	01-Nov-15 A	30-Nov-15 A
6219	3.3.5.1.1	Temporary Power	0.0	100%	100%	18-Aug-15 A	25-Aug-15 A
6220	GTA.4.P3.W.CPW05.02 - Instrumentation		0.0	0%	0%	04-Dec-15 A	05-Feb-16 A
6221	3.3.5.2	Instrumentation	0.0	100%	100%	04-Dec-15 A	05-Feb-16 A
6222	GTA.4.P3.W.CPW07 - Permits		0.0	0%	0%	14-Aug-15 A	14-Aug-15 A
6223	3.3.7	GTA.4.P3.W.CPW07 - Permits	0.0	100%	100%	14-Aug-15 A	14-Aug-15 A
6224	GTA.4.P3.W.CPW10 - Cathodic Protection System (Change)		0.0	0%	0%	17-Nov-15 A	05-Dec-15 A
6225	GTA.4.P3.W.CPW10.01 - Cathodic Protection System (Change)		0.0	0%	0%	17-Nov-15 A	05-Dec-15 A
6226	3.3.10.1	Cathodic Protection System	0.0	0%	100%	17-Nov-15 A	05-Dec-15 A

Actual Work | Critical Remaining Work | Summary
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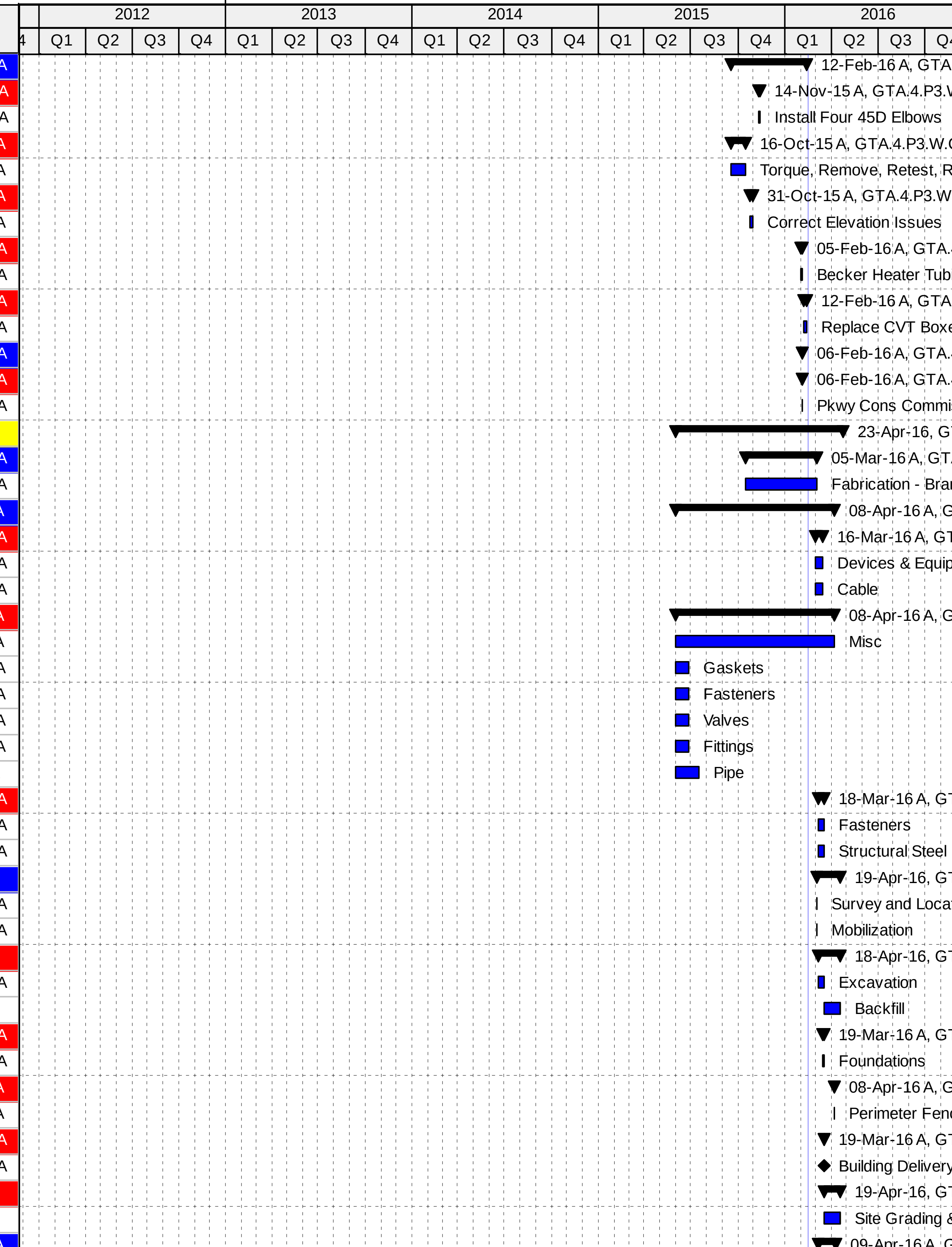
GTA - Master Schedule... | Classic Schedule Layout | 03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
6227	GTA.4.P3.W.CPW11 - Piping Modifications (Change)		0.0	0%	0%	19-Sep-15 A	12-Feb-16 A
6228	GTA.4.P3.W.CPW11.01 - Add Four 45D Elbows		0.0	0%	0%	12-Nov-15 A	14-Nov-15 A
6229	3.3.11.1	Install Four 45D Elbows	0.0	0%	100%	12-Nov-15 A	14-Nov-15 A
6230	GTA.4.P3.W.CPW11.02 - Adjust, Remove, Test, Install Defective Plug V		0.0	0%	0%	19-Sep-15 A	16-Oct-15 A
6231	3.3.11.2	Torque, Remove, Retest, Reinstall Defective Plug Valve	0.0	0%	100%	19-Sep-15 A	16-Oct-15 A
6232	GTA.4.P3.W.CPW11.03 - Correct Elevation Issues		0.0	0%	0%	26-Oct-15 A	31-Oct-15 A
6233	3.3.11.3	Correct Elevation Issues	0.0	0%	100%	26-Oct-15 A	31-Oct-15 A
6234	GTA.4.P3.W.CPW11.04 - Becker Heater Tubing		0.0	0%	0%	02-Feb-16 A	05-Feb-16 A
6235	3.3.11.4	Becker Heater Tubing Rework	0.0	0%	100%	02-Feb-16 A	05-Feb-16 A
6236	GTA.4.P3.W.CPW11.05 - Replace CVT Boxes		0.0	0%	0%	08-Feb-16 A	12-Feb-16 A
6237	3.3.11.5	Replace CVT Boxes	0.0	0%	100%	08-Feb-16 A	12-Feb-16 A
6238	GTA.4.P3.W.CPW12 - Commissioning Support Valve Sites		0.0	0%	0%	04-Feb-16 A	06-Feb-16 A
6239	GTA.4.P3.W.CPW12.01 - Pkwy Cons Commissioning Support		0.0	0%	0%	04-Feb-16 A	06-Feb-16 A
6240	3.3.12.1	Pkwy Cons Commissioning Support	0.0	0%	100%	04-Feb-16 A	06-Feb-16 A
6241	GTA.2.S3.W.VS3 - Bramalea - 42" Valve Site 'VS3'		6.0	0%	0%	01-Jun-15 A	23-Apr-16
6242	GTA.2.S3.W.VS3.CPW01 - Shop Fabrication		0.0	0%	0%	15-Oct-15 A	05-Mar-16 A
6243	3.4.1.3	Fabrication - Bramalea	0.0	100%	100%	15-Oct-15 A	05-Mar-16 A
6244	GTA.2.S3.W.VS3.CPW02 - Contractor Supplied Materials		0.0	0%	0%	01-Jun-15 A	08-Apr-16 A
6245	GTA.2.S3.W.VS3.CPW02.01 - Electrical Material		0.0	0%	0%	01-Mar-16 A	16-Mar-16 A
6246	3.4.2.1.3	Devices & Equipment	0.0	100%	100%	01-Mar-16 A	16-Mar-16 A
6247	3.4.2.1.1	Cable	0.0	100%	100%	01-Mar-16 A	16-Mar-16 A
6248	GTA.2.S3.W.VS3.CPW02.02 - Piping & Components		0.0	0%	0%	01-Jun-15 A	08-Apr-16 A
6249	3.4.2.2.6	Misc	0.0	100%	100%	01-Jun-15 A	08-Apr-16 A
6250	3.4.2.2.5	Gaskets	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
6251	3.4.2.2.4	Fasteners	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
6252	3.4.2.2.3	Valves	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
6253	3.4.2.2.2	Fittings	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
6254	3.4.2.2.1	Pipe	0.0	100%	100%	01-Jun-15 A	16-Jul-15 A
6255	GTA.2.S3.W.VS3.CPW02.03 - Mechanical Material		0.0	0%	0%	07-Mar-16 A	18-Mar-16 A
6256	3.4.2.3.2	Fasteners	0.0	100%	100%	07-Mar-16 A	18-Mar-16 A
6257	3.4.2.3.1	Structural Steel	0.0	100%	100%	07-Mar-16 A	18-Mar-16 A
6258	GTA.2.S3.W.VS3.CPW03 - Civil Works		2.0	0%	0%	03-Mar-16 A	19-Apr-16
6259	A1080	Survey and Locate	0.0	100%	100%	04-Mar-16 A	04-Mar-16 A
6260	A10-100	Mobilization	0.0	100%	100%	03-Mar-16 A	03-Mar-16 A
6261	GTA.2.S3.W.VS3.CPW03.01 - Earth Works		1.0	0%	0%	07-Mar-16 A	18-Apr-16
6262	3.4.3.1.2	Excavation	0.0	100%	100%	07-Mar-16 A	18-Mar-16 A
6263	3.4.3.1.1	Backfill	1.0	100%	90%	18-Mar-16 A	18-Apr-16
6264	GTA.2.S3.W.VS3.CPW03.02 - Footings & Foundations		0.0	0%	0%	16-Mar-16 A	19-Mar-16 A
6265	3.4.3.2.2	Foundations	0.0	100%	100%	16-Mar-16 A	19-Mar-16 A
6266	GTA.2.S3.W.VS3.CPW03.03 - Fencing		0.0	0%	0%	08-Apr-16 A	08-Apr-16 A
6267	3.4.3.3.1	Perimeter Fence	0.0	100%	100%	08-Apr-16 A	08-Apr-16 A
6268	GTA.2.S3.W.VS3.CPW03.04 - Building Erection		0.0	0%	0%	19-Mar-16 A	19-Mar-16 A
6269	3.4.3.4	Building Delivery	0.0	100%	100%		19-Mar-16 A
6270	GTA.2.S3.W.VS3.CPW03.05 - Site Grading & Restoration		2.0	0%	0%	18-Mar-16 A	19-Apr-16
6271	3.4.3.5	Site Grading & Restoration	2.0	100%	75%	18-Mar-16 A	19-Apr-16
6272	GTA.2.S3.W.VS3.CPW04 - Mechanical and Piping		0.0	0%	0%	07-Mar-16 A	09-Apr-16 A



Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish	Bar label
6273	GTA.2.S3.W.VS3.CPW04.01 - Structural Steel Erection		0.0	0%	0%	21-Mar-16 A	22-Mar-16 A	22-Mar-16 A, GTA
6274	3.4.4.1.1	Supports	0.0	100%	100%	21-Mar-16 A	22-Mar-16 A	Supports
6275	GTA.2.S3.W.VS3.CPW04.02 - Yard Piping		0.0	0%	0%	07-Mar-16 A	09-Apr-16 A	09-Apr-16 A, GTA
6276	A1280	Install Valve and Fabrication By Others	0.0	100%	100%	07-Mar-16 A	14-Mar-16 A	Install Valve and Fa
6277	3.4.4.2.2	Painting/Coating	0.0	100%	100%	06-Apr-16 A	09-Apr-16 A	Painting/Coating
6278	3.4.4.2.1	Set and Connect Actuators	0.0	100%	100%	18-Mar-16 A	09-Apr-16 A	Set and Connect
6279	GTA.2.S3.W.VS3.CPW05 - Electrical and Instrumentation		6.0	0%	0%	14-Mar-16 A	23-Apr-16	23-Apr-16, GTA
6280	GTA.2.S3.W.VS3.CPW05 .01 - Electrical Works		6.0	0%	0%	14-Mar-16 A	23-Apr-16	23-Apr-16, GTA
6281	3.4.5.1.9	Terminations	0.0	100%	100%	25-Mar-16 A	16-Apr-16 A	Terminations
6282	3.4.5.1.6	Pull Cables	0.0	100%	100%	18-Mar-16 A	14-Apr-16 A	Pull Cables
6283	3.4.5.1.4	Set Equipment - Bramalea	0.0	100%	100%	16-Mar-16 A	19-Mar-16 A	Set Equipment - Br
6284	3.4.5.1.3	Grounding	0.0	100%	100%	16-Mar-16 A	19-Mar-16 A	Grounding
6285	3.4.5.1.1	Temporary Power	6.0	100%	50%	14-Mar-16 A	23-Apr-16	Temporary Powe
6286	GTA.2.S3.W.VS3.CPW05.02 - Instrumentation		0.0	0%	0%	19-Mar-16 A	16-Apr-16 A	16-Apr-16 A, GT.
6287	3.4.5.2	Instrumentation	0.0	100%	100%	19-Mar-16 A	16-Apr-16 A	Instrumentation
6288	GTA.2.S3.W.VS3.CPW07 - Permits		0.0	0%	0%	10-Mar-16 A	10-Mar-16 A	10-Mar-16 A, GTA.:
6289	3.4.7	GTA.2.S3.W.VS3.CPW07 - Elec Permits	0.0	100%	100%	10-Mar-16 A	10-Mar-16 A	GTA.2.S3.W.VS3.C
6290	GTA.2.S3.W.VS3.CPW10 - Bramalea Valve Change Revisions		0.0	0%	0%	18-Mar-16 A	16-Apr-16 A	16-Apr-16 A, GT.
6291	GTA.2.S3.W.VS3.CPW10.01 - Bramalea Valve Change Revisions		0.0	0%	0%	18-Mar-16 A	16-Apr-16 A	16-Apr-16 A, GT.
6292	3.4.10.1	Bramalea Valve Change Revisions	0.0	0%	100%	18-Mar-16 A	16-Apr-16 A	Bramalea Valve (
6293	GTA.2.S3.W.VS2 - Hurontario - 42" Valve Site 'VS2'		7.0	0%	0%	01-Jun-15 A	25-Apr-16	25-Apr-16, GTA
6294	GTA.2.S3.W.VS2.CPW01 - Shop Fabrication		0.0	0%	0%	15-Oct-15 A	04-Mar-16 A	04-Mar-16 A, GTA.2
6295	3.5.1.3	Fabrication - Herontario	0.0	100%	100%	15-Oct-15 A	04-Mar-16 A	Fabrication - Heront
6296	GTA.2.S3.W.VS2.CPW02 - Contractor Supplied Materials		0.0	0%	0%	01-Jun-15 A	07-Apr-16 A	07-Apr-16 A, GTA
6297	GTA.2.S3.W.VS2.CPW02.01 - Electrical Material		0.0	0%	0%	01-Mar-16 A	04-Mar-16 A	04-Mar-16 A, GTA.2
6298	3.5.2.1.3	Devices & Equipment	0.0	100%	100%	01-Mar-16 A	04-Mar-16 A	Devices & Equipme
6299	3.5.2.1.1	Cable	0.0	100%	100%	01-Mar-16 A	04-Mar-16 A	Cable
6300	GTA.2.S3.W.VS2.CPW02.02 - Piping & Components		0.0	0%	0%	01-Jun-15 A	07-Apr-16 A	07-Apr-16 A, GTA
6301	3.5.2.2.6	Misc	0.0	100%	100%	01-Jun-15 A	07-Apr-16 A	Misc
6302	3.5.2.2.5	Gaskets	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A	Gaskets
6303	3.5.2.2.4	Fasteners	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A	Fasteners
6304	3.5.2.2.3	Valves	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A	Valves
6305	3.5.2.2.2	Fittings	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A	Fittings
6306	3.5.2.2.1	Pipe	0.0	100%	100%	01-Jun-15 A	16-Jul-15 A	Pipe
6307	GTA.2.S3.W.VS2.CPW02.03 - Mechanical Material		0.0	0%	0%	01-Mar-16 A	24-Mar-16 A	24-Mar-16 A, GTA
6308	3.5.2.3.2	Fasteners	0.0	100%	100%	01-Mar-16 A	24-Mar-16 A	Fasteners
6309	3.5.2.3.1	Structural Steel	0.0	100%	100%	01-Mar-16 A	04-Mar-16 A	Structural Steel
6310	GTA.2.S3.W.VS2.CPW03 - Civil Works		0.0	0%	0%	29-Feb-16 A	05-Apr-16 A	05-Apr-16 A, GTA
6311	A11-100	Mobilization	0.0	100%	100%	29-Feb-16 A	01-Mar-16 A	Mobilization
6312	A1090	Survey and Locate	0.0	100%	100%	29-Feb-16 A	01-Mar-16 A	Survey and Locate
6313	GTA.2.S3.W.VS2.CPW03.01 - Earth Works		0.0	0%	0%	03-Mar-16 A	12-Mar-16 A	12-Mar-16 A, GTA.
6314	3.5.3.1.2	Excavation	0.0	100%	100%	03-Mar-16 A	09-Mar-16 A	Excavation
6315	3.5.3.1.1	Backfill	0.0	100%	100%	04-Mar-16 A	12-Mar-16 A	Backfill
6316	GTA.2.S3.W.VS2.CPW03.02 - Footings & Foundations		0.0	0%	0%	04-Mar-16 A	05-Mar-16 A	05-Mar-16 A, GTA.2
6317	3.5.3.2.2	Foundations	0.0	100%	100%	04-Mar-16 A	05-Mar-16 A	Foundations
6318	GTA.2.S3.W.VS2.CPW03.03 - Fencing		0.0	0%	0%	04-Apr-16 A	05-Apr-16 A	05-Apr-16 A, GTA

Timeline: 2012 Q1–Q4, 2013 Q1–Q4, 2014 Q1–Q4, 2015 Q1–Q4, 2016 Q1–Q4

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GTA - Master Schedule...	Classic Schedule Layout	03-Nov-16 16:07

#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
6319	3.5.3.3.1	Perimeter Fence	0.0	100%	100%	04-Apr-16 A	05-Apr-16 A
6320	GTA.2.S3.W.VS1.CPW03.04 - Building Erection		0.0	0%	0%	05-Mar-16 A	05-Mar-16 A
6321	3.5.3.4	Building Delivery	0.0	100%	100%		05-Mar-16 A
6322	GTA.2.S3.W.VS2.CPW03.05 - Site Grading & Restoration		0.0	0%	0%	04-Mar-16 A	19-Mar-16 A
6323	3.5.3.5	Site Grading & Restoration	0.0	100%	100%	04-Mar-16 A	19-Mar-16 A
6324	GTA.2.S3.W.VS2.CPW04 - Mechanical and Piping		0.0	0%	0%	01-Mar-16 A	12-Mar-16 A
6325	GTA.2.S3.W.VS2.CPW04.01 - Structural Steel Erection		0.0	0%	0%	04-Mar-16 A	04-Mar-16 A
6326	3.5.4.1.1	Pipe Supports	0.0	100%	100%	04-Mar-16 A	04-Mar-16 A
6327	GTA.2.S3.W.VS2.CPW04.02 - Yard Piping		0.0	0%	0%	01-Mar-16 A	12-Mar-16 A
6328	A1290	Install Valve and Fabrication By Others	0.0	100%	100%	01-Mar-16 A	04-Mar-16 A
6329	3.5.4.2.2	Painting/Coating	0.0	100%	100%	04-Mar-16 A	05-Mar-16 A
6330	3.5.4.2.1	Set and Connect Acutators	0.0	100%	100%	05-Mar-16 A	12-Mar-16 A
6331	GTA.2.S3.W.VS2.CPW05 - Electrical and Instrumentation		7.0	0%	0%	29-Feb-16 A	25-Apr-16
6332	GTA.2.S3.W.VS2.CPW05 .01 - Electrical Works		7.0	0%	0%	29-Feb-16 A	25-Apr-16
6333	3.5.5.1.9	Terminations	0.0	100%	100%	04-Mar-16 A	09-Apr-16 A
6334	3.5.5.1.6	Pull Cables	0.0	100%	100%	04-Mar-16 A	05-Apr-16 A
6335	3.5.5.1.4	Set Equipment - Hurontario	0.0	100%	100%	04-Mar-16 A	12-Mar-16 A
6336	3.5.5.1.3	Grounding	0.0	100%	100%	04-Mar-16 A	14-Apr-16 A
6337	3.5.5.1.1	Temporary Power	7.0	100%	50%	29-Feb-16 A	25-Apr-16
6338	GTA.2.S3.W.VS2.CPW05.02 - Instrumentation		0.0	0%	0%	18-Mar-16 A	26-Mar-16 A
6339	3.5.5.2	Instrumentation	0.0	100%	100%	18-Mar-16 A	26-Mar-16 A
6340	GTA.2.S3.W.VS2.CPW07 - Permits		0.0	0%	0%	02-Mar-16 A	02-Mar-16 A
6341	3.5.7	GTA.2.S3.W.VS2.CPW07 - Permits	0.0	100%	100%	02-Mar-16 A	02-Mar-16 A
6342	GTA.2.S3.W.VS2.CPW10 - Hurontario Valve Change Revisions		0.0	0%	0%	18-Mar-16 A	16-Apr-16 A
6343	GTA.2.S3.W.VS2.CPW10.01 - Hurontario Valve Change Revisions		0.0	0%	0%	18-Mar-16 A	16-Apr-16 A
6344	3.5.10.1	Hurontario Valve Change Revisions	0.0	0%	100%	18-Mar-16 A	16-Apr-16 A
6345	GTA.2.S3.W.VS1 - Heritage Road - 42" Valve Site 'VS1'		7.0	0%	0%	01-Jun-15 A	25-Apr-16
6346	GTA.2.S3.W.VS1.CPW01 - Shop Fabrication		0.0	0%	0%	15-Oct-15 A	05-Mar-16 A
6347	3.6.1.3	Fabrication - Heritage	0.0	100%	100%	15-Oct-15 A	05-Mar-16 A
6348	GTA.2.S3.W.VS1.CPW02 - Contractor Supplied Materials		0.0	0%	0%	01-Jun-15 A	04-Apr-16 A
6349	GTA.2.S3.W.VS1.CPW02.01 - Electrical Material		0.0	0%	0%	01-Mar-16 A	05-Mar-16 A
6350	3.6.2.1.3	Devices & Equipment	0.0	100%	100%	01-Mar-16 A	05-Mar-16 A
6351	3.6.2.1.1	Cable	0.0	100%	100%	01-Mar-16 A	05-Mar-16 A
6352	GTA.2.S3.W.VS1.CPW02.02 - Piping & Components		0.0	0%	0%	01-Jun-15 A	04-Apr-16 A
6353	3.6.2.2.6	Misc	0.0	100%	100%	01-Jun-15 A	04-Apr-16 A
6354	3.6.2.2.5	Gaskets	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
6355	3.6.2.2.4	Fasteners	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
6356	3.6.2.2.3	Valves	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
6357	3.6.2.2.2	Fittings	0.0	100%	100%	01-Jun-15 A	27-Jun-15 A
6358	3.6.2.2.1	Pipe	0.0	100%	100%	01-Jun-15 A	16-Jul-15 A
6359	GTA.2.S3.W.VS1.CPW02.03 - Mechanical Material		0.0	0%	0%	01-Mar-16 A	05-Mar-16 A
6360	3.6.2.3.2	Fasteners	0.0	100%	100%	01-Mar-16 A	05-Mar-16 A
6361	3.6.2.3.1	Structural Steel	0.0	100%	100%	01-Mar-16 A	05-Mar-16 A
6362	GTA.2.S3.W.VS1.CPW03 - Civil Works		4.0	0%	0%	29-Feb-16 A	21-Apr-16
6363	A12-100	Mobilization	0.0	100%	100%	29-Feb-16 A	01-Mar-16 A
6364	A1100	Survey and Locate	0.0	100%	100%	29-Feb-16 A	01-Mar-16 A

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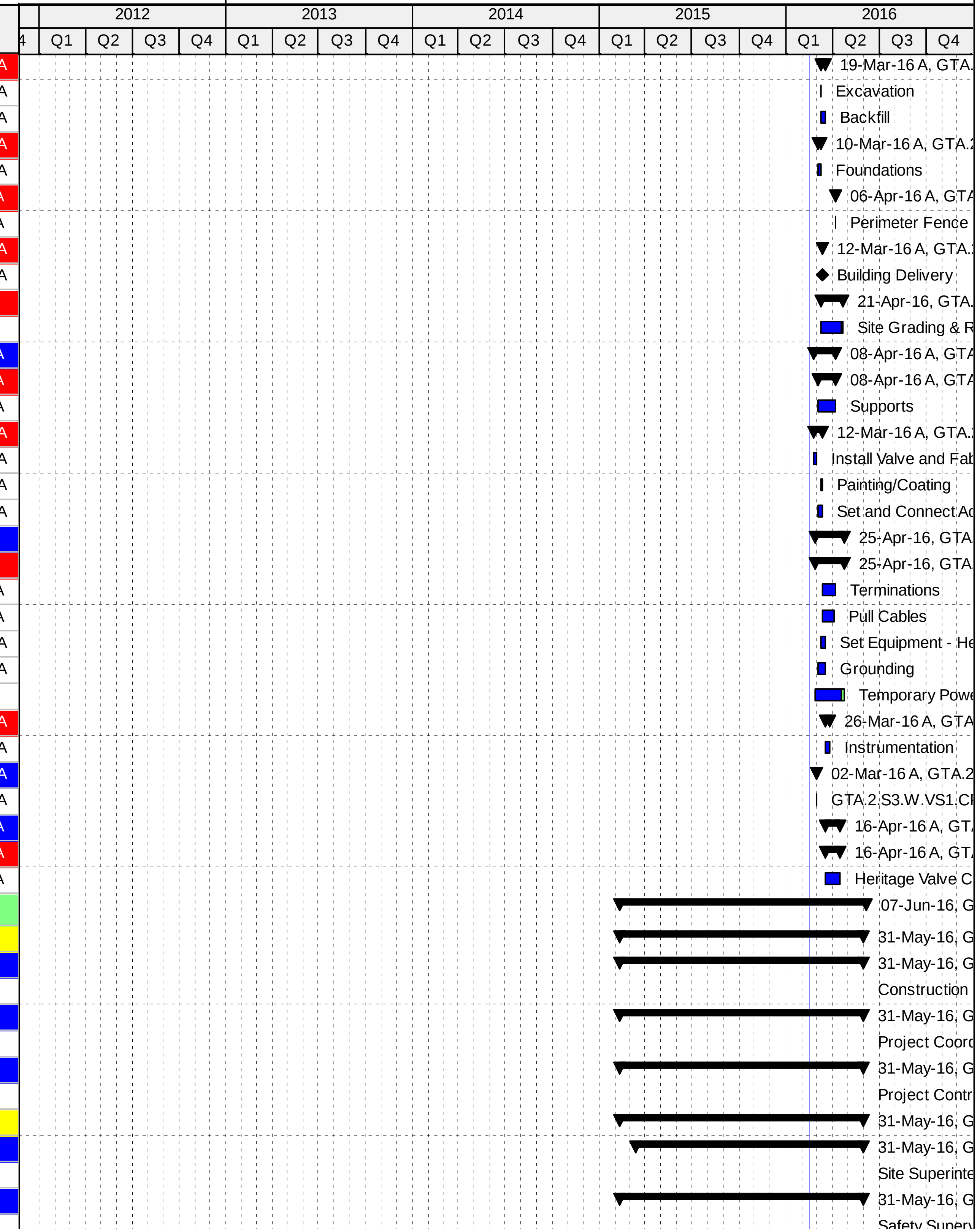
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
6365	GTA.2.S3.W.VS1.CPW03.01 - Earth Works		0.0	0%	0%	09-Mar-16 A	19-Mar-16 A
6366	3.6.3.1.2	Excavation	0.0	100%	100%	09-Mar-16 A	11-Mar-16 A
6367	3.6.3.1.1	Backfill	0.0	100%	100%	11-Mar-16 A	19-Mar-16 A
6368	GTA.2.S3.W.VS1.CPW03.02 - Footings & Foundations		0.0	0%	0%	04-Mar-16 A	10-Mar-16 A
6369	3.6.3.2.2	Foundations	0.0	100%	100%	04-Mar-16 A	10-Mar-16 A
6370	GTA.2.S3.W.VS1.CPW03.03 - Fencing		0.0	0%	0%	06-Apr-16 A	06-Apr-16 A
6371	3.6.3.3.1	Perimeter Fence	0.0	100%	100%	06-Apr-16 A	06-Apr-16 A
6372	GTA.2.S3.W.VS1.CPW03.04 - Building Erection		0.0	0%	0%	12-Mar-16 A	12-Mar-16 A
6373	3.6.3.4	Building Delivery	0.0	100%	100%		12-Mar-16 A
6374	GTA.2.S3.W.VS1.CPW03.05 - Site Grading & Restoration		4.0	0%	0%	11-Mar-16 A	21-Apr-16
6375	3.6.3.5	Site Grading & Restoration	4.0	100%	90%	11-Mar-16 A	21-Apr-16
6376	GTA.2.S3.W.VS1.CPW04 - Mechanical and Piping		0.0	0%	0%	24-Feb-16 A	08-Apr-16 A
6377	GTA.2.S3.W.VS1.CPW04.01 - Structural Steel Erection		0.0	0%	0%	04-Mar-16 A	08-Apr-16 A
6378	3.6.4.1.1	Supports	0.0	100%	100%	04-Mar-16 A	08-Apr-16 A
6379	GTA.2.S3.W.VS1.CPW04.02 - Yard Piping		0.0	0%	0%	24-Feb-16 A	12-Mar-16 A
6380	A1300	Install Valve and Fabrication By Others	0.0	100%	100%	24-Feb-16 A	02-Mar-16 A
6381	3.6.4.2.2	Painting/Coating	0.0	100%	100%	09-Mar-16 A	12-Mar-16 A
6382	3.6.4.2.1	Set and Connect Acutators	0.0	100%	100%	03-Mar-16 A	12-Mar-16 A
6383	GTA.2.S3.W.VS1.CPW05 - Electrical and Instrumentation		7.0	0%	0%	29-Feb-16 A	25-Apr-16
6384	GTA.2.S3.W.VS1.CPW05 .01 - Electrical Works		7.0	0%	0%	29-Feb-16 A	25-Apr-16
6385	3.6.5.1.9	Terminations	0.0	100%	100%	12-Mar-16 A	08-Apr-16 A
6386	3.6.5.1.6	Pull Cables	0.0	100%	100%	12-Mar-16 A	04-Apr-16 A
6387	3.6.5.1.4	Set Equipment - Heritage	0.0	100%	100%	11-Mar-16 A	19-Mar-16 A
6388	3.6.5.1.3	Grounding	0.0	100%	100%	04-Mar-16 A	19-Mar-16 A
6389	3.6.5.1.1	Temporary Power	7.0	100%	50%	29-Feb-16 A	25-Apr-16
6390	GTA.2.S3.W.VS1.CPW05.02 - Instrumentation		0.0	0%	0%	19-Mar-16 A	26-Mar-16 A
6391	3.6.5.2	Instrumentation	0.0	100%	100%	19-Mar-16 A	26-Mar-16 A
6392	GTA.2.S3.W.VS1.CPW07 - Permits		0.0	0%	0%	02-Mar-16 A	02-Mar-16 A
6393	3.6.7	GTA.2.S3.W.VS1.CPW07 - Permits	0.0	100%	100%	02-Mar-16 A	02-Mar-16 A
6394	GTA.2.S3.W.VS1.CPW10 - Heritage Valve Change Revisions		0.0	0%	0%	19-Mar-16 A	16-Apr-16 A
6395	GTA.2.S3.W.VS1.CPW10.01 - Heritage Valve Change Revisions		0.0	0%	0%	19-Mar-16 A	16-Apr-16 A
6396	3.6.10.1	Heritage Valve Change Revisions	0.0	0%	100%	19-Mar-16 A	16-Apr-16 A
6397	GTA.4.P0.W - Enbridge GTA Project Indirect Costs		44.0	0%	0%	10-Feb-15 A	07-Jun-16
6398	GTA.4.P0.W.SAL - Salaray Costs		38.0	0%	0%	10-Feb-15 A	31-May-16
6399	GTA.4.P0.W.SAL.01 - Construction Manager		38.0	0%	0%	10-Feb-15 A	31-May-16
6400	4.1.1	Construction Manager	38.0	100%	0%	10-Feb-15 A	31-May-16
6401	GTA.4.P0.W.SAL.02 - Project Coordinator		38.0	0%	0%	10-Feb-15 A	31-May-16
6402	4.1.2	Project Coordinator	38.0	100%	0%	10-Feb-15 A	31-May-16
6403	GTA.4.P0.W.SAL.03 - Project Controls		38.0	0%	0%	10-Feb-15 A	31-May-16
6404	4.1.3	Project Controls	38.0	100%	0%	10-Feb-15 A	31-May-16
6405	GTA.4.P0.W.IND - Indirect Labour		38.0	0%	0%	10-Feb-15 A	31-May-16
6406	GTA.4.P0.W.IND.01 - Site Superintendent		38.0	0%	0%	14-Mar-15 A	31-May-16
6407	4.2.1	Site Superintendent	38.0	100%	0%	14-Mar-15 A	31-May-16
6408	GTA.4.P0.W.IND.02 - Safety Supervisor		38.0	0%	0%	10-Feb-15 A	31-May-16
6409	4.2.2	Safety Supervisor	38.0	100%	0%	10-Feb-15 A	31-May-16



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish	2012–2016 (Q1–Q4)
6410	GTA.4.P0.W.IND.03 - Quality Control		38.0	0%	0%	27-Feb-15 A	31-May-16	31-May-16, G
6411	4.2.5	Warehouseman	38.0	100%	0%	27-Feb-15 A	31-May-16	Warehousem
6412	4.2.3	Quality Control	38.0	100%	50.41%	27-Feb-15 A	31-May-16	Quality Contr
6413	GTA.4.P0.W.IND.04 - Document Control		38.0	0%	0%	11-Mar-15 A	31-May-16	31-May-16, G
6414	4.2.4	Document Control	38.0	100%	0%	11-Mar-15 A	31-May-16	Document Co
6415	GTA.4.P0.W.IND.05 - Weather Impacts - Direct Labour & Equip		4.0	0%	0%	23-Nov-15 A	21-Apr-16	21-Apr-16, GTA.
6416	4.2.6	Weather Impacts - Labour & Equipment	4.0	0%	0%	23-Nov-15 A	21-Apr-16	Weather Impact
6417	GTA.4.P0.W.EXP - Indirect Consumables and Expenses		44.0	0%	0%	10-Feb-15 A	07-Jun-16	07-Jun-16, G
6418	GTA.4.P0.W.EXP.01 - General Truckload Freight		38.0	0%	0%	02-Mar-15 A	31-May-16	31-May-16, G
6419	4.3.1	General Truckload Freight	38.0	100%	0%	02-Mar-15 A	31-May-16	General Truc
6420	GTA.4.P0.W.EXP.08 - Trailer Rentals		38.0	0%	0%	02-Mar-15 A	31-May-16	31-May-16, G
6421	4.3.2	Trailer Rentals	38.0	100%	0%	02-Mar-15 A	31-May-16	Trailer Rental
6422	GTA.4.P0.W.EXP.09 - Washroom		38.0	0%	0%	02-Mar-15 A	31-May-16	31-May-16, G
6423	4.3.3	Washroom	38.0	100%	0%	02-Mar-15 A	31-May-16	Washroom
6424	GTA.4.P0.W.EXP.10 - Site Trucks		38.0	0%	0%	08-Apr-15 A	31-May-16	31-May-16, G
6425	4.3.4	Site Trucks	38.0	100%	0%	08-Apr-15 A	31-May-16	Site Trucks
6426	GTA.4.P0.W.EXP.11 - Travel/Board Allowance		38.0	0%	0%	10-Feb-15 A	31-May-16	31-May-16, G
6427	4.3.5	Travel/Board Allowance	38.0	100%	0%	10-Feb-15 A	31-May-16	Travel/Board
6428	GTA.4.P0.W.EXP.12 - Training		38.0	0%	0%	09-Apr-15 A	31-May-16	31-May-16, G
6429	4.3.6	Training	38.0	100%	0%	09-Apr-15 A	31-May-16	Training
6430	GTA.4.P0.W.EXP.16 - Parkway Winterization Costs		44.0	0%	0%	18-Apr-16	07-Jun-16	07-Jun-16, G
6431	4.3.16	PARKWAY Winterization Costs	44.0	0%	0%	18-Apr-16	07-Jun-16	PARKWAY W
6432	GTA.4.P0.W.EXP.15 - Albion Winterization Costs		44.0	0%	0%	18-Apr-16	07-Jun-16	07-Jun-16, G
6433	4.3.15	ALBION Winterization Costs	44.0	0%	0%	18-Apr-16	07-Jun-16	ALBION Wint
6434	GTA.4.P0.W.CPW10 - Indirect Change Revisions		38.0	0%	0%	10-Feb-15 A	31-May-16	31-May-16, G
6435	GTA.4.P0.W.CPW10.01 - Brampton Office Trailer		38.0	0%	0%	10-Feb-15 A	31-May-16	31-May-16, G
6436	4.3.7	Enbridge Brampton Office Trailer	38.0	100%	0%	10-Feb-15 A	31-May-16	Enbridge Bra
6437	GTA.4.P0.W.CPW10.02 - Class E Type 2 Hard Hats		38.0	0%	0%	20-Jun-15 A	31-May-16	31-May-16, G
6438	4.3.8	Class E Type 2 Hard Hats (CO 0002)	38.0	0%	100%	20-Jun-15 A	31-May-16	Class E Type
6439	GTA Project Indirects - Non-Billable		38.0	0%	0%	10-Feb-15 A	31-May-16	31-May-16, G
6440	5.7	Communications	38.0	100%	0%	10-Feb-15 A	31-May-16	Communicati
6441	5.6	Office Supplies	38.0	100%	0%	11-Apr-15 A	31-May-16	Office Supplie
6442	5.5	Staff Expenses	38.0	100%	0%	10-Feb-15 A	31-May-16	Staff Expense
6443	5.4	Fuel Charges	38.0	100%	0%	08-Apr-15 A	31-May-16	Fuel Charges
6444	5.3	Staff	38.0	100%	0%	10-Feb-15 A	31-May-16	Staff
6445	5.2	Consumables	38.0	100%	0%	11-Apr-15 A	31-May-16	Consumables
6446	5.1	Small Tools	38.0	100%	0%	11-Apr-15 A	31-May-16	Small Tools
6447	Station Dry and Wet Commissioning Schedule		12.0	0%	0%	27-Aug-15 A	03-May-16	03-May-16, Sta
6448	Segment A - Station Commissioning Schedule		12.0	0%	0%	30-Aug-15 A	03-May-16	03-May-16, Seg
6449	Segment A - Major Milestones		0.4	0%	0%	31-Aug-15 A	03-May-16	03-May-16, Seg
6450	Albion		0.0	0%	0%	14-Mar-16 A	09-Apr-16 A	09-Apr-16 A, Albi
6451	MILE_A_0_1(	Albion - Wet Commissioning Complete	0.0	100%	100%	09-Apr-16 A		Albion - Wet Com
6452	MILE_A_0_1(	Albion - Pre-Commissioning Complete	0.0	100%	100%	14-Mar-16 A		Albion - Pre-Comm
6453	Parkway Gate		0.0	0%	0%	29-Feb-16 A	03-May-16	03-May-16, Par
6454	MILE_A_0_11	Parkway West Gate - Wet Commissioning Complete	0.0	0%	0%	03-May-16		Parkway West

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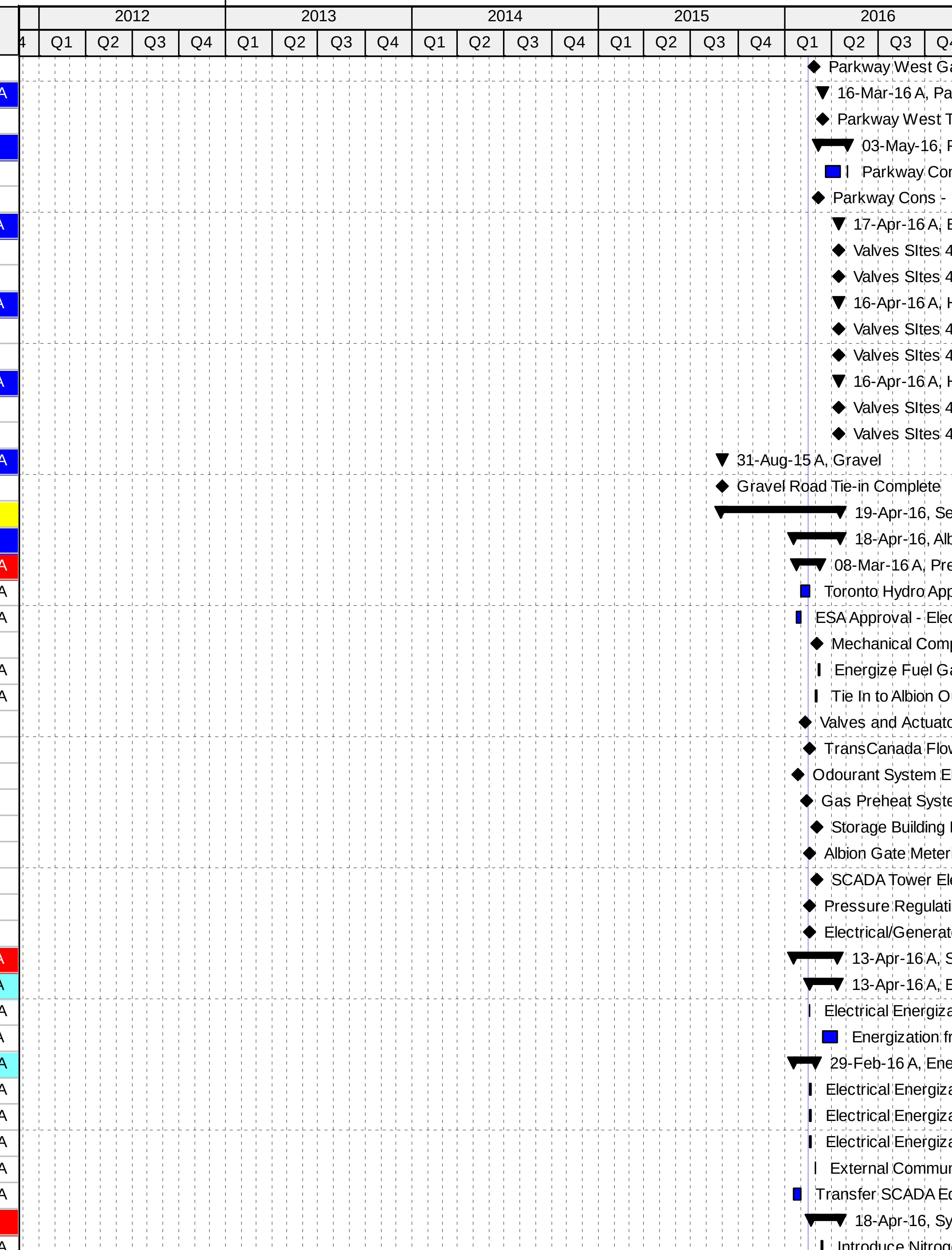
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
6455	MILE_A_0_1:	Parkway West Gate - Pre-Commissioning Complete	0.0	100%	100%	29-Feb-16 A	
6456		**Parkway Transmission**	0.0	0%	0%	16-Mar-16 A	16-Mar-16 A
6457	MILE_A_0_1:	Parkway West Transmission - Wet Commissioning Comple	0.0	100%	100%	16-Mar-16 A	
6458		**Parkway Cons**	0.4	0%	0%	07-Mar-16 A	03-May-16
6459	MILE_A_0_1‹	Parkway Cons - Wet Commissioning Complete	0.4	100%	90%	22-Mar-16 A	03-May-16
6460	MILE_A_0_1‹	Parkway Cons - Pre-Commissioning Complete	0.0	100%	100%	07-Mar-16 A	
6461		**Bramalea**	0.0	0%	0%	17-Apr-16 A	17-Apr-16 A
6462	MILE_A_0_1‹	Valves SItes 42" - Bramalea Rd - Wet Commissioning Com|	0.0	0%	100%	17-Apr-16 A	
6463	MILE_A_0_1:	Valves SItes 42" - Bramalea Rd - Pre-Commissioning Comp	0.0	0%	100%	17-Apr-16 A	
6464		**Heritage**	0.0	0%	0%	15-Apr-16 A	16-Apr-16 A
6465	MILE_A_0_1‹	Valves SItes 42" - Heritage Road - Wet Commissioning Cor	0.0	0%	100%	16-Apr-16 A	
6466	MILE_A_0_1:	Valves SItes 42" - Heritage Road - Pre-Commissioning Con	0.0	0%	100%	15-Apr-16 A	
6467		**Hurontario**	0.0	0%	0%	15-Apr-16 A	16-Apr-16 A
6468	MILE_A_0_1‹	Valves SItes 42" - Hurontario St - Wet Commissioning Com	0.0	0%	100%	16-Apr-16 A	
6469	MILE_A_0_1:	Valves SItes 42" - Hurontario St - Pre-Commissioning Com|	0.0	0%	100%	15-Apr-16 A	
6470		**Gravel**	0.0	0%	0%	31-Aug-15 A	31-Aug-15 A
6471	MILE_A_0_1:	Gravel Road Tie-in Complete	0.0	100%	100%	31-Aug-15 A	
6472		**Segment A - Pre Commissioning**	1.2	0%	0%	30-Aug-15 A	19-Apr-16
6473		**Albion Gate Station**	1.0	0%	0%	19-Jan-16 A	18-Apr-16
6474		**Pre-Commissioning: Milestones**	0.0	0%	0%	25-Jan-16 A	08-Mar-16 A
6475	MILE_ST4	Toronto Hydro Approval - Electrical Systems	0.0	100%	100%	03-Feb-16 A	19-Feb-16 A
6476	MILE_ST4	ESA Approval - Electrical Systems	0.0	100%	100%	25-Jan-16 A	02-Feb-16 A
6477	MILE_ST4	Mechanical Completion - Fuel Gas System	0.0	100%	100%	04-Mar-16 A	
6478	MILE_ST4	Energize Fuel Gas Line (Enbridge)	0.0	100%	100%	07-Mar-16 A	08-Mar-16 A
6479	MILE_ST4	Tie In to Albion Outlet (Aecon)	0.0	100%	100%	02-Mar-16 A	03-Mar-16 A
6480	MILE_ST4	Valves and Actuators Installation Complete	0.0	100%	100%	10-Feb-16 A	
6481	MILE_ST4	TransCanada Flow Valve and Metering System Elec/Instr T	0.0	100%	100%	20-Feb-16 A	
6482	MILE_ST4	Odourant System Elec/Instr Terminations Complete	0.0	100%	100%	28-Jan-16 A	
6483	MILE_ST4	Gas Preheat System Elec/Instr Terminations Complete	0.0	100%	100%	13-Feb-16 A	
6484	MILE_ST4	Storage Building Elec/Instr Terminations Complete	0.0	100%	100%	05-Mar-16 A	
6485	MILE_ST4	Albion Gate Metering Station Elec/Instr Terminations Compl	0.0	100%	100%	20-Feb-16 A	
6486	MILE_ST4	SCADA Tower Elec/Instr Terminations Complete	0.0	100%	100%	05-Mar-16 A	
6487	MILE_ST4	Pressure Regulating System Elec/Instr Terminations Compl	0.0	100%	100%	20-Feb-16 A	
6488	MILE_ST4	Electrical/Generator Building Elec/Instr Terminations Compl	0.0	100%	100%	20-Feb-16 A	
6489		**Site Pre-Commissioning**	0.0	0%	0%	19-Jan-16 A	13-Apr-16 A
6490		**Energization - Electrical Building**	0.0	0%	0%	20-Feb-16 A	13-Apr-16 A
6491	COMM_	Electrical Energization - MCC	0.0	100%	100%	20-Feb-16 A	20-Feb-16 A
6492	COMM_	Energization from Backup Generator System	0.0	100%	100%	15-Mar-16 A	13-Apr-16 A
6493		**Energization - Other**	0.0	0%	0%	19-Jan-16 A	29-Feb-16 A
6494	COMM_	Electrical Energization - Odourant Building	0.0	100%	100%	20-Feb-16 A	22-Feb-16 A
6495	COMM_	Electrical Energization - Boiler Building	0.0	100%	100%	20-Feb-16 A	22-Feb-16 A
6496	COMM_	Electrical Energization - Storage Building	0.0	100%	100%	20-Feb-16 A	22-Feb-16 A
6497	COMM_	External Communications through Antenna	0.0	100%	100%	29-Feb-16 A	29-Feb-16 A
6498	COMM_	Transfer SCADA Equipment Tower	0.0	100%	100%	19-Jan-16 A	01-Feb-16 A
6499		**System Pre-Commissioning including RTU and Communications**	1.0	0%	0%	22-Feb-16 A	18-Apr-16
6500	COMM_S`	Introduce Nitrogen in the facility per PSSR phases	0.0	100%	100%	14-Mar-16 A	14-Mar-16 A



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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
6501	COMM_S'	Desiccant Drying of Facility	0.0	100%	100%	28-Feb-16 A	01-Mar-16 A
6502		**Non Fuel Gas Dependent Functionality Tests**	1.0	0%	0%	22-Feb-16 A	18-Apr-16
6503	COMM_	Measurement Canada Site Acceptance / TCPL	1.0	0%	0%	18-Apr-16	18-Apr-16
6504	COMM_	Flow Control Valve to TCPL	0.0	100%	100%	29-Feb-16 A	29-Feb-16 A
6505	COMM_	Valves Functional Testing - Remote	0.0	100%	100%	22-Feb-16 A	05-Mar-16 A
6506	COMM_	Valves Functional Testing - Manual	0.0	100%	100%	22-Feb-16 A	26-Feb-16 A
6507	COMM_	Measurement System and Flow Control Functional Testing	0.0	100%	100%	22-Feb-16 A	14-Mar-16 A
6508	COMM_	Measurement System Functional Testing - Albion Gate	0.0	100%	100%	22-Feb-16 A	14-Mar-16 A
6509	COMM_	Pressure Control System Functional Testing	0.0	100%	100%	29-Feb-16 A	10-Mar-16 A
6510		**Fuel Gas Dependent Functionality Tests**	0.0	0%	0%	09-Mar-16 A	12-Apr-16 A
6511	COMM_	Backup Electrical Generator Functional Testing	0.0	100%	100%	09-Mar-16 A	12-Apr-16 A
6512	COMM_	Odourant System Functional Testing	0.0	100%	100%	09-Mar-16 A	18-Mar-16 A
6513	COMM_	Milestone: Odourant Fill	0.0	100%	100%	09-Mar-16 A	
6514	COMM_	Gas Preheat System Functional Testing	0.0	100%	100%	09-Mar-16 A	18-Mar-16 A
6515		**Parkway West Station**	1.2	0%	0%	30-Dec-15 A	19-Apr-16
6516		**Pre-Commissioning: Milestones**	0.0	0%	0%	30-Dec-15 A	01-Mar-16 A
6517	MILE_ST1	Mechanical Completion - Fuel Gas System	0.0	100%	100%	18-Feb-16 A	29-Feb-16 A
6518	MILE_ST1	Energize Fuel Gas Line (Enbridge)	0.0	100%	100%	29-Feb-16 A	01-Mar-16 A
6519	MILE_ST1	Cut-in Monolithic Isolators - NPS 42 (Aecon)	0.0	100%	100%	29-Feb-16 A	01-Mar-16 A
6520	MILE_ST1	Cut-in Monolithic Isolators - NPS 36 (Aecon)	0.0	100%	100%	08-Feb-16 A	12-Feb-16 A
6521	MILE_ST1	Spread 4 Tie-in- NPS 36 (Aecon)	0.0	100%	100%	26-Feb-16 A	27-Feb-16 A
6522	MILE_ST1	SCADA Tower Elec/Instr Terminations Complete	0.0	100%	100%	16-Feb-16 A	
6523	MILE_ST1	Valves and Actuators Installation Complete	0.0	100%	100%	28-Jan-16 A	
6524	MILE_ST1	Gas Preheat System Elec/Instr Terminations Complete	0.0	100%	100%	11-Feb-16 A	
6525	MILE_ST1	Electrical/Generator Building Elec/Instr Terminations Compl	0.0	100%	100%	31-Dec-15 A	
6526	MILE_ST1	Pressure Regulating System Elec/Instr Terminations Compl	0.0	100%	100%	14-Jan-16 A	
6527	MILE_ST1	Parkway Gate Metering Station Elec/Instr Terminations Con	0.0	100%	100%	13-Jan-16 A	
6528	MILE_ST1	Odourant System Elec/Instr Terminations Complete	0.0	100%	100%	30-Dec-15 A	
6529		**Site Pre-Commissioning**	0.2	0%	0%	28-Jan-16 A	19-Apr-16
6530		**Energization - Electrical Building**	0.2	0%	0%	28-Jan-16 A	19-Apr-16
6531	COMM_	Energization from Backup Generator System	0.2	100%	80%	17-Mar-16 A	19-Apr-16
6532	COMM_	Electrical Energization - MCC	0.0	100%	100%	28-Jan-16 A	28-Jan-16 A
6533		**Energization - Other**	0.0	0%	0%	29-Jan-16 A	08-Feb-16 A
6534	COMM_	Electrical Energization - Storage Building	0.0	100%	100%	29-Jan-16 A	29-Jan-16 A
6535	COMM_	External Communications through Antenna	0.0	100%	100%	08-Feb-16 A	08-Feb-16 A
6536	COMM_	Electrical Energization - Odourant Building	0.0	100%	100%	29-Jan-16 A	29-Jan-16 A
6537	COMM_	Electrical Energization - Boiler Building	0.0	100%	100%	29-Jan-16 A	29-Jan-16 A
6538		**System Pre-Commissioning including RTU and Communications**	1.0	0%	0%	27-Jan-16 A	18-Apr-16
6539		**Parkway West Transmission**	0.0	0%	0%	27-Jan-16 A	11-Mar-16 A
6540	COMM_	Valves Functional Testing - Manual	0.0	100%	100%	15-Feb-16 A	15-Feb-16 A
6541	COMM_	Introduce Nitrogen into Facility and fill. per PSSR phases	0.0	100%	100%	29-Feb-16 A	11-Mar-16 A
6542	COMM_	Desiccant Drying of Facility	0.0	100%	100%	27-Jan-16 A	25-Feb-16 A
6543		**Parkway West Gate**	1.0	0%	0%	29-Jan-16 A	18-Apr-16
6544	COMM_	Introduce Nitrogen into Facility and Fill.per PSSR phases	0.0	100%	100%	29-Feb-16 A	11-Mar-16 A
6545	COMM_	Desiccant Drying of Facility	0.0	100%	100%	18-Feb-16 A	23-Feb-16 A
6546		**Non Fuel Gas Dependent Functionality Tests**	0.0	0%	0%	29-Jan-16 A	08-Mar-16 A

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#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
6547	CON	Parkway West Transmission Instruments Functional Testing	0.0	100%	100%	15-Feb-16 A	01-Mar-16 A
6548	CON	Parkway West Gate - Valves Functional Testing - Remote	0.0	100%	100%	08-Feb-16 A	29-Feb-16 A
6549	CON	Parkway West Transmission Valves Functional Testing - Re	0.0	100%	100%	29-Jan-16 A	29-Feb-16 A
6550	CON	Valves Functional Testing - Manual	0.0	100%	100%	29-Jan-16 A	05-Feb-16 A
6551	CON	Pressure Control System Functional Testing	0.0	100%	100%	08-Feb-16 A	08-Mar-16 A
6552	CON	Measurement System Functional Testing	0.0	100%	100%	08-Feb-16 A	29-Feb-16 A
6553		**Fuel Gas Dependent Functionality Tests**	1.0	0%	0%	07-Mar-16 A	18-Apr-16
6554	CON	Backup Electrical Generator Functional Testing	1.0	100%	60%	14-Mar-16 A	18-Apr-16
6555	CON	Gas Preheat System Functional Testing	0.0	100%	100%	07-Mar-16 A	16-Mar-16 A
6556	CON	Odourant System Functional Testing	0.0	100%	100%	09-Mar-16 A	15-Mar-16 A
6557	CON	Milestone: Odourant Fill	0.0	100%	100%	09-Mar-16 A	
6558		**Parkway Cons Bypass Regulating Station**	0.0	0%	0%	11-Feb-16 A	07-Mar-16 A
6559		**Pre-Commissioning Milestones**	0.0	0%	0%	11-Feb-16 A	11-Feb-16 A
6560	MILE_ST3	Electrical Building Elec/Instr Terminations Complete	0.0	100%	100%	11-Feb-16 A	
6561	MILE_ST3	Valves and Actuators Installation Complete	0.0	100%	100%	11-Feb-16 A	
6562	MILE_ST3	Pressure Regulating System Elec/Instr Terminations Compl	0.0	100%	100%	11-Feb-16 A	
6563		**Site Pre-Commissioning**	0.0	0%	0%	12-Feb-16 A	12-Feb-16 A
6564	COMM_S	Electrical Energization - MCC	0.0	100%	100%	12-Feb-16 A	12-Feb-16 A
6565		**System Pre-Commissioning including RTU and Communications**	0.0	0%	0%	12-Feb-16 A	07-Mar-16 A
6566	COMM_S	Commission RTU Pressure Control System	0.0	100%	100%	23-Feb-16 A	07-Mar-16 A
6567	COMM_S	Valves Functional Testing - Remote	0.0	100%	100%	24-Feb-16 A	29-Feb-16 A
6568	COMM_S	Valves Functional Testing - Manual	0.0	100%	100%	12-Feb-16 A	12-Feb-16 A
6569		**Gravel Rd Tie In**	0.0	0%	0%	30-Aug-15 A	31-Aug-15 A
6570		**Pre-Commissioning Milestones**	0.0	0%	0%	30-Aug-15 A	30-Aug-15 A
6571	MILE_VS6	Mechanical/Piping Work Complete	0.0	100%	100%	30-Aug-15 A	
6572		**System Pre-Commissioning including RTU and Communications**	0.0	0%	0%	31-Aug-15 A	31-Aug-15 A
6573	COMM_V	Valves Functional Testing - Manual	0.0	100%	100%	31-Aug-15 A	31-Aug-15 A
6574		**Valves Sites NPS 42 - Heritage Road**	0.0	0%	0%	19-Feb-16 A	15-Apr-16 A
6575		**Pre-Commissioning Milestones**	0.0	0%	0%	19-Feb-16 A	01-Mar-16 A
6576	MILE_VS1	Electrical Building Elec/Instr Terminations Complete	0.0	100%	100%	01-Mar-16 A	
6577	MILE_VS1	Valves and Actuators Installation Complete	0.0	100%	100%	19-Feb-16 A	
6578		**Site Pre-Commissioning**	0.0	0%	0%	23-Mar-16 A	23-Mar-16 A
6579	COMM_V	Electrical Energization - MCC	0.0	100%	100%	23-Mar-16 A	23-Mar-16 A
6580		**System Pre-Commissioning including RTU and Communications**	0.0	0%	0%	07-Mar-16 A	15-Apr-16 A
6581	COMM_V	Valves Functional Testing - Remote	0.0	0%	100%	15-Apr-16 A	15-Apr-16 A
6582	COMM_V	Valves Functional Testing - Manual	0.0	100%	100%	07-Mar-16 A	16-Mar-16 A
6583		**Valves Sites NPS 42 - Bramalea Rd**	0.0	0%	0%	29-Feb-16 A	17-Apr-16 A
6584		**Pre-Commissioning Milestones**	0.0	0%	0%	29-Feb-16 A	01-Mar-16 A
6585	MILE_VS3	Electrical Building Elec/Instr Terminations Complete	0.0	100%	100%	01-Mar-16 A	
6586	MILE_VS3	Valves and Actuators Installation Complete	0.0	100%	100%	29-Feb-16 A	
6587		**Site Pre-Commissioning**	0.0	0%	0%	23-Mar-16 A	23-Mar-16 A
6588	COMM_V	Electrical Energization - MCC	0.0	100%	100%	23-Mar-16 A	23-Mar-16 A
6589		**System Pre-Commissioning including RTU and Communications**	0.0	0%	0%	16-Mar-16 A	17-Apr-16 A
6590	COMM_V	Valves Functional Testing - Remote	0.0	0%	100%	17-Apr-16 A	17-Apr-16 A
6591	COMM_V	Valves Functional Testing - Manual	0.0	100%	100%	16-Mar-16 A	16-Mar-16 A
6592		**Valves Sites NPS 42 - Hurontario St**	0.0	0%	0%	19-Feb-16 A	15-Apr-16 A

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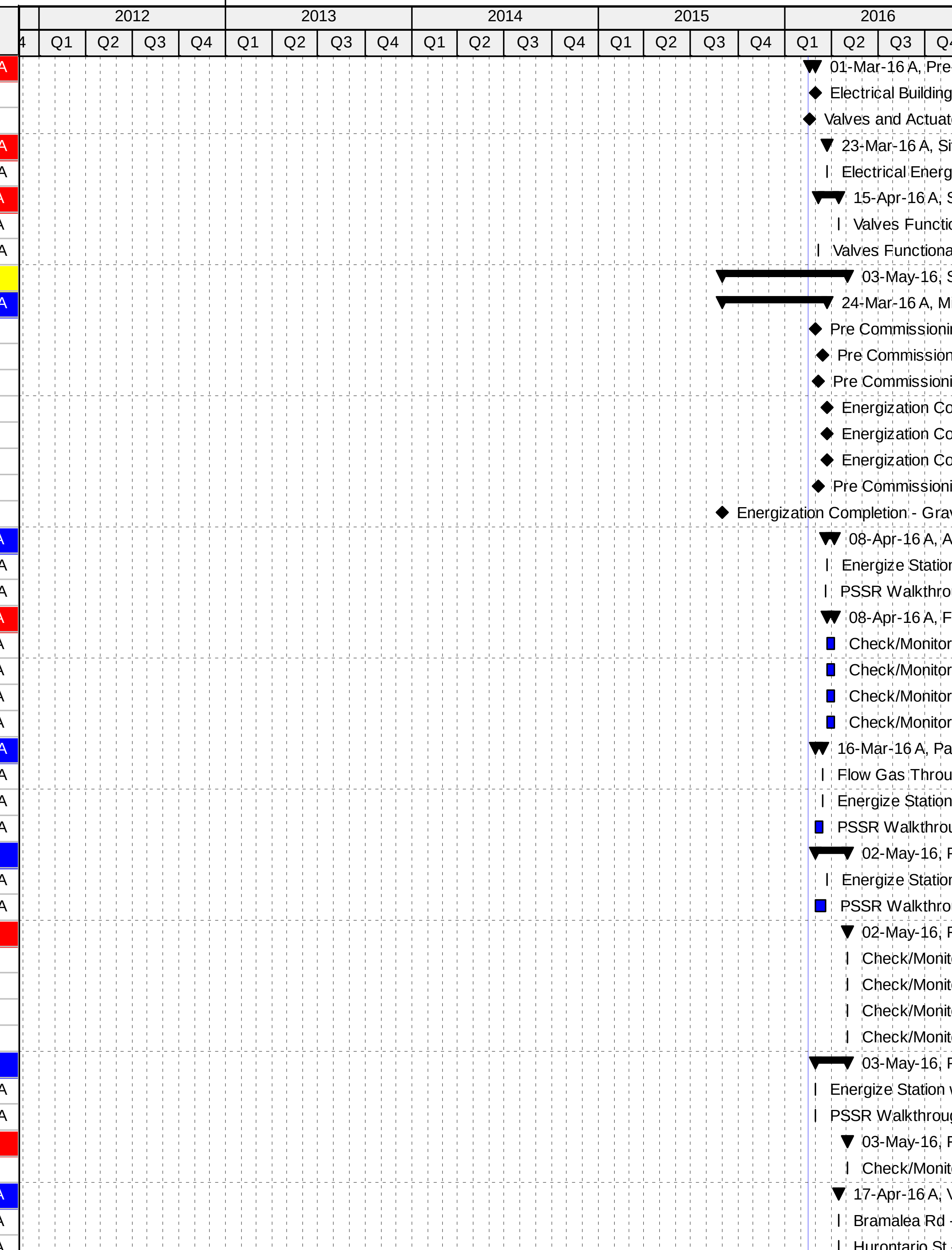
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
6593		Pre-Commissioning Milestones	0.0	0%	0%	19-Feb-16 A	01-Mar-16 A
6594	MILE_VS2	Electrical Building Elec/Instr Terminations Complete	0.0	100%	100%	01-Mar-16 A	
6595	MILE_VS2	Valves and Actuators Installation Complete	0.0	100%	100%	19-Feb-16 A	
6596		Site Pre-Commissioning	0.0	0%	0%	23-Mar-16 A	23-Mar-16 A
6597	COMM_VS	Electrical Energization - MCC	0.0	100%	100%	23-Mar-16 A	23-Mar-16 A
6598		System Pre-Commissioning including RTU and Communications	0.0	0%	0%	07-Mar-16 A	15-Apr-16 A
6599	COMM_VS	Valves Functional Testing - Remote	0.0	0%	100%	15-Apr-16 A	15-Apr-16 A
6600	COMM_VS	Valves Functional Testing - Manual	0.0	100%	100%	07-Mar-16 A	07-Mar-16 A
6601		Segment A - Wet Commissioning	2.0	0%	0%	31-Aug-15 A	03-May-16
6602		Milestones	0.0	0%	0%	31-Aug-15 A	24-Mar-16 A
6603	Mile_AW_1_1	Pre Commissioning Complete - Parkway West Transmission	0.0	100%	100%	01-Mar-16 A	
6604	Mile_AW_1_1	Pre Commissioning Complete - Albion	0.0	100%	100%	16-Mar-16 A	
6605	Mile_AW_1_1	Pre Commissioning Complete - Parkway West Gate	0.0	100%	100%	08-Mar-16 A	
6606	Mile_AW_1_1	Energization Completion - Hurontario	0.0	100%	100%	24-Mar-16 A	
6607	Mile_AW_1_1	Energization Completion - Bramalea	0.0	100%	100%	24-Mar-16 A	
6608	Mile_AW_1_1	Energization Completion - Heritage Rd	0.0	100%	100%	24-Mar-16 A	
6609	Mile_AW_1_1	Pre Commissioning Complete - Parkway Cons	0.0	100%	100%	08-Mar-16 A	
6610	Mile_AW_1_1	Energization Completion - Gravel Road	0.0	100%	100%	31-Aug-15 A	
6611		Albion Gate Station	0.0	0%	0%	21-Mar-16 A	08-Apr-16 A
6612	COMM_ST4_	Energize Station with Natural Gas	0.0	100%	100%	23-Mar-16 A	23-Mar-16 A
6613	COMM_ST4_	PSSR Walkthrough - Phase 1B,2?	0.0	100%	100%	21-Mar-16 A	22-Mar-16 A
6614		Flow Gas Through Station-Albion	0.0	0%	0%	25-Mar-16 A	08-Apr-16 A
6615	COMM_S	Check/Monitor Odourant System	0.0	100%	100%	25-Mar-16 A	08-Apr-16 A
6616	COMM_S	Check/Monitor Pressure Regulation	0.0	100%	100%	25-Mar-16 A	08-Apr-16 A
6617	COMM_S	Check/Monitor Gas Preheat System	0.0	100%	100%	25-Mar-16 A	08-Apr-16 A
6618	COMM_S	Check/Monitor Metering System	0.0	100%	100%	25-Mar-16 A	08-Apr-16 A
6619		Parkway West Transmission Station	0.0	0%	0%	02-Mar-16 A	16-Mar-16 A
6620	COMM_ST1_	Flow Gas Through Station	0.0	100%	100%	16-Mar-16 A	16-Mar-16 A
6621	COMM_ST1_	Energize Station with Natural Gas	0.0	100%	100%	15-Mar-16 A	15-Mar-16 A
6622	COMM_ST1_	PSSR Walkthrough - Phase 1B,2?	0.0	100%	100%	02-Mar-16 A	14-Mar-16 A
6623		Parkway West Gate Station	1.0	0%	0%	02-Mar-16 A	02-May-16
6624	COMM_ST1_	Energize Station with Natural Gas	0.0	100%	100%	23-Mar-16 A	23-Mar-16 A
6625	COMM_ST1_	PSSR Walkthrough - Phase 1B,2?	0.0	100%	100%	02-Mar-16 A	22-Mar-16 A
6626		Flow Gas Through Station	1.0	0%	0%	02-May-16	02-May-16
6627	COMM_S	Check/Monitor Odourant System	1.0	0%	0%	02-May-16	02-May-16
6628	COMM_S	Check/Monitor Pressure Regulation	1.0	0%	0%	02-May-16	02-May-16
6629	COMM_S	Check/Monitor Gas Preheat System	1.0	0%	0%	02-May-16	02-May-16
6630	COMM_S	Check/Monitor Metering System	1.0	0%	0%	02-May-16*	02-May-16
6631		Parkway Cons Bypass Regulating Station	1.0	0%	0%	01-Mar-16 A	03-May-16
6632	COMM_ST3_	Energize Station with Natural Gas	0.0	100%	100%	02-Mar-16 A	02-Mar-16 A
6633	COMM_ST3_	PSSR Walkthrough	0.0	100%	100%	01-Mar-16 A	01-Mar-16 A
6634		Flow Gas Through Station	1.0	0%	0%	03-May-16	03-May-16
6635	COMM_S	Check/Monitor Pressure Regulation	1.0	0%	0%	03-May-16	03-May-16
6636		Valves Sites - NPS 42	0.0	0%	0%	16-Apr-16 A	17-Apr-16 A
6637	COMM_VS3_	Bramalea Rd - Check/Monitor Pressures and Scada	0.0	0%	100%	17-Apr-16 A	17-Apr-16 A
6638	COMM_VS2_	Hurontario St - Check/Monitor Pressures and Scada	0.0	0%	100%	16-Apr-16 A	16-Apr-16 A



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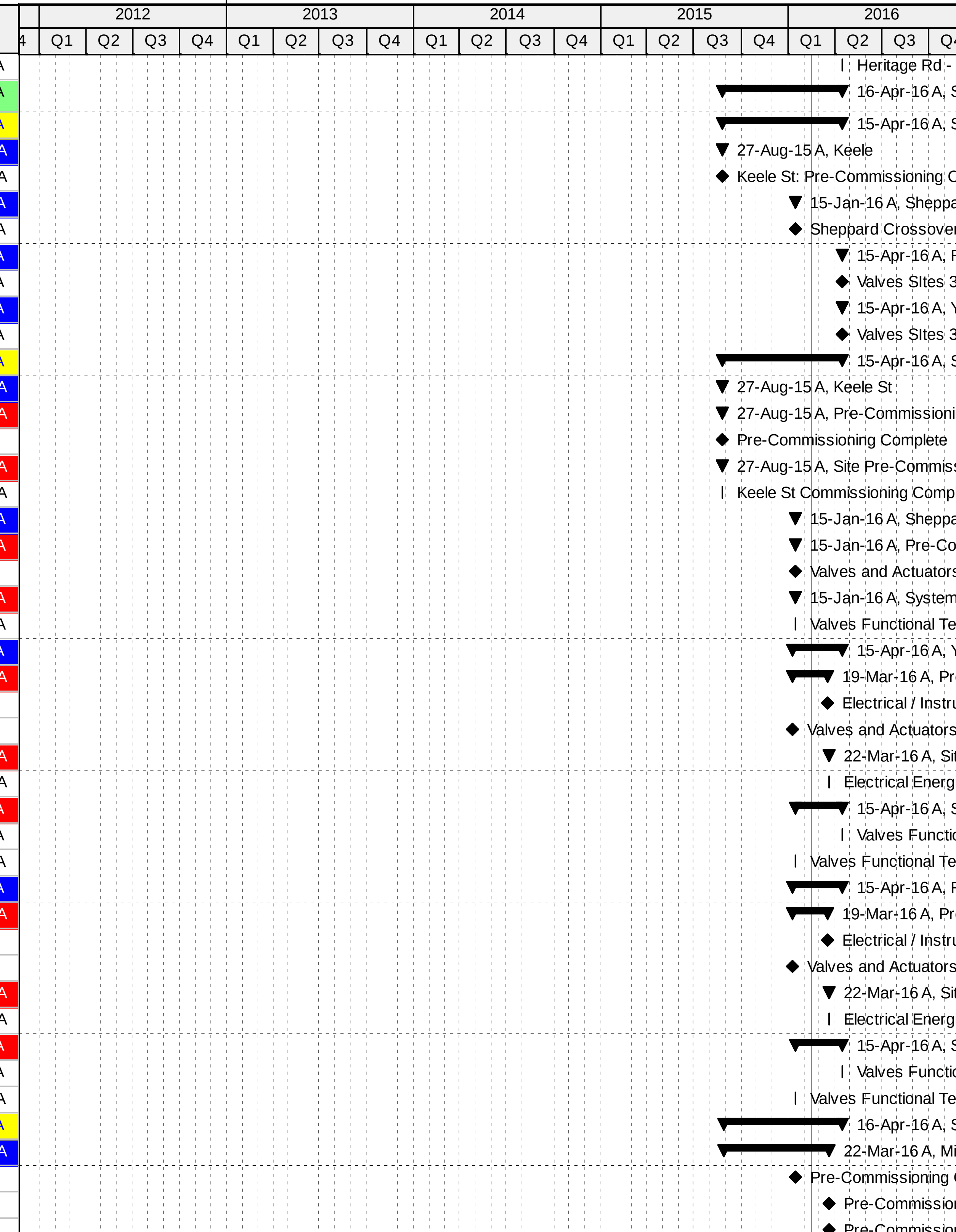
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
6639	COMM_VS1_	Heritage Rd - Check/Monitor Pressures and Scada	0.0	0%	100%	16-Apr-16 A	16-Apr-16 A
6640		**Segment B - Station Commissioning Schedule**	0.0	0%	0%	27-Aug-15 A	16-Apr-16 A
6641		**Segment B - Major Milestones**	0.0	0%	0%	27-Aug-15 A	15-Apr-16 A
6642		**Keele**	0.0	0%	0%	27-Aug-15 A	27-Aug-15 A
6643	MILE_B_0_1(	Keele St: Pre-Commissioning Complete	0.0	100%	100%		27-Aug-15 A
6644		**Sheppard Crossover**	0.0	0%	0%	15-Jan-16 A	15-Jan-16 A
6645	MILE_B_0_1(	Sheppard Crossover: Pre-Commissioning Complete	0.0	100%	100%		15-Jan-16 A
6646		**Roddick**	0.0	0%	0%	15-Apr-16 A	15-Apr-16 A
6647	MILE_B_0_1(	Valves SItes 36" - Roddick Rd: Pre-Commissioning Comple	0.0	0%	100%		15-Apr-16 A
6648		**Yonge**	0.0	0%	0%	15-Apr-16 A	15-Apr-16 A
6649	MILE_B_0_1(	Valves SItes 36" - Yonge St: Pre-Commissioning Complete	0.0	0%	100%		15-Apr-16 A
6650		**Segment B - Pre Commissioning**	0.0	0%	0%	27-Aug-15 A	15-Apr-16 A
6651		**Keele St**	0.0	0%	0%	27-Aug-15 A	27-Aug-15 A
6652		**Pre-Commissioning Milestones**	0.0	0%	0%	27-Aug-15 A	27-Aug-15 A
6653	MILE_ST5	Pre-Commissioning Complete	0.0	100%	100%	27-Aug-15 A	
6654		**Site Pre-Commissioning**	0.0	0%	0%	27-Aug-15 A	27-Aug-15 A
6655	COMM_S'	Keele St Commissioning Completion Date	0.0	100%	100%	27-Aug-15 A	27-Aug-15 A
6656		**Sheppard Crossover**	0.0	0%	0%	15-Jan-16 A	15-Jan-16 A
6657		**Pre-Commissioning Milestones**	0.0	0%	0%	15-Jan-16 A	15-Jan-16 A
6658	MILE_VS5	Valves and Actuators Installation Complete	0.0	100%	100%	15-Jan-16 A	
6659		**System Pre-Commissioning**	0.0	0%	0%	15-Jan-16 A	15-Jan-16 A
6660	COMM_V:	Valves Functional Testing - Manual	0.0	100%	100%	15-Jan-16 A	15-Jan-16 A
6661		**Yonge St 36**	0.0	0%	0%	09-Jan-16 A	15-Apr-16 A
6662		**Pre-Commissioning Milestones**	0.0	0%	0%	09-Jan-16 A	19-Mar-16 A
6663	MILE_VS4	Electrical / Instrumentation Terminations Complete	0.0	100%	100%	19-Mar-16 A	
6664	MILE_VS4	Valves and Actuators Installation Complete	0.0	100%	100%	09-Jan-16 A	
6665		**Site Pre-Commissioning**	0.0	0%	0%	22-Mar-16 A	22-Mar-16 A
6666	COMM_V:	Electrical Energization - MCC	0.0	100%	100%	22-Mar-16 A	22-Mar-16 A
6667		**System Pre-Commissioning**	0.0	0%	0%	15-Jan-16 A	15-Apr-16 A
6668	COMM_V:	Valves Functional Testing - Remote	0.0	0%	100%	15-Apr-16 A	15-Apr-16 A
6669	COMM_V:	Valves Functional Testing - Manual	0.0	100%	100%	15-Jan-16 A	15-Jan-16 A
6670		**Roddick Rd 36**	0.0	0%	0%	09-Jan-16 A	15-Apr-16 A
6671		**Pre-Commissioning Milestones**	0.0	0%	0%	09-Jan-16 A	19-Mar-16 A
6672	MILE_VS7	Electrical / Instrumentation Terminations Complete	0.0	100%	100%	19-Mar-16 A	
6673	MILE_VS7	Valves and Actuators Installation Complete	0.0	100%	100%	09-Jan-16 A	
6674		**Site Pre-Commissioning**	0.0	0%	0%	22-Mar-16 A	22-Mar-16 A
6675	COMM_V:	Electrical Energization - MCC	0.0	100%	100%	22-Mar-16 A	22-Mar-16 A
6676		**System Pre-Commissioning**	0.0	0%	0%	15-Jan-16 A	15-Apr-16 A
6677	COMM_V:	Valves Functional Testing - Remote	0.0	0%	100%	15-Apr-16 A	15-Apr-16 A
6678	COMM_V:	Valves Functional Testing - Manual	0.0	100%	100%	15-Jan-16 A	15-Jan-16 A
6679		**Segment B - Wet Commissioning**	0.0	0%	0%	28-Aug-15 A	16-Apr-16 A
6680		**Milestones**	0.0	0%	0%	28-Aug-15 A	22-Mar-16 A
6681	Mile_BW_1_2	Pre-Commissioning Complete - Sheppard Crossover	0.0	100%	100%	15-Jan-16 A	
6682	Mile_BW_1_2	Pre-Commissioning Complete - Roddick Rd 36"	0.0	100%	100%	22-Mar-16 A	
6683	Mile_BW_1_2	Pre-Commissioning Complete - Yonge St 36"	0.0	100%	100%	22-Mar-16 A	



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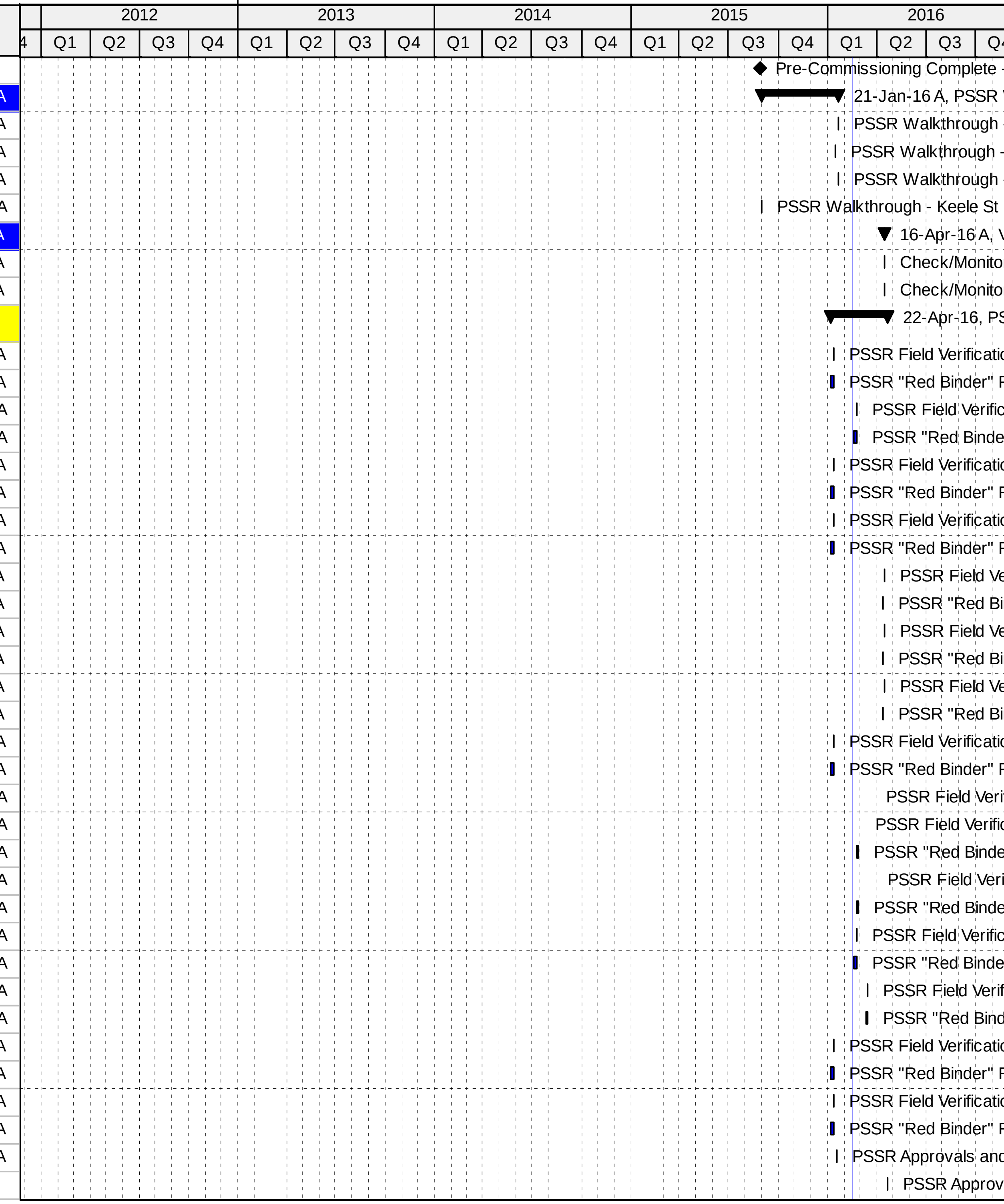
#	Activity ID	Activity Name	Remaining Duration	Schedule % Complete	Performance % Complete	Start	Finish
6684	Mile_BW_1_2	Pre-Commissioning Complete - Keele St	0.0	100%	100%	28-Aug-15 A	
6685	**PSSR Walkthrough**		0.0	0%	0%	31-Aug-15 A	21-Jan-16 A
6686	COMM_VS7_	PSSR Walkthrough - Roddick Rd 36"	0.0	100%	100%	21-Jan-16 A	21-Jan-16 A
6687	COMM_VS5_	PSSR Walkthrough - Sheppard Crossover	0.0	100%	100%	16-Jan-16 A	16-Jan-16 A
6688	COMM_VS4_	PSSR Walkthrough - Yonge Ste 36"	0.0	100%	100%	21-Jan-16 A	21-Jan-16 A
6689	COMM_ST5_	PSSR Walkthrough - Keele St	0.0	100%	100%	31-Aug-15 A	31-Aug-15 A
6690	**Valves Sites - NPS 36**		0.0	0%	0%	16-Apr-16 A	16-Apr-16 A
6691	COMM_VS7_	Check/Monitor Pressures and Scada - Roddick Rd	0.0	0%	100%	16-Apr-16 A	16-Apr-16 A
6692	COMM_VS4_	Check/Monitor Pressures and Scada - Yonge St	0.0	0%	100%	16-Apr-16 A	16-Apr-16 A
6693	**PSSR Activities**		1.0	0%	0%	06-Jan-16 A	22-Apr-16
6694	TRN_VS7_10030	PSSR Field Verification Walkdown - Roddick	0.0	100%	100%	13-Jan-16 A	14-Jan-16 A
6695	TRN_VS7_10010	PSSR "Red Binder" Reviews - Roddick	0.0	100%	100%	06-Jan-16 A	12-Jan-16 A
6696	TRN_VS6_10030	PSSR Field Verification Walkdown - Gravel Road	0.0	100%	100%	25-Feb-16 A	25-Feb-16 A
6697	TRN_VS6_10010	PSSR "Red Binder" Reviews - Gravel Road	0.0	100%	100%	20-Feb-16 A	24-Feb-16 A
6698	TRN_VS5_10020	PSSR Field Verification Walkdown - Sheppard	0.0	100%	100%	13-Jan-16 A	14-Jan-16 A
6699	TRN_VS5_10010	PSSR "Red Binder" Reviews - Sheppard	0.0	100%	100%	06-Jan-16 A	12-Jan-16 A
6700	TRN_VS4_10030	PSSR Field Verification Walkdown - Yonge	0.0	100%	100%	13-Jan-16 A	14-Jan-16 A
6701	TRN_VS4_10010	PSSR "Red Binder" Reviews - Yonge	0.0	100%	100%	06-Jan-16 A	12-Jan-16 A
6702	TRN_VS3_10030	PSSR Field Verification Walkdown - Bramalea Road	0.0	0%	100%	15-Apr-16 A	15-Apr-16 A
6703	TRN_VS3_10010	PSSR "Red Binder" Reviews - Bramalea Road	0.0	0%	100%	13-Apr-16 A	14-Apr-16 A
6704	TRN_VS2_10030	PSSR Field Verification Walkdown - Hurontario Street	0.0	0%	100%	15-Apr-16 A	15-Apr-16 A
6705	TRN_VS2_10010	PSSR "Red Binder" Reviews - Hurontario Street	0.0	0%	100%	13-Apr-16 A	14-Apr-16 A
6706	TRN_VS1_10030	PSSR Field Verification Walkdown - Heritage Road	0.0	0%	100%	15-Apr-16 A	15-Apr-16 A
6707	TRN_VS1_10010	PSSR "Red Binder" Reviews - Heritage Road	0.0	0%	100%	13-Apr-16 A	14-Apr-16 A
6708	TRN_ST5_10030	PSSR Field Verification Walkdown - Keele	0.0	100%	100%	13-Jan-16 A	14-Jan-16 A
6709	TRN_ST5_10010	PSSR "Red Binder" Reviews - Keele	0.0	100%	100%	06-Jan-16 A	12-Jan-16 A
6710	TRN_ST4_10030	PSSR Field Verification Walkdown - Albion Station	0.0	100%	100%	21-Mar-16 A	22-Mar-16 A
6711	TRN_ST3_10030	PSSR Field Verification Walkdown - Parkway Cons	0.0	100%	100%	01-Mar-16 A	01-Mar-16 A
6712	TRN_ST3_10010	PSSR "Red Binder" Reviews - Parkway Cons	0.0	100%	100%	25-Feb-16 A	29-Feb-16 A
6713	TRN_ST1_10030	PSSR Field Verification Walkdown - Parkway West	0.0	100%	100%	02-Mar-16 A	23-Mar-16 A
6714	TRN_ST1_10010	PSSR "Red Binder" Reviews - Parkway West	0.0	100%	100%	25-Feb-16 A	29-Feb-16 A
6715	TRN_SP4_10030	PSSR Field Verification Walkdown - Spread 4	0.0	100%	100%	25-Feb-16 A	25-Feb-16 A
6716	TRN_SP4_10010	PSSR "Red Binder" Reviews - Spread 4	0.0	100%	100%	20-Feb-16 A	24-Feb-16 A
6717	TRN_SP3_10020	PSSR Field Verification Walkdown - Spread 3	0.0	100%	100%	16-Mar-16 A	16-Mar-16 A
6718	TRN_SP3_10010	PSSR "Red Binder" Reviews - Spread 3	0.0	100%	100%	14-Mar-16 A	15-Mar-16 A
6719	TRN_SP2_10030	PSSR Field Verification Walkdown - Spread 2	0.0	100%	100%	13-Jan-16 A	14-Jan-16 A
6720	TRN_SP2_10010	PSSR "Red Binder" Reviews - Spread 2	0.0	100%	100%	06-Jan-16 A	12-Jan-16 A
6721	TRN_SP1_10020	PSSR Field Verification Walkdown - Spread 1	0.0	100%	100%	13-Jan-16 A	14-Jan-16 A
6722	TRN_SP1_10010	PSSR "Red Binder" Reviews - Spread 1	0.0	100%	100%	06-Jan-16 A	12-Jan-16 A
6723	TRN_SGB_10010	PSSR Approvals and Sign off - Segment B	0.0	100%	100%	20-Jan-16 A	20-Jan-16 A
6724	TRN_SGA_10010	PSSR Approvals and Sign off - Segment A	1.0	0%	0%	22-Apr-16	22-Apr-16



Actual Work | Critical Remaining Work | Summary | Remaining Work | Milestone

TASK filter: All Activities

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-12-1, Attach 2, p.16

Question(s):

Please provide details of the additions to load originally forecast by Enbridge to affect the Bathurst Reinforcement Project, and the net new load (or reduced load, if applicable) subsequently actually arising, from each of the following:

a) The proposed project at the corner of Wilmington and Overbrook.

b) The Prosserman Jewish Community Centre.

c) The expected project on Sheppard Avenue immediately east of the valley.

Response:

a-c) It is not clear what aspect of the evidence at Exhibit 1, Tab 12, Schedule 1, Attachment 2, page 16 (relating to project costs and drivers of cost variances) is being clarified through this interrogatory. The load information being requested does not appear relevant to the evidence or to Enbridge Gas's requested relief in the Rebasing Application. The need and costs of the Bathurst Reinforcement Project were already examined and accepted by the OEB in the leave-to-construct proceeding [1]. Moreover, such load information would constitute "consumer information" that is protected under Section 5.3 of the OEB's Gas Distribution Access Rule (i.e., not to be disclosed without written consent of the consumer or the specific authorization of the OEB). Accordingly, Enbridge Gas respectfully declines to produce the information sought.

[1] EB-2018-0097

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

EB-2012-0451, EGD GTA Project – Post Construction Financial Report, dated June 30, 2017, Appendix K

Question(s):

With respect to the KPMG, *GTA Project Report*:

a) Please provide a copy of the retainer agreement with KPMG and a copy of the CV of the report's author(s).

b) [p.4] Please confirm that KPMG was retained during the project construction to provide on-going advice regarding project management and governance practices. If this is not confirmed, please explain.

c) Please provide a copy of all memos, reports, analyses, recommendations, and any other work product provided to the company during the construction of the GTA Project.

Response:

a) Please see Attachment 1 for a copy of the agreement and CVs. Parts of the agreement have been redacted for reasons set out in the Company's accompanying request for confidential treatment of certain information filed in this proceeding.

b) Confirmed.

c) Please see Attachment 2 for a copy of the KMPG Initial Governance & Controls Framework Assessment of the GTA Project. All relevant correspondence, analysis, reports and recommendations are captured within the aforementioned document and the final KPMG Assessment Report, which is found at Appendix K of the GTA Project Post Construction Financial Report.[1]

[1] EB-2012-0451, GTA Project Post Construction Financial Report (June 30, 2017), available at https://www.rds.oeb.ca/CMWebDrawer/Record/576741/File/document

CONSULTING AGREEMENT

THIS AGREEMENT made effective this 30th day of October, 2014.

BETWEEN:

ENBRIDGE GAS DISTRIBUTION INC.
("Enbridge")

– and –

KPMG LLP
(the "Consultant")

WITNESSES THAT in consideration of the mutual covenants and agreements herein contained, the parties hereto covenant and agree as follows:

1. Scope of Services

(a) During the term hereof (as hereinafter defined), the Consultant shall provide consulting services to Enbridge, on the terms and conditions set forth below.

(b) The scope of work for specific projects to be undertaken by the Consultant at the request of Enbridge will be described in separate schedules referencing this Agreement, each of which shall become effective, be incorporated by reference and form an integral part of this Agreement upon the execution of each such schedule by Enbridge and the Consultant. The schedule for each project will specify the names of key individuals, scope of consulting services, deliverables, commencement and completion dates, rate of compensation and payment terms applicable to such project. Each schedule described above shall be prepared using a form similar to the attached Schedule "A".

2. Compensation

In consideration of the consulting services and deliverables to be provided by the Consultant hereunder, and provided that the Consultant is not in default of its obligations hereunder, Enbridge shall remit to the Consultant all amounts required to be paid in accordance with the applicable schedule.

Consultant shall be responsible for charging, collecting and remitting all applicable federal and provincial sales, use and value-added taxes in respect of the fees paid or payable to Consultant and, in particular, the goods and services tax ("GST") and harmonized sales tax ("HST") imposed under Part IX of the *Excise Tax Act* (the "ETA"), the Québec sales tax ("QST") imposed under an *Act respecting the Québec Sales Tax* (the "QSTA") and any provincial sales taxes ("PST"); and such taxes, if applicable, shall be shown separately on all invoices. Where Consultant is required to collect any GST/HST, QST or similar tax, Consultant shall provide Enbridge with the documentary evidence as prescribed pursuant to the ETA or QSTA, any successor provision thereto or any similar provision of any other taxing statute as is required to entitle Enbridge to claim an input tax credit, input tax refund, rebate, refund or any other form of relief in respect of such taxes.

In the event Consultant is a non-resident of Canada and has not obtained and provided to Enbridge a non-resident withholding tax waiver at such time as Enbridge makes any payment to Consultant for the services rendered by it to Enbridge in Canada, Enbridge shall withhold such percentage of any payment made by it for the consulting services as is from time to time mandated under the *Income Tax Act* (Canada) (the "ITA") and shall remit the withheld amount to Canada Revenue Agency in the manner and at the time required by the ITA. In the event that Enbridge is assessed for any non-resident withholding taxes payable, Consultant agrees to forthwith reimburse Enbridge for such amount together with applicable interest and penalties, if any.

3. Term

Subject to earlier termination as provided for herein, the term of this Agreement shall commence on the day set forth above and expires on December 31, 2017 (hereinafter the "Term").

4. Termination

(a) Enbridge may terminate this Agreement or any schedule to this Agreement for convenience upon giving two (2) weeks written notice to the Consultant.

(b) Either party may terminate this Agreement in case of a breach by the other party of its obligations hereunder, provided that the breach is not cured within five (5) days of written notification by the non-defaulting party to the defaulting party setting out the particulars of the breach.

(c) Either party may terminate this Agreement upon written notice to the other party, if: (i) the other party is subject to proceedings in bankruptcy, or insolvency, whether voluntary or involuntary, (ii) a receiver is appointed in respect of all or a substantial portion of the other party's assets; or (iii) the other party assigns its property to its creditors or generally becomes unable to pay its debts as they become due.

Upon any termination of this Agreement, the Consultant shall deliver to Enbridge the results of all consulting services provided as of the date of termination, including completed or uncompleted deliverables for which payment has been received in accordance with the terms of this Agreement.

5. Facilities

Enbridge shall provide to the Consultant use of such office facilities as may be required by the Consultant, acting reasonably, to perform the consulting services during the Term.

6. Reimbursement for Expenses

In addition to the payments to be made pursuant to Section 2 hereof, Enbridge shall reimburse the Consultant for all reasonable expenses properly incurred by the Consultant in connection with the consulting services provided to Enbridge hereunder and that have been pre-approved by Enbridge in writing, including, without limitation, reasonable travel and other costs and expenses in connection therewith. Concurrently with its delivery of invoices to Enbridge as contemplated by Section 2 hereof, the Consultant shall submit to Enbridge invoices and statements setting out in reasonable detail the nature and amount of the expenses or costs incurred by the Consultant for which the Consultant claims reimbursement, and Enbridge shall within thirty (30) days of the receipt of such invoices and statements reimburse the Consultant for all approved invoiced expenses and costs. The Consultant shall provide to Enbridge copies of all documentation in support of invoiced expenses as Enbridge may request from time to time during the Term hereof.

7. Independent Contractor

Notwithstanding anything to the contrary herein contained, the Consultant shall not, for any purpose, be or be deemed to be an employee of Enbridge during the Term or at any time during which the consulting services described in Section 1 hereof are provided to Enbridge nor shall anything in this Agreement create or be construed for any purpose as creating any relationship between Enbridge and the Consultant of employer and employee. Except as expressly provided herein, Enbridge shall not be liable to contribute to any employee benefit or pension plan or pay premiums for any policy or form of insurance whatsoever on behalf of the Consultant nor to pay any amounts or premiums on its behalf in respect of the Canada Pension Plan, Ontario Health Insurance Plan, Workplace Safety and Insurance Board or Employment Insurance, nor to deduct or withhold from source any amount from amounts payable by Enbridge to the Consultant hereunder in respect of any income tax obligation or liability payable by the Consultant to the Canada Revenue Agency. The Consultant agrees to indemnify and hold Enbridge harmless from and against any order, penalty, interest or tax that may be assessed or levied against Enbridge as a result of the failure or delay of the Consultant to file any return or information required to be filed by the Consultant by any law, ordinance or regulation relating to the consulting services performed by the Consultant herein.

8. Confidential Information and Personal Information

(a) For the purposes of this Section 8, the following definitions will apply:

(i) "Confidential Information", means all information pertaining to the business and affairs of Enbridge, its affiliates and subsidiaries, whether oral or written, furnished by Enbridge to the Consultant, its employees and representatives, whether furnished or prepared before or after the date of this Agreement, and includes all analysis, compilations, data, studies, reports or other documents prepared by the Consultant based upon or including any of the information furnished by Enbridge, but does not include information which:

A. is at the time of disclosure or thereafter becomes generally available to the public other than as a result of disclosure by the Consultant or anyone to whom the Consultant transmits the information;

B. is at the time of disclosure or thereafter becomes known or available to the Consultant on a non-confidential basis and not in contravention of applicable law from a source other than Enbridge that is entitled to disclose the information;

C. is already in the possession of the Consultant or is lawfully acquired, provided that such information is not subject to another confidentiality agreement with, or obligations of secrecy to Enbridge; or

D. the Consultant is required to disclose by any applicable law or regulation or competent judicial, governmental or other authority or in accordance with the requirements of any Stock Exchange.

(ii) "Person" includes individuals, partnerships, firms and corporations.

(b) Enbridge is furnishing the Confidential Information to the Consultant solely for the purpose of assisting the Consultant in the performance of consulting services which the Consultant provides to Enbridge. The Consultant shall not use the Confidential Information for any purpose other than the performance of consulting services provided to Enbridge.

(c) The Consultant acknowledges that the Confidential Information is the property of Enbridge, which is confidential and material to the interests, business and affairs of Enbridge and that disclosure thereof would be detrimental to the interests, business and affairs of Enbridge. Accordingly, the Consultant agrees that it shall maintain the confidentiality of the Confidential Information and that it shall not disclose the Confidential Information to any Person for any reason whatsoever except as expressly provided herein. In the event that the Consultant becomes obligated to disclose Confidential Information in the manner described in Subsection 8(a)(i)D above, the Consultant shall forthwith notify, unless legally prevented from such notice, Enbridge in writing of such obligation prior to the disclosure of any Confidential Information and shall, upon request, co-operate with and assist Enbridge in responding to said demands for disclosure

(d) Except with the prior written consent of Enbridge, the Consultant shall not make or cause to be made any copies of the Confidential Information except as required to evidence compliance with the terms of this agreement and to evidence the work performed hereunder.

(e) The Consultant acknowledges and agrees that Enbridge would be irreparably harmed if any provision of this Agreement is not performed by the Consultant in accordance with its terms. Accordingly, Enbridge shall be entitled to an injunction or injunctions to prevent breaches of any of the provisions of this Agreement and may specifically enforce such provisions by an action instituted in a court having jurisdiction. These specific remedies are in addition to any other remedy to which Enbridge may be entitled at law or equity.

(f) If in the course of performing consulting services hereunder, the Consultant obtains or accesses personal information about an individual, including without limitation, a customer, potential customer or employee or contractor of Enbridge ("Personal Information") the Consultant agrees to treat such Personal Information in compliance with all applicable federal or provincial privacy or protection of personal information laws and to use such Personal Information only for purposes of providing the consulting services hereunder. Furthermore, the Consultant acknowledges and agrees that it will:

(i) not otherwise copy, retain, use, modify, manipulate, disclose or make available any Personal Information, except as required by applicable law;

(ii) establish or maintain in place appropriate policies and procedures to protect Personal Information from unauthorized collection, use or disclosure;

(iii) implement such policies and procedures thoroughly and effectively;

(iv) except as required for purposes of providing the consulting services hereunder, will not develop or derive, for any purpose whatsoever, any products in machine-readable form or otherwise, that incorporates, modifies, or uses in any manner whatsoever, any Personal Information; and

(v) upon completion of its consulting services for or on behalf of Enbridge, will at Enbridge's direction: A. return; or B. destroy all Personal Information and all copies and records thereof in its possession, provided however that consultant may retain information as required to evidence compliance with the terms of this Agreement and to evidence the work performed hereunder

9. Indemnification

(a) The Consultant hereby agrees to and shall:

(i) be liable to Enbridge and its directors, officers and employees, for all claims, liabilities, damages, costs, losses and expenses whatsoever which Enbridge or any of its directors, officers and employees may suffer, sustain or incur; and

(ii) indemnify and save harmless Enbridge and its directors, officers and employees from and against any and all claims, liabilities, damages, costs, losses and expenses to or which any third party may suffer, sustain or incur,

in respect of all matters or anything which may arise out of any act or omission directly or indirectly related to any breach of this Agreement by the Consultant, its employees or representatives.

(b) In the event of a claim by any third party against the Consultant that is the direct result of the services performed hereunder, Enbridge will indemnify the Consultant from all such claims, liabilities, damages, costs and expenses, including, without limitation, reasonable legal fees, except to the extent such claim is the result of the Consultant's gross negligence or intentional, deliberate or fraudulent misconduct of the Consultant. .

(c) In no event shall either party be to the other party for consequential, special, indirect, incidental, punitive or exemplary damages, costs, expenses, or losses (including, without limitation, lost profits and opportunity costs). In any action, claim, loss or damages arising out of the consulting services, the parties agree that the other's liability will be several and not joint and several and each may only claim payment from the other of such other's proportionate share of the total liability based on degree of fault.

(d) Notwithstanding 9(a) and (b), the parties agree that neither shall be liable to the other for any actions, damages, claims, liabilities, costs, expenses, or losses in any way arising out of or relating to the services performed hereunder for an aggregate amount in excess of the fees paid by Enbridge to the Consultant for the services. On a multi-schedule contract, the liability shall be based on the aggregate amount actually paid to the Consultant pursuant to the Schedule of services that gives rise to the liability.

(e) The limitations in 9(d) will not apply to limit:

(i) the liability for a breach of Sections 7 (Independent Contractor), 8 Confidential Information and Personal Information), 10(f) (Intellectual Property Infringement Indemnity) or 14 (Compliance with Laws);

(ii) the liability of either party for wilful misconduct or fraud;

(iii) the liability for any damage, loss or destruction of any real, personal or intangible property; and

(iv) the liability for any death or bodily injury of any natural person. .

(f) For purposes of this section 9, the Consultant shall include its associated and affiliated entities and their respective partners, directors, officers and employees. The provisions of this section shall apply regardless of the form of action, damage, claim, liability, cost, expense, or loss, whether in contract, statute, tort (including, without limitation, negligence) or otherwise.

10. Work Product

(a) For the purposes of this Section 10, "Work Product" shall include any of the following, which are developed in the course of or arise from the consulting services provided by the Consultant to Enbridge hereunder throughout the Term: (i) any deliverables produced under any schedule to this Agreement together with any and all notes, reports, research information, compilations, data specifications, designs, programs, documentation, software (including object code and source materials), development tools, products and other materials or things; and (ii) all copyright which may relate to any deliverables produced under this Agreement..

(b) For the purposes of this Section 10, "Consultant Materials" comprises any of the following, which were developed by the Consultant, at its own cost and expense in advance of and independent of this Agreement and as proven by the Consultant to be the case in the event of a dispute concerning the same: (i) any and all notes, research, information, data, specifications, designs, programs, documentation, software (including object code and source materials), development tools, products and other materials or things; (ii) any and all knowledge, know-how, techniques, inventions, processes, trade secrets, methodologies, approaches and other intangible intellectual property rights; and (iii) all designs, patent applications, issued patents, industrial design registrations, design patents, trade-mark applications, registered trade-marks and copyright which may relate thereto. "Consultant Materials" shall also include all methodologies, know-how, knowledge, applications and software developed by the Consultant in the course of providing consulting services to Enbridge but does not include Work Product or Confidential Information.

(c) For greater certainty, subject to section 8, the Consultant shall be entitled to use or develop the knowledge, experience and skills of general application gained through providing consulting services to Enbridge under this Agreement.

(d) All right, title and interest in and to the Work Product shall be the property of Enbridge. The Consultant shall ensure that any agent or employee of the Consultant shall have waived all of his or her moral rights over any such Intellectual Property in a written waiver in form and substance reasonably acceptable to Enbridge. Appendix 1 attached hereto sets forth a reasonably acceptable form to Enbridge. During and after the Term of this Agreement, the Consultant shall from time to time as and when requested by Enbridge execute all papers and documents and perform other acts as necessary or appropriate to evidence or further document Enbridge's ownership of the Work Product and the intellectual property rights therein.

(e) The Consultant retains all right, title and interest in and to the Consultant Materials. The Consultant hereby grants to Enbridge a non-exclusive, perpetual, irrevocable, non-terminable, transferable, assignable and royalty-free license to copy, disclose, use, operate, maintain, repair, modify, enhance, make derivative works, license, sub-license and otherwise commercially exploit without limitation or restriction those Consultant Materials used in connection with the delivery of the consulting services or to the extent contained within any Work Product.

(f) The Consultant agrees to fully indemnify and hold harmless Enbridge from and against any and all: (i) claims, demands and actions; (ii) liabilities, damages or losses awarded by a court of competent jurisdiction or as agreed to as part of a settlement; and (iii) litigation costs and/or expenses (including reasonable legal fees and disbursements) reasonably incurred by Enbridge in connection with any claim that the consulting services or Work Product provided hereunder infringe any patent, copyright, trade secret or other right of any third party.

(g) Enbridge agrees not to publish any extract or excerpt of the Work Product or commercially exploit the Work Product without the Consultant's written consent. The Consultant acknowledges and agrees that the Work Product may be used by Enbridge in any proceedings before the Ontario Energy Board.

11. Representations and Warranties

(a) The Consultant represents, warrants and covenants with Enbridge that: (i) it will perform all consulting services in a good and workmanlike manner using reasonable care (at a level that is at least consistent with industry standards for the provision of similar services) and in accordance with the terms of this Agreement; (ii) it possesses the knowledge, skill and experience necessary for the provision and completion of the consulting services in accordance with the terms of this Agreement; and (iii) any deliverables provided hereunder shall conform to their relevant specifications as described in the applicable schedule.

(b) The Consultant agrees that under no circumstances will it interface a non-Enbridge computing device (including without limitation desktops, laptops, handheld device) with the Enbridge intranet or internet without obtaining the prior written approval of Enbridge. To the extent the deliverables produced hereunder involve the provision or development of any software application, interface or electronic data, the Consultant shall use commercially reasonable efforts to prevent the introduction of any virus to the hardware and computer systems upon which the application, interface or electronic data are to be installed. During the Term of this Agreement, the Consultant shall implement and run virus prevention and detection control procedures in accordance with industry standards.

(c) In addition to the policies described in Section 23, the Consultant shall ensure that it is familiar with and understands all of Enbridge's current policies, procedures and standards that are pertinent to the activities associated with the consulting services and which have been provided to the Consultant in advance of the execution of this Agreement.

(d) Consultant disclaims all other warranties, representations or conditions, either express or implied, including, without limitation warranties, representations or conditions of merchantability or fitness for a particular purpose.

12. Subcontractors

The Consultant shall not enter into any agreement with any other party to assist in the provision of the consulting services described in Section 1 hereof (hereinafter described as a "Subcontract") nor shall the Consultant allow any other party to perform such consulting services or any part thereof without first obtaining the consent in writing of Enbridge, which consent may be withheld by Enbridge, acting reasonably. Notwithstanding any approval or consent that may be provided by Enbridge in connection with any Subcontract, the Consultant shall not be relieved of any of its liabilities and responsibilities hereunder. Any party which enters into a Subcontract with the Consultant shall be required by the terms of such Subcontract to comply with and be bound by the obligations and responsibilities of the Consultant described hereunder and without restricting the generality of the foregoing, any Subcontract which has been entered into without the prior written consent of Enbridge shall be null and void and without force and effect.

13. Insurance

Save and except where Enbridge specifies otherwise in writing, the Consultant shall at its own expense maintain and keep in full force and effect during the Term hereof and for a period of two (2) years following the expiry of the Term or other termination of this Agreement:

(a) commercial general liability insurance having a minimum inclusive coverage limit, including personal injury and property damage, of at least Two Million Dollars ($2,000,000). Enbridge must be added as an additional insured in the insurance policy, which should be extended to cover contractual liability, products/completed operations liability, owners'/ contractors' protective liability and must also contain a cross liability clause;

(b) automobile liability insurance on all vehicles used in connection with this Agreement and such insurance shall have a limit of at least Two Million Dollars ($2,000,000) in respect of bodily injury (including passenger hazard) and property damage inclusive of any one accident;

(c) non-owned automobile liability insurance and such insurance shall have a limit of at least Two Million Dollars ($2,000,000) in respect of bodily injury (including passenger hazard) and property damage, inclusive in any one accident; and

(d) professional liability or errors and omissions insurance and such insurance shall have a limit of at least Two Million Dollars ($2,000,000).

The Consultant shall forthwith after entering into this Agreement, and from time to time thereafter at the request of Enbridge, furnish to Enbridge a memorandum of insurance or an insurance certificate setting out the terms and conditions of each policy of insurance (all such policies of insurance being hereinafter described as the "Insurance Policies") maintained by the Consultant in order to satisfy the requirements of this section. At any time and from time to time at the request of Enbridge, the Consultant shall furnish Enbridge with one or more duly completed insurance certificates in the form requested by Enbridge to evidence the details of all the Insurance Policies. The Insurance Policies shall be arranged with insurers acceptable to Enbridge, acting reasonably, and shall contain such terms and conditions as are reasonably acceptable to Enbridge. The Consultant shall not cancel, terminate or materially alter the terms of any of the Insurance Policies without giving prior notice in writing to Enbridge. The Consultant shall cause or arrange for any of its insurers under any one or more of the Insurance Policies to oblige itself contractually in writing to Enbridge to provide fifteen (15) days prior notice in writing before cancelling, terminating or materially altering the Insurance Policies under which it is an insurer.

14. Compliance with Law

The Consultant agrees to comply with the *Occupational Health and Safety Act* (Ontario) and the *Workplace Safety and Insurance Act* (Ontario) and with all other prevailing federal, provincial and municipal laws and regulations or any other laws or regulations in force in any jurisdiction where the consulting services are performed (the "Laws") and which are applicable to the Consultant, its subcontractors and the consulting services provided hereunder, and the Consultant shall familiarize itself and procure all required permits and licenses and pay all charges and fees necessary or incidental to the due and lawful prosecution of this Agreement and shall indemnify and save harmless Enbridge, its directors, officers, agents and employees thereof against any claim or liability from or based on the violation of any Laws, whether by the Consultant, its officers, employees, subcontractors, representatives or agents. The Consultant shall, from time to time, if requested by Enbridge, furnish Enbridge with evidence of such compliance, and in particular, evidence from the Workplace Safety and Insurance Board, or the equivalent thereof in any jurisdiction where the consulting services provided hereunder are carried out, that the Consultant and any party with which it has entered into a Subcontract are in compliance with and have paid all assessments and other amounts owing pursuant to the workers' compensation legislation of such jurisdiction.

Enbridge is committed to compliance with the *Accessibility for Ontarians with Disabilities Act, 2005* and O.Reg. 429/07, the Accessibility Standards for Customer Service (collectively the "AODA"). In its delivery of services on behalf of Enbridge, the Consultant shall comply with the AODA. The Consultant shall satisfy Enbridge as to its compliance with the AODA and shall permit Enbridge to monitor its compliance. If requested to so, the Consultant shall provide Enbridge with copies of its policies, practices and procedures, training materials and dates of training, and confirmation the Consultant has reported its compliance to the Ministry of Community and Social Services.

15. Waiver

Either the Consultant or Enbridge may, in writing, extend the time for performance by the other and waive non-compliance or non-performance by the other of any of the other's obligations, covenants and agreements under this Agreement and any compliance therewith or performance thereof. However, no such extension or waiver shall operate so as to waive, diminish or reduce the scope of or otherwise affect any obligation, covenant or agreement of such other which is not the subject matter of such extension or waiver or, except to the extent of such extension or waiver, of the obligation, covenant and agreement which is the subject matter of such waiver. No act or failure to act of either the Consultant or Enbridge shall be or be deemed to be an extension or waiver of timely or strict performance by the other of the other's obligations, covenants and agreements under this Agreement except to the extent notice thereof is given to the other.

16. Notice

Any notice or other communication to be given under or pursuant to the provisions hereof or in any way concerning this Agreement shall be sufficiently given if reduced to writing and delivered to the person to whom such communication is to be given or sent by facsimile or electronic internet communication, addressed to such person at the address set forth below:

If to Enbridge:

Enbridge Gas Distribution Inc.
500 Consumers Road
Toronto, ON M2J 1P8
Attention: Scott Dodd
Email: scott.dodd@enbridge.com

With a copy to: Andrew Mandyam
Email: andrew.mandyam@enbridge.com

With a copy to: Law Department
Facsimile: 416-495-5994

If to the Consultant:

KPMG LLP
Bay Adelaide Centre
333 Bay Street, Suite 4600
Toronto, ON M5H 2S5
Attention: Augusto Patmore
Fax: 416-777-3515
Email: apatmore@kpmg.ca

or at such other address as may be specified therefor by proper notice hereunder. A notice or communication shall be deemed to have been sent and received on the day it is delivered personally or by courier or by facsimile or by electronic internet communication. If such day is not a business day or if the notice or communication is received after 5:00 PM (at the place of receipt) on any business day, the notice or communication shall be deemed to have been sent and received on the immediately following business day.

17. Interpretation

This Agreement shall be governed by and construed in accordance with the laws of the Province of Ontario and the laws of Canada applicable therein. Headings used herein are for the convenience of reference only and shall not be considered in construing or interpreting this Agreement. The words "herein", "hereunder", "hereof" and other similar words refer to this Agreement as a whole and not to any particular paragraph. Any provision herein prohibited by law shall to the extent prohibited be ineffective without invalidating any other provisions hereof. This Agreement, together with all exhibits and schedules attached hereto and all documents referenced therein constitutes the entire Agreement of the parties hereto and supersedes all prior agreements and understandings, oral or written, among the parties hereto with respect to the matters herein and shall not be modified or amended except by written Agreement signed by the parties. All references to amounts of money in this Agreement and any schedule shall mean lawful currency of Canada.

18. Assignment

The Consultant may not assign this Agreement in whole or in part without the express prior consent in writing of Enbridge. This Agreement shall be binding upon and enure to the benefit of the successors and assigns of Enbridge.

19. Use of Enbridge Name and Logo

Neither party shall use or display the other party's name or any symbols, signs, trademarks and other marks denoting and identifying the other party in any manner whatsoever without the prior written authorization of the other party, provided however, nothing shall prevent Enbridge from referring to the Consultant by name in reference to this Agreement or any Schedule thereunder.

20. Time of Essence

Time shall be of the essence in this Agreement.

21. Survival

All warranties and indemnities contained in this Agreement, and the obligations contained in Section 8, shall survive the termination of this Agreement irrespective of the time of or party responsible for such termination, and such warranties, indemnities and obligations shall remain in full force and effect and be binding on the Consultant notwithstanding such termination.

22. Audit

The Consultant shall, following no less than seven (7) business days advance notice in writing, provide to such auditors (including external auditors and Enbridge's internal audit staff or agents) as Enbridge may designate in writing, supervised access to the data, records and supporting documentation maintained by the Consultant with respect to the Consulting Services solely for the purpose of: (i) performing audits and inspections to enable Enbridge to satisfy applicable regulatory requirements or certify compliance with applicable laws; and (ii) to confirm that the consulting services are being provided in accordance with the terms of this Agreement. Enbridge and its auditors shall use commercially reasonable efforts to conduct such audits in a manner that will result in a minimum of inconvenience and disruption to the Consultant's business operations.

23. Enbridge Policies

The Consultant acknowledges receipt of a copy of each of Enbridge Inc.'s Statement on Business Conduct for Enbridge Inc. and its Subsidiaries and Lifesaving Rules, each as amended from time to time (the "Policies"). The Consultant agrees to comply with the Policies in connection with its delivery of the consulting services described in this Agreement, and agrees that, if requested by Enbridge, it will ensure all personnel delivering the consulting services herein attend training on the Lifesaving Rules.

24. Alternative Dispute Resolution.

(a) The parties hereby agree that they will first attempt to settle any dispute arising out of or relating to this Agreement or the services provided hereunder through good faith negotiations in the spirit of mutual cooperation between representatives of each of the parties with authority to resolve the dispute. In the event that the parties are unable to settle or resolve their dispute through negotiation within 30 days of the dispute first arising or such longer period as the parties may mutually agree upon, such dispute shall, as promptly as is reasonably practicable, be subject to mediation pursuant to the National Mediation Rules of the ADR Institute of Canada, Inc. All disputes remaining unsettled for more than 60 days following the parties first meeting with a mediator or such longer period as the parties may mutually agree upon shall, as promptly as is reasonably practicable, be subject to arbitration pursuant to the National Arbitration Rules of the ADR Institute of Canada, Inc. (the "Arbitration Rules"). Such arbitration shall be final, conclusive and binding upon the parties, and the parties shall have no right of appeal or judicial review of the decision. The parties hereby waive any such right of appeal which may otherwise be provided for in any provincial arbitration statute made applicable under the Arbitration Rules. The place of mediation and arbitration shall be Toronto, Ontario. The language of the mediation and arbitration shall be English.

(b) Notwithstanding 24(a), the following matters are excluded from mediation and arbitration:

(i) Lawsuits involving third parties;
(ii) Any decision by Enbridge to terminate this Agreement or any schedule thereunder for convenience;
(iii) Any decision by Enbridge not to approve a subcontractor;
(iv) Enbridge's use of Work Product; or
(v) Any dispute over fees or expenses.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first written above.

Dated the 13 day of November, 2014.

KPMG LLP		**ENBRIDGE GAS DISTRIBUTION INC.**	
By:		By:	
	AUGUSTO R. PATMORE, PARTNER		Aman Hav, Manager
Signature	Name and Title	Signature	Name and Title
			Scott Dodd Sr. Project Director
Signature	Name and Title	Signature	Name and Title

APPROVED AS TO FORM
ENBRIDGE LAW

APPENDIX 1

WAIVER OF MORAL RIGHTS

TO: ENBRIDGE GAS DISTRIBUTION INC. ("Enbridge")

The undersigned hereby expressly and irrevocably waives any and all moral rights arising under copyright law that the undersigned may have with respect to any copyrighted works now or hereafter prepared by the undersigned in connection with or related to the provision of consulting services by KPMG, LLP to Enbridge and the undersigned agrees that Enbridge may modify and use each such work as it sees fit.

Dated this 13 day of NOVEMBER, 2014.

Signed: ____________________

Name: AUGUSTO R. PATMORE

(Please print name of Individual Contractor/Consultant performing the work)

SCHEDULE A

Scope of Work

This Schedule is made under the above referenced consulting agreement (the "**Agreement**") between ENBRIDGE GAS DISTRIBUTION INC. ("**Enbridge**") and KPMG LLP (the "**Consultant**").

All terms not defined herein take the meaning ascribed to them in the Agreement.

1. SCOPE OF SERVICES AND DELIVERABLES

The Consultant will undertake the following consulting services:

- [Insert a description of consulting services. Identify Deliverable and due date]
- Provide Enbridge with an independent written evaluation (the "**Independent Evaluation**") of the [*] that may be included with Enbridge's [*describe regulatory proceeding] submission to the Ontario Energy Board.

2. KEY PERSONNEL

The individuals set out in the table below under the heading "Name" are deemed to be key personnel ("Key Personnel"). Unless an individual Key Personnel resigns for reasons beyond the control of the Consultant, the Consultant will ensure that each Key Personnel: (i) maintains his or her designated role set forth in the column under the heading "Project Role / Title" and (ii) remains a Key Personnel until the services set out in this Schedule are completed.

Name	Project Role / Title

3. FEES AND PAYMENT TERMS

Fees: *

Expenses: *

The above fees and expenses cannot be exceeded without prior written approval from Enbridge.

Fees are payable by Enbridge in monthly installments upon the delivery by the Consultant of an appropriate invoice setting out in reasonable detail the nature of the services provided.

4. INSTRUCTIONS

The Consultant acknowledges and agrees that the Rule 13A.03(c) of the Ontario Energy Board (the "**Board**") Rules of Practice and Procedure (last revision, January 17, 2013) (the "**Board Rules**") requires Enbridge to disclose the instructions (the "**Expert Instructions**") it has provided to the Consultant, for the purpose of Enbridge submitting the Independent Evaluation to the Board as a form of expert evidence to support an application before the Board.

The Expert Instructions are attached hereto as Attachment 1.

5. STATUTORY DECLARATION

The Consultant acknowledges and agrees that the Independent Evaluation will be prepared for the purpose of providing expert evidence before the Board, and further acknowledges and agrees that the

Independent Evaluation, and any other oral or written testimony it may provide in relation to same, shall be prepared impartially, be fair and be objective, as required by the Board Rules. Owing to the importance this requirement to Enbridge, the Consultant will execute the Acknowledgement of Expert's duty attached to the Schedule at Attachment 2, in order to solemnly affirm the foregoing. An executive or senior manager of the Consultant shall swear the statutory declaration on behalf of the Consultant.

6. TERM AND COMMENCEMENT AND COMPLETION DATES

Notwithstanding the date of execution, this Schedule shall be effective as of the execution date of the Agreement, and shall expire on *, or such other date as the parties may mutually agree in writing.

Dated the 13 day of NOVEMBER, 20 14

KPMG, LLP		**ENBRIDGE GAS DISTRIBUTION INC.**	
By:		By:	
Signature	AUGUSTO R. PATMORE, PARTNER Name and Title	Signature	Name and Title
Signature	Name and Title	Signature	Name and Title

ATTACHMENT 2

ACKNOWLEDGMENT OF EXPERT'S DUTY

1. My name is ..AUGUSTO R. PATMORE.(*name*). I live at ....TORONTO (*city*), in the .... (*province/state*) of ....ONTARIO........ .

2. I have been engaged by or on behalf of Enbridge Gas Distribution Inc. to provide evidence in relation to the above-noted proceeding before the Ontario Energy Board.

3. I acknowledge that it is my duty to provide evidence in relation to this proceeding as follows:

   (a) to provide opinion evidence that is fair, objective and non-partisan;

   (b) to provide opinion evidence that is related only to matters that are within my area of expertise; and

   (c) to provide such additional assistance as the Board may reasonably require, to determine a matter in issue.

4. I acknowledge that the duty referred to above prevails over any obligation which I may owe to any party by whom or on whose behalf I am engaged.

Date ..NOVEMBER 13, 2014

Signature

SCHEDULE B

Scope of Work

This Schedule is made under the above referenced consulting agreement (the "**Agreement**") between ENBRIDGE GAS DISTRIBUTION INC. ("**Enbridge**") and KPMG LLP (the "**Consultant**").

All terms not defined herein take the meaning ascribed to them in the Agreement.

Background:

Enbridge is a natural gas utility which is regulated by the Ontario Energy Board the ("OEB"). In Ontario, it operates its franchise in Niagara, Ottawa and the Greater Toronto Area. Within its franchise area, Enbridge has been granted the exclusive right to distribute natural gas. In exchange for this right, Enbridge is responsible for building and maintaining the required natural gas distribution infrastructure.

Enbridge's GTA Project consists of the construction of two segments of a natural gas pipeline, and associated facilities, in and around the City of Toronto, more particularly described as: Segment A (approximately 27 km long and to traverse lands in Milton, Town of Halton Hills, Mississauga, Brampton and Toronto, Ontario), the Parkway West Gate Station and associated facilities, and Segment B (approximately 23 km long and to traverse lands in Vaughan, Markham and Toronto, Ontario and associated facilities). The GTA project will allow for continued system reliability, and diversify access to natural gas supply. This infrastructure project will enable Enbridge to prepare for future natural gas needs within the Greater Toronto Area now and in the long term.

In January 2014, Enbridge was granted permission from the OEB to construct its GTA Project. The OEB accepted Enbridge's cost estimate for the GTA Project as reasonable and found that the economic analysis, along with the qualitative factors related to supply diversity and reliability, supported a conclusion that the GTA Project is in the public interest.

1. SCOPE OF SERVICES AND DELIVERABLES

The Consultant is being retained by Enbridge as an Independent Risk Manager and the Consultant will utilize its Major Projects Advisory ("MPA") framework to assist Enbridge to i) enhance efficiencies, ii) manage risks and iii) demonstrate prudency in the utilization of ratepayer funds in carrying out the GTA Project. The Consultant shall:

1. Initial Phase: Provide a baseline review of the existing GTA Project governance process controls and GTA Project management tools and methodology.
    a. In its assessment, the Consultant shall consider the GTA Project governance and control framework with specific consideration of its governance structures, budgeting and estimating standards, corporate policies and standards, environment, health and safety standards, reporting standards, resource management standards and quality and technical standards.
    b. Perform a commercial risk review of the GTA Project's main construction contracts as identified by Enbridge.
    c. Provide a gap analysis between Enbridge's GTA Project capital management practices and other leading practices and recommend monitoring tools, governance systems and other improvements to close gaps and mitigate identified risks including any risks identified in its review of the main construction contracts.
    d. Assist EGD with the use and implementation of the recommend monitoring tools, governance systems and other improvements.

2. Monitoring and Control:
    a. Provide monthly monitoring of the GTA Project and prepare a written report for Enbridge with a focus on:
        i. Progress (a summary of work achieved over the past month);

ii. Performance and contract management issues (identifying issues and providing insights into potential opportunities for improvement); and
iii. Key risks (The Consultant shall prepare, maintain and update a comprehensive risk register identifying financial, technical (tactical) and strategic risks to the GTA Project).

b. On a monthly basis, monitor and report on Enbridge's implementation of Consultant recommendations (where applicable) and assist with the rollout, adjustment and refinement of such recommendations.
c. Ensure Consultant Key Personnel are available for ongoing support and meeting attendance.

3. Operational Readiness:
   a. During construction, on a monthly basis, provide a written operational readiness assessment utilizing Key Personnel and additional Consultant subject-matter experts (as required) to identify gaps and provide Enbridge with advice and strategic direction to optimize the commissioning, ramp up and smooth transition of the GTA Project from a construction project to an in-service pipeline.
   b. Ensure the monthly monitoring and control report contains a report on operational readiness assessment together with the Consultant's recommendations for improvements in this area.

4. Close-out Report: Upon completion of the GTA Project, provide Enbridge with a Close-out Report summarizing:
   a. the history of the GTA Project including its organizational structure and stakeholders and the main events and the milestones completed:
   b. the risks and improvement opportunities identified by the Consultant and trends and data representing the evolution of costs and forecasting;
   c. actions taken by Enbridge to minimize any cost overruns, to reduce any project risks and operational issues; and
   d. a summary of conclusions and lessons learned.

5. At the request of Enbridge appear as a witness at the OEB.

The Consultant will provide the following deliverables:

Deliverable Description	Due Date	Fees
Perform a commercial risk review of the GTA Project's main construction contracts as identified by Enbridge.	The estimated review period for each contract is of 7 days.	[redacted]
Project Governance and Control Framework Assessment (Includes initial baseline assessment and monthly monitoring)	Initial baseline assessment to be provided by November 30, 2014 and monthly updates to be included in the monthly reports until advised by EGD on 30-day's notice to cease providing monthly reports	[redacted]
Monthly Monitoring & Control Report	Due on or before the 30th day each month commencing on November 30th until advised by EGD, on 30-day's notice to cease providing monthly reports.	[redacted]
Operational Readiness Assessment	Prior to Substantial Completion of the GTA Project at a date to be	[redacted]

	determined by EGD	
Close-out Report (Independent Evaluation)	Upon Completion of the GTA Project at a date to be determined by EGD	[redacted]
Witness Attendance	To be determined by EGD	Based on hourly rates as provided by Consultant

2. KEY PERSONNEL

The individuals set out in the table below under the heading "Name" are deemed to be key personnel ("Key Personnel"). Unless an individual Key Personnel resigns for reasons beyond the control of the Consultant, the Consultant will ensure that each Key Personnel: (i) maintains his or her designated role set forth in the column under the heading "Project Role / Title" and (ii) remains a Key Personnel until the services set out in this Schedule are completed.

Name	Project Role / Title
Augusto Patmore	Engagement Leader
Jamie Cameron	Field Specialist – Governance and Engineering
Grant Hillier	Specialist – Contract Management

3. FEES AND PAYMENT TERMS

Fees:

Contract commercial risk review fee: [redacted] per contract reviewed. Contract includes all schedules. Contracts to be determined by EGD

Fee for Monthly Monitoring and Control report: to be billed at hourly rates and not to exceed [redacted] per month

Fee for project Governance and Controls framework assessment (initial assessment and monthly monitoring) : to be billed at hourly rates and not to exceed [redacted] per month

Fee for the Operational Readiness Assessment to be billed at the hourly rates set out below and not to exceed [redacted] lump sum)

Fee for Close-out Report to be billed at the hourly rates set out below and not to exceed [redacted] (lump sum)

Fees include all conversations, conferences, correspondence, telephone calls, emails, memoranda, reports and meeting attendance necessarily incidental and related to the items set out in the Scope of Services and Deliverables.

Fees for the Independent Evaluation, witness attendance or additional services not included above to be provided on an hourly basis in accordance with the following rates:

Level	Hourly Rate
Senior Consultant	[redacted]
Manager	[redacted]
Senior Manager	[redacted]
Partner	[redacted]

At EGD's request, the Consultant shall provide EGD with an estimate or lump sum fee proposal for witness attendance or any additional services not included in the Scope of Service and Deliverables.

Expenses:

Enbridge shall reimburse the Consultant for all reasonable expenses properly incurred by the Consultant in connection with the consulting services provided to Enbridge hereunder and that have been pre-approved by Enbridge in writing.

The above fees and expenses cannot be exceeded without prior written approval from Enbridge. Fees are payable by Enbridge in monthly installments upon the delivery by the Consultant of an appropriate invoice setting out in reasonable detail the nature of the services provided.

4. INSTRUCTIONS

The Consultant acknowledges and agrees that the Rule 13A.03(c) of the Ontario Energy Board (the "**Board**") Rules of Practice and Procedure (last revision, January 17, 2013) (the "**Board Rules**") requires Enbridge to disclose the instructions (the "**Expert Instructions**") it has provided to the Consultant, for the purpose of Enbridge submitting the Independent Evaluation to the Board as a form of expert evidence to support an application before the Board.

The Expert Instructions are attached hereto as Attachment 1.

5. STATUTORY DECLARATION

The Consultant acknowledges and agrees that the Independent Evaluation will be prepared for the purpose of providing expert evidence before the Board, and further acknowledges and agrees that the Independent Evaluation, and any other oral or written testimony it may provide in relation to same, shall be prepared impartially, be fair and be objective, as required by the Board Rules. Owing to the importance this requirement to Enbridge, the Consultant will execute the Acknowledgement of Expert's duty attached to the Schedule at Attachment 2, in order to solemnly affirm the foregoing. An executive or senior manager of the Consultant shall swear the statutory declaration on behalf of the Consultant.

6. TERM AND COMMENCEMENT AND COMPLETION DATES

Notwithstanding the date of execution, this Schedule shall be effective as of the execution date of the Agreement, and shall expire on December 31, 2017, or such other date as the parties may mutually agree in writing.

Dated the 13 day of November, 2014.

KPMG, LLP
By:

AUGUSTO R. PATMORE, PARTNER

Signature — Name and Title

Signature — Name and Title

ENBRIDGE GAS DISTRIBUTION INC.
By:

Amen Hoy Manager.

Signature — Name and Title

Scott Dodd
Sr. Project Director

Signature — Name and Title

APPROVED AS TO FORM
ENBRIDGE LAW

ATTACHMENT 1

Expert Instructions

Enbridge is a natural gas utility which is regulated by the Ontario Energy Board the ("OEB"). In Ontario, it operates its franchise in Niagara, Ottawa and the Greater Toronto Area. Within its franchise area, Enbridge has been granted the exclusive right to distribute natural gas. In exchange for this right, Enbridge is responsible for building and maintaining the required natural gas distribution infrastructure.

Enbridge's GTA Project consists of the construction of two segments of a natural gas pipeline, and associated facilities, in and around the City of Toronto, more particularly described as: Segment A (approximately 27 km long and to traverse lands in Milton, Town of Halton Hills, Mississauga, Brampton and Toronto, Ontario), the Parkway West Gate Station and associated facilities, and Segment B (approximately 23 km long and to traverse lands in Vaughan, Markham and Toronto, Ontario and associated facilities). The GTA project will allow for continued system reliability, and diversify access to natural gas supply. This infrastructure project will enable Enbridge to prepare for future natural gas needs within the Greater Toronto Area now and in the long term.

In January 2014, Enbridge was granted permission from the OEB to construct its GTA Project. The OEB accepted Enbridge's cost estimate for the GTA Project as reasonable and found that the economic analysis, along with the qualitative factors related to supply diversity and reliability, supported a conclusion that the GTA Project is in the public interest.

The Consultant is being retained by Enbridge as an Independent Risk Manager and the Consultant will utilize its Major Projects Advisory ("MPA") framework to assist Enbridge to i) enhance efficiencies, ii) manage risks and iii) demonstrate prudency in the utilization of ratepayer funds in carrying out the GTA Project. The Consultant shall:

1. Initial Phase: Provide a baseline review of the existing GTA Project governance process controls and GTA Project management tools and methodology.
    a. In its assessment, the Consultant shall consider the GTA Project governance and control framework with specific consideration of its governance structures, budgeting and estimating standards, corporate policies and standards, environment, health and safety standards, reporting standards, resource management standards and quality and technical standards.
    b. Perform a commercial risk review of the GTA Project's main construction contracts as identified by Enbridge.
    c. Provide a gap analysis between Enbridge's GTA Project capital management practices and other leading practices and recommend monitoring tools, governance systems and other improvements to close gaps and mitigate identified risks including any risks identified in its review of the main construction contracts.
    d. Assist EGD with the use and implementation of the recommend monitoring tools, governance systems and other improvements.

2. Monitoring and Control:
    a. Provide monthly monitoring of the GTA Project and prepare a written report for Enbridge with a focus on:
        i. Progress (a summary of work achieved over the past month);
        ii. Performance and contract management issues (identifying issues and providing insights into potential opportunities for improvement); and
        iii. Key risks (The Consultant shall prepare, maintain and update a comprehensive risk register identifying financial, technical (tactical) and strategic risks to the GTA Project).
    b. On a monthly basis, monitor and report on Enbridge's implementation of Consultant recommendations (where applicable) and assist with the rollout, adjustment and refinement of such recommendations.
    c. Ensure Consultant Key Personnel are available for ongoing support and meeting attendance.

3. Operational Readiness:
   a. During the latter stages of construction and prior to Substantial Completion, provide a written Full Operational Readiness assessment utilizing Key Personnel and additional Consultant subject-matter experts (as required) to identify gaps and provide Enbridge with advice and strategic direction to optimize the commissioning, ramp up and smooth transition of the GTA Project from a construction project to an in-service pipeline.
   b. Ensure the monthly monitoring and control report contains a section on operational readiness considerations together with the Consultant's recommendations for improvements in this area. The Full Operational Readiness Assessment will be provided prior to Substantial Completion

4. Close-out Report: Upon completion of the GTA Project, provide Enbridge with a Close-out Report summarizing:
   a. the history of the GTA Project including its organizational structure and stakeholders and the main events and the milestones completed:
   b. the risks and improvement opportunities identified by the Consultant and trends and data representing the evolution of costs and forecasting;
   c. actions taken by Enbridge to minimize any cost overruns, to reduce any project risks and operational issues; and
   d. a summary of conclusions and lessons learned.

5. At the request of Enbridge, provide Enbridge appear as a witness at the OEB.

ATTACHMENT 2

ACKNOWLEDGMENT OF EXPERT'S DUTY

1. My name is AUGUSTO R. PATMORE (*name*). I live at TORONTO (*city*), in the .... (*province/state*) of ONTARIO .

2. I have been engaged by or on behalf of Enbridge Gas Distribution Inc. to provide evidence in relation to the above-noted proceeding before the Ontario Energy Board.

3. I acknowledge that it is my duty to provide evidence in relation to this proceeding as follows:

   (a) to provide opinion evidence that is fair, objective and non-partisan;

   (b) to provide opinion evidence that is related only to matters that are within my area of expertise; and

   (c) to provide such additional assistance as the Board may reasonably require, to determine a matter in issue.

4. I acknowledge that the duty referred to above prevails over any obligation which I may owe to any party by whom or on whose behalf I am engaged.

Date NOVEMBER 13, 2014

Signature

Augusto R. Patmore (P. Eng, MBA)
Partner, Deal Advisory/Infrastructure
Capital Projects Leader
KPMG LLP
Toronto, Canada
Office 1.416.777.3277
Mobile 1.647.406.9768
apatmore@kpmg.ca

Industry and Functional Responsibilities
Augusto is a Partner with KPMG's Global Infrastructure Practice and leads the GTA Mining and Energy Capital Projects Practice in Toronto.

Education, Licenses & Certifications
- Professional Engineer Ontario (P.Eng)
- MSc Civil Engineering, Polytechnic University of Madrid. Spain
- MBA, Imperial College London, UK
- Executive Leadership Program, Georgetown University, USA

Background

Augusto is a senior infrastructure industry executive, and currently a KPMG Infrastructure partner in Canada. He has 25 years of professional experience across design, construction and operations of infrastructure assets, both in industry (Ferrovial and other large contractors) and advisory (KPMG Canada). He has lived in three countries (Ireland, Canada and Spain) and has worked for clients globally across the transportation and energy industries.

A KPMG partner, he leads the firm's Capital Projects and Engineering and Construction advisory practices, a team and practice that he started from scratch in 2013 after joining the firm out of industry, and that has grown considerably under his leadership. From 2016 to 2020 he also led the **Power & Utilities Practice for KPMG** in the Greater Toronto Area. As a lead for the GTA Power and Utilities practice, he regularly attends P&U industry conferences and events and has acted as Chair of the Ontario Power Symposium in 2018. He is active writing articles and thought leadership around Asset Management best practices, with a focus on AM processes and cost estimating in asset intensive industries.

In his role at KPMG, he has provided advisory services to major Canadian clients such as Algonquin Power, Enbridge Gas, OPG, Nalcor, NWMO, Barrick Gold, Metrolinx, Windsor Detroit Bridge Authority, Goldcorp, Hudbay, Vale, Yamana Gold, on a wide range of issues affecting their corporate and growth strategy, portfolio management and board reporting, project planning, construction advisory, and asset management, helping these clients improve performance and reduce costs.

Prior to KPMG he held the following roles in industry:

- **Managing Director, EPC Renewables** Division at **Prointec**, a leading consulting engineering firm from Madrid, Spain, where he led the creation of an EPC division focused on the development of **renewable energy assets**, and construction of solar assets in Europe.
- **International Managing Director** of the largest **specialist civil and tunnel** contractor in Spain (**OSSA**), operating globally on subway, hydro power and mining projects.
- **Project Director P3/DBFO** Projects. Spent 12 years working as a design engineer, site manager, construction manager, project manager, project director, and JV Board member on **large international P3 highway projects** with global infrastructure investor **Ferrovial** in Canada (407 ETR) and Ireland (M3, M4 and N1 Highways)

KPMG Infrastructure Advisory Experience

Since 2013, he leads a team across Canada that provide a wide range of advisory services across transportation, energy, mining industries, in all areas of the project lifecycle from early planning and procurement, technical and operational due diligence, project management, and asset management. Example engagements by industry, sector and client are listed below.

Renewable Energy

- **Algonquin Power**. Provided commercial and cost review services on the Amherst Island Wind Farm Project, a 76 MW generation project. Advised the owner of the wind farm (Windlectric Inc) in the analysis of project overruns and schedule delays. Provided advisory in the resolution of claims and disputes with the general contractor, leading to settlement.
- **Enwave.** Worked as a commercial and cost advisor with this heating and cooling and district energy company to review cost estimates, project management processes and business cases for the supply of heating and cooling to a major condo development in Toronto and other expansion projects underway by Enwave.
- **Nalcor Energy.** Commercial readiness review for the Contract Administration team tasked with delivering the Lower Churchill Project ($8.5 Billion, largest hydropower and electrical project in Canada) based in St John's, Newfoundland and on site (Goose Bay, Labrador). Identified risks and opportunities for improvement in the governance structure and management model, project controls, budgeting, contract management and claims strategies.
- **Nalcor Energy.** Contract review of 4 different contracts (North Spur, Dams, Powerhouse, Balance of Plant) performance on the Lower Churchill Hydro project in Labrador ($13 B capex). Reviewed productivity, contract compliance and cost overruns, to provide the owner with and independent report on the cost/schedule status of the project, highlighting the strengths and weaknesses of the owner's position vis a vis the contractor's, that would serve as a basis for a negotiated contract settlement.
- **Altalink.** Advisory services to this Canadian utility company, based in Calgary, Alberta. Developed new quality performance measures that contributed to increased performance and project cost reduction. Key performance metrics for senior executives.
- **Ontario Energy Board (OEB, 2018).** Review and assessment of the Asset Management Plan and DSP (Distribution System Plan) submitted by several confidential utilities in Ontario. Assisted with technical reviews and preparation of question for interrogatories at OEB hearings.

Water

- **Acciona.** North Shore Water Treatment Plant, BC. (320 million litres/day water treatment facility). Advised on the improvement of the project's integrated governance documentation, with a focus on the QMS (Quality Management System), including engineering and construction quality as well as construction and engineering management plans.

Digital Infrastructure

- **Ledcor.** Worked with Ledcor's leadership team to explore market opportunities in Ontario to support Ledcor's growth in various sectors including digital infrastructure and broadband investment, project development and construction opportunities

Nuclear Energy

- **Nuclear Waste Management Organization (NWMO)**. Commercial advisory services on the 170-year lifecycle ($25 Billion Capex) Deep Geological Repository (DGR) program. This is one of the world's largest used fuel underground repositories. Augusto leads a team that provides commercial consulting services for NWMO in capital planning procurement options, and delivery model implementation. His team bridge technical and commercial expertise, providing a road map and leading practices for NWMO around delivery model options and planning advisory services.
- **Ontario Power Generation** Augusto served as a member of the Refurbishment Construction Review Board (RCRB), a global panel of construction industry and nuclear experts that will advise executives on construction execution risk, commercial readiness for execution, and contract management opportunities through the execution of the 10-year ($13 Billion) Darlington Nuclear Refurbishment Program in Ontario. Among other areas he advised on appropriate levels of risk transfer and budgeting processes.
- **Ontario Power Generation.** Various contract performance and cost audit reviews on the RFR (Re-tube and Feeder replacement) CAD$3.2 Billion execution contract and various other construction contracts such as BOP (Balance of Plant).
- **Ontario Power Generation.** Several large projects related to the Darlington Nuclear refurbishment project, including an assessment of the project controls framework, a lean process review of the funding, procurement and payment business process as they relate to construction contracts, and an independent review of the Release Quality Estimate (RQE), the cost estimate for the $13 Billion Darlington refurbishment project.

Hospitals and Social Buildings

- **University of Toronto**. Strategic Capital Program advisory services and Executive support, on the University's $5.5 Billion capital program. Services he leads include project management maturity assessment, on-going project review and advisory (schedule, claims an disputes, contract reviews), and executive commercial and procurement support.
- **St Joseph's Hospital P3 Project** Augusto and his team provided commercial advice on this P3 project to the owner's executive team through the transition from construction into operations (handover process). The Project Co. had multiple invoices that exceeded contractual thresholds, and the team Augusto

led identified contract management issues associated with service failure and facility availability that allowed the owner to successfully negotiate payment entitlement, and negotiate a process mutually agreeable to owner and contractor on measurement of facility service levels and availability. This process had not been clearly laid out in the original contract.

- **St Michaels Hospital P3 project.** Provided numerous P3 expert and advisory reports to counsel in a dispute related to project completion percentage, use of funds from performance and payment bonds, contractor replacement costs, productivity of contractor labor, and contractor cost reviews.

Pipelines and Oil& Gas

- **Enbridge Gas.** Asset Health Index Review, supporting the Engineering and Asset Management groups development of internal processes and frameworks to serve as a basis for asset capital investment planning.
- **Enbridge Gas.** Independent oversight to the GTA Pipeline project ($ 700M Capex) with a focus on project control opportunities and monitoring of project risks. Expert witness on construction cost management and prudency hearings.
- **Sherritt International.** Supported Sherritt in the development of a performance improvement tool (Vaue Driver Tree tool) that provided an operational and financial data repository and database and Power BI visualizations of KPI's for executives and Board that would highlight potential areas of profitability improvement for electricity generation, sulphur, LPG and condensate by-products in Sherritt's gas plants in Cuba.
- **Project Ewing (Confidential investor).** Provided technical and operational due diligence services on an upstream oil & gas production facility in Colombia using an innovative advanced well stimulation technology.

Highways and Rail

- **Ministry of Transportation, BC**. Contract management strategic advice on the Port Mann Highway 1 Design/Build Contract in Vancouver, BC. Augusto acted as Deputy Authority Representative through the construction handover phase and provided technical advisory on various contractual negotiations between the owner and the contractor.
- **Government of New Brunswick.** Deh-Cho Bridge Project. Expert construction dispute advisory services on a $400 M P3 bridge project in Northwestern Territories
- **Pont Champlain Bridge P3 project.** Provided project schedule delay analysis and claims quantification services and was retained as expert on a large dispute between the construction consortium and Infrastructure Canada.
- **Infrastructure Ontario – Market Capacity Study.** Developed a model to analyze the supply/demand sides of the Ontario capital project pipeline and assess constraints. Identified opportunities to improve and broaden procurement practices at IO.

- **Infrastructure Ontario – Steel and Aluminum Tariffs.** He led a study that analyzed the macro-economic trends and global situation of the steel and aluminum industries, and the impacts of the US government 2018 tariffs on the construction market in Canada and Ontario in particular.
- **Ontario Road Builders Association -** ORBA retained Augusto and his team to review and assess highway and road asphalt quality issues in Ontario and develop a framework for improvement of quality of asphalt, and potential causes for premature cracking.
- **Windsor-Detroit Bridge Authority (Gordie Howe Bridge).** Provided commercial and claims advisory services on this major P3 project, supporting the senior executive team and legal counsel in the review of P3 Co submissions, change orders, and claims.
- **Metrolinx.** RER and RT $21 B programs lead contract claims advisor. Leading a team of 10 professionals providing support to Metrolinx executives and staff in the areas of commercial awareness and contract negotiation support, claims identification, analysis and resolution, and dispute/negotiation expert advisory services.

Mining

- **SNC Lavalin**. Nunavik Mine project. Provided construction dispute and project cost analysis services in an arbitration between SNC and the owner of the project Canadian Royalties.
- **Northern Vertex Mining Co.** US mine review. Analysis a tool development to assess dilution (mined grade vs crushed grade) and determined loss of precious metal revenues and increased costs in the plant due to dilution.
- **Mary River Mine** project. Provided construction third party cost analysis and expert services in a dispute between Baffinland Iron Mines Co and one of their major contractors.
- **Vale**. Project governance and EPCM and contractor performance assessments on two of their largest EPCM contracts in Canada (Long Harbour Plant, Newfoundland, and Clarabelle Mill, Sudbury, Ontario). Negotiation support and recommendations for contract management improvement opportunities and cost recoveries from the EPCM firm.
- **Confidential client**. Project claims advisory and expert services assessing the overruns on the Fording River Extension project by Teck Resources
- **Banro Co**. Canadian Miner with two mines in D.R. Congo (Africa). Developed a claims and cost recovery analysis document, assisted with EPCM negotiation and provided cost recovery options to the Board in a dispute settlement process.
- **Goldcorp.** Construction contract compliance, project controls. and cost reviews at four of Goldcorp's largest mines (Cerro Negro, Cochenour and Eleonore and Balmer). At Cerro Negro, his team provided advice on a revised a project controls framework and identified construction cost savings through a detailed review of the project, including the performance of the EPCM and the main construction contractors in Argentina.

- **Hudbay Minerals.** Augusto provided upfront commercial and strategic advice on contracting terms for construction contracts in a large mine in the US. He also provided advice in advance of arbitration with one of Hudbay's vendors in Latin America, conducting interviews and an assessment of the situation in Lima Peru.
- **Yamana Gold.** Independent oversight and commercial support on the Cerro Moro Project, Argentina. Performed quarterly site visits, project cost audits, and contract management recommendations to advance this $350 M construction project.
- **Barrick Gold.** Pascua Lama Project ($11 B) – Reviewed EPCM and contractor performance. Provided contract negotiation support to legal counsel for the purposes of account settlement with major contractors and acted as consulting expert through arbitration. Provided lessons learned and opportunities for improvement in contract management of future projects.
- **Barrick Gold.** Provided executive commercial and strategic advice on an $11 Billion project in Latin America, advising on forecasting processes and cost recovery and cost optimization opportunities.
- **SNC Lavalin, Chile.** Provided cost, commercial and claims advisory on a large project claim in Codelco's Chuquicamata Mine, Chile, in support of contract settlement between various parties involved.

Renewables Development Experience

Managing Director of Prointec S.A. (EPC Renewables Division)

Prointec is one of the top 5 engineering companies in Spain, with a global footprint, largely focused on civil engineering and transportation projects globally

Augusto started the EPC Renewables division, focused on developing turnkey solar power projects as a developer. He set up a JV with Sampol, a company from Mallorca, and built the team that delivered their first $30 M EUR solar power plant (Huertas de Binipark), the first solar power project entirely financed, procured, designed, constructed and operated by Prointec S.A.

Construction Industry Executive Experience

Managing Director, International Division OSSA (2008-2012)

Ossa (Obras Subterraneas S.A.) is a world class specialist **civil and tunneling construction** company, with over 700 employees and 250 Million USD revenue.

Augusto joined the company in 2008 as International Director when a leading private equity firm Mercapital acquired a majority stake in the company and recruited him to enhance the international experience of the leadership team. He was a member of the company's management committee and a minority shareholder.

In 4 years built an international team and led the company from no previous international activity (all revenues were in Spain prior to 2012) to the award of fourteen major international contracts both in the mining and civil engineering construction sectors.

This growth transformed the company changing the culture, modernizing processes and systems, and building a team to carry out projects in Hong Kong, Costa Rica, Chile, Greece, Peru, Panama and Nicaragua. In addition, he developed a strategy for the short-term future in the US, China, Colombia and Brazil.

During his tenure, he was responsible for international business development and for the operational side of the international business, running all international construction operations, while pursuing more new opportunities around the world.

As of 2012, international revenues represented about 50% of total revenue for the company.

Some of the international projects that Ossa executed under Augusto's leadership are listed below

China

Hong Kong Express Rail Link Tunnels. 5,2 km. twin 67 sqm. tunnels and 200 m. deep shafts in urban environment. Contract 824. Client: MTR Co. Budget: 180 Million Euros.

Augusto led the management of the design/build of tunnel and shafts on this landmark contract which was a unit price agreement with a target cost with a "pain/gain" incentive mechanism. As a member of the project Joint Venture Board, he participated in providing commercial and technical direction and guidance to the Project Director and the construction JV team on all commercial matters associated to the tunnels and the construction of the shafts, negotiating changes and cost/schedule impact of changes with the client (MTR) to successful completion of the project.

He also played a key role in guiding, structuring, negotiating and awarding work to many key subcontractors and suppliers on this massive urban project, such as concrete and steel suppliers, logistic vendors, building contractors, ventilation and other equipment, and major construction equipment lease and purchase contracts.

As a JV Board member he participated in monthly client meetings with the client (MTR) representatives to discuss project performance, safety and quality, and ensure the client was satisfied with the performance of the JV.

Chile

Chuquicamata Mine Underground Expansion Tunnels. 9 km 80 sqm. twin tunnels, shafts and cross passages. Contract 3. Client: CODELCO. Budget: circa USD 100 Million.

As a member of the construction Acciona/Ossa JV Board, he provided guidance and leadership to the Project Director in the negotiation of contract changes, and monthly progress reporting to the client, Codelco, the largest state-owned copper miner in Chile. The unique conditions of this mine in the Chilean desert posed some major logistical challenges such as effectively deploying a high performing team to the region of Atacama

Panama

Esti Power Plant Headrace Tunnel Project. 4,5 Km, 75 sqm. headrace tunnel. Client: AES Co. Budget: 80 Million USD

As the headrace tunnel in this plant had collapsed in 2010, Augusto identified the opportunity to bid for emergency repairs and re-construction for client AES out of Washington DC. The Esti plant had been shut down as tunnel failures risked damaging the turbines, causing a deficit of energy generation in the region of Volcan, in Panama. Given the brownfield nature of this project where the existing tunnel was being urgently inspected, re-designed and refurbished while hydro generation was suspended. Augusto and the owner's team of AES (US power company) negotiated the terms of an innovative milestone and incentive based reimbursable fast track target cost Design/Build Agreement with international partners Seli Tunnel SPA from Italy. The contract included reimbursable components as well as unit price and fixed price components, as well as advance payments for critical equipment and urgent mobilization. This fast track contract involved over 500 skilled trade labourers and 90 project management staff team members. The project involved consisted designing and constructing a new secondary lining of over 5 kms. in length. Engineers from Switzerland (Lombardi) and various international specialists provided engineering and monitoring services. Part of Augusto's role as a JV Board member was to communicate with the client (AES) on all project management matters such as providing updates on equipment supply and operation, labor issues and union agreements, government relations, subcontractor management, and relationships with the technical partners at SELI

Peru

Toquepala Mine Conveyor Tunnel Project. 2,2 km., 60 sqm. tunnel at 3.200 m. altitude for mineral haulage. Client: Southern Peru Copper Co. Budget: 19 Million USD

Augusto's role was to manage the execution of this design/build contract, and as part of that, managing the relationship with the owner's team at Southern Peru Copper, the largest mining company in Peru. This role included monthly project reports and forecasts, arranging and attending progress calls and meetings, joint site inspections, resolution of deficiencies, management of contract changes, and agreeing two major contract amendments that allowed differing site conditions to be dealt with and complete the project on schedule.

Tunneles Intersur. 2 Km., 100 sqm. tunnels for San Gaban-Puno Highway in the Peruvian jungle (Puno Region). Budget: 17 Million USD

Augusto's role was focused on managing cost and schedule execution as well as commercial changes and final contract settlement with client Odebretch from Brazil. The contract was a unit price contract with incentive mechanisms for early schedule completion in a remote area of Peru.

Greece

E 65 Tunnel 2 Project, Lamia. 3 Km, 106 sqm. twin highway tunnels. Client: Ferrovial Agroman. Budget: 38 Million Euros

Kalydona Tunnel Project, Agrinio. 800 m, 106 sqm. twin highway tunnels. Client: Ferrovial Agroman. Budget: 9 Million Euros

Ambelia Tunnel Project, Ioannina. 1,6 Km, 106 sqm. twin highway tunnels. Client: Ferrovial Agroman. Budget: 18 Million Euros

The key accomplishment that Augusto (as International Director of OSSA) contributed to on these highway projects was to implement a strategy and detailed execution plan to deploy local management teams in various cities in Greece to execute complex design/build tunnel contracts for clients Ferrovial and Dragados. The complexities (administrative and legal) of the Greek marketplace, as well as issues with unions, challenged these projects. Halfway through execution the financing from European banks was canceled and the highways came to a halt in 2011 when tunnels were 80% complete. Augusto had to re-negotiate the terms of the contracts to ensure termination compensation and de-mobilization terms were adequate and fair, essentially ensuring that all de-mobilization costs would be covered by the client.

He also led negotiations with key local subcontractors such as Edrassis C. PSallidas SA,a large Greek contractor with whom OSSA partnered for these projects.

Costa Rica

El Torito Hydro Power Plant Tunnels Project, Turrialba. 4 Km EPB 7,8 m. diameter TBM headrace tunnel and several adits. Client: Gas Natural Fenosa. Budget: 41 Million USD

Augusto led proposal negotiations with client Gas Natural Fenosa that led to award of the project to Ossa. The key was to reduce scope to allow the contract price to fit within the owner’s budget and to propose alternative technical designs (replace steel reinforcement with steel fibers, and proceed with a modified EPB tunnel boring machine) that helped reduce project costs to an acceptable level that would allow the client to sanction the investment at the expected NPV and rate of return on investment.

Through the course of this EPC contract, many lump sum prices were re-negotiated, and some major change orders were approved to allow for successful execution. International procurement of equipment and materials to a small market like Costa Rica was key. Other key areas managed by Augusto and his project team were the import of goods (including customs negotiation and international tax planning and logistics associated to importing foreign materials and equipment from the US and Europe). For example, the EPB machine was sourced from Turkey, refurbished and modified in the US, and transported to Costa Rica for the project. Augusto led the overall execution of this project.

Nicaragua

Larreynaga Hydro Power Plant Tunnel Project. 2,5 Km, 25 sqm. headrace tunnel and several adits. Client: Enel. Budget 56 Million USD

Augusto's team at Ossa and the construction partners at Cobra negotiated the award of this project to the JV company of Ossa and Cobra (a major international hydraulic contractor). The role included the negotiation of contract changes, execution of the tunnel. Eventually the contract rights were assigned to Cobra as Augusto's company decided that the complex political environment in the country did not offer long term prospects for the company. All contract negotiations and management from award to completing the tunnel, to rescinding the contract and selling the shares in the JV to the partners were led by Augusto and his team.

Spain

Pajares Lote 2 High Speed Rail Tunnels. 7,5 km twin high-speed rail tunnels. 10, 5 m diameter TBM. Client: Spanish High Speed Rail Authority, ADIF. Budget of 456 Million Euros

Santa Lucia Coal Mine tunnels. Over 5 kms. of mine development tunnels (10 sqm.). Client: Hullera Vasco Leonesa SA. Budget 20 Million Euros.

Suria Potash Mine tunnels and shafts. (15 sqm. Tunnels). Client: Iberpotash SA. Budget: 15 Million Euros.

Augusto was a member of the construction leadership teams and Dragados/Ossa JV Boards on these 3 projects. Providing direction and governance to the project teams, as well as approving the strategic direction and decision making proposed by the Project Directors, as well as approving the monthly reports and financial statements prepared by the project companies performing these projects. All these projects were unit price contracts with the exception of the Suria mine which was a shaft maintenance reimbursable (time and materials) type contract.

Augusto's key achievement was to provide direction to the project team on these contracts from a JV Board position to help ensure profitability and compliance with contractual requirements (quality, safety, budget and schedule).

In the particular case of the Suria mine project, Augusto led the re-negotiation of annual rates and collective agreement changes with the unions on behalf of Ossa

Infrastructure and P3 Project Experience
Director of Projects, Ferrovial Ireland Ltd (2003-2008)

Director of Civil Engineering Projects, Ferrovial Ireland Ltd. , a subsidiary of Ferrovial

Responsible for a portfolio of projects totaling 890 Million Euros Budget in Highway Concession DBFO Projects, and approximately 200 project staff. His main achievement was to help grow a subsidiary company with an initial staff body of 4 people into one of the largest contractors in Ireland with a staff of 120 and a turnover of 1.2 Billion Euros, in 4 years.

Augusto managed over 15 major subcontracts, each in excess $25 Million Euros (earthworks, drainage, structures, fencing, signage, pavement, and toll equipment and gantries). There were many forms of contract, cost plus, unit price, and fixed price with various incentive mechanisms embedded. Augusto worked together with the JV Commercial Director and the legal team in drafting the terms and conditions with each supplier and then negotiated contract changes and management of project changes with suppliers. Other tasks included subcontractor payment approvals, and overall project cost and risk management.

In this role Augusto reported to the Country Manager at Ferrovial and led frequent site tours and visits for external stakeholders from the owner's team, lenders, concessionaire, and corporate executives, from start to completion of four major highway projects in Ireland.

Project Director, M3 Motorway JV (Ferrovial/Budimex/SIAC Joint Venture), M3 Clone to Kells PPP Scheme.

This was the largest civil engineering Private Public Partnership Project in Irish history. Budget of 500 Million Euros. Responsible for a team of 120 professionals. Client: National Roads Authority.

Project Manager, Westroute JV (Ferrovial/SIAC Joint Venture) M4/M6 Kilcock - Kinnegad Toll Motorway (40 Km).

This was up to 2003 the largest Private Public Partnership Project in Irish history. Budget of 302 Million Euros. Responsible for a team of 85 professionals. Client: National Roads Authority.

Member of Supervisory Board, and Director for Northroute JV (Ferrovial/SIAC Joint Venture) on N1/A1 Dundalk- Newry Motorway (16 Km),

First UK-Ireland cross border Target Cost Contract, 90 Million Euros. - Responsible for a team of 55 professionals. Client: NRA and Department of Regional Development.

Construction Management Experience

Project Manager, Ferrovial Canada (1998 – 2003)

Construction Manager, Ferrovial Canada, Inc.

Canadian subsidiary of one of the world's leading infrastructure groups. SLF JV (Ferrovial / SNC Lavalin Joint Venture) Highway 407 ETR East, Central and West Extensions in Toronto. Largest infrastructure privatization in Canadian history. Budget of 330 Million US$. Client: 407 ETR International and Ministry of Transportation Ontario.

Participated in various design/build bids tenders, such as the Terminal 3 Expansion at Pearson Airport (Ferrovial/Kenaidan JV)

Based primarily in the field, Augusto managed the entire technical scope associated to 12 bridges and one major interchange on the 407 Highway. He managed all site operations, ordered materials, kept updated records of progress and monitored quality of constructed assets. In addition, he reviewed and approved contracts and purchase orders for his entire section and worked with office contract administrators to help negotiate and approve subcontractor change orders and negotiate project claims. On a monthly basis he would negotiate subcontractor progress payment applications, as well as settle claims and manage relationships with Ministry of Transportation Ontario representatives and concessionaire supervisors and project executives at 407 ETR International.

Construction Manager, SLF JV, Highway 407 ETR Mavis Interchange.

Construction of a new interchange over live traffic, including bridge demolition and widening and upgrade of local roads. Budget of 20 Million USD

In this role, Augusto managed various subcontractors and suppliers to design and build the improvement to this interchange. All the construction work was performed under live traffic conditions and delivered safely on budget and on schedule.

Site Manager, SLF JV, Highway 407 ETR Bronte Creek Bridges.

Augusto oversaw construction of the first launched girder bridge in Ontario over the environmentally sensitive area of Bronte Creek in Oakville, Ontario. The project involved managing all aspects of supply of equipment, labor, materials, and overall construction cost, quality and safety supervision. The budget was approximately 20 M USD

Structures Agent, Highway Bridges for SLF JV on Highway 407 ETR, West Section.

In this role Augusto was responsible for supervision and management of Bridge construction contracts with a budget of 21 Million USD. Managed subcontractors and ensured all resources were deployed to meet schedule obligations, as well as reporting on cost and progress periodically to the Project Services team and the Project Construction Manager.

Engineering Design Experience
Prointec (1996-1998)

Augusto started his career in Spain in 1996, as a junior design engineer where he learned the basics of earthworks, drainage and general civil highway and rail alignment layout, drafting plans and feasibility reports for linear infrastructure projects. He participated in the production of feasibility studies, and basic design for high-speed rail projects in Spain.

Main projects: Madrid-Barcelona High Speed Rail, and Madrid Metro Línea 7 (acting as Designer´s Site representative).

Geoff Hayes

Partner, Deal Advisory – Infrastructure, Energy & Natural Resources

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Function and Specialization

— Financial and Commercial Diligence
— Strategic Planning and Analysis
— Financial Modelling and Evaluation
— Project Financing and Transaction Advisory

Education and Qualifications

— Masters of Accounting, University of Waterloo School of Accounting and Finance
— Institute of Chartered Accountants of Ontario

Background

- Geoff is an experienced finance professional focused on the strategic evaluation and financial assessment of major infrastructure assets and investments for industry clients, private equity and pension funds.
- He has worked closely with his clients and/or their investment banks or technical advisors to evaluate M&A investment decisions through the provision of independent sector research, business plan assessments, asset cost and performance reviews, financial model development, and due diligence transaction support.
- Geoff is a member of KPMG"s Global Infrastructure, Energy & Natural Resources, and Construction networks.

Experience

- Geoff has over 20 years of industry and advisory experience, working in-house for corporate finance functions at Barrick Gold and Magna Entertainment, as a financial advisor at Deloitte & Touché and now a Partner at KPMG.
- A selection of Geoff's recent and relevant energy due diligence and transaction support experience includes:
  - Provided financial due diligence to a confidential global power producer on their acquisition of wind and solar renewable energy assets.
  - Lead sell-side advisor to a Canadian institutional investor in relation to their syndication of a portion of their investment in a portfolio of solar and wind assets in the U.S. and internationally
  - Advised Forum Equity Partners on their investment in a Canadian natural gas and electricity retailer
  - Advised OTPP and IFM Investors on their acquisition of Brookfield Infrastructure's 100% interest in the Canadian district energy operations owned by Enwave Energy Corporation for $2.8 billion (enterprise value basis)
  - Advised Northland Power on its acquisition of Helia Renovables, a 540 MW operating wind and solar portfolio in Spain
  - Advised Northland Power on their $1.05 billion acquisition of a Colombian regulated utility from Brookfield Infrastructure
  - Advised DIF Capital Partners on their acquisition of BluEarth Renewables from Ontario Teachers' Pension Plan
  - Provided due diligence and financial model review to Canadian Pension Plan Investment Board on their $741 million acquisition of NextEra Energy's Canadian renewable assets (wind + solar)
  - Advised Greystone Infrastructure Fund on their acquisition of the Genalta Power portfolio of Canadian power plants from Kensington Capital Partners
  - Advised Nalcor Energy on their investment decision in the Lower Churchill hydroelectric project
  - Performed independent project planning assessment and provided ongoing project monitoring to Enbridge Gas for the construction of their $1 billion GTA Pipeline Project, a natural gas pipeline and facilities in Toronto
  - Advised Ontario Power Generation with project due diligence on the $13 billion Darlington nuclear refurbishment

Jamie Cameron

Director

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Function and Specialization

- Director in the Major Projects Advisory group within KPMG's Global Infrastructure Advisory practice, specializing in commercial management and claims strategy, business plan development, and collaborative contracting.
- Professional Engineers of Ontario (P.Eng.)
- Professional Management Institute (PMP)

Education, Licenses & Certifications

- MBA – Master of Business Administration, Schulich School of Business, York University, Ontario
- BASc – Bachelor of Applied Science in Engineering (Mechanical), Queen's University, Ontario
- Professional Engineer (P.Eng.) – Mechanical, Professional Engineers Ontario
- Project Management Professional (PMP), Project Management Institute

Background

Jamie Cameron is a Director in the Infrastructure practice of KPMG's Toronto office. He specializes in capital project management, oversight, governance, risk and controls with a focus in the transportation infrastructure space. He also provides strategic planning services for clients around project portfolio management. James is both a professional engineer (P.Eng.) and project manager (PMP) with over 17 years in industry and consulting.

Professional and Industry Experience

Jamie's professional project experience covers the buildings, transportation, municipal, electricity, natural gas distribution and mining sectors. His industry experience covers the tunneling industry including projects in the transit, water, wastewater and power sectors. Specific areas of focus include:

- Project-specific compliance reviews of project management, governance and controls.
- Third party project management oversight, including ongoing cost, scope (change orders), schedule and risk register review and analysis.
- Construction claims analysis and negotiation support, including assessments related to scope creep from initial estimates and contract compliance.
- Assessments of organizational project management maturity.
- Development of project management frameworks (topics include risk management, project change control, and project delivery options analysis)
- Design of organizational project governance structures and systems.
- Risk register development.
- Financial modeling, with an emphasis on translating technical inputs into model assumptions.
- Board-level (and below) training on project governance and stewardship responsibilities.
- Portfolio and Project Management Office development and support.
- Past experience in engineering and design management.

Jamie graduated from Queen's University a Bachelor of Applied Science (Mechanical Engineering). He also has an M.B.A. in Infrastructure and Real Estate from the Schulich School of Business at York University. He is a certified member of Professional Engineers Ontario and the Project Management Institute. He has over 10 years of advisory services experience with KPMG.

Project Review & Commercial Support Experience

- ***Capital Project Management Prudency Services – Enbridge Gas Distribution:*** Jamie was a lead team member on a multi-year engagement acting as a third party project management, governance and control oversight on a $700M+ pipeline expansion project. Jamie was involved in an initial governance & controls maturity assessment, and completed monthly reviews of the project (contract, schedule, cost, risk), aiding in identifying potential project management issues. The work will conclude with a close-out report related to project management prudency in support of a regulatory rate application, and may include testifying.
- ***Project Estimate Process Review – Ontario Power Generation:*** Jamie was a lead team member reviewing OPG's estimate development process for the Darlington Nuclear Refurbishment Project. The engagement was twofold,

focusing first on the process and secondly taking a more detailed look at the composition of particular sub-sections of the estimate. Jamie's work paid specific attention to the development process of the Operations and Maintenance estimate.

- ***Project Risk and Controls Review – Shipyard:*** Jamie was on a team providing ongoing project governance and controls assessments to a major shipyard. The shipyard is undergoing a major renovation and expansion project, and KPMG conducted semi-annual reviews of project and contract management of the project.
- ***Authorities Representative - Gateway Program for BC Ministry of Transportation / TI Corp.:*** As part of the KPMG team engaged as the Senior Business Advisor to the $3.5B+ Port Mann Highway 1 Project, Jamie spent two years assisting the Authorities Representative on both contract management oversight for the tolling system contract and claims management on the main construction contract.
- ***Contract Cost Recovery – Mining Company:*** was a team member involved in a major project contract cost recovery review on a new-build gold mine, with a focus on assessing the performance of the EPCM contractor. The review included assessing the project management and controls performance of the contractor, as well as an invoice review for alignment with the commercial terms of the contracts.
- ***Functional Contract & Project Management Assessment – Mining Company:*** Jamie was a lead team member involved in a major project contract functional assessment (contract, schedule, cost, risk) on a new-build gold mine, including assessing the project to-date with a focus on identifying cost recovery options on the EPCM and subcontracts, as well as lessons learned for future contracting methods and structure.
- ***Functional Contract & Project Management Assessment – Mining Company:*** Jamie was involved in a major project contract functional assessment (contract, schedule, cost, risk) on a new-build, $4B mine processing plant. Work included assessing the project to-date, as well as giving Project Management improvements, project controls support and claims advice.
- ***Functional Contract & Project Management Assessment – Mining Company:*** Jamie was involved in a major project contract functional assessment (contract, schedule, cost, risk) on a $220m mine processing plant upgrade. Work included assessing the project to-date, as well as giving Project Management improvements and claims advice.
- ***Project Controls Assessment – Stornoway Diamonds:*** Jamie was part of a team providing strategic project governance and management advice to a publicly traded mining company in the early stages of delivering a $500m diamond mine. Jamie assessed the current state of project governance and key project controls to establish a project governance and project management framework aimed at providing proper oversight of the construction of the company's first mine and act as a roadmap to strategically guide the organization through delivery.
- ***Capital Project Risk, Governance & Control Review – City of Regina*** - Jamie was recently involved in an engagement with the City of Regina to assess their capital construction project controls and governance procedures. This assessment was facilitated by a review of 5 recent or current construction projects, and structured interviews with individuals representing project management, finance, procurement and executive leadership. The aim of the

project was to identify risks and improvement opportunities for capital project management functions at the City.

- ***Project Management Review - City of Vancouver:*** Jamie conducted a review of the City's Engineering Services Department aimed at evaluating the maturity of project management practices. The work resulted in a series of opportunities for project management improvement. KPMG is continuing to help the City through the implementation of these improvements.
- ***Procurement & Asset Management Audit – BC Municipality:*** KPMG worked on behalf of the BC Auditor General of Local Governments to audit capital project procurement and asset management at six small municipalities in British Columbia. Jamie led the audits for one municipality, including a wastewater treatment plant and a small road project.

Infrastructure & Transport

- ***Vehicle Compliance Training Review & Benchmarking – HRM:*** Jamie recently led a benchmarking and review exercise to compare the vehicle compliance training program at HRM TPW to a variety of jurisdictions across Canada.
- ***Roads Services Review – Oxford County:*** Jamie recently led work in reviewing the transportation services, facilities and equipment at Oxford County and its 9 constituent municipalities. The work involves considering opportunities for shared services.
- ***Public Works Review – Wellington County:*** Jamie is recently led work to study the equipment and facility needs of the County's public works department, building up an activity-based model of the delivered services, the resulting equipment requirements and the impact on long-term facilities needs.
- ***Public Works Review – Town of Pelham:*** Jamie recently led work to study the equipment and facility needs of the Town of Pelham's public works department, building up an activity-based model of the delivered services, the resulting equipment requirements and the impact on long-term facilities needs.
- ***Snow Plow Route Optimization Study – South Glengarry:*** Jamie recently led work to study optimization opportunities for South Glengarry's winter operations delivery given their adoption of a new public works yard.
- ***Public Works Review – Huron County:*** Jamie recently led work to study the equipment and facility needs of Huron County's public works department, building up an activity-based model of the delivered services, the resulting equipment requirements and the impact on long-term facilities needs.
- ***Fleet Utilization Study – Town of Ajax:*** Jamie recently led work to study the fleet utilization of Ajax's light and medium duty vehicle fleet, and develop opportunities for improvement in terms of right-sizing, fuel efficiency and management strategy.
- ***Fleet Benchmarking – Ville de Montréal:*** Jamie recently led a benchmarking exercise to compare the fleet management operations between the city of Montréal and a variety of jurisdictions across Canada.
- ***Ontario Ministry of Transportation – Review of Corridor Management Function:*** Jamie is currently leading work to complete a fulsome review of the Corridor Management function within MTO, whose primary responsibility is maintaining the integrity of Ontario highway corridor by managing adjacent

planning and development (with partner jurisdictions like Essex), permitting signage and access, and managing third party utility access.

- ***Equipment Management Plan – Ministry of Highways and Infrastructure, Province of Saskatchewan:*** Jamie recently completed work to study the equipment fleet (heavy duty trucks & specialized equipment) utilization and management across the province's dozens of geographic maintenance sectors, with an emphasis on road maintenance.
- ***Capital Project Delivery Process Reviews – Metrolinx:*** As a part of the KPMG's broader internal audit support, Jamie led two reviews of capital project delivery processes for both cost estimating and reporting, and the management of third party utilities.
- ***Finance Transformation - Toronto Transit Commission:*** Jamie was recently supporting the finance transformation team within the CFO's office with the implementation of its agenda.
- ***Project Management Services, Vehicle Programs Department - Toronto Transit Commission:*** Jamie currently leads a team that is supporting the TTC's bus & automotive fleets, including bus, electric bus, para-transit and non-revenue. More specifically, Jamie has been leading the support of the TTC's eBus program that includes the procurement of 60 eBuses, the associated charging infrastructure, and the development of a business case for the full electrification of the TTC's 2100+ bus fleet. Recent tasks related to the eBus program have included the development of a program schedule, charter, project management plan and risk register, as well as facilitating workshops with maintenance staff on how the introduction of eBuses will impact their SOWs.
- ***Operations Strategic Initiatives – Toronto Transit Commission:*** For the last year, Jamie has been supporting the Deputy CEO / Chief of Operations and her team in their strategic planning, as well as supported a review of local and leading practices related to fare evasion / revenue protection, and operational management reporting.
- ***Organizational Project Management Services, Portfolio Management Office ("PfMO") - Toronto Transit Commission:*** Over a period of two years, Jamie led a variety of tasks to assist the TTC's PfMO deliver on their Project Management Maturity Plan. Work to date has included assisting with the development of project management standards, providing advice on process improvements for budgeting and project prioritization, providing support to staff in the development of business cases, and an annual maturity assessment to assess how the TTC has progressed against their PMM Plan through 2017. The PMM Annual Assessment was received by the TTC Board at their December 2017 meeting.
- ***Capital Project Lifecycle Review – Greater Toronto Airports Authority (Toronto, Canada).*** KPMG provides a wide array of risk-based internal audit assistance to the GTAA across their operations and capital programs. Jamie is currently helping lead a review of their Airport Development PMO's new project lifecycle framework, including a review of the design of their processes, procedures and standard documentation, as well as the effectiveness of their Project Management Information System (PMIS).
- ***Dam Portfolio Engineering Asset Management Plan (EAMP) Updates - PWGSC Engineering Assets Strategy Sector (EASS):*** PWGSC required the

updating of the EAMPs for six (6) assets in their 'Dam/Other' assets including five (5) dams (St. Andrew, French River, Timiskaming, Latchford, Rideau Falls) and the Kingston Dry Dock. Jamie authored two of the reports and managed the delivery of all six reports. Each report required the development of asset lifecycle financial model, including any planned capital or rehabilitation programs over a 25-year time horizon.

- ***Investment Analysis Report – Public Works and Government Services Canada:*** Jamie assisted PWGSC with the completion of two investment analysis reports, on the replacement of a dam and an interprovincial bridge, as a part of their Engineered Assets portfolio. PWGSC required assistance with the updating/revising/finalizing of the IARs for seeking Effective Project Approval (EPA) to proceed with construction tendering. Jamie developed the IARs that outlined the capital project options assessed, analyzed the comparative costs for each and delivered recommendations for approval.
- ***Project Management Services, Bus & Automotive Fleet – Toronto Transit Commission:*** Jamie currently leads a team that is supporting the TTC's bus & automotive fleets, including bus, electric bus, para-transit and non-revenue. More specifically, Jamie has been leading the support of the TTC's eBus program that includes the procurement of 60 eBuses, the associated charging infrastructure, and the development of a business case for the full electrification of the TTC's 2100+ bus fleet. Recent tasks related to the eBus program have included the development of a program schedule, charter, project management plan and risk register, as well as facilitating workshops with maintenance staff on how the introduction of eBuses will impact their SOWs. Jamie and his team were also recently awarded additional work related to the development of a business case for full electrification (with the potential for P3 delivery) as well as the ongoing monitoring of the success of the program.
- ***Capital Program Delivery Review "CPDR" - City of Toronto / Toronto Transit Commission (TTC):*** Jamie worked with the City of Toronto to assess the Toronto Transit Commission's (TTC) capital program project management, controls and governance maturity. This assessment is facilitated by a review of over a dozen recent or ongoing capital projects and programs, and structured interviews with individuals representing project management, finance, procurement and executive leadership. Jamie managed 60+ interviews with senior internal and external stakeholders at the TTC, City of Toronto, Metrolinx, Infrastructure Ontario and multiple contractors. The project also involved multiple working sessions and briefings with high level City and TTC staff, as well as politicians. The review included 41 recommendations, as well as a Project Risk & Complexity Classification framework and a Project Delivery Options Analysis framework. The TTC accepted all 41 recommendations for implementation at their September 2016 TTC Board meeting.
- ***CPDR Implementation Scoping - Toronto Transit Commission*** – As a follow-on to the Capital Program Delivery Review, Jamie assisting the TTC develop the detailed scoping of the TTC's implementation of the review's 41 recommendations, working through multiple stakeholder workshops to develop what ultimately became a 4-year Project Management Maturity implementation plan ("PMM Plan"). The TTC Board approved the PMM Plan at their December 2016 Board meeting.
- ***Project Management Framework Development - Toronto Transit Commission.*** Jamie recently assisted the TTC develop a corporate Project Management Framework ("PMF"), fulfilling a number of the key recommendations

in KPMG's CPDR. Approved by the TTC Board at its June 2017 meeting, the PMF addresses project governance based project categorization by risk and complexity and overlaid on a stage gate process. It also addresses corporate standards in the areas of risk management, business case development, cost estimating, and project monitoring, among others.

- ***Capital Program Board Governance Toolkit - Toronto Transit Commission.*** As a follow-on to the CPDR, Jamie and his team developed a toolkit and workshops to help the TTC Board execute its stewardship responsibilities for the TTC's capital portfolio. The work included small workshops with TTC Board members to introduce the TTC's new Project Management Framework and to provide tools and techniques to support the Board in executing their oversight responsibilities. The workshop documentation, toolkit, and a white-paper on capital project governance were received by the TTC Board at their July 2017 meeting.
- ***Organizational Project Management Services, Portfolio Management Office ("PfMO") - Toronto Transit Commission.*** Since July 2017, Jamie has been leading a variety of tasks to assist the TTC's PfMO deliver on their Project Management Maturity Plan. Work to date has included assisting with the development of project management standards, providing advice on process improvements for budgeting and project prioritization, providing support to staff in the development of business cases, and an annual maturity assessment to assess how the TTC has progressed against their PMM Plan through 2017. The PMM Annual Assessment was received by the TTC Board at their December 2017 meeting.
- ***Improvement & Efficiency Services, Service Delivery Group - Toronto Transit Commission.*** Since January 2017, Jamie has been leading a variety of tasks to assist the TTC's Service Delivery Group (responsible for buses, streetcars, Wheel Trans and stations) improve strategy and processes. Work to date has included helping develop a group-specific Project Management Maturity plan for their newly formed PMO, investigate leading practice long-term capital planning practices for similar organizations, and support the development of project management deliverables for individual projects including business cases and project charters. Jamie's work on these efforts will continue until at least December 2018.
- ***Toronto Ferry Fleet Replacement Analysis – City of Toronto:*** Jamie worked with the Parks, Forestry and Recreation department to complete a review of existing ferry operations and inform immediate ferry replacement decisions as well as the long-term strategic ferry fleet replacement direction. This work will ensure that the ultimate selection and sequencing of ferry vessel replacement is supported by comprehensive business analysis that clearly outlines anticipated costs and benefits. KPMG's work included qualitative and quantitative analysis of the Toronto Ferry operations and fleet, with a focus on broad stakeholder engagement, a detailed financial analysis, a green propulsion options analysis (hybrid vs. battery electric), and a technical sub-consultant's suitability review of the City's existing replacement vessel design. Jamie was the project manager, lead contact with the City, and manages multiple work streams and a technical sub-consultant.

Real Estate & Building Experience

- ***Parliamentary Precinct Value for Money Analysis – Public Works and Government Services Canada***: Jamie assisted PWGSC's P3 group with the completion of a Value for Money Analysis for a large commercial real estate redevelopment project in downtown Ottawa, encompassing six different financial models evaluating multiple project bundling options and methods of procurement. Jamie drove the risk workshop process with multiple senior PWGSC staff, as well as the development of a preliminary risk register, which was then quantified and incorporated into the project's financial model.

- ***Operations Capital Program Planning & Delivery Optimization – Commercial/Retail Developer:*** Jamie led a nationwide review of a large commercial/retail developer's Operations practices at the corporate, portfolio and property levels relating to capital project planning and execution. The practices were compared to those of the Development group, as well as benchmarks of other leading businesses. The resulting report and recommendations for a more formalized Operations Project Management Function and greater emphasis on asset management have since been adopted by the organization.
- ***End-to-End Development Review Process Review – City of Toronto:*** Jamie is currently working with the Transformation office and the Chief Planner to complete an end-to-end review of the processes, governance, roles and responsibilities and technology used in the cross-divisional process that intakes, comments on, and ultimately approves development applications. Those applications include things like re-zoning applications, site plan approvals and committee of adjustment applications for minor variances. The work is heavily focused on stakeholder engagement and participative operating model and process re-design.
- ***Project Review - City of Winnipeg:*** Jamie participated in a review of the City's handling of the construction of the new Police Services headquarters, aimed at determining what factors may have led the project to being completed significantly over budget, including a contract review.

Industry Experience

Prior to his consulting career, Jamie spent 6.5 years working at Caterpillar Tunneling Canada Corp., formerly Lovat Inc., including Designer (1.5 yrs.), Mechanical Project Leader (3 yrs.) and Mechanical Design Supervisor (2 yrs.). As a Project Leader, Jamie directed a team of four engineers and designers through detailed engineering of mechanical subsystems. As a Design Supervisor, Jamie managed a department of nine engineers and designers of major mechanical subsystems including propulsion, steering, shield sealing, segment erection and spoilage (excess soil) removal. In his role, Jamie exercised final design oversight on system design, managed department HR and performance, drove connectivity with other design departments and liaised directly with clients through the sales, design, manufacturing, commissioning and operations (project construction) phases.

PETER SIMPSON

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Function and Specialization

Commercial and technical experience including: Specialization in project controls, contract and claim management, and Aboriginal agreements.

Professional Associations

- Dispute Resolution Board Foundation (DRBF)
- Association for the Advancement of Cost Engineering (AACE)
- Project Management Institute (PMI)

Languages

English

Education, Licenses & Certifications

- Diploma in Operations Management Technology – Project Management
- Diploma in Civil and Structural Engineering Technology – Construction Management

Top Skills

- Project Controls
- Dispute Resolution and Avoidance
- Contract Management
- Cost Controls
- Project Management
- Construction Management
- Contract Negotiation
- Project Estimation

Background

Peter is a Director within KPMG's Global Infrastructure Advisory Practice, with over 16 years of experience falling within project and cost controls, claims, and claim avoidance of major infrastructure capital projects. Peter has experience in advisory support spanning from project initiation to closeout. His areas of expertise include:

- Project Planning / Integration Management
- Claims Management
- Scope Definition and Baseline Development
- Procurement
- Contract, Cost and Schedule Management
- Monitoring & Reporting

Professional and Industry Experience

During his 15 year tenure with Kiewit, Peter spent his first 10 years on Major Projects across Canada. He spent an additional 5 years with overall Project Controls where he was responsible for and provided support for both Western Canada and Eastern Canada regions.

From 2000-2010, Peter set-up and implemented the Project Controls and Contract Management systems for the Voisey's Bay Nickel Mine Project in Labrador and Diavik Diamond Mine projects in the North West Territories. Peter had additional Project Control responsibilities on the White Rose FPSO Topside project in Newfoundland and the Kearl Lake Deep Underground Oil Sands Mining projects in Alberta.

From 2010-2015, Peter oversaw all Project and Cost Controls responsibilities across Canada for Kiewit, including SME support for Project Schedule, Cost Management & Controls, Project Scope, Stakeholder Management and Aboriginal Affairs.

Management Consulting Experience – Infrastructure Advisory

- **OPG (Ontario Power Generation)**

  Several large projects related to the Darlington Nuclear refurbishment project including an assessment of the project controls framework, Estimate Process and Contingency review
- **Barrick Gold**

  Claim review, assessment and discovery
- **SNC Lavalin**

  Expert Witness: claim quantum calculations
- **Enbridge Gas**

  Independent oversight to the GTA Pipeline project, a $700M Capex, with a focus on project control opportunities and monitoring of project risks
- **MUN University**

  Project Control Review and Audit Program set-up for the $300M Science Building
- **Hudbay Minerals**

  Contracts and claims review for South American resources

Industry Commercial Experience

- **Head of the Commercial Group, Integrated Construction Solutions at Kiewit (2013-2014)**

  Leading the shared service Commercial Department for Canadian Infrastructure operations with nearly $2B in annual revenue and over 8,000 employees from British Columbia to Newfoundland. Responsible for partnering with senior leaders in the development and execution of people programs that support business objectives. Accountable for Contracts, Project and Cost Controls and Engineering for Canada.

- **Aboriginal Affairs Director (2011-2013)**

  Responsible for the negotiation and implementation of all Aboriginal Agreements consisting of the First Nations, Métis and the Inuit of the North including the coordination of IBA's, IIBA's and other Stakeholder commitments. Duties also included selecting and reviewing bid proposals.

Project Experience

- **Detour Lake Transmission Project, ON (2010-2011)**

  Construction of a 180 km transmission line (230 kV) from Hydro 1 substation in Pinard to the Detour Lake Gold Mine. The project is divided into two phases. The first phase involves building a 142 km stretch of transmission line from Detour Gold Mine to Island Falls where a temporary 115 kV substation is to be constructed. The second phase of the project is to construct the remaining 38 km of transmission line from Island Falls to Pinard.

  Responsible as Project Sponsor/Commercial Manager accountable for budgeting, scheduling, project controls, interface with First Nations and subcontract negotiations.

- **Kearl Lake Froth Project, Fort McMurray, AB (2010)**

  This project included pipe installation and steel modular fabrication for the Kearl bitumen extraction facility. This facility will be responsible for the oil sand bitumen separation as "froth" – a mixture of bitumen, water and fine solids. Responsible for the initial implementation of project controls, including control budgets, quantity claiming and general set-up of project policies and procedures.

- **Kearl Deep Underground Oil Sands Mining and Bitumen Extraction Project (2009 - 2010)**

  Installation of underground piping system for the oil sands mine serve facilities including the oily water sewer system, the firewater system, the process utility systems, the storm sewer system and the utility pipeline. A fast-paced project that became the first Deep Undergrounds Project ever to be completed on time in the Oil Sands area in Alberta. Responsible for managing the Project Engineering and Controls Department, namely cost controls, scheduling, quantity surveying, document control, invoicing, and subcontract management.

- **Cloudworks and Plutonic Run-of-river Projects, BC, (2007-2008)**

  Responsible for project controls and financial reporting for Cloudworks' $400M run-of-river hydroelectric projects, as well as for contract negotiations for the $100M Diavik Earthworks projects and Aboriginal / Local Business partnership agreements for the Plutonic $500M run-of-river hydroelectric project.

- **Diavik Diamond Mine Dyke A-418 Project, NWT, (2006-2007)**

  Construction of a 1 km long dyke in 30 m depth of water in hostile weather conditions typical of this remote region, 300 km North of Yellowknife on East Island, NT. The dyke was built with crushed rock. The impervious dam core consisted of a combination of plastic concrete cut-off wall and jet grouting to seal the rock bed. The project included installation of instrumentation, lakebed suction dredging, thermosyphons and dewatering. Responsible for the management of the contract administration, cost controls, scheduling, quantity surveying, document controls, invoicing and Subcontractor departments.

- **Voisey's Bay Nickel Project (2004-2005)**

  Construction of mine infrastructures in remote area accessible only by water and air. The scope of work included moving 6 M m^3 of material, drilling and blasting, 1 M m^3 of rock, placement of 32,000 m^3 of structural concrete and 10,000 m^3 of lean concrete, construction of 25 km of roads, crushing of 270,000 m^3 of rock, construction of a four-cell marine dock, installation of 2 km of culverts and 45 km of pipeline. 550 employees at peak, including Innu, Inuit and Metis aboriginal workers and 16 trade unions. Responsible for contract administration, including negotiation for any and all extra works, management of change orders, and cost control.

- **White Rose FPSO Topsides, Husky Energy/Petro-Canada, NF, (2002-2003)**
  Design-Build Topsides portion of the White Rose Floating Production Storage and Offloading (FPSO) vessel. Processing facilities consisted of 16 topside modules, ranging from 100 to 1,250 t. Modules included oil separation equipment, three 28 MW power generation units, water injection pumps, gas infection pumps, and a flare tower. Module construction began with structural steel fabrication, painting, and the application of passive fire protection. After major equipment was installed, piping, electrical, instrumentation and insulation was completed. Responsible for the Management and coordination of the Cost Control departments.

- **Diavik Diamond Mine A-154, NWT, (2000-2002)**

  Drilling, blasting, crushing and embankment placement for the construction of 3.8 km of dikes in 20 m of water around the diamond-bearing kimberlite pipes. Including the installation of a plastic concrete cut-off wall of 51,000 m², jet grout and dewatering of 10M m3 of water. 700 employees at peak. Responsible for cost reporting and daily T&M invoicing to the owner/client.

Technical Skills

Project Controls, Contract Management, Dispute Management, Construction, Project Engineering, Claims Assembly & Review, Cost Controls, Project Management, Subcontracting, Construction Management.

KPMG

Initial Governance & Controls Framework Assessment of the Enbridge GTA Project

February 27, 2015

Third Party Use, Limitations & Caveats

This draft document has been prepared by KPMG LLP (“KPMG”) for the internal use of Enbridge Gas Distribution (“Enbridge”) pursuant to the terms of our engagement agreement with Client dated October 30, 2014 (the “Consulting Agreement”) as amended on January 31, 2015. This draft document is being provided to Client on a confidential basis and may not be disclosed to any other person or entity without the express written consent of KPMG and Client. KPMG neither warrants nor represents that the information contained in this draft document is accurate, complete, sufficient or appropriate for use by any person or entity other than Client or for any purpose other than set out in the Engagement Agreement. This draft document may not be relied upon by any person or entity other than Client, and KPMG hereby expressly disclaims any and all responsibility or liability to any person or entity other than Client in connection with their use of this draft document.

While this draft document contains our assessment of your project progress, performance and risks, the procedures we carried out in performing the work that forms the basis of this draft document were not such as to constitute an audit. As such, the content of this draft document should not be considered as providing the same level of assurance as an audit. Furthermore, the services provided by KPMG are intended to assist Enbridge with its management of financial risks and, as such, KPMG's services shall not extend to advising on methodologies intended to result in the safe execution of the GTA Project nor shall KPMG's services extend to advising on the safe operation of Enbridge's distribution system. All safety and operational decisions related to the execution of the GTA Project and to the ongoing operation and maintenance of the distribution system shall rest entirely with Enbridge.

This draft document is subject to edits and modifications following a review with Enbridge. Once comments from the Client have been received, a revised document may be issued.

Agenda

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Methodology

Scope of Work: Initial Governance & Controls Framework Assessment

- KPMG has been retained by Enbridge to act as Independent Consultant for Enbridge's GTA Project and to utilize its Major Project Advisory (MPA) framework and relevant infrastructure industry expertise to assist Enbridge in:
  - identifying governance and controls improvement opportunities
  - identifying risks proactively
  - documenting cost variances and their root causes
- For this Initial Governance & Controls Framework Assessment, KPMG has conducted a baseline review of the existing GTA Project governance processes, project controls and project management tools, specifically considering:
  - governance processes
  - budgeting and estimating standards
  - corporate policies and standards
  - environment, health and safety standards
  - reporting standards
  - resource management standards
  - quality and technical standards
- Based on this review, a gap analysis between Enbridge's GTA Project and our understanding of Leading Practices[1] has been completed
- Opportunities for improvement on monitoring tools, governance systems and other project management functions have been identified to help close the gaps and assist Enbridge in mitigating project risks

1. For purposes of this report, the use of the term leading practice ("Leading Practice") is defined as the features and processes common to successful capital projects taken from the KPMG library of projects and from global successful projects in which KPMG team members have participated.

KPMG Major Project Advisory (MPA) Framework

The KPMG team has applied their Major Project Advisory Framework (MPA) to assess the GTA Project’s Governance & Control Processes. This framework is grouped by **process control categories:**

Project strategy, Organization and Administration

Project Integration Management
- Governance Protocols
- Project Charter
- Roles & Responsibilities
- Lessons Learned
- Project Breakdown Structure
- Document Management
- Project Execution Plan
- Configuration Management

Reporting & Stakeholder Management
- Stakeholder Identification & Communication Planning
- Implementation
- Management Reporting

Human Resources & Labor Relations
- Resource Planning & Management
- Code of Conduct & Ethics
- Recruiting, Hiring & Retention
- Labour Relations & Industrial Action Management
- Training & Development of Resources
- Performance Management
- Compliance Management

Cost and Financial Management

Project Estimating & Cost Management
- Baseline Estimate & Budget
- Budget Revisions
- Contingency Management
- Funding Revision
- Cost Management
- Trend Management
- Commitment Management
- Value Engineering

Financial Management
- Corporate Treasury Management
- Taxation & Duties
- Financial Management & Accounting
- Progress & Other Payments
- Cash Flow Management

Asset Management
- Asset Management Strategy & Planning
- Asset Categorization
- Asset Register
- Asset Transfer

Procurement Management

Procurement Management
- Procurement Planning
- Prime Contracting
- Contracting & Purchasing
- Contracting Administration
- Materials Management
- Claims Management
- Dispute Management

Project Controls, Quality and Risk Management

Project Scope Management
- Baseline Scope Development
- Scope Management
- Change Control Management
- Design Standards & Specifications

Risk Management
- Risk Management Strategy & Planning
- Risk Identification
- Qualitative Risk Analysis
- Quantitative Risk Analysis
- Risk Response Planning
- Risk Monitoring & Control
- Risk Reporting

Regulatory and Environmental Health & Safety
- Policies, Procedures & Standards
- EH&S Training
- Environmental Management & Compliance
- Occupational Health & Safety Management & Compliance
- EH&S Reporting
- Site Security

Quality Management
- Quality Planning
- Quality Assurance
- Quality Control

Information Management
- Info. Management Process Design
- Info. Management System Implementation & Integration
- Information Security

Schedule Management

Project Schedule Management
- Baseline Schedule Development
- Progress Management
- Schedule Change Management
- Schedule Integration

Under each process control category are a set of **process controls** that represent the fundamentals necessary to implement successful project controls and governance of a capital construction project

Focused Governance & Controls Framework Assessment

Two-fold approach was used for GTA Project governance and controls assessment:

1. **Review of key documents**
   - Project documents received were reviewed against process control categories
   - Processes / policies compared against Leading Practices based on similar size infrastructure projects
   - Overall control coverage assessed for gap analysis

2. **Interview with key personnel**
   - Key members of the GTA Project team were interviewed for their insight on the governance and controls framework for the project
   - Functional coverage focused on:
     a. Governance
     b. Project Cost & Schedule Controls
     c. Engineering and Construction Quality & Risk Management
     d. Procurement

The results of both the document review and management team interviews have been considered concurrently in completing our assessment

Assessment

Review of Key Governance and Controls Documents

- KPMG reviewed **45** documents provided by the Enbridge GTA Project team that were identified as key governance and controls documentation for the project
- A quality assessment was completed individually on each document against the process controls for each category on the basis of (1) breadth of coverage and (2) depth of Leading Practices, and individually rated as:

(green)	Strong Process
(yellow)	Partial Process
(red)	Insufficient Process
	Not Applicable

  - **Strong Process** documentation provides adequate conceptual coverage of the process at an appropriate level of detail
  - **Partial Process** documentation is somewhat lacking in terms of either conceptual coverage or level of detail
  - **Insufficient Process** documentation is lacking in terms of conceptual coverage and level of detail

- Collectively the documents provided covered most of the Major Project Advisory framework process control categories that are considered Leading Practice
- On the basis of the documentation assessment when compared to the full scope of process controls for each category, the following categories were identified as having partial or insufficient documentation coverage:
  - Project Integration Management
  - Human Resources & Labour Relations
  - Project Estimating & Cost Management
  - Project Schedule Management

Governance & Controls Document Assessment

Documentation provided has been individually assessed under each process control category to determine the extent to which the document provides coverage of processes within the control category. The control category on a whole is then assessed to determine the extent to which the fundamentals of a successful capital project governance and controls framework are being covered collectively by the documentation.

Legend	
Green	Strong Process
Yellow	Partial Process
Red	Insufficient Process
White	Not Applicable

Documents Received	Project Integration Management	Reporting & Stakeholder Management	Human Resources & Labour Relations	Project Estimating & Cost Management	Financial Management	Asset Management	Procurement Management	Project Scope Management	Risk Management	Regulatory and Environmental Health & Safety	Quality Management	Information Management	Project Schedule Management
20140130 20dec_order_Enbridge_Union_GTA-Parkway	Partial	Partial		Partial				Partial					
Cash Flow Forecasting Guideline[1]				Strong	Strong								
Change Management Process Summary								Strong					Partial
Change Management, EPC Contracts - Guideline[1]								Strong					Partial
Contingency Management Standard[1]				Strong									
Escalation Management Standard[1]				Strong									
PROJECT-				Strong									
Project Charter	Partial	Partial	Partial				Partial	Strong					
Project Management Plan	Partial	Partial	Partial										
Stage Gate Management Plan	Strong												Partial
Land Acquisition Plan		Partial							Partial	Partial			
Permitting Plan		Partial							Partial	Partial			
Public Consultation & Aboriginal Affairs Plan		Strong											
Environmental										Strong			

Governance & Controls Document Assessment [continued]

Strong	Strong Process
Partial	Partial Process
Insufficient	Insufficient Process
	Not Applicable

Documents Received

Documents Received	Project Integration Management	Reporting & Stakeholder Management	Human Resources & Labour Relations	Project Estimating & Cost Management	Financial Management	Asset Management	Procurement Management	Project Scope Management	Risk Management	Regulatory and Environmental Health & Safety	Quality Management	Information Management	Project Schedule Management
Project Controls Plan				Partial	Strong			Strong					Partial
Document Management Plan	Strong											Strong	
Pipeline Construction Management Plan	Partial							Strong					Partial
Facilities Construction Management Plan	Partial							Strong					Partial
Commissioning & Start-up Management Plan	Strong												Partial
Regulatory Compliance Management Plan										Strong			
Risk Management Plan									Strong				
Project Safety and Security Management Plan										Strong			
Regulatory Plan										Strong			
Asset Integration Plan						Strong							
GTA Quality Management Plan											Strong		
Supply Chain Management Plan							Strong						
PLGC Placemat[1]													Partial
GTA Project Risk Register_November 6, 2014									Strong				
Construction_Timeline													Partial
2013 Scorecard - GTA_Q4 Update_Jan 6			Partial	Partial						Partial	Strong		Partial
2014 MP Scorecard GTA Project_v6			Partial	Partial						Partial	Strong		Partial

Governance & Controls Document Assessment [continued]

(green)	Strong Process
(yellow)	Partial Process
(red)	Insufficient Process
(white)	Not Applicable

Documents Received	Project Integration Management	Reporting & Stakeholder Management	Human Resources & Labour Relations	Project Estimating & Cost Management	Financial Management	Asset Management	Procurement Management	Project Scope Management	Risk Management	Regulatory and Environmental Health & Safety	Quality Management	Information Management	Project Schedule Management
EGD Approved Material MFGs list Feb 2014						Strong Process	Partial Process						
GTA Cost Report_MPSR_141201(MPRS)	Strong Process	Strong Process		Strong Process	Strong Process			Partial Process					Partial Process
GTA Project Special Delegtation (3)	Partial Process						Partial Process						
GTA Project_Compliance List_Rev 5									Strong Process	Strong Process	Strong Process		
MP SCM Protocol							Strong Process						
Risk Process									Strong Process				
GTA-ADM-RPT-001_Monthly Report_04_07_2014[1]		Strong Process		Partial Process									Partial Process
GTA-ADM-RPT-001_Monthly Report_11_06_2014		Strong Process		Partial Process									Partial Process
GTA-ADM-RPT-001_Monthly Report_12_05_2014		Strong Process		Partial Process									Partial Process
GTA MPR - May 2014 - Final Approved		Strong Process		Partial Process									Partial Process
GTA MPSR - August 2014 - Final Approved		Strong Process		Partial Process									Partial Process
GTA MPSR - October 2014 - Final Approved		Strong Process		Partial Process									Partial Process
GTA MPSR - September 2014 - Final Approved		Strong Process		Partial Process									Partial Process
GTA Project Report July 2014 - Final Approved		Strong Process		Partial Process									Partial Process

All control categories have been discussed in the current documentation, but depth of coverage is still needed – see the following "Gap Analysis" to address the information gap

Governance & Controls Document Gap Analysis

Project Strategy, Organization and Administration

Process Control Category	Documentation Gap Assessment
Project Integration Management	Developed and appears adequately documented but appears to function at or below Leading Practices. ***Gap considerations:*** 1. Expand definition of roles and responsibilities, specifically at the field control level; 2. Develop detailed authority matrix, not just for spend limits but to define all required approvals of documents; 3. Project breakdown structure (standard), including budget owners, should be outlined in the planning documents, not just the financial estimate model; 4. Project execution plan varied amongst the sections in terms of depth and quality of GTA Project specific process documentation (such as the Facilities Construction, Commissioning & Start Up and Project Controls Management Plans).
Reporting & Stakeholder Management	Developed, appears to be adequately documented for standardized use across the organization and appears to function appropriately when compared to Leading Practices, utilizing corporate standards for stakeholder management such as permit tracking, stakeholder plans and compliance plans. ***No immediate gap or actionable item.***
Human Resources & Labour Relations	Developed, appears to be adequately documented for standardized use across the organization but appears to function at or below Leading Practices. ***Gap considerations:*** 1. Enbridge effectively utilizes the comprehensive corporate guidelines, processes and training for ethics to govern the project. However, reference to relevant corporate processes and/or training were not specifically identified in the core project documents. Leading Practice would be to directly reference these relevant supporting documents as tools for the project within the overall project plan; 2. Detailed resource skill assessment and ramp up plan should be developed to help ensure resources and skill sets are available as needed, particularly in light of the significant number of still vacant positions.

Governance & Controls Document Gap Analysis [continued]

	Process Control Category	Documentation Gap Assessment
Cost and Financial Management	Project Estimating & Cost Management	Developed and appears adequately documented but appears to function at or below Leading Practices given the scrutiny over spend prudency. ***Gap considerations:*** 1. Clearly define the set of cost variance or earned value metrics that will be used on a monthly basis to evaluate project spend, referencing corporate guidelines; 2. Establish basis for which costs will be managed against original baseline budget, periodic estimates, or ongoing forecasts; 3. Allocation of budget to owners appears to be done at too high a level and does not appear to create enough accountability at the work package level management.
	Financial Management	Developed, appears to be adequately documented for standardized use across the organization and appears to function appropriately when compared to Leading Practices. ***No immediate gap or actionable item.***
	Asset Management	Developed, appears to be adequately documented for standardized use across the organization and appears to function appropriately when compared to Leading Practices. ***No immediate gap or actionable item.***

	Process Control Category	Documentation Gap Assessment
Procurement Management	Procurement Management	Developed, appears to be adequately documented for standardized use across the organization and appears to function appropriately when compared to Leading Practices. Utilizing existing procurement log and maintaining stringent procurement controls will also aide in cost management and controlling against the budget. ***No immediate gap or actionable item.***

Governance & Controls Document Gap Analysis [continued]

Project Controls, Quality and Risk Management

Process Control Category	Documentation Gap Assessment
Project Scope Management	Developed and appears adequately documented for standardized use across the organization and appears to function appropriately when compared to Leading Practices. ***No immediate gap or actionable item.***
Risk Management	Developed and appears adequately documented for standardized use across the organization but appears to vary from Leading Practice. ***Gap considerations:*** 1. Corporate processes do not allow for a clear mapping of contingency to specific risks. This may warrant discussion for review at a corporate level but is outside the control of the GTA project team.
Relulatory and Environmental, Health & Safety	Developed, appears to be adequately documented for standardized use across the organization and appears to function appropriately when compared to industry standards. Target future state should strive to ensure regulatory and EHS processes are Leading Practice given the significance of regulatory and environmental approval required for the project, including OEB oversight, stakeholder environmental impact, and urban city permitting requirements. ***No immediate gap or actionable item.***
Quality Management	Developed and appears adequately documented for standardized use across the organization and appears to function appropriately when compared to the industry. ***No immediate gap or actionable item.***
Information Management	Developed and appears adequately documented but appears to function at or below Leading Practices. ***Gap considerations:*** 1. Opportunities to modernize information management by utilizing Leading Practice technology in the field to capture and transmit information.

Schedule Management

Process Control Category	Documentation Gap Assessment
Project Schedule Management	Developed and appears adequately documented but appears to function at or below Leading Practices. ***Gap considerations:*** 1. Preparation of a resource loaded schedule to manage performance against; 2. Improve definition and clarify controls over “small changes” in the field, which can have an adverse impact on schedule if not properly managed.

Interviews with Key GTA Project Management Team

Process insights have been collected and documented through interviews with key project personnel

Function	Resource	Position	Date
Project Director	Scott Dodd	Snr. Project Director	Dec 12, 2014
Construction Manager	Brian Wikant	Project Director	Dec 10, 2014
Project Accounting Manager – Chief Controller	Owen Schneider	Sr. Mgr., Project Controls	Dec 10, 2014
Project Controls Lead	Parag Datta	Sr. Advisor, Governance & Control	Dec 10, 2014
Technical / Engineering Manager	Tyler Horton	Mgr. Engineering	Dec 12, 2014
Purchasing Manager	Aman Haq	Mgr. Procurement	Dec 10, 2014

Project Management Team Interview Assessment

Project Strategy, Organization and Administration

Process Control Category	Issues Identified Through Interview Process	Gap Assessment / Comments[1]
Governance	Corporate Standards have been used as the template for most project standards, with minimal room to deviate	Ensure policies and procedures are project specific and recognize unique needs and risks.
Project Integration Management	Duplicate reporting by the project team to Major Projects (MP) and Enbridge Gas Distribution (EGD) may divert attention from project execution	**Gap:** Reporting to various internal stakeholders should be unified in one standard monthly report to avoid repeat work and allow for focus on fast track project execution issues
Project Integration Management	The Delegation of Authority (DOA) is very high level and does not include consideration of authority levels for documents such as budget/forecasts, AFEs, purchase orders, work orders, design and field changes, payment certificates, etc.	**Gap:** A more complete DOA should be produced to include more documents and line supervisors
Project Integration Management / HR	Roles and responsibility definitions at the field level, particularly with respect to the field engineer and field controls analyst	**Gap:** Update roles and responsibilities, authority / approval matrix, and reporting lines to ensure the expectations of field employees are clearly understood with no duplication of efforts
Project Integration Management / HR	Significant number of construction inspectors will be used, with varying relationships to the project (i.e. internal employees, contractors, consultants, etc)	**Gap:** Inspector role should be clearly defined in the PMP for authority level and responsibilities, as positive interaction and flexibility with contractors is critical to project success; claims avoidance training should also be considered
Project Integration Management / HR	Field changes should be made in a timely manner, but without losing control and visibility of the senior project management team; ensure a robust process is in place to facilitate field level changes while maintaining overall control over the cost and schedule	Decentralized decisions allows for greater flexibility and avoids schedule delays associated to excessive layers of approvals; need to balance against loss of control over billings **Gap:** T&M Change Orders should be validated and reconciled against approved timesheets and cost codes included directly on timesheets
HR and Labour Relations	On-boarding training is provided for functional specific groups and for all level of employee (internal, contract, etc).	**Gap:** Debrief and evaluate effectiveness of training program for assimilating new team members or contractors.
HR and Labour Relations	Level of accountability/ownership of CAM's towards the budgets, particularly those not involved in preparing the class 3 baseline	Variances measured against Stantec baseline budget; CAMs may state overruns caused by underestimated class 3 and not their performance; tie portion of CAMs compensation to forecast performance

1. Comments have been provided for management consideration, but do not necessarily constitute an immediate gap or actionable item.

Project Management Team Interview Assessment [continued]

	Process Control Category	Issues Identified Through Interview Process	Gap Assessment / Comments[1]
Cost and Financial Management	Project Estimating & Cost Management	Contract price for mainline piping appears low for the scope of work and in comparison with other bidders, although above initial plan	Although early indications do not suggest contractors are preparing for it, the risk of claims should be closely monitored
	Project Estimating & Cost Management	The inclusion of Unit Price Items (UPI) in contracts could be a source of additional contractor billing	**Gap:** Risk should be included and quantified in the risk register; have allowances for quantity growth been included in contingency
	Project Estimating & Cost Management	Clearly established guidelines for overhead allocation from parent company and support groups	**Gap:** Ensure overhead is properly allocated and included in the forecast
	Project Estimating & Cost Management	Cost overruns resulting from underestimated market prices in the GTA; to date cost overrun is already $70M ($755M vs $685M)	Review forecast to ensure "historical" costs have been updated to reflect higher costs of GTA construction market
	Project Estimating & Cost Management	Monthly forecasting will be used; could remove the sense of accountability against the baseline as with each revision past overruns are included in new forecast	Monthly forecasting methodology is dictated by Enbridge corporate policy. Project team should continue to ensure that focus of variance analysis remains against baseline budget, while monthly forecast is a cash flow / trending tool.
	Financial Management	TeamWork tool is being replaced with new ECOSYS tool	If possible, avoid a system implementation mid-project to minimize disruption to project reporting and loss of focus of management team
	Financial Management / Asset Management	Allocation of costs between portions of asset used as distribution versus transmission	Allocation methodology to be established based on corporate standards and to be implemented by corporate team

	Process Control Category	Issues Identified Through Interview Process	Gap Assessment / Comments[1]
Procurement Management	Procurement	Risk of delays of material deliveries to Facility Contractors	Monitor delivery timelines and compliance with technical specifications
	Procurement	Risk of delays in new 42" pipe order from Germany	Monitor delivery timelines and compliance with technical specifications

1. Comments have been provided for management consideration, but do not necessarily constitute an immediate gap or actionable item.

Project Management Team Interview Assessment [continued]

Project Controls, Quality and Risk Management

Process Control Category	Issues Identified Through Interview Process	Gap Assessment / Comments[1]
Project Scope Management	Introduce concept of Project Change Notice (PCN) and differentiate to the Change Order (CO) to avoid confusion; shifts of budget from one item to another (no scope change) should be recognized as a PCN as opposed to a CO	Project Controls team is aware of the difference and has tools / processes to capture these differences; however the Enbridge GTA PMP (Project Management Plan) does not provide detail / reference to support documents with respect to PCN versus CO definitions and treatments
Project Scope Management	Change process in PMP mentions "small" changes can be approved in the field, but the scope of these changes and approval authority required is not clearly defined	**Gap:** Revise project controls section of the PMP and the DOA for greater project specific detail and clarity in the language
Risk Management	Four HDD drills planned to start by the third week of January 2015 Enbridge has taken geological (ground conditions) risk on board; borehole grid is considered adequate by project team to minimize this risk (ground conditions are well represented in design documents, and design definition is stated as 90% complete)	Significant risks such as weather and geological risk are incorporated directly in the base estimate, as per Enbridge corporate policy and the centralized parametric modelling of contingency from the risk register **Gap:** Leading practice would suggest that two of the largest risks to the project should not be 'expired' before they could materialize, as creates the possibility that mitigation of the risk impacts could get overlooked through project execution. This could be more of a corporate process terminology issue, as opposed to an item that could be actioned by the project team.
Risk Management	Lack of recent experience with major pipeline projects in the GTA's urban environment could entail "learning curve" costs, lower than expected outputs, and delays to the schedule	**Gap:** Scenario planning: consider the schedule (and overhead cost) impact of potentially lower outputs that can realistically be achieved in the GTA environment
Risk Management	Shared perception by management team that the timing of permitting is the largest risk to the project and could effect access and impact the construction schedule – only 20% of permits are currently in place	Awareness of risk means that proactive solutions and advance negotiations with contractors can happen; cost impact of this risk could be greater than what is currently stated in the risk register
Risk Management	Delays in obtaining locates	Potential schedule delays need to be monitored
Information Management	Document control system based on physical (paper) documents	**Gap:** Improve info management systems by scanning all documents and consider using an electronic document control system/tool; best in class

1. Comments have been provided for management consideration, but do not necessarily constitute an immediate gap or actionable item.

Project Management Team Interview Assessment [continued]

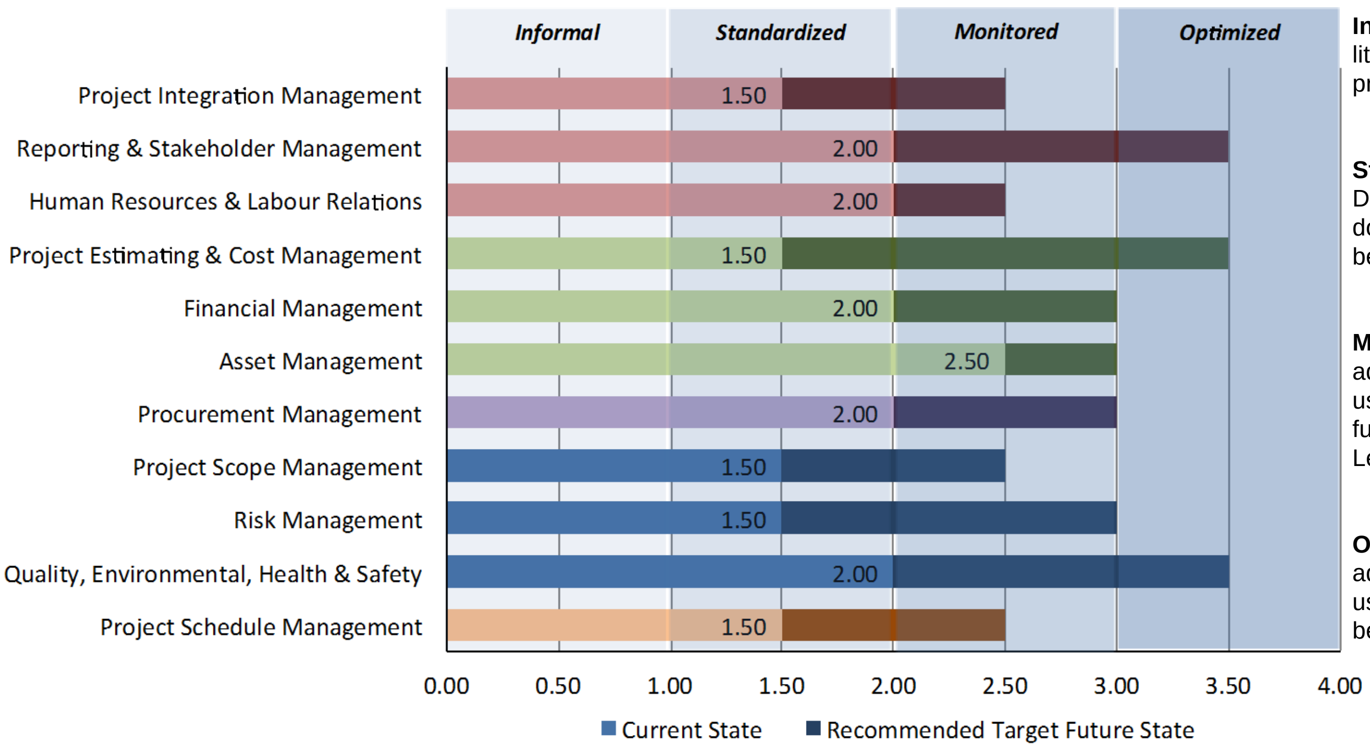
	Process Control Category	Issues Identified Through Interview Process	Gap Assessment / Comments[1]
Schedule Management	Project Schedule Management	Resource loaded schedules are not yet available from contractors	Although these schedules have already been analyzed by the Enbridge corporate PMO, the loaded schedules should be verified and tested for robustness again, or by an independent third party
	Project Schedule Management	Late permits might affect sequencing of works and result in out of sequence work for contractors	Schedule delays or revisions resulting in cost overruns and claims
	Project Schedule Management	Engineering delays due to contractor approval process and re-work for quality; Project schedule can be impacted due to late delivery of technical specifications or incorrect initial engineering estimates	Ensure all work is verified by internal engineering expertise; manage engineers process and ensure "A team" is made available; monitor billings and ensure cost recovery for re-work

1. Comments have been provided for management consideration, but do not necessarily constitute an immediate gap or actionable item.

Findings

Process Control Category Maturity Assessment

KPMG has assessed the maturity level of each process control category specific to the GTA Project based on current state documents and interviews *(lighter colour bar)*, and scored it relative to the project's recommended target future state *(darker colour bar)* based on the relative significance of each process control to the delivery of a successful project



Informal (0 to 1.0) - Not fully developed, little or no documentation or formalized procedure exists.

Standardized (above 1.0 to 2.0) - Developed and appears adequately documented but appears to function at or below Leading Practices.

Monitored (above 2.0 to 3.0) - Developed, adequately documented for standardized use across the organization and appears to function appropriately when compared to Leading Practices.

Optimized (above 3.0) – Developed, adequately documented for standardized use across the organization and appears to be a Leading Practice.

Based on these initial ratings, incremental improvement opportunities have been identified as priority targets for implimentation and monitoring over the course of the project

Incremental Improvement Opportunities

As a result of KPMG's review of key process control documents and interviews with members of the project management team, our assessment of project risk and areas for improvement can be categorized into four major focus areas for the GTA Project:

1. **Project Organization and Administration**
   - *Delivering the project in a coordinated and effective manner*

2. **Cost Management**
   - *Delivering the project on budget*

3. **Technical Quality and Risk Management**
   - *Delivering the project to specification*

4. **Schedule Management** (including **Procurement** impact on schedule)
   - *Delivering the project on time*

When considering whether to implement any of the opportunities outlined in this "Findings" section, Enbridge should also reference the context for the opportunity as described in the previous "Assessment" section.

Priority Target Category #1 – Project Strategy, Organization & Administration

Project Organization and Administration

The ability to deliver the project efficiently in a well organized and coordinated manner

Priority Target	Implementation Opportunity
1. Detailed Role Clarification	- Revise roles and responsibilities document to improve a more granular level of employee detail, particularly with respect to field level employees
2. Clear Reporting Lines & Approvals	- Revise DOA to include approval lines for all documents and decision making processes expected to occur on the project
3. Resource Needs Assessment	- Develop a resource and skills requirement schedule to ensure the necessary resources are being obtained in a timely manner to advance various phases of the project
4. Team Building	- Conduct an all staff workshop or team building exercise to establish relationships and facilitate communication and information sharing across functions and between employees and contractors
5. Delegation of Estimate Accountability	- Advance the decision on how the budget will be allocated and provide to the responsible owners to ensure they are part of the planning process and develop early buy-in and accountability

Priority Target Category #2 – Cost and Financial Management

Cost Management

The ability to controls spend to deliver the project in line with baseline estimates

Priority Target	Implementation Opportunity
6. Contractor Cost Overruns	- Define KPI's to be used to evaluate project performance against incurred cost - Establish strict procedures to monitor and approve UPI claims
7. Cost Allocations	- Develop a methodology to determine capital allocation between transmission and distribution assets - Review overhead cost allocation (versus direct billing) to ensure costs are being properly assigned to the project
8. Variance Analysis Baseline	- Expand root cause analysis for variance explanations - Control budget should be basis to measure variance - Define the purpose and use of original budget, project control baseline, and monthly forecasts
9. Financial Systems	- If possible, refrain from any system implementations mid-project - For TeamWork to ECOSYS conversion, develop project specific implementation plan and ensure adequate test environment is completed before project go-live

Priority Target Category #3 – Project Controls, Quality & Risk Management

Technical Quality and Risk Management

The ability to deliver a high quality, risk mitigated project

Priority Target	Implementation Opportunity
10. Project Experience	- Supplement lack of similar urban project experience and standards with external or contracted industry experts for guidance and to conduct lessons learned session
11. Quality Monitoring Resources	- Vendor quality management is currently under the procurement function and does not formally report into quality management - For independence and assurance in quality management, the quality monitoring of materials should reside directly under the quality management function

Priority Target Category #4 – Schedule Management

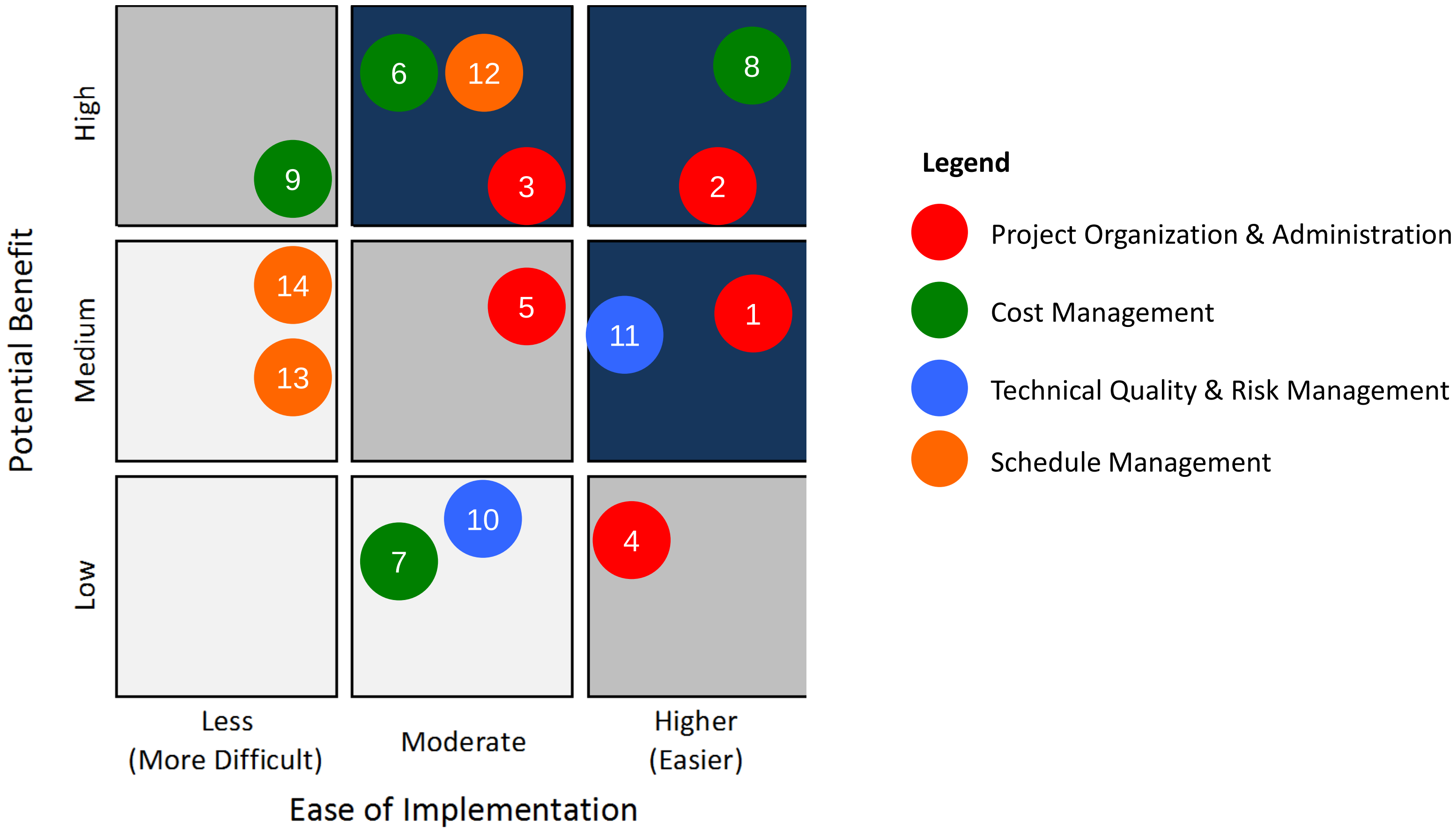
Schedule Management

The ability to manage the schedule to deliver the project within the planned timelines

Priority Target	Implementation Opportunity
12. Detailed Baseline Schedule	- Develop detailed resource loaded schedule; assess against current schedule and used as the baseline to monitor progress performance
13. Materials Delivery	- Establish material management process with key pipeline and facilities suppliers to ensure regular updates and inspections are conducted to manage timing of deliveries and potential impact on schedule
14. Permiting	- Develop a permit requirement schedule linked to the resource loaded schedule to be regularly monitored against construction progress to ensure permits are obtained in a time appropriate manner - Advanced scenario planning can be performed for early identification of points of schedule flexibility that could be used to accommodate permitting delays

Process Control Improvement Opportunities

Based on our assessment of the improvement opportunities for each process control category, we have prioritized each opportunity by ‘Potential Benefit vs. Ease of Implementation’ and categorized them by work area to facilitate the implementation process



Implementation Plan (Future Phase)

The roadmap presented below represents an initial plan to implement the improvement opportunities based on their priority and relevance to the particular stage of the project

The selection and allocation of recommendations into each phase will be further refined in close consultation with the key project stakeholders

KPMG

cutting through complexity

KPMG CONFIDENTIAL

ENBRIDGE GAS INC.

Answer to Interrogatory from
Ontario Energy Board Staff (STAFF)

Interrogatory

Reference:

Exhibit 1, Tab 13, Schedule 3, pp. 1-7

Question(s):

Enbridge Gas has requested approval of a new deferral account as part of this application for the enhanced Distribution Integrity Management Program (DIMP), to record general administrative costs, as well as operating and maintenance and ongoing integrity inspection-related costs incurred to implement and execute the enhanced DIMP. Enbridge Gas noted that the program will enable Enbridge Gas to assess the condition of certain distribution assets that are approaching end of life, which allows for appropriate action to be taken, whether that is maintenance work or replacement of the pipe. The enhanced DIMP responds to the OEB's Decision in the St. Laurent Ottawa North Replacement Project (EB-2020-0293) and is above and beyond the requirements set out in code as well as industry best practices. As such, the costs for enhanced DIMP are all incremental to the amounts included in the revenue requirement for the 2024 Test Year forecast. Enbridge Gas anticipates the costs of the program to be $10 million on an annual basis.

a) Please explain why an incremental cost of $10 million for the enhanced DIMP cannot be accommodated within the OM&A budget.

b) Please confirm if an Integrity Management Program for distribution assets is part of the AMP. Please also provide the estimated annual budget for the Integrity Management Program.

c) Enbridge Gas has noted that enhanced DIMP initiatives are above and beyond the requirements set out in code as well as industry best practices and therefore the costs are incremental to the amounts included in the 2024 revenue requirement. Please provide any expenditures (capital or operating) that is included in the 2024 revenue requirement or the AMP and is for initiatives that go beyond codes or industry best practices.

Response:

a) Enbridge Gas received the OEB's Decision in the St. Laurent Ottawa North Replacement Project Decision on May 3, 2022[1]. It was in this Decision that:

> The OEB urges Enbridge Gas to thoroughly examine other alternatives such as the development and implementation of an in-line inspection and maintenance program using available modern technology, and to propose appropriate action based on its findings as part of its next rebasing application.

When this Decision was received, the internal process required to develop the 2024 Test Year forecast was well underway. Enbridge Gas didn't have the requisite time to thoroughly examine other alternatives requested by the OEB and incorporate the forecasted program costs into the OM&A budget for this Application, and therefore, the costs were not included. Additionally, there could be variability in spending associated with this program given that the Enhanced DIMP is a new program and the tight timeframe to plan. Enbridge Gas, therefore, has proposed to record all general administrative costs, as well as O&M and ongoing integrity inspection-related costs to implement and execute the Enhanced DIMP, in the requested deferral account.

b) Yes, the Distribution Integrity Management Program (DIMP) is currently part of the AMP and the DIMP 2023 budget is $2.38 million.

c) To maintain the safety and reliability of its complex and evolving asset network, Enbridge Gas executes activities in accordance with its standards and procedures, which can exceed minimum code requirements. Such work is not tracked separately in budget portfolios.

[1] EB-2020-0293, OEB Decision and Order, May 3, 2022, pp3, 23.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 13, Schedule 1

Preamble:

On page 3, EGI evidence states: *Enbridge Gas is proposing to introduce an Enhanced DIMP to improve the understanding of the condition of distribution pipeline assets. This program would ensure that Enbridge Gas has the ability to thoroughly assess the condition of these assets to allow appropriate action to be taken, whether that is maintenance work or replacement of the pipeline.*

We would like to understand better EGI's proposal to establish an Enhanced Distribution Integrity Management Program.

Question(s):

Please confirm that EGI is required to have a Distribution Integrity Management Program as required by the Technical Standards and Safety Authority (TSSA)

a) Please file the TSSA's Pipeline Compliance Standard Summary Checklist-Pipeline Owners and Operators.

b) Please file the CSA Z662 Annex N.

c) Please confirm that the CSA Z662 and the TSSA regulations define minimum standards.

Response:

Confirmed. Please see response at Exhibit I.9.1-VECC-73 part d).

a) The requested document is available on the TSSA website.[1]

b) The CSA Z662 code is available on the CSA website (https://www.csagroup.org/) for purchase.

c) Confirmed.

The CSA Z662-19, Clause 1.4 indicates that “this Standard is intended to establish essential requirements and minimum standards for the design, construction, operation, pipeline system management, and abandonment of oil and gas industry pipeline systems.”

The TSSA Oil and Gas Pipeline Systems Code Adoption Document Amendment (FS-253-20) with publication date of December 8, 2020, indicates the adoption of the CSA Z662-19, and therefore, adopts these minimum standards.

[1]Pipeline Compliance Standard Summary Checklist Pipeline Owners and Operators, Pipeline Compliance Standards Summary Checklist (tssa.org).

ENBRIDGE GAS INC.

Answer to Interrogatory from
Federation of Rental-housing Providers of Ontario (FRPO)

Interrogatory

Reference:

Ex. 1, Tab 13, Schedule 1

Preamble:

On page 4, EGI evidence states: *As part of the Enhanced DIMP, Enbridge Gas has identified a sub-set of the DIMP pipelines that could benefit from a more extensive condition monitoring program. Given available monitoring technique limitations as well as the cost/benefit assumptions, the recommendation is to include distribution pipeline assets in the Enhanced DIMP that are:*

a) Operating at pressures above 700 kPa;
b) NPS 6 or greater;
c) Over 1 km in length; and
d) Greater than 50 years old.

Question(s):

Please confirm that establishing standards that are above minimum Code standards is within the discretion of the gas utility.

a) Using the filed documents from the TSSA and CSA code, please identify where the utility did not previously have the discretion to apply a more extensive condition monitoring program prior to the St. Laurent decision.

b) Given that the TSSA and CSA code expect that condition monitoring to ensure safe and reliable operation is a core responsibility of the utility, please explain why EGI requires the proposed deferral account to invest the appropriate level of resources to this core responsibility.

Response:

Confirmed. Enbridge Gas is accountable for the integrity and reliability of its assets and therefore has the discretion to exceed minimum Code requirements when needed.

a) Please see response above and please see response at Exhibit I.1.13-FRPO-27.

b) Please see response at Exhibit I.1.13-IGUA-3 part b).

ENBRIDGE GAS INC.

Answer to Interrogatory from
Industrial Gas Users Association (IGUA)

Interrogatory

Reference:

Exhibit 1, Tab 13, Schedule 3

Preamble:

At page 1, paragraph 2, EGI explains that its proposed Enhanced Distribution Integrity Management Program (Enhanced DIMP) is in response to the OEB's Decision in the St. Laurent Ottawa North Replacement Project application (EB-2020-0293). The full quote from the decision part of which is cited by EGI at paragraph 2 is as follows (emphasis added to the portion of paragraph not cited by EGI in its evidence in this application):

> *For the reasons provided in this Decision and Order, the OEB denies Enbridge Gas's leave to construct application. The OEB finds that the need for the Project and the alternatives to the Project have not been appropriately assessed. Enbridge Gas has not demonstrated that the pipeline integrity is compromised, and that pipeline replacement is required at this time. The OEB urges Enbridge Gas to thoroughly examine other alternatives such as the development and implementation of an in-line inspection and maintenance program using available modern technology, and propose appropriate action based on its finding as part of its next rebasing application.*

At page 6, paragraphs 18-20 of the referenced evidence EGI explains that $10 million in forecast annual costs of the Enhanced DIMP are not included in forecast 2024 rates and are proposed to be recorded for recovery through a new proposed deferral account.

Question(s):

a) Why did EGI not include the forecast costs of the Enhanced DIMP in forecast 2024 rates, like all other integrity management costs?

b) The direction cited by EGI in support of its proposed Enhanced DIMP was St. Laurent pipeline specific. Are there other statements made by the Hearing Panel in the St. Laurent case which EGI relies on in advancing its Enhanced DIMP proposal?

c) EGI asserts that the Enhanced DIMP "responds to the OEB's Decision in the St. Laurent Ottawa North Replacement Project Decision, and is above and beyond the requirements set out in the code as well as industry best practices". (Page 6, paragraph 13 of the cited evidence.) Does EGI believe that the Enhanced DIMP is necessary (apart from the direction that EGI says the OEB provided)?

Response:

a) Please see response at Exhibit I.1.13-STAFF-41 part a).

b) The OEB provided its direction as part of the St. Laurent Ottawa North Replacement Project Decision[1]. It was in this Decision that:

> The OEB urges Enbridge Gas to thoroughly examine other alternatives such as the development and implementation of an in-line inspection and maintenance program using available modern technology, and to propose appropriate action based on its findings as part of its next rebasing application.

Enbridge Gas's system encompasses distribution assets with analogous parameters to the St. Laurent Pipeline (e.g., vintage, pressure). Based on the St. Laurent OEB Decision[2], it is Enbridge Gas's belief that the OEB will require a similar level of evidence quantification and analyses for pipelines with parameters similar to the St. Laurent Pipeline going forward.

c) Yes, Enbridge Gas believes the Enhanced DIMP is necessary. While the St. Laurent Decision was the predominant driver to initiate the Enhanced DIMP, there are other drivers and benefits, as provided at Exhibit 1, Tab 13, Schedule 3, paragraphs 15 to 17 and Exhibit I.1.13-SEC-95 part a).

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[1] EB-2020-0293, OEB Decision and Order, May 3, 2022, pp3, 23.
[2] Ibid.

ENBRIDGE GAS INC.

Answer to Interrogatory from
London Property Management Association (LPMA)

Interrogatory

Reference:

Exhibit 1, Tab 13, Sch. 2

Question(s):

With respect to materials and supplies inventory on page 5, the evidence describes the current methodology to allocate to unregulated storage for Union and further indicates that there is no allocation to unregulated storage for EGD. Table 2 shows a reduction in material and supplies inventory to unregulated storage of $0.7 million based on the proposed harmonized methodology. Table 1 indicates that this modified Union methodology was not included in the unregulated storage allocation study.

a) Please explain why the modified Union methodology associated with materials and supplies inventory was not included in the unregulated storage allocation study.

b) Please provide the absolute value of the materials and supplies inventory allocated to unregulated storage under both the current Union methodology and the proposed modified Union methodology.

c) Please explain why using unregulated O&M expenses relative to total O&M expenses is appropriate for allocating a component of rate base.

Response:

a-c) This evidence will be addressed in Phase 2 of the proceeding as noted in Enbridge Gas's February 1, 2023 letter.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-13-3; 9-1-3

Question(s):

With respect to the Enhanced Distribution Integrity Management Program (DIMP):

a) [p.4] Please detail the "available monitoring technique limitations as well as the cost/benefit assumptions" that led to the referenced criteria for pipelines to include as part of the Enhanced DIMP.

b) [p.3] Please detail the capital spending and specific capital projects set out in the AMP that meet the Enhanced DIMP criteria.

c) [p.6] If Enbridge is able to estimate the cost of the program ($10M a year), please explain why the costs are not included in the 2024 budget.

d) [p.6] Please explain the basis for the cost forecast.

e) If Enbridge defers capital work because of the Enhanced DIMP, will the revenue requirement impact be included in the proposed Enhanced DIMP Deferral Account? If not, please explain why not.

Response:

a) Of the over 140,000 kilometres of distribution piping in the Enbridge Gas distribution system, a small portion is comprised of larger diameter, higher pressure steel pipelines that function as key distribution pipelines or networks. Historically, this cohort of distribution pipelines was maintained and managed through the same standards and criteria applied to the broader distribution steel pipeline asset category. Following the outcome of the St. Laurent Application[1], and given Energy Transition, aging assets and the new Integrated Resource Planning framework requirements, Enbridge Gas has initiated an Enhanced Distribution Integrity

[1] EB-2020-0293.

Management Program (DIMP) to carry out additional assessments, focus on improving the understanding of condition and risk for these pipelines through targeted inspections and mitigation actions. This also follows the continuous improvement process for the Integrity Programs with the goals of sustaining safe and reliable operations of these critical assets balanced with the capital and operating costs. Resulting data from the Enhanced DIMP will be the basis for the development of appropriate maintenance and replacement strategies for these pipelines.

Regarding the cost/benefits, as provided at Exhibit 1, Tab 13, Schedule 3, the goal of the Enhanced DIMP is to provide a substantive rigorous review of the condition of the Enhanced DIMP pipelines and to identify specific areas that could benefit from proactive mitigation projects. This program allows appropriate actions to be taken which may extend the life of the asset, maintenance or replacement work, potentially delaying or avoiding costly and time-consuming pipeline replacement projects.

Available monitoring techniques include corrosion protection surveys, Depth of Cover Surveys, investigative digs with Non-destructive examination, guided-wave technology, External Corrosion Direct Assessments (ECDA) which are comprised of a Direct Current Voltage Gradient (DCVG) and a Close Interval Survey (CIL), and In-Line-Inspections, etc. From a cost/benefit and feasibility perspective, corrosion protection surveys, ECDA surveys as well as opportunistic digs (digs that are being done for another purpose which can be also used to collect non-destructive examination data) are most recommended: ECDA is a survey that can be done using equipment above ground and it collects data on the condition of the pipe coating and potential pipeline corrosion which are the top two condition concerns (third-party damage and external corrosion) on a steel pipeline. ECDA is an accepted method for gathering data on transmission pipelines and it also provides depth of cover data as part of the survey which helps understand the potential concerns of third-party damage further.

Other more invasive surveys such as In-Line-Inspection or investigative digs have high costs and there are limitations to their benefits and therefore should be only considered once the more cost-effective, higher benefit methods have been used and determined to be lacking specific data required. Details of their limitations are as follows:

Distribution pipeline systems have design and location constraints that limit the ability to In-Line-Inspect (ILI). These constraints include:

- lower operating pressures that prevent the use of traditional free swimming In Line Inspection (ILI) tools;

- presence of plug valves and fittings that prevent the ILI tools from traversing through those sections; and

- the absence of launcher fittings.

Therefore, inspections require excavations and/or hot work that can be restrictive or impractical in built-up urban environments and may require self-propelling ILI tools, which have their own limitations. For example, these self-propelled ILI tools are not for all pipeline diameters, cannot clean the pipeline (this limits the use and the quality of the data), have limited battery life (range is impacted) and do not capture all the types of data a free-swimming ILI could capture (the technology is limited).

Based upon the above, ILI may not be the best solution for a typical application; therefore, the other above examples are additional potential monitoring techniques that could be leveraged on DIMP pipelines.

More generally, Enbridge Gas will have to choose the appropriate inspection technology or solution for each Enhanced DIMP pipeline, depending on assessments of the specific situation. Depending on the location of the pipeline system, some surveys can be difficult to complete and may have limited capabilities: DCVG/CIL as an example requires contact with soil so in developed areas with asphalt/concrete, holes must be drilled though the hard surface frequently to get readings which is an invasive, labour-intensive, time-consuming and expensive process. Digging holes to complete non-destructive examination (NDE) can also be very expensive and time-consuming and only provides data for a small section of the pipeline system. These holes can also be very disruptive to the public, depending on the required location as they may close roads or disrupt traffic patterns for days or weeks.

b) The following are the distribution pipelines listed for replacement in the AMP that meet Enhanced DIMP criteria provided at Exhibit 1, Tab 13, Schedule 3[2]:

- Wilson Avenue
- Martin Grove
- St. Laurent Pipeline
- Port Stanley

The capital spending for each of these distribution pipelines is provided at:

- Exhibit 2 Tab 6 Schedule 2 Appendix A, page 11 for Wilson Avenue;
- Exhibit 2 Tab 6 Schedule 2 Appendix A, page 13 for Martin Grove Phase 2;
- Exhibit 2 Tab 6 Schedule 2 Appendix A, page 14 for St Laurent Phase 3;

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[2] The criteria and potential methodologies are preliminary and may be refined as the Enhanced DIMP program is developed and evolves.

- Exhibit 2 Tab 6 Schedule 2 Appendix A, page 15 for St Laurent Phase 4; and
- Exhibit 2 Tab 6 Schedule 2 Appendix A, page 17 for Port Stanley.

Enbridge Gas will leverage the DIMP risk model to identify more pipelines to add to the Enhanced DIMP Program which could lead to the benefits described in part a).

c) Please see response at Exhibit I.1.13-STAFF-41 part a).

d) The cost forecast is estimated to be approximately $10 million a year. This estimate assumes that, at a preliminary level, each distribution pipeline will require between $0.75 million to $3 million to complete a targeted inspection plan, depending on the type and scope of inspection, and the number of integrity digs completed. The forecast of $10 million a year would facilitate inspections for a reasonable number of pipelines per year for targeted inspections. It would also allow the refinement and development of appropriate maintenance and replacement strategies for these pipelines in the longer term. As Enbridge Gas begins the Enhanced DIMP and learns from its results, Enbridge Gas will refine the scope, parameters, methodology, resourcing and costing accordingly.

e) Enbridge Gas is not proposing to record revenue requirement impacts in the proposed Enhanced DIMP Deferral Account. The proposed account is intended to record the general administrative costs, as well as operating and maintenance and ongoing integrity inspection-related costs incurred to implement and execute the Enhanced DIMP. As such, the Company is not proposing to recover any direct results of deferred capital work through the deferral account.

   Enbridge Gas intends to re-prioritize and re-optimize the investment portfolio biannually. In an instance where a pipe can be repaired, it could result in higher operating and maintenance costs and lower capital costs, but it is expected that the capital costs could be used for other high priority requirements, or to offset capital pressures elsewhere. There could be a case where the Enhanced DIMP reveals a replacement is required earlier than planned, and this would have the opposite result. Tracking the puts and takes of this in the deferral account would be very difficult and very iterative.

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-14-4, p.2

Question(s):

Please advise whether as part of the current Application Enbridge is seeking an order of the OEB amending the settlement agreements referred to and, if so, in what respects.

Response:

Enbridge Gas is not requesting any amendment to prior Open Bill settlement agreements. The most recent settlement agreement sets the financial terms of the operation of the Open Bill Program until the earlier of: (i) December 31, 2023 (which is the last day of Enbridge Gas's deferred rebasing period); or (ii) an OEB decision in any earlier application by Enbridge Gas to expand the OBA Program into the Union Gas service area.[1] The settlement agreements contemplate that Enbridge Gas would make an application as part of the rebasing proceeding to indicate/propose and seek approval for the terms of any continuation of the Open Bill Program.

In this Rebasing proceeding, Enbridge Gas is requesting the following:

1. Approval for the continued application of the determination of net revenues for the OBA Program to be in place from January 1, 2024, to October 31, 2024.

2. Approval for all of the net revenue for 10 months from January 1, 2024, to October 31, 2024 (determined as set out above) to be tracked in a separate deferral account.

3. Approval of a new Open Bill Extension Deferral Account as part of this Application, to record 10-month net revenues in 2024 for disposition to ratepayers.

[1] EB-2018-0319, Supplementary Partial Settlement Proposal, October 23, 2019, p.6.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Ontario Energy Board Staff (STAFF)

Interrogatory

Reference:

Exhibit 1, Tab 14, Schedule 2, pp. 1-9

Question(s):

Enbridge Gas has requested approval to continue the Natural Gas Vehicle (NGV) program as a utility activity and expand the current NGV program for the EGD rate zone to all Enbridge Gas franchise areas. In its evidence, Enbridge Gas notes that although the NGV market has been in place and active for many years, the market has been slow to develop.

a) Please provide Enbridge Gas's view on recent innovation in electric vehicles and battery technology for medium and heavy-duty commercial vehicles.

b) Does Enbridge Gas see a diminishing role of NGV in the next five years due to electrification of commercial and fleet vehicles?

Response:

a) There have been significant advancements in all alternative fuel technologies (NGV, hydrogen fuel cell, hydrogen combustion, battery electric) in medium and heavy-duty commercial vehicles. However, Enbridge Gas believes that medium and heavy-duty battery electric technologies currently have limited feasibility.

   Battery electric vehicles currently have a high capital cost, are significantly heavier, have long recharging times, have a limited range, lack refueling station infrastructure, and are negatively impacted by weather and cold temperatures.

b) Enbridge Gas sees an increasing role in NGVs in the next ten years. The transportation sector is one of the largest emitters of GHG emissions, and there is an impetus to decarbonize the sector. Fleets require technologies that are suitable to their specific set of conditions and needs. They must consider technology readiness, range, weight, refueling time, related infrastructure and the location of this infrastructure. It will take multiple technologies to decarbonize medium and heavy-duty transportation.

As provided at Exhibit 1, Tab 10, Schedule 6, page 28, Enbridge Gas considers NGV for heavy duty trucks and public transportation vehicles a safe bet action that can drive immediate and significant GHG reductions. With the federal Clean Fuel Regulation credits, Natural Resources Canada Green Freight program funding, and increased RNG supply, NGVs provide an opportunity to rapidly and cost effectively decarbonize the medium and heavy-duty transportation sector.

Examples of actions being taken in the sector that support the viability of NGV over the next five years include Amazon and Cummins.

Amazon has ordered over a thousand[1] Classes 6 through 8 NGV trucks, choosing natural gas vehicles because they would not buy diesel trucks and could not buy electric trucks now or in a reasonable timeframe[2]. Many other fleets[3] have chosen NGVs as the only available non-diesel heavy-duty truck that outperforms other alternative technologies in all aspects of vehicle operation.

To support NGV markets, Cummins[4] is growing its worldwide natural gas engine division to fulfill the demands for immediate diesel alternatives worldwide. They also are bringing forward a new heavy-duty 15L natural gas engine that provides the power and performance of diesel, and that is 500 pounds lighter and more efficient. This new engine provides for a full line of diesel equivalent medium and heavy-duty natural gas engines.

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[1] Fox Business. (2021, February 5). Amazon orders more than 1,000 natgas-powered engines for U.S. fleet. https://www.foxbusiness.com/economy/amazon-orders-more-than-1000-natgas-powered-engines-for-u-s-fleet

[2] Transport Drive. (2021, July 6). Amazon, UPS say hydrogen is further down the road than battery-electric. https://www.transportdive.com/news/Amazon-UPS-hydrogen-battery-electric-trucks-emissions-EVs/602581/#:~:text=Amazon%20has%20ordered%20100%2C000%20electric%20delivery%20vehicles%20and,of%20all%20shipments%20with%20net-zero%20carbon%20by%202030.

[3] Including UPS, PepsiCo, WM, Republic Services, Piedmont Natural Gas, City of Raleigh, Los Angeles World Airports Buses, City of Los Angeles, City of Fresno Transit, LA Metro Transit, New York's Hunts Point fleet Industries, and Denver International Airport Buses.

[4] Cummins. (2021, October 14). Moving Heavy-Duty Trucking Down the Path to Zero Emissions. https://www.cummins.com/news/releases/2021/10/14/moving-heavy-duty-trucking-down-path-zero-emissions

ENBRIDGE GAS INC.

Answer to Interrogatory from
Ontario Energy Board Staff (STAFF)

Interrogatory

Reference:

Exhibit 1, Tab 14, Schedule 2, pp. 10-13

Question(s):

In the current application, Enbridge Gas has requested approval to modify the current regulatory treatment of the NGV Program to remove the need for revenue imputation, such that the program is funded solely by the monthly service rates charged to participating customers over the life of the program. Under the current NGV program, if the program's annual rate of return (RoR) does not meet or exceed the RoR, revenue is imputed to bring the program's RoR up to the required level. In order to ensure that there is no subsidy from ratepayers, Enbridge Gas has proposed that the final NGV service charge included in the NGV customer's contract will be on a fully allocated basis and will be updated at the time the project is completed. Enbridge Gas further noted that it will file a report as part of its next rebasing proceeding.

a) Please confirm that if the program is unable to meet the RoR, Enbridge Gas's non-participating customers will subsidize the NGV program under Enbridge Gas's proposal.

b) Please explain why the NGV program should be considered a utility activity.

c) Please clarify if an NGV customer has the option to exit the contract before term and whether the term of the contract is set in a manner to recover the entire cost of the project.

d) Enbridge Gas has proposed to file a NGV report as part of its next rebasing application. If Enbridge Gas's rate framework proposal is approved, the next rebasing application will be for 2029 rates. Would Enbridge Gas consider filing a NGV report mid-term (in 2026) in order to assess the performance of the NGV program under the proposed framework?

Response:

a) Consistent with the regulatory treatment of all other utility assets, if the NGV Program cannot meet the rate of return in a particular year, non-participating customers may subsidize the NGV Program in that year. Similarly, consistent with other utility assets, if the NGV Program exceeds the rate of return in a particular year, non-participating customers will benefit from the NGV Program in that year.

   Setting the rates for NGV Program services using the E.B.O 188 Profitability Index formula ensures that rates charged will recover NGV Program costs and return over the life of these contracts. Subsidization is not likely to occur as the NGV Program customer revenues are secure, in that the NGV Program customers are bound to the terms of contracts that ensure revenue recovery over the life of these agreements.

b) As provided at Exhibit 1, Tab 14, Schedule 2, Enbridge Gas is proposing to continue the NGV Program as a utility activity and expand it to all Enbridge Gas franchise areas.

   Enbridge Gas has operated the NGV Program as a regulated ancillary program since the 1980s. In E.B.R.O 495, the OEB found that the unregulated component of the NGV Program should be treated as an ancillary program subject to fully allocated costing. The OEB's Decision was reaffirmed in E.B.R.O 497.

   The NGV Program continues to be relevant and important for the purposes of maintaining the market and continues to have proven benefits for the gas industry and customers. The need for the NGV Program to be considered a utility activity continues, as there is increasing importance of GHG reduction initiatives, increasing availability of RNG, CFR regulation and implementation of the OEB's IRP Framework..

   The NGV Program differs from other unregulated activities conducted within or outside the utility because there is no fully functioning competitive market for turnkey NGV solutions. Enbridge Gas is concerned that if the OEB were to deny the requested regulatory treatment for the NGV Program, the market would receive this as a negative signal about the importance of Enbridge Gas's role as a facilitator to continue stimulating and growing the market.

   Beyond what has already been stated in the Company's evidence, further reasoning as to why the Company's NGV Program should be operated as part of its regulated business activities are as follows:

   i. Moving the NGV Program outside the utility now, with its strong connection to IRP alternatives, e.g., CNG tube trailers for peak shaving, seem contrary to the direction the OEB has directed Enbridge Gas to take in the IRP Framework and keeping NGV within regulation is consistent with IRP facilitation.

ii. There are no entities participating in this proceeding that are or are intending to competitively offer services comparable to the NGV services offered by the Company.

iii. Increasing natural gas system throughput spreads the Company's fixed operating costs over larger gas volumes, thereby reducing gas distribution rates for all customers.

iv. The regulation of the Company's NGV Program is consistent with the fifth objective of the OEB as stated in Section 2 of the province's Ontario Energy Board Act: "To promote energy conservation and energy efficiency in accordance with the policies of the Government of Ontario, including having regard to the consumer's economic circumstances."[1]

As noted in item iii., the Company is currently working with a prospective NGV Program customer in the Union rate zone. The customer intends to deploy many NGVs in the coming years and plans to build a new vehicle garage with NGV refuelling facilities. This customer is relying on the Company to deliver a "turnkey program managed by a reliable and trustworthy partner." The customer wants to focus on managing its fleet and seeks to avoid having to undertake the management and delivery of its natural gas fuel supply.

c) If an NGV Program participant decided to exit the contract before the term, they would pay a termination fee. The fee is based upon the aggregate of all internal and external costs, expenses and overheads incurred by Enbridge Gas up to and resulting from the termination, including but not limited to those relating to the site and station design and studies, permitting fees, site preparation, construction, material, equipment, third party parts and components, maintenance, decommissioning, site and station restoration and associated cancellation fees. No NGV Program contracts have been subject to early termination to date.

d) Yes, Enbridge Gas would consider filing a mid-term NGV report in 2026.

[1] Ontario Energy Board Act, 1998, S.O. 1998, Chapter 15, Schedule B
https://www.energy.gov/sites/prod/files/2015/06/f22/OEBA1998.pdf

ENBRIDGE GAS INC.

Answer to Interrogatory from
Consumers Council of Canada (CCC)

Interrogatory

Reference:

Ex. 1/T4/S2/p. 1

Question(s):

EGI is proposing to continue its Natural Gas Vehicle Program as a utility activity, expand the current program to all EGI franchise areas, and remove the requirement to impute revenue in any fiscal year that the NGV Program' annual rate of return does not meet or exceed the required rate of return:

a) Please provide a complete description of the current NGV Program;

b) EGI assists in the conversion of vehicles to natural gas, which provides customers with turnkey NGV solutions that help customers reduce operating costs and their environmental footprints. Do these customers pay for the services provided by EGI in this context?;

c) Why did Union Gas exit the NGV Program?;

d) Is EGI aware of any jurisdictions other than BC that have expanding NGV Programs?;

e) How has the annual rate of return been established for the NGV Program?;

f) Please confirm that EG's non-participating ratepayers have not benefitted from the NGV program;

g) Please provide the capital and O&M costs of the program included in the 2024 revenue requirement;

h) Please explain how the $5 million in revenue for 2024 was derived?

Response:

a) Please see Exhibit 1, Tab 14, Schedule 2, Section 1 for a description of the NGV Program.

b) As provided at Exhibit 1, Tab 14, Schedule 2, pages 9-10, costs incurred for the NGV Program are recovered from the customers taking the NGV service.

c) Union discontinued NGV operations in the early 2000s due to declining revenues in its NGV Program.

d) Outside of British Columbia, the Company is not aware of other Canadian jurisdictions offering an expanded NGV Program.

e) The requirement to determine an annual rate of return (RoR) for the NGV Program was established in EGD's 2000 Rate Application[1]. The RoR calculation is consistent with the method used in determining Enbridge Gas's utility rate of return.

f) Not confirmed. In years where the actual rate of return for the NGV Program has exceeded Enbridge Gas's annual utility required rate of return threshold, non-participating ratepayers have benefited. During these periods, the program generated net income in excess of the Utility's allowed return on equity. Such amounts were included in Enbridge Gas's utility income results and shared with non-participating ratepayers, subject to the Earnings Sharing Mechanism in place for the respective periods. As evident in Exhibit 1, Tab 14, Schedule 2, Attachment 1, the NGV Program has been in a sufficient position annually since 2015.

g) The 2024 capital additions forecast for the NGV Program included in 2024 revenue requirement is $7.6 million. The O&M cost for the NGV Program in 2024 is $1.0 million. For clarity, the O&M cost is inclusive of third party NGV maintenance costs of $0.5 million.

h) The $5 million in revenue for 2024 includes NGV Program rental revenue of $1.9 million, sales-type lease income of $2.4 million, distribution margin of $1.2 million related to the incremental NGV Program volumes and ($0.5) million for third party NGV O&M maintenance costs included in the Gross NGV Program Rental Revenue. Please see Table 1.

[1] RP-1999-0001, Decision with Reasons, December 16, 1999.

Table 1
NGV Program Revenue

Line No.	Revenues:	$ million
1	Gross NGV Program Rental Revenue	1.9
2	NGV Sales -Type Lease Income	2.4
3	Distribution Margin for NGV Program Volume	1.2
4	Third-party NGV maintenance cost recovery in Revenue	(0.5)
5	Total Revenues	5.0

Note:

The O&M cost in 2024 included in Exhibit 1, Tab 14, Schedule 2, Attachment 1, line 2 correspondingly excludes the third-party NGV maintenance cost of $0.5 million

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence (ED)

Interrogatory

Reference:

Exhibit 1, Tab 14, Schedule 2, p. 2

Question(s):

a) Please explain why Compressed Natural Gas (CNG) refuelling facilities, NGV fuel cylinders, Vehicle Refuelling Appliances (VRAs), and CNG tube trailers should be a regulated business, not an unregulated business. Please provide a separate answer for each item.

b) Please explain this sentence on page 5: “RNG, with a cost up to 50% less than diesel fuel, blended into the NGV fuel supply has the opportunity to fully decarbonize the vehicle fuel supply, and depending on the RNG feedstock mix, provides a carbon-negative solution.” What percent RNG blending is being proposed?

c) Please compare the cost of a tank of fuel for a heavy truck at current prices as between (i) fossil gas, (ii) RNG, and (iii) diesel.

d) How confident is Enbridge that heavy trucks will not be electrified in the future? Please estimate a probability.

e) If the demand for this service declines due to improvements in electric batteries, what financial risks are borne by ratepayers? For instance, if by 2035 there is little or no demand for this service, what liability, if any, would be left to non-participating ratepayers?

f) Please provide a table listing each of the components of the NGV program and whether they are rate regulated or competitive in other provinces. Please includes at least Alberta, Quebec, and BC in the comparison.

Response:

a) Please see response at Exhibit I.1.14-STAFF-43 part b).

b) Enbridge Gas is not proposing a specific RNG blend percentage within the NGV Program. With existing NGVs and refuelling infrastructure in Ontario, RNG provides an immediate and cost-effective path to decarbonizing existing assets.

c) The Freight Carriers Association of Canada's most recent fuel price for diesel was $1.843/litre pre-sales tax on December 19, 2022[1] across Canada. The conventional and renewable natural gas fuel price depends on the source of the commodity, whether you are using public versus private stations and potential other variables that we have not researched. Using some Ontario reference points as estimates and assuming $8/GJ natural gas, conventional natural gas could range from $0.55 to $0.85/dLe (diesel litre equivalent). RNG at $25/GJ could range from $1.10 to $1.40/dLe.

d) It is difficult to determine a probability since many variables exist. Fleet adoption of any technology depends upon total cost of ownership, government subsidies, technology readiness, range, weight, refueling time and related infrastructure. Please see response at Exhibit I.1.14-STAFF-42 for a description of why electric vehicles are not the best option for many applications from a cost or operational perspective.

e) Ratepayers are protected by contract and credit vetting as provided at Exhibit 1, Tab 14, Schedule 2, page 12. Please see response at Exhibit I.1.14-STAFF-43, part a) and c).

f) The NGV Program is consistent with what is done in British Columbia for refuelling facilities. However, unlike the Fortis BC Energy Inc. Program, the NGV Program is not subsidized by non-participating ratepayers. Please see Table 1 for NGV activity across Canada. Outside of Ontario and BC, Enbridge Gas is unaware of a regulated offering.

Table 1
Comparison of NGV Programs

NGV Component	Alberta	Quebec	British Columbia
Refuelling facilities	Competitive	Competitive	Regulated
Fuel cylinders	Competitive	Competitive	Competitive
VRAs	Competitive	Competitive	Competitive
Tube trailers	Competitive	Competitive	Competitive

[1] Freight Carriers Association of Canada. The Historical Trend in Canadian Fuel Pricing. https://fcafuel.org/historical-fuel-index/

ENBRIDGE GAS INC.

Answer to Interrogatory from
Pollution Probe (PP)

Interrogatory

Reference:

NGV Program

Question(s):

a) Please provide a current summary of capitalized assets in the NGV Program and indicate which portion serves company (i.e. Enbridge) purposes vs. non-company (i.e. open market) customers.

b) Please provide the most recent net profit (revenues less costs) statement for the NGV Program.

c) Given Enbridge's expressed interest in pivoting to hydrogen over natural gas, please explain why the NGV program should not be phased out in favour of migrating to hydrogen for transport where electric vehicles are not adequate.

d) Please provide any studies, analysis or other related materials Enbridge has on the potential for the NGV Program to become a stranded asset.

Response:

a) Exhibit 1, Tab 14, Schedule 2 pertains to the NGV Program which is currently offered in the EGD rate zone as a regulated ancillary program. The NGV Program does not include company-use NGV assets. Please see Table 1 for a summary of NGV Program assets for customer use, as at December 31, 2022.

Table 1
2022 NGV Program Assets

$ millions	Asset Cost	Accumulated Depreciation	Net Book Value
Customer Use NGV	11.0	3.3	7.7

Note, assets in service commencing in June 2019 are accounted for as sales-type leases; the lease asset balance as of December 31, 2022 is $14.9 million.

b) Please see Table 2 for the most recent net profit statement that pertains to the 2022 NGV Program.

Table 2
2022 Actual Net Profit of the NGV Program

Net Profit ($ millions)	2022 Actual
Total Revenues	3.2
Total Expenses	1.2
Operating Income before Income Taxes	2.0
Net Income after Income Taxes	2.3

c) Fleets select technologies that are suitable to their specific set of conditions and needs. Key considerations are technology readiness, range, weight, refueling time, and related infrastructure. The hydrogen market is still in the initial stages of becoming a practical widescale vehicle fuel across the medium and heavy-duty sectors. There are several market conditions required to advance hydrogen, including:

i. Increased hydrogen production capacity at market-competitive prices is key to increasing adoption.
ii. Sufficient infrastructure is required to store, transport, and dispense hydrogen to market end-users.
iii. New market applications are essential for creating demand and encouraging investment in the production and distribution of hydrogen.

Given these challenges, along with the current higher initial cost of hydrogen fuel cell electric medium and heavy-duty vehicles, it will be five to ten years before hydrogen becomes a significant alternative. The NGV Program is set up for the transition and is well positioned to support the hydrogen market as it progresses further.

d) Enbridge has not conducted any studies or analysis on the potential of the NGV program to become a stranded asset. NGV Program assets are underwritten by long term take-or-pay contracts that ensure the recovery of their fully allocated costs over the life of each contract.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Vulnerable Energy Consumers Coalition (VECC)

Interrogatory

Reference:

Exhibit 1, Tab 14, Schedule 4

Question(s):

What is the net revenue requirement impact of eliminating the OBA program in 2024?

Response:

The net revenue requirement impact of eliminating the OBA Program for 2024 is approximately $5.4 million. Enbridge Gas is proposing to credit the net revenues to ratepayers for Open Bill Services over a 10-month extension period from January 1, 2024 to October 31, 2024 in the Open Bill Extension Deferral Account. The net revenues for 2024 are estimated to be approximately $2.6 million.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Vulnerable Energy Consumers Coalition (VECC)

Interrogatory

Reference:

Exhibit 1, Tab 14, Schedule 2

Question(s):

a) Please provide a list of the types of operating expenses incurred in the NGV program.

b) Attachment 1, which shows the costs and revenues for the NGV program does not include any capital costs. Are there no capital costs incurred by the program?

c) Please explain how expanding the NGV program to the former Union territories is consistent with the Utility's commitments to reduce GHG emissions?

Response:

a) Operating expenses within the NGV Program represent the costs to develop, operate and maintain the assets included in the program. The costs include expenses charged by third-party maintenance contractors, and Enbridge Gas labour costs related to administering the program.

b) No, there are capital costs incurred by the NGV Program. Total expenses provided at Exhibit 1, Tab 14, Schedule 2, Attachment 1, line 2 includes both NGV Program operating expense and annual depreciation expense.

c) Enbridge Gas's GHG reduction commitments are focused on supporting the corporate target to reduce GHG Emissions Intensity for Scope 1 and 2 emissions by 35% by 2030 and to achieve net-zero by 2050. Enbridge Gas has not set Scope 3 emission reduction targets; however, as provided at Exhibit 1, Tab 10, Schedule 6, the Company has developed an Energy Transition Plan (ETP) in order to support an orderly energy transition in Ontario and to provide customers with cost-effective solutions to reduce GHG emissions. As provided at Exhibit 1, Tab 10, Schedule 6, page 28, Enbridge Gas considers NGV for heavy duty trucks and public transportation vehicles a safe bet action that can drive immediate and significant GHG reductions. Please see response at Exhibit I.1.10-GEC-51 part a) for additional explanation on how NGVs reduce GHG emissions. Enbridge Gas also notes that an NGV Program that is available to all Enbridge Gas customers is consistent with the direction of harmonizing programs across both legacy franchise areas.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Ontario Energy Board Staff (STAFF)

Interrogatory

Reference:

Exhibit 1, Tab 15, Schedule 1, Attachment 1

Question(s):

Enbridge Gas filed its proposed harmonized customer connection policies. The harmonized policies replace the OEB-approved connection policies for the EGD and Union rate zones.

a) Please file the current OEB-approved connection policies for the EGD and Union rate zones.

b) Please provide a summary of the changes to the proposed harmonized customer connection policies from the current EDG and Union rate zone connection policies and explain the basis of these changes.

c) Aside from Enbridge Gas's Infill policy, did Enbridge Gas undertake customer engagement on any other topics related to key changes to its Customer Connection Policy (i.e. CIAC allocation and collection)? If not, please explain why. If yes, please provide a summary of the engagement results.

d) Please outline Enbridge Gas's plans for communicating changes to its customer connection policies to customers.

Response:

a) Please see:

Attachment 1- Revised EGD Rate Zone Economic Feasibility Procedure And Policy
Attachment 2 - Revised Union Rate Zones' Distribution New Business Guidelines

b) Attachment 3 contains a summary of changes to the harmonized customer connection polices from the current OEB-approved policies for the EGD and Union rate zones.

c) Enbridge Gas did not undertake any other additional customer engagement on proposed connection policies beyond what was filed with this application as other changes to the policies were minor in nature and designed to improve customer convenience and process efficiency.

d) Upon approval of these harmonized customer connection policies, Enbridge Gas will post them at Enbridgegas.com.

REVISED EGD RATE ZONE ECONOMIC FEASIBILITY PROCEDURE AND POLICY

Introduction

1. The purpose of this evidence is to present the proposed revisions to the Company's current procedures and policies for determining the feasibility of the Company's system expansion and community expansion projects in the EGD rate zone. These procedures and policies are adopted to comply with the *Guidelines for Assessing and Reporting on Natural Gas System Expansion in Ontario* of the Ontario Energy Board ("Board"), reported under EBO 188 dated January 30, 1998.

2. This evidence includes an overview of the Company's Customer Connection Policy, Customer Contribution and Refund Policy, Method for Economic Feasibility Assessment, and Procedure for Capital Expenditure Approval. It has been expanded to include key elements of the Company policy under the Community Expansion framework as approved by the Board in EB-2016-0004 dated November 17, 2016 and refined for this Application. The new framework applies to all qualifying Community Expansion ("CE") Projects and Small Main Extension ("SME") and Customer Attachment Projects, as defined in the EGD rate zone Rate Handbook, Rider I.

Customer Connection Policy

3. The Company uses a portfolio approach to manage its system expansion activities and ensures that the required profitability standards are achieved at both the individual project and the portfolio level. Investment Portfolio and Rolling Project Portfolio are two Board-prescribed portfolio approaches and are discussed in paragraph 15 and 16 of this evidence.

4. The Company manages both of its portfolio approaches to achieve a Profitability Index ("PI") of greater than 1.0 as required by the Board under EBO 188.

5. Individual projects are required to achieve a PI of 1.0 or the customer shall be required to pay a Contribution-in-Aid-of-Construction ("CIAC") to bring the project up to the required PI level. In exceptional circumstances, a project may be authorized at a lower PI levels (i.e. between 1.0 and greater than 0.8) as long the Company maintains its overall portfolio PI above 1.0.

6. During construction and operation of each project, the Company will comply with the OEB's *Environmental Guidelines for HydroCarbon Pipelines and Facilities in Ontario*.

Customer Contribution and Refund Policy

7. CIAC may be obtained for projects having a negative Net Present Value ("NPV") or a PI less than 1.0. The contribution should be sufficient to bring the project PI up to a required level. Harmonized Sales Tax ("HST") is added to contribution payments.

8. New residential customers connecting to the existing mains are provided, at no cost, with a service connection up to a maximum of 20 meters. Any service length beyond 20 meters is charged to the customer at a rate $32 per metre as prescribed in Rider G of the Rate Handbook.

9. The length of service for feasibility assessment is measured from the customer property line to the location on the front wall of the building where the meter will be installed.

10. Where the use of a proposed facility is dominated by a single large volume customer, it is considered a dedicated facility for CIAC purposes. The dominant customer may be required to pay a CIAC to result in a project NPV of zero or a PI of 1.0. CIAC amounts are subject to added HST.

11. Refunds of CIAC may be requested by customers when the actual customer count on the system expansion exceeds the original forecast. For Rate 1 and Rate 6 customers, these refunds are processed at the end of five years from the date of construction. The system expansion project is then re-evaluated with the actual customer count to determine a revised contribution that is required to bring the NPV to the original targeted level. The difference between the revised contribution amount and the actual contribution paid by customers is the total amount to be refunded to original customers. Refunds are made based on the proportionate contribution of customers.

12. These refunds do not apply to the mains wheres SES and TCS rate riders have been applied in lieu of CIAC. The refunds are made only for the specific piece of main put into service; no refunds are payable for customers added downstream of the specific piece of main. No interest is payable, and only customers who made a contribution are eligible for a refund.

13. In order to be eligible for a refund, the customer must be consuming natural gas at the address for which refund is being claimed. If the customer moves, he or she is responsible for notifying the Company of the new address.

14. Refunds for large volume customers will be determined based on a re-evaluation of the system expansion project, taking into consideration extra investment and

additional load brought on within five years to the specific piece of main constructed to serve the initial customer(s). Similar to system expansions, refunds for large volume customers will be evaluated subject to customer request. This policy is not available to large volume customers in Development Projects where an Hourly Allocation Factor process has been used for allocating project cost amongst the prospective customers.

System Expansion Portfolios – Accountability

15. Investment Portfolio: The Company evaluates all system expansion projects in a test year and ensures they are designed to achieve a portfolio PI of at least 1.1. All new customers attaching to new and existing mains are included in this portfolio.

16. Rolling Project Portfolio ("RPP"): The Company also maintains a rolling 12-month distribution expansion portfolio including the cumulative result of project-specific Discounted Cash Flow ("DCF") analyses. The RPP does not include customer attachments from existing mains constructed in prior years. The Company maintains RPP at a PI level greater than 1.0.

Estimating Inputs for Economic Feasibility Assessment

17. This section provides the method used to determine the parameters that make up the economic feasibility assessment. It includes capital cost, O&M expenses, and distribution revenues associated with a system expansion project. These inputs are discounted at the Utility's Weighted Average Cost of Capital ("WACC") to carry out the DCF analysis which measures Economic Feasibility of a project based on NPV and PI.

Capital Cost Estimation

18. The Company uses various approaches for estimating capital cost for different types of projects. The objective is to derive estimates that are closely aligned to costs that are reflective of the unique parameters of each project, and those cost differences are typically delineated by geographic area.

19. The following is a summary of various estimation techniques and the project types to which they are applied:
    - For new subdivisions where Joint Utility Trenching (“JUT”) is often used to construct natural gas infrastructure, unit rates prescribed in the underlying contracts are used for estimating capital cost for mains and services.
    - For subdivisions where JUT is not an option, or for commercial and industrial connections, field estimates are used for capital costing.
    - For large volume customers field estimates are used to estimate mains and service cost.

20. If a main is oversized to meet future growth potential, it may be re-priced at the size required to meet customers’ load requirements for feasibility calculations. The actual cost of the main must be shown on the Authorization for Expenditure (“AFE”).

21. An incremental overhead allowance is added to the cost of mains and services and is incorporated in the feasibility analysis of all projects.

Consumption and Revenue

22. For subdivision and residential connections, consumption is estimated based on building type (single, semi-detached, townhouse) and configuration (bungalow, split or two-story). The Capital Project Feasibility (“CAPF”) program calculates customer

revenue based on consumption levels input by the Customer Connections Representative ("CCR").

23. A load sheet is used to estimate consumption of commercial and industrial connections. The load sheet information is provided by the customer and contains consumption of various appliances installed at the premises.

24. For large volume connections, consumption information should include monthly volumes and the customer's contract daily demand.

25. The Investment Review group calculates revenue, based on the input consumption profiles and the most recent Board-approved rates.

<u>System Expansion Surcharge ("SES") and Temporary Connection Surcharge ("TCS")</u>

26. As set out in Rider I of the Company's Rate Handbook, the Company may apply an SES or TCS to Rate 1 and Rate 6 customers receiving gas distribution services as part of a CE project, SME or Customer Attachment Project. The Company may apply the SES or TCS if the project PI is less than 1.0. The terms and conditions applicable to the SES and TCS are set out in Rider I.

(a) SES

27. The SES is used for CE Projects, having 50 or more potential customers. Unlike approved distribution rates, the SES will not change over time and will appear as a separate line item on a customer's monthly gas bill.

28. The SES will be treated as a revenue for the purpose of the Company's economic

feasibility analsysis of the project. The SES will be charged to all Rate 1 and 6 customers who consume an estimated volume of gas less than 50,000 m^3 in the project area for a period of up to 40 years. The term of the SES for each project will be set at the minimum term required for the project to achieve a PI of at least 1.0 or 40 years, whichever is less.

29. Customers attaching after the start of the initial SES term will also be required to pay the SES for the remainder of the initial SES term for that project. The ongoing payment obligation of the SES will attach to the property for the balance of its term should the property change ownership or occupancy during this time.

30. Municipal contributions may be collected by way of up front lump sum or annual payments for up to 10 years subject to municipal commitment for such contributions to qualifying projects.

31. Large volume customers within the CE Project area, who consume more than 50,000 m^3 per year may pay either the SES and/or the CIAC. This will be addressed separately or as part of the customer contracts.

(b) TCS

32. The TCS is used for SME and Customer Attachment Projects, having less than 50 potential customers. The Company will require small volume customers in these projects to pay either the TCS or a CIAC to achieve a PI of 1.0. Large volume customers may pay a TCS in lieu of, or in addition to CIAC and/or negotiate other contribution arrangements for a project to achieve a minimum PI of 1.0.

33. These projects include the extension of mains, the related service attachments, as well as any service lines to individual customers connecting to pre-existing mains.

34. Similar to the SES, the TCS is charged at the same rate, is in addition to approved distribution rates and is treated as revenue for the Company's economic feasibility analysis of the project. TCS appears on a customer's gas bill as a separate line item.

35. The TCS term will be determined on a project specific basis and will be restricted to a minimum of one year to a maximum of 40 years from the project's in-service date. The term will be based on the number of years it takes for the project to achieve a PI of 1.0.

36. Similar to SES, customers attaching after the start of the initial TCS term will also be required to pay the TCS for the remainder of the initial TCS term for that project. The ongoing payment of the TCS will attach to the property for the balance of its term should the property change ownership or occupancy during this time.

37. For the purpose of governance and reporting, all projects where TCS is applied will be included in the Company's Rolling Project Portfolio and Investment Portfolio alongside other system expansion projects.

Hourly Allocation Factor ("HAF")

38. The HAF process is a method of allocating the capital cost of a Development Project between forecast large volume customers requiring incremental firm capacity within an identified Area of Benefit. The HAF is applied as a capital cost in addition to the capital cost of customer specific facilities (i.e. dedicated distribution main, service line, customer station, meter) to the individual economic analysis of customers receiving incremental firm capacity in the Area of Benefit as they commit or contract for gas service.

39. The large volume component of a Development Project is derived by splitting the capital cost of the Development Project into a large volume and small volume component in proportion with the peak hourly demands of each component. The HAF is calculated by dividing the forecast capital cost of the large volume component of the Development Project (net of any municipal or government funding) by the sum of the forecast firm hourly large volume customer demand (regardless of seasonality) that the project serves within the Area of Benefit and is expressed in dollars per m^3/hour.

40. The threshold of eligibility of the HAF for all Development Projects will be 50 m^3/h and greater.

Customer Attachment and Revenue Horizon

41. The maximum customer attachment horizon for small volume customers (including residential, commercial and industrial connections with annual consumption of no more than 50 000 m^3) is 10 years. The revenue horizon is 40 years from the in-service date of the initial mainline. For large volume customers, the maximum customer attachment horizon is 10 years. The maximum revenue horizon is 20 years from the customers' initial service date.

42. A project specific revenue horizon is used when the project life cycle is deemed shorter than 20 years.

Marginal Operating and Maintenance ("O&M") Expenses

43. The Company's incremental operating and maintenance ("O&M") cost is based on an annual study that is aligned with cost allocation principles and is included in

assessing project feasibility.

Procedure for Capital Expenditure Approval

44. Enbridge's procedure for obtaining management approval to make a capital expenditure for distribution system expansion is known as the Authorization for Expenditure ("AFE"), and is outlined in the AFE manual. A system expansion project is typically initiated by a Customer Connections Representative ("CCR"), who identifies potential new customers. The CCR will assess the required amount of plant additions to provide service and will initiate an AFE for approval.

45. A feasibility assessment is required to be attached to an AFE as part of the approval process. Feasibility assessment is done based on the estimated revenue and benefits of connecting new customers against the total cost of attaching and serving them. The Capital Project Feasibility ("CAPF") program is an online IT tool used for evaluating all projects except for residential infills connections and Large Volume projects. All Large-volume projects are separately evaluated by the Investment Review group using Excel based feasibility tools.

46. CCRs provide inputs for the CAPF tool, which include estimates of capital cost, customer additions and timing, and annual consumptions of new customers. The Investment Review group uses Excel based feasibility tools for assessing large-volume and more complex projects with inputs from the Special Projects and Key Accounts groups.

47. All AFEs are approved by the appropriate level of authority including managers,

directors, VPs and President as set out in the workflows based on capital approval authority.

REVISED UNION RATE ZONES' DISTRIBUTION NEW BUSINESS GUIDELINES

1. Purpose
   - To ensure that customers are treated fairly and consistently.
   - To manage growth of the natural gas distribution business by providing guidelines for capital investment to ensure no undue rate impact for existing customers.
   - To provide business principles and guidelines for distribution new business investments.
   - To streamline administrative processes and approvals where possible.
   - To delegate authority where appropriate to field operations staff.

2. Definitions
   - Area of Benefit - The Area of Benefit is defined as the geographic area, drawn as a polygon on a map, that includes all customers who will be served by, and benefit from, the infrastructure build or pressure increase from a Development Project where an Hourly Allocation Factor process is used to allocate capital costs.

   - Community Expansion Project - A natural gas system expansion project undertaken by the Company for which the PI is less than 1.0 and which will provide first-time natural gas system access to a minimum of 50 potential customers.

   - Contribution in Aid of Construction (CIAC) - The Company's calculation in accordance with its feasibility policy of the amount of customer financial contributions required to reduce the capital cost of a project to serve one or more customers so that the project becomes economically feasible.

- Development Project - a system expansion project that will expand capacity over a certain area to serve increasing demands from existing and/or new customers. It may include a mix of large and small volume customers.

- Distribution New Business - Providing gas service to new customers in all market segments (i.e. new and existing housing, commercial and industrial). It also includes providing incremental gas supply capacity to existing customers.

- Hourly Allocation Factor (HAF) – A method used to allocate the capital costs of a Development Project to customers requiring additional firm service within an identified Area of Benefit. The HAF is expressed as a capital cost per m^3/hour.

- Investment Portfolio - The costs and revenues associated with all new distribution customers who are forecast to attach in a particular test year (including new customers attaching on existing mains). The Investment Portfolio includes a forecast of normalized reinforcement costs.

- Large volume - Gas consumption of greater than 50,000 m^3 per year.

- Profitability Index (PI) – The Company's calculation in accordance with its feasibility policy of the ratio of the net present value (NPV) of the net cash inflows to the NPV of the net cash outflows for a natural gas system expansion or extension project undertaken by the Company.[1]

- Rolling Project Portfolio - An accumulation of the new business capital requisitions that are issued and approved for a 12 month period. The rolling PI is the cumulative PI data from the Rolling Project Portfolio. The Rolling Project Portfolio includes all future customer attachments, revenues and costs on the basis of the life cycle of each project. It also includes a forecast of normalized reinforcement costs. It excludes those customers requiring only a Service Lateral from an existing main.

- Service Lateral - A gas pipeline connecting the company gas main to the customer's gas meter as measured from property line to meter.

- Small Main Extension and Customer Attachment Projects – Natural gas system extension or expansion projects undertaken by the Company for which the PI is less than 1.0 and which will provide natural gas system access to less than 50 potential customers.

- Small volume – Gas consumption of no more than 50,000 m^3 per year.

- System Expansion Surcharge (SES) - An economic contribution to financial feasibility of community expansion projects by all small volume customers who attach to the system as part of a Community Expansion Project during the period

[1] https://www.oeb.ca/oeb/_Documents/Regulatory/EBO%20188%20Decision_AppB_Guidelines.pdf

in which it is in place through a temporary volumetric rate as set out in the applicable rate schedules.

- Temporary Connection Surcharge (TCS) - An economic contribution to financial feasibility of main extension projects that may be made by customers who attach to a Small Main Extension or Customer Attachment Project through a temporary volumetric rate as set out in applicable rate schedules. The TCS is used as an alternative to CIAC to achieve a PI of 1.0.

3. Accountability

Enbridge Gas manages separate Investment Portfolios and Rolling Project Portfolios for Union North (Rate 01 and 10) and Union South (Rate M1 and M2) rate zones. Excluding Community Expansion Projects, the Rolling Project Portfolio PI for each area must remain above 1.0 and the Net Present Value (“NPV”) must remain greater than $0 at all times.

The Director, Distribution In-Franchise Sales is accountable for ensuring that the corporate Rolling Project Portfolio PI, excluding Community Expansion Projects, exceeds 1.0 on an ongoing basis.

4. Project Acceptance Levels

The Company manages its portfolio approach to achieve a Profitability Index (“PI”) of greater than 1.0 as required by the Board under EBO 188.

Individual projects are required to achieve a PI of 1.0 or the customer shall be required to pay a Contribution in Aid of Construction (“CIAC”) to bring the project up to the required PI level. In exceptional circumstances, a project may be authorized at a lower PI levels (i.e. between 1.0 and greater than 0.8) as long the Company maintains its overall portfolio PI above 1.0.

5. Acceptance Level Exceptions

Subject to ability to manage minimum portfolio PIs as indicated above, projects can proceed with reduced PI levels. All requests for exceptions to the minimum project PI of 1.0 must be authorized by the Director, Distribution In-Franchise Sales, and the Director, Operational Services & Governance prior to construction.

6. Hourly Allocation Factor

The HAF process is a method of allocating the capital cost of a Development Project between forecast large volume customers requiring incremental firm capacity within an identified Area of Benefit. The HAF is applied as a capital cost in addition to the capital cost of customer specific facilities (i.e. dedicated distribution main, service line, customer station, meter) to the individual economic analysis of customers receiving incremental firm capacity in the Area of Benefit as they commit or contract for gas service.

The large volume component of a Development Project is derived by splitting the capital cost of the Development Project into a large volume and small volume component in proportion with the peak hourly demands of each component. The HAF is calculated by dividing the forecast capital cost of the large volume component of the Development Project (net of any municipal or government funding) by the sum of the forecast firm hourly large volume customer demand (regardless of seasonality) that the project serves within the Area of Benefit and is expressed in dollars per m^3/hour.

The threshold of applicability of the HAF for all Development Projects will be 50 m^3/h or greater

For the purposes of the economic feasibility analysis for customers allocated capital costs using the HAF, the Company would continue to apply the EBO 188 Guidelines. Large volume customers would have flexibility through longer term contracts and/or a CIAC payment to achieve a PI of 1.0. Small volume customers would have to, as applicable, make a CIAC payment or pay the TCS over a defined term to achieve a PI of 1.0.

7. Collecting a Contribution

Projects that do not meet the minimum stage 1 economic criteria, after factoring in SES, or long-term service agreements, where applicable, shall be required to pay a CIAC.

CIAC may be collected in advance of construction from new customers or other parties who have agreed to fund the shortfall in the economics.

For Small Main Extensions and Customer Attachment Projects, the Company will require small volume customers to pay either a TCS or CIAC. Large volume customers may pay a TCS in lieu of, or in addition to CIAC and/or negotiate other contribution arrangements.

The TCS term will be determined on a project specific basis and will be restricted to a minimum of one year and to a maximum of 40 years from the project's in-service date. The term will be based on the number of years it takes for the project to achieve a PI of 1.0.

For Community Expansion Projects, contributions will be collected from all small volume customers served by the project through use of an SES. Larger volume customers may elect to pay the required CIAC through an SES and/or negotiate other contribution arrangements.

The SES will be treated as revenue for the purpose of the Company's economic feasibility analysis of the project. The term of the SES for each project will be set at the minimum term required for the project to achieve a PI of at least 1.0 or 40 years, whichever is less.

Both the TCS and SES will apply to the property for the full term, notwithstanding any change of ownership or occupancy.

8. Project Costs
   a) When available, economic feasibility analysis shall use project specific data (costs, volumes, customer attachments) based on survey data, historical practice, weather and local conditions to determine the costs, load and forecast.
   b) When no specific data is available or the project is a minor project, regional averages shall be used.

9. Service Laterals
   a) The Company shall provide, at its cost, up to 30 metres of Service Lateral to connect a residential customer.

b) Service Laterals over the length specified above shall require the prior agreement of the customer to pay an “excess charge” of $45.00 per metre. The PI analysis for commercial and industrial services shall be individually calculated reflecting the site-specific lateral length, pipeline sizing, costs, gas usage and margins.

c) The Service Lateral is measured from property line to meter.

d) The minimum requirement to qualify for residential service shall be attachment of a water heater or a primary heat source. Requests for service where this condition is not satisfied shall be considered but will require a discounted cash flow analysis to be completed and any required customer contribution to be made in advance.

e) Full or partial abandonments of Service Laterals are completed at no charge to the customer. When the customer wishes to reconnect to our system, the Excess Footage Charge referenced in (b) above does not apply, however, the applicable service replacement costs that would apply can be found on the Enbridge Gas website.

Summary of Changes to the Harmonized Customer Connection Policies

Item	Proposed Harmonized Policy	EGD - Current Policy	Union - Current Policy	Rationale
1	**Residential Infill Service Connections** 33.Enbridge Gas uses the extra length rule for new residential customers (infills) connecting to existing mains. The rule allows Enbridge Gas to attach residential infill customers at no cost to a maximum of 20 meters. Beyond 20 metres, the customer pays an Extra Length Charge (ELC) per metre at a rate prescribed in Rider G of the Rate Handbook. The ELC rate in the proposed Rider G included at Exhibit 8, Tab 3, Schedule 1 is $122 per metre.	8. New residential customers connecting to the existing mains are provided, at no cost, with a service connection up to a maximum of 20 meters. Any service length beyond 20 meters is charged to the customer at a rate of $32 per metre as prescribed in Rider G of the Rate Handbook.	a) The Company shall provide, at its cost, up to 30 metres of Service Lateral to connect a residential customer. b) Service Laterals over the length specified above shall require the prior agreement of the customer to pay an "excess charge" of $45 per metre.	Changes: Service length at no cost was harmonized at 20 metres. ELC rate was harmonized to $122 per metre. Rationale: Connection costs up to 20 metres is supported by the revenue of a residential customer. It covers most connections (75%) and provides for process efficiency. Costs for the remaining connections informed the resulting ELC rate.
2	**CIAC allocation** 26.The following guidelines will be used in allocating CIAC between customers served by a new project. a) When a CIAC is required for a project that serves more than one general service residential and small commercial customer, the CIAC is allocated between the customers based on the annual consumption forecast. b) When the project serves more than one LVC, the CIAC will be allocated between the customers based on their forecast peak hourly demand.	10.Where the use of a proposed facility is dominated by a single large volume customer, it is considered a dedicated facility for CIAC purposes. The dominant customer may be required to pay a CIAC to result in a project NPV of zero or a PI of 1.0.	Consistent with the proposed.	**Change:** All customers pay CIAC in proportion to their loads and a single dominant customer is not burdened with the full CIAC amount. **Rationale:** Allocation of cost is aligned with customer demand.

	c) If the project serves a mix of general service and one or more LVCs, the CIAC will be allocated between customers based on forecast peak hourly demand.			
3	**Timing of CIAC collection** 25.The timing and method of CIAC collection for different market sectors is as follows: a) For general service residential and commercial projects, CIAC is collected from the customer prior to the start of construction. b) The ELC for residential infill customers on main is calculated based on the actual service length after the service is installed and will be collected through the customer's first gas bill. c) CIAC for large volume contract customers are collected prior to the start of construction except for rare situations where installment payments may be authorized. Customer requests for payment of CIAC in installments may be authorized by the responsible Director and are subject to a credit review. All installments must be paid between the start of construction and the in-service date of the project.	CIAC is collected in the EGD rate zone prior to the start of construction for all types of projects including new construction (subdivision), large volume industrial or commercial project or residential infill customer connections. There is no formal statement in the policy document.	7. Collecting a Contribution CIAC may be collected in advance of construction from new customers or other parties who have agreed to fund the shortfall in the economics.	**Change:** There are two changes related to ELC for residential infill customers. 1) collect ELC through the first gas bill. 2) calculate ELC based on the actual service length in lieu of the estimated length **Rationale:** This change provides process efficiency and customer convenience.
4	**Refund Policy** 27.Refunds of CIAC may be requested by customers when the actual customer count on a system expansion project exceeds the original forecast. 28.General service customers: For general service customers, refund requests are evaluated upon customer request and will be accepted at any time within 10 years of the in-service date of the project. The system expansion project is then re-evaluated with the actual customer count and the timing of service connections to determine a revised contribution that is required to bring the PI to the original targeted level. If the revised CIAC amount is lower than the actual CIAC paid by customers, the difference will be refunded to those customers who paid it. Refunds are made based on the proportionate contribution of customers who paid the CIAC. This	11.Refunds of CIAC may be requested by customers when the actual customer count on the system expansion exceeds the original forecast. For Rate 1 and Rate 6 customers, these refunds are processed at the end of five years from the date of construction. The system expansion project is then re-evaluated with the actual customer count to determine a revised contribution that is required to bring the NPV to the original targeted level. The difference between the revised contribution amount and the actual contribution paid by customers is the total amount to be refunded to original customers. Refunds are made based on the proportionate contribution of customers.	No refund policy for customers in the Union rate zone.	**Change:** The time period for considering a customer's refund request is proposed to increase from 5 years to 10 years. **Rationale:** 10 years is more consistent with the attachment horizon of a project prescribed in regulation (E.B.O 188)

	policy applies to main extension projects involving conversion customers. 29.Large volume customers: Refunds for LVCs will be determined based on re-evaluation of the system expansion project, considering the timing and load associated with customers not forecasted in the original project. Refund requests are applicable only to the original project scope, the specific piece of main constructed to serve the initial customer(s) and does not consider subsequent main extensions coming off the original project main. Refund requests are evaluated upon customer request and will be accepted at any time up to 10 years from the in-service date of the project. 30.No interest is payable on refunds, and only those customers who made the original contribution are eligible for a refund. 31.In order to be eligible for a refund, the customer must be consuming natural gas at the address for which refund is being claimed. 32.The Refund Policy does not apply to: a) New construction builder developments b) Customers on a system expansion projects where either the SES or TCS rate riders have been applied in lieu of a CIAC. c) Customers in a Development Project where an Hourly Allocation Factor (HAF) has been used for allocating project costs amongst the prospective customers.	12.These refunds do not apply to the mains where SES and TCS rate riders have been applied in lieu of CIAC. The refunds are made only for the specific piece of main put into service; no refunds are payable for customers added downstream of the specific piece of main. No interest is payable, and only customers who made a contribution are eligible for a refund. 13.In order to be eligible for a refund, the customer must be consuming natural gas at the address for which refund is being claimed. If the customer moves, he or she is responsible for notifying the Company of the new address. 14.Refunds for large volume customers will be determined based on a re-evaluation of the system expansion project, taking into consideration extra investment and additional load brought on within five years to the specific piece of main constructed to serve the initial customer(s). Similar to system expansions, refunds for large volume customers will be evaluated subject to customer request. This policy is not available to large volume customers in Development Projects where an Hourly Allocation Factor process has been used for allocating project cost amongst the prospective customers.		

ENBRIDGE GAS INC.

Answer to Interrogatory from
Ontario Energy Board Staff (STAFF)

Interrogatory

Reference:

Exhibit 1, Tab 15, Schedule 1, Attachment 1, p.3, Enbridge Gas reply argument in EB-2020-0091, p.69

Question(s):

Enbridge Gas's customer connection policies include a method for calculating normalized system reinforcements costs. In the IRP proceeding (EB-2020-0091), OEB staff submitted that Enbridge Gas should review its economic feasibility policies associated with system expansion to ensure that system reinforcement costs are based on a forward-looking approach that accounts for system needs/constraints identified in the AMP and submit the revised policies in the rebasing case. Enbridge Gas indicated that it would consider including this update into its economic feasibility policies to be presented for approval at rebasing.

Has Enbridge Gas given further consideration to this approach, e.g., varying system reinforcement costs for new customers by geographic area to link to the identified system reinforcement projects and project costs for different geographic areas identified in its 2023-2032 AMP in this application? If yes, please elaborate, and if not, please explain Enbridge Gas's rationale for not proposing to adopt such an approach.

Response:

The current method for calculating the Normalized System Reinforcement Cost (NSRC) is explained in detail in response at Exhibit I.1.15-VECC-4. The forward-looking approach as proposed would require linking a reinforcement project to a specific area that benefits from the project and applying the project cost to new customers in that specific area. Conceptually, this approach conflicts with postage stamp rate making principles. Moreover, this approach is problematic for a number of reasons including:

a) The constraint which a reinforcement is requesting to address is underpinned by a forward incremental load forecast and the scope of that reinforcement is highly dependent not only on the demand but the location and nature of the demand.

b) Including forward reinforcements in project feasibility estimates would conflict with the current methodology of including past reinforcement projects on an amortized basis, and effectively constitute double counting.

c) The complexity of the distribution network makes linking a reinforcement project to a specific area challenging as reinforcement projects may feed multiple areas, and areas receive feeds from various networks.

d) Tracking and linking specific reinforcement costs to relevant project areas and attaching customers over time would be administratively burdensome and may lead to disputes and errors.

e) Reinforcement costs for different areas may vary significantly, which may lead to large differences in feasibility results for customers across franchise areas. This will present challenges in communicating outcomes to customers and would likely lead to an increase in customer complaints.

Alternative approaches were considered in the original development of E.B.O 188 guidelines and the OEB ruled in favor of applying system reinforcement costs on a normalized basis rather than using the forecast actual cost[1].

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[1] E.B.O. 188, Guidelines for Assessing and Reporting on Natural Gas System Expansion in Ontario p 2.2.3

ENBRIDGE GAS INC.

Answer to Interrogatory from
Ontario Energy Board Staff (STAFF)

Interrogatory

Reference:

Exhibit 1, Tab 15, Schedule 1, Attachment 1, p. 12

Question(s):

Enbridge Gas's customer connection policies state that projects that do not achieve a PI of 1.0 after factoring in the maximum term of 40 years of the SES or TCS, cannot use CIAC in conjunction with the SES or TCS to bridge any economic shortfall. The policies also state that small volume customers (SVC) on a project that are designated for SES or TCS, do not have the option of paying a CIAC in lieu of the SES or the TCS. The policies also state that large volume customers (LVCs) have the option of paying an upfront CIAC in lieu of the SES or the TCS or a combination of both.

Please confirm that LVCs, unlike SVC, have the option of paying a CIAC, a SES or TCS, or a combination of a CIAC and a SES or TCS.

Response:

Confirmed. LVCs, unlike SVC, have the option of paying a CIAC, a SES or TCS, or a combination of a CIAC and a SES or TCS.

The policy statements are consistent with OEB decisions.[1,2,3]

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[1] EB-2020-0094, OEB Decision and Order, January 7, 2021, p.2, paragraph 3.
[2] EB-2020-0094, Exhibit C, Tab 2, Schedule 1, "Revised EGD Rate Zone Economic Feasibility Procedure and Policy", p. 7, paragraph 31-32.
[3] EB-2020-0094, Exhibit C, Tab 2, Schedule 2, "Revised Union Rate Zones' Distribution New Business Guidelines", p. 6, section 7.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence (ED)

Interrogatory

Reference:

Exhibit 1, Tab 15, Schedule 1, Attachment 1 (Customer Connections)

Question(s):

a) Pages 4 and 5 refer to three methods to bring a PI up to 1.0. Please provide a table indicating the dollar value of the capital shortfall made up by each method over the past 10 years and forecast over 2024-2028. This will assist in assessing the overall risks of these ongoing practice to existing customers, if any, in the context of decarbonization.

b) Page 5 notes that customers can negotiate a premium to posted rates be paid to bring a project PI to the required threshold. Has this ever been used in relation to a residential development? Will this apply to residential developments going forward? If yes, who pays the premium – the developer or the eventual home owners?

c) Page 5 notes that customers can negotiate a premium to posted rates be paid to bring a project PI to the required threshold. If there is a future unexpected shortfall (e.g. due to customer bankruptcy), are existing ratepayers responsible for covering the shortfall?

Response:

a) Please see Table 1 containing CIAC, SES and TCS actual for 2014 to 2022 and forecast for 2023 and 2024. Enbridge Gas does not have a forecast beyond 2024.

Table 1

	Actual 2014 $million	Actual 2015 $million	Actual 2016 $million	Actual 2017 $million	Actual 2018 $million	Actual 2019 $million	Actual 2020 $million	Actual 2021 $million	Actual 2022 $million	Forecast 2023 $million	Forecast 2024 $million
CIAC	18.15	22.71	32.41	19.48	34.36	24.67	17.62	16.26	19.94	NA [1]	NA [1]
SES	0	0	0	0	0.14	0.69	1.06	1.53	1.45	2.13	2.92
TCS	0	0	0	0	0	0	0.003	0.009	0.065	0.172	0.305

[1] The CIAC is not available for these years as the capital budget is completed net of CIAC.

b) A premium to posted rates has not been used for residential developments and is not expected to be used in the future.

c) A premium to posted rates is generally offered to large-volume contract (LVC) customers. LVC customers are required to sign a distribution contract that includes the requirement to provide financial assurance in the form of a cash deposit, letter of credit, parental guarantee, or other equivalent instruments, subject to credit review. Financial assurances may be adjusted over time to reflect the most current credit rating of the customer and exposure. The distribution contract holds a customer liable for any revenue shortfall in the event of default or early termination and Enridge Gas may enforce these customer obligations exercising financial assurances rights. If the customer files for bankruptcy and recovery through financial assurances becomes unenforceable, any revenue shortfall will be borne by all ratepayers.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence (ED)

Interrogatory

Reference:

Exhibit 1, Tab 15, Schedule 1, Attachment 1 (Customer Connections)

Question(s):

a) Page 5 refers to the Investment Portfolio and Rolling Project Portfolio. We understand that this portfolio approach is meant at least in part to allow some projects to have a PI no lower than 0.8. Does a portfolio with a PI of over 1 help to cover the costs of (i) future revenue forecasts not coming to fruition and/or (ii) connection capital costs being higher than expected?

b) Please describe how a shortfall is made up (e.g. from existing customers, from the connecting customers, from the IP or RPP, etc.) in the following examples:

   i. A connection has a PI of 1. However, the final construction costs are significantly more than the estimate (including contingency).
   ii. A connection has a PI of 1. However, in the decades after the connection is made, the forecast revenue does not come to fruition.
   iii. The situation of (i) and (ii) specifically in the situation of a residential development.

c) According to page 5, “the responsible Director may authorize exceptions, subject to a PI no lower than 0.8, as stipulated in E.B.O. 188.” When is Enbridge more likely to authorize an exception? Please provide any internal policy/practice documents on this question. How many times has an exception been authorized for a residential development over the past decade.

d) Please provide a table of projects given approval for a PI lower than 1 over the last 10 years with columns showing the size and type of the project (e.g. residential development, industrial, community expansion, etc). If an itemized table cannot be provided, please at least provide a breakdown of the total by type.

e) Please provide a table showing the connection costs for residential developments over the most recent 10 years with columns showing: the NPV of the total costs, the NPV of the forecast incremental revenue, any customer contribution, and the method of customer contribution (e.g. one of those listing in para. 7 on page 4).

Response:

a) Yes, a portfolio PI greater than 1.0 would help to offset a revenue shortfall or cost overrun incurred by some of the projects in the portfolio.

b)

i-iii) For general service customers, including residential developments please see response at Exhibit I.1.15-ED-83 part e) and for large volume contract customers, please see response at Exhibit I.1.15-ED-84.

c) Per E.B.O 188, Enbridge Gas is permitted to attach customers at an estimated PI below 1.0 but not below 0.8. The relevant internal policy document can be found at Attachment 1 for reference. Over the past decade Enbridge has approved approximately 200 customer connection projects with a PI lower than 1.0. In an effort to manage the Investment Portfolio, Enbridge Gas has not exercised the option of attaching system expansion projects below a PI of 1.0 since 2015, except for two system reinforcement projects completed in 2018.

d) Table 1 provides the number of projects where a PI below 1.0 was used. This information is not available by size and type of project e.g., residential development, commercial, industrial etc. Please note that Community expansion projects are not authorized to have a PI below 1.0 as per the OEB's Decision in Harmonization of System Expansion and Temporary Connection Surcharges[1].

Table 1

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Projects	128	69	2	0	0	2	0	0	0	0

e) The requested information is not available as projects underpinning the Company's Rolling Project Portfolio (RPP) are not tracked by project type. Information on project type is not tracked as it is not pertinent to the discounted cashflow calculation of the RPP.

[1] EB-2020-0094

Minimum PI Threshold for Feasibility Assessment Policy

1 Purpose

The purpose of this policy is to provide guidance on the minimum profitability index (PI) used for the assessment of project feasibility. The scope of this policy includes all system expansion projects except for those where system expansion surcharge (SES) and temporary connection surcharge (TCS) are applied.

2 Terms and Definitions

The following is a list of terms found in this document and their definitions.

authorization for expenditure (AFE): A document that records a project cost that has been reviewed and approved by appropriated authorities prior to project start.

contribution-in-aid of construction (CIAC): The Enbridge Gas Distribution and Storage (GDS) calculation in accordance with its feasibility policy of the amount of customer financial contributions required to reduce the capital cost of a project to serve one or more customers so that the project becomes feasible.

profitability index (PI): The GDS calculation in accordance with its feasibility policy of the ratio of the net present value (NPV) of the net cash inflows to the NPV of the net cash outflows for a natural gas system expansion or extension project undertaken by the Company.

residential infill customers: Existing homes in front of a natural gas mainline seeking a new gas connection to switch to natural gas from other fuel sources, such as electricity, propane, or oil.

system expansion surcharge (SES): A volumetric surcharge at $0.23 per m^3 that applies to customers on a system expansion project where the feasibility analysis results in a PI of less than 1.0 and provides natural gas system access to more than 50 potential customers.

temporary connection surcharge (TCS): A volumetric surcharge at $0.23 per m^3 that applies to customers on a system expansion project where the feasibility analysis results in a PI of less than 1.0 and provides natural gas system access to less than 50 potential customers.

3 References

OEB Guidelines for Assessing and Reporting on Natural Gas System Expansion in Ontario issued under the file no. EBO 188 dated January 30, 1998.

4 Compliance

This policy is required to comply with EBO 188 dated January 30, 1998; The Guidelines for Assessing and Reporting on Natural Gas System Expansion in Ontario.

5 Policy Statement

The minimum PI threshold for assessment of project feasibility will be determined using the following guidelines.

- The minimum PI threshold for testing project feasibility will be 1.0 for all projects, absent exceptional circumstances.
- Exceptional circumstances may include but are not limited to system reinforcement projects, which are critical for future customer growth.
- The Director of In-franchise Sales will approve exceptions and allow using a PI of less than 1.0 and greater than 0.8 as allowed in the regulatory guidelines refenced below.
- A business case must be submitted with each exception as part of the approval process.
- Exceptions must be reviewed and approved prior to submitting a capital requisition or an authorization for expenditure (AFE).

5.1 Exception to the Policy

Any project that uses TCS or SES charges will not qualify for making an exception to the rule and these projects must demonstrate a PI of 1.0 or greater. This is consistent with the OEB decision in EB-2020-0094 dated December 4, 2020.

6 Signature

7 Document Governance

For document governance purposes, the following tables capture important information related to this document.

Document Control

Table 7-1:

Category	Value
Owned by:	In-Franchise Sales
Review interval:	Annual

Revision History

Table 7-2: July 25, 2022 Release

Release Date	Version	Project Number	RFC Number	Prepared By	Approved By
2022-07-25	1.0.0	n/a	n/a	Faheem Ahmad, Specialist, Customer Portfolio and Policy	Ian Macpherson, Director, In-Franchise Sales

Doc ID	Scope	Document & Section	Summary of Changes
PY-27-F7CD-CCC9	GDS	Minimum PI Threshold For Feasibility Assessment Policy	Initial version.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defence (ED)

Interrogatory

Reference:

Exhibit 1, Tab 15, Schedule 1, Attachment 1 (Customer Connections)

Question(s):

a) How does Enbridge classify connections of new residential developments (i.e. subdivision)? Are these “customers attaching to existing mains (infills)” as described on page 9?

b) Please confirm which methods are available for connections of new residential developments to bring a project up to the required PI.

c) If a shortfall must be made up to bring the PI to 1, can this be done through a premium that is applied to the bills of future residential homeowners?

d) Please explain the rational for any significant differences between the gas and electric connection rules outlined in (e) below.

e) To help us understand gas connections policy as they relate to residential housing developments and consider them in comparison to electric connection policies, please complete the following table:

Gas vs. Electric Connection Rules for Residential Housing Developments		
	Gas	**Electricity**
Feasibility testing & CIAC calculation		
Customer attachment forecast horizon		
Maximum customer revenue horizon		
Timing of CIAC payment		
Availability of contribution through a premium or surcharge paid by homeowners		

Deposit in support of revenue forecast [1]		
Timing of repayment of deposit in support of revenue forecast		
Liability for connection cost overruns (who is liable, and how it this enforced)		
Liability for revenue forecast shortfalls (who is liable, and how it this enforced)		
Availability and timing of refunds where connection cost is less than forecast		
Other		

Response:

a) New residential developments (i.e. subdivisions) are classified as residential new construction, not infills. Subdivisions require a new main to connect new homes and businesses. Infills are customers converting to natural gas from another fuel type and are connected to existing mains.

b) New residential developments pay a contribution-in-aid of construction (CIAC), or a system expansion surcharge (SES) (in Community Expansion projects), or a temporary connection surcharge (TCS) to bring the project up to the required profitability index (PI). However, CIAC cannot be combined with either the SES or TCS.

c) No. Premiums to posted rates are not used to cover the shortfall of a residential subdivision project. However, as noted above, a surcharge in the form of an SES or TCS can be used and is applied to the bills of the residential homeowners taking gas service.

d) The table has been completed for Enbridge Gas connection policies. Enbridge Gas cannot complete the table for electric connection policies for the reasons set out in response to Exhibit I.1.15-ED-84 part a), and therefore cannot provide a comparison as requested.

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[1] A deposit to protect against the risk that the number of forecast residential connections does not materialize, leading to a drop in forecast revenue.

e) Enbridge Gas has provided the information requested for its connection policies, however, cannot provide the requested information for electric policies as stated in part d) above.

Gas vs. Electric Connection Rules for Residential Housing Developments	
	Gas
Feasibility testing & CIAC calculation	
Customer attachment forecast horizon	10 years
Maximum customer revenue horizon	40 years
Timing of CIAC payment	Before construction starts
Availability of contribution through a premium or surcharge paid by homeowners	Premium to posted rates are not available. SES and TCS are available, however, these cannot be used in conjunction with CIAC.
Deposit in support of revenue forecast [2]	No
Timing of repayment of deposit in support of revenue forecast	Not applicable
Liability for connection cost overruns (who is liable, and how it this enforced)	The cost overruns in some projects are offset by cost underruns in others. The actual costs of all projects each year are incorporated in calculating the PI of the Company's Investment Portfolio (IP). The Company is liable for managing its portfolio at a PI greater than 1.0 and reporting to the OEB as required in the E.B.O 188 guidelines.

[2] A deposit to protect against the risk that the number of forecast residential connections does not materialize, leading to a drop in forecast revenue.

Gas vs. Electric Connection Rules for Residential Housing Developments	
	Gas
Liability for revenue forecast shortfalls (who is liable, and how it this enforced)	The revenue deficiency created by one project is offset by the revenue sufficiency created by others. The actual revenues of all projects each year are incorporated in calculating the PI of the Company's IP. The Company is liable for managing its portfolio at a PI greater than 1.0 and reporting to the OEB as required in the E.B.O 188 guidelines.
Availability and timing of refunds where connection cost is less than forecast	Not available
Other	

ENBRIDGE GAS INC.

Answer to Interrogatory from
Environmental Defense (ED)

Interrogatory

Reference:

Exhibit 1, Tab 15, Schedule 1, Attachment 1 (Customer Connections)

Question(s):

a) To help us understand gas connections policy as they relate to large customers (e.g. industrial facilities) and consider them in comparison to electric connection policies, please complete the following table:

Gas vs. Electric Connection Rules for Large Customers		
	Gas	**Electricity**
Revenue forecast parameters in CIAC calculations		
Timing of CIAC payment		
Availability of contribution through a premium or surcharge paid by the customer		
Deposit in support of revenue forecast		
Timing of repayment of deposit in support of revenue forecast		
Liability for connection cost overruns (who is liable, and how it this enforced)		
Liability for revenue forecast shortfalls (who is liable, and how it this enforced)		
Availability and timing of refunds where connection cost is less than forecast		

Availability and timing of refunds where distribution revenue is greater than forecast		
Other		

Response:

a) Connection policy elements applicable to large volume customers are summarized in the table below, however for complete details please see the full policy document provided at Exhibit 1, Tab 15, Schedule 1.

   Applicable terms and conditions of service are set out in the Rate Handbook pro and service contracts provide additional details.

   Enbridge Gas is not able to provide a summary of the connection policy details for electricity distributors in the requested format because of the variety of policies that exist. There are currently 55 electricity distributors (LDCs) being rate regulated by the OEB and each of these LDCs has a Conditions of Service policy document pursuant to the Distribution Code and the Retail Settlement Code that differs to some degree on content / rules and updates are often made annually. Some larger customers also have unique Connection Agreements with the LDCs, particularly Large Use customers (> 5 MW). These connection agreements often deal with unique customer features such as multiple feeds, standby rates, distributed generation, transformer ownership, etc. It is unknown if these connection agreements are publicly available.

Gas vs. Electric Connection Rules for Large Customers	
	Gas
Revenue forecast parameters in CIAC calculations	20 years
Timing of CIAC payment	Prior to the start of construction except for rare situations where installment payments may be authorized, subject to a credit review
Availability of contribution through a premium or surcharge paid by the customer	Yes

Gas vs. Electric Connection Rules for Large Customers	
	Gas
Deposit in support of revenue forecast	Customer may be required to provide financial assurances which may include a cash deposit, letter of credit, parental guarantee or other equivalent based upon a credit review.
Timing of repayment of deposit in support of revenue forecast	Financial assurances may be adjusted over time to reflect the most current credit rating of the customer and exposure.
Liability for connection cost overruns (who is liable, and how it this enforced)	Depending on the terms of the contract a customer may either be responsible for final actual project costs or accept a classified cost estimate with contingency in which case there would be no adjustment for final costs.
Liability for revenue forecast shortfalls (who is liable, and how it this enforced)	Per the terms of the distribution contract, customers are liable for any revenue shortfall that may occur as a result of an event of default or early termination. It may be enforced through financial assurances.
Availability and timing of refunds where connection cost is less than forecast	For distribution contracts with a cost true up provision the CIAC would be adjusted immediately upon final costs being established.
Availability and timing of refunds where distribution revenue is greater than forecast	Not available
Other	

ENBRIDGE GAS INC.

Answer to Interrogatory from
School Energy Coalition (SEC)

Interrogatory

Reference:

1-15-1

Question(s):

Please provide a table that shows a comparison of the existing EGD, Union and proposed EGI connection policies.

Response:

Please see response at Exhibit I.1.15-STAFF-44 part b).

ENBRIDGE GAS INC.

Answer to Interrogatory from
Vulnerable Energy Consumers Coalition (VECC)

Interrogatory

Reference:

Exhibit 1, Tab 15, Schedule 1, Attachment 1

Question(s):

a) Please clarify how normalized system reinforcement costs (NSRC) are calculated in any given year/project. Specifically provide a sample calculation to show its derivation.

b) Was the concept of NSRC discussed in EB-2020-0094 or is the concept new to this application?

c) In its Decision in EB-2020-0094 the Board noted evidence of Enbridge which stated: “Enbridge Gas stated that this does not mean that it does not apply a PI of 0.8, but that this lower PI threshold is the exception generally reserved for system reinforcement projects, and not the rule.” Please explain how this statement is consistent with the NSRC concept proposed in this application.

Response:

a) The OEB requires gas utilities to include an allowance for system reinforcement costs for new connection projects on a normalized basis as described in the Final Report of the Board in E.B.O 188, paragraph 2.3.7. "Normalized system reinforcement costs” (NSRC) are categorized into "special" reinforcements and "normal" reinforcements. The costs of the former are those associated with specific major reinforcements of the system and are to be amortized over a period of 10-20 years. Normal reinforcement costs are the residual of the total identified reinforcement costs after the special reinforcement costs are deducted. The amortized value of special reinforcements and a 10-year average of normal reinforcement costs are included in the portfolio analysis as a percentage of the total capital expenditure in the year.

Calculation of NSRC is a four-step process as described below.

1. The 10-20 year total amortized special reinforcement cost is added to a 10-year average normal reinforcement cost. This determines the total cost to be included in NSRC calculations.

2. A 10-year average "Sales Main" cost is determined based on the most recent 10 years data, including 9 years of actual and 1 year of current budget cost.

3. A reinforcement allocation percent (%) is established by using the values in step 1 and step 2 as numerator and denominator respectively.

4. The allocation % of step 3 is multiplied with the sales mains cost of the current year budget to determine the NSRC for the budget year.

Sample calculations (based on hypothetical number)

Step 1:			($000)
	Special Reinforcement Costs (amortized over 10-20 years)	A	$ 13,731
	Normal Reinforcement Costs(10 years average)	B	$ 1,550
Total Reinforcement costs (to be included)		A + B	$ 15,281
Step 2:			
	Cost of Sales Mains (10 years average)	C	$ 27,244
Step 3:			
	Reinforcement Allocation %	(A + B) ÷ C	56.1%
Step 4:			
Allowance for system reinforcement			
	Test Year - Sales Main Budget	D	$ 22,696
	Reinforcement Allocation %		56.1%
NSRC for the test year		{(A + B) ÷ C} x D	$ 12,731

b) NSRC was not an issue in EB-2020-0094 proceedings. This concept was first introduced in 1998 in the OEB's E.B.O 188 Final Report of the Board.

c) The concept of NSRC and the flexibility of using a lower PI threshold for project assessment are unrelated items approved by the OEB as part of its E.B.O 188 guidelines and are not new proposals in this application.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Vulnerable Energy Consumers Coalition (VECC)

Interrogatory

Reference:

Exhibit 1, Tab 15, Schedule 1, Attachment 1

Question(s):

“Refunds of CIAC may be requested by customers when the actual customer count on a system expansion project exceeds the original forecast.”

“No interest is payable on refunds, and only those customers who made the original contribution are eligible for a refund.”

a) How will a customer know if a project’s actual customer count has exceeded the original forecast?

b) Is the calculation for exceeding (or not meeting) the forecast done on an annual basis or at the end of a given period? If the latter please specify how the refund amount will be calculated.

c) What is the reason for not providing interest on overcollection of CIAC amounts?

d) What is the reason for attaching the refund to the original customer rather than the property? And is this policy the same for large volume customers, residential and commercial customers?

Response:

a) The majority of projects are short main extensions with 10 or less customers. Since the scope of these projects is so small, customers are often aware but alternatively customers may request Enbridge Gas to perform a reassessment at any time.

b) A refund calculation is completed as soon as Enbridge Gas receives a customer request for reassessment. Enbridge Gas validates if additional customers have been connected to the same facility, if confirmed, the refund is processed. The refund amount is determined by re-assessing the original feasibility of the project by including additional customers and calculating a revised CIAC amount to bring the PI to 1.0. Any difference between the revised CIAC amount and the initial CIAC paid by customers is refunded to the customers who originally paid the contribution immediately.

c) The CIAC amount collected from the customers offsets Enbridge Gas capital investments and is a credit to assets. These payments offset the rate base and tend to lower the rates for Enbridge Gas ratepayers. Based on the regulatory model, Enbridge Gas does not earn any interest on these payments and therefore does not offer an interest on CIAC refunds.

d) The refund policy is aligned with the basic legal principle that a refund is payable to the same customer who originally paid it. This policy is the same for all types of customers.

ENBRIDGE GAS INC.

Answer to Interrogatory from
Vulnerable Energy Consumers Coalition (VECC)

Interrogatory

Reference:

Exhibit 1, Tab 15, Schedule 1, Attachment 1

Question(s):

> *"When a CIAC is required for a project that serves more than one general service residential and small commercial customers, the CIAC is allocated between the customers based on the annual consumption forecast"*

a) Is the CIAC calculated on a forecast or actual basis and if the former is any adjustment (refund/charge) made to the CIAC subsequent to actual consumption?

> *"Small volume customers (SVC) on a project that is denoted as SES or TCS, do not have the option of paying a CIAC in lieu of the SES or the TCS."*

b) It is unclear to us when or what differentiates a project that attracts the use of CIAC and one that uses the SES/TCS funding mechanisms – please clarify.

c) Is the above noted mutual exclusion as between CIAN and SES/TCS meant to prohibit both the use of CIAC where SES/TCS is used and to exclude them being used in conjunction with each other (i.e., could **both** a CIAC and SES/TCS be applied to make a project reach a PI of 1.0)?

Response:

a) The CIAC is calculated on a forecast basis and no subsequent adjustments are made based on the actual consumption, please see Exhibit 1, Tab 15, Schedule 1, Attachment 1, paragraph 26.

b) The CIAC mechanism and SES/TCS mechanisms are available to the Company and may be used for projects regardless of customer type, please see Exhibit 1, Tab 15, Schedule 1, Attachment 1, paragraph 38, 42, however, a CIAC is generally more suitable for large industrial customers, and the SES/TCS mechanisms are more appropriate for general service customers, including residential and small commercial. The advantage for general service customers is that projects using

SES/TCS more fairly account for future customers connecting to the project. For projects involving CIAC contributions, only year 1 customers connecting to the project are accountable for paying a contribution.

c) Any project using a SES or TCS, cannot use a CIAC in conjunction with the SES or TCS to make the project achieve a PI of 1.0, please see Exhibit 1, Tab 15, Schedule 1, Attachment 1, paragraph 40. This approach is consistent with the OEB's Harmonization of System Expansion and Temporary Connection Surcharges Decision[1]. The Decision states "the OEB finds that allowing a CIAC for TCS residential customers in addition to the maximum term of the TCS in order to achieve a profitability index of 1.0 would be inconsistent with the treatment for SES customers who do not have that option."

[1] EB-2020-0094, Decision and Order, December 4, 2020, p2.