

June 10, 2016

BY COURIER & RESS

Ms. Kirsten Walli  
Board Secretary  
Ontario Energy Board  
Suite 2700, 2300 Yonge Street  
Toronto, Ontario  
M4P 1E4

Dear Ms. Walli:

**RE: EB-2016-0186 – Panhandle Reinforcement Project – Union Gas Limited (“Union”)**

Enclosed please find two copies of Union’s Application and pre-filed evidence in relation to the above-noted project.

The Application and pre-filed evidence have been filed through the Ontario Energy Board’s RESS and will be available on Union’s website at: [www.uniongas.com](http://www.uniongas.com).

The Panhandle Reinforcement Project (“the Project”) involves the construction of approximately 40 km of NPS 36 pipeline extending from Union’s Dawn Compressor Station to the Dover Transmission Station. The Project also requires related modifications at several stations.

The Panhandle System consists of an existing NPS 16 and NPS 20 pipeline. As detailed in evidence, to construct the Project, Union will remove the existing NPS 16 pipeline and replace it with a new NPS 36 pipeline. This “lift and lay” construction process allows the new pipeline to be installed in the same easement as the NPS 16, thus minimizing land and environmental impacts.

The Panhandle System represents the primary pipeline asset to transport natural gas from Dawn and the Ojibway Valve Site (“Ojibway”) in Windsor to high pressure distribution pipelines serving residential, commercial and industrial in-franchise markets in Chatham-Kent, Windsor, Lakeshore, Leamington, Kingsville, Essex, Amherstburg, LaSalle, and Tecumseh (the “Market”). Union has served this Market for decades using the existing NPS 16 and NPS 20 pipelines with limited pipeline reinforcement.

The Panhandle System is nearing its Design Day capacity. Based on the limited capacity available, the Project is critical to ensuring the continued reliable and secure delivery of natural gas to the Market. Union has recognized the urgent need for natural gas infrastructure reinforcement in Southwestern Ontario. In short, if the Project is not constructed, firm demand growth in the

Market cannot be served. The total estimated cost to construct the Project is \$264.5 million with an in-service date of November 1, 2017.

Union is requesting Section 90 leave to construct approval for the new NPS 36 pipeline as well as Section 36 approvals related to the recovery of the cost consequences of the Project in accordance with the Board-approved Capital Pass-through Mechanism.

Union is proposing the Project at a time of uncertainty resulting from the Ontario Cap and Trade program and the recent issuance of the Ontario government's 5-year (2016-2020) Climate Change Action Plan ("CCAP"). In response to this risk, Union has calculated the revenue requirement and resulting rate impacts of the Project based on a 20-year estimated useful life of the assets rather than the weighted average useful life of approximately 50 years based on Board-approved depreciation rates. Union submits depreciating the asset over a 20-year term better aligns the cost with the timing of reported restrictions and potential elimination of natural gas heating in homes and businesses as noted in the CCAP.

Please note, the Environmental Report prepared for the Project is not included in the electronic filing. Rather, a CD containing the Environmental Report will be sent by courier to the Board. The Environmental Report will also be available on Union's website.

Should you have any questions on the above or would like to discuss in more detail, please contact me at 519-436-5473.

Yours truly,

*[original signed by]*

Karen Hockin  
Manager, Regulatory Initiatives

Encl.

cc: EB-2015-0116 (2016 Rates) Intervenor  
Charles Keizer, Torys

**PANHANDLE REINFORCEMENT PIPELINE PROJECT**

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Exhibit

Appendix

A

A

Schedule 1 DCF Over 40-Year Term

B

Capital Pass-Through and Rate Impacts Schedules 1-7 based on Board-Approved Depreciation

**ONTARIO ENERGY BOARD**

**IN THE MATTER OF** The Ontario Energy Board Act, 1998, S.O. 1998, c.15, Schedule B, and in particular, S.90.(1) thereof;

**AND IN THE MATTER OF** The Ontario Energy Board Act, 1998, S.O. 1998, c.15, Schedule B, and in particular, S. 36 thereof;

**AND IN THE MATTER OF** an Application by Union Gas Limited for an Order or Orders granting leave to construct natural gas pipelines and ancillary facilities in the Township of Dawn Euphemia, Township of St. Clair and the Municipality of Chatham-Kent;

**AND IN THE MATTER OF** an Application by Union Gas Limited for an Order or Orders for approval of recovery of the cost consequences of all facilities associated with the development of the proposed Panhandle Reinforcement Pipeline Project.

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**UNION GAS LIMITED**

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1. Union Gas Limited (the “Applicant” or “Union”) hereby applies to the Ontario Energy Board (the “Board”), pursuant to Section 90(1) of the Act, for an Order or Orders granting leave to construct approximately 40 kilometres of NPS 36 pipeline from Union’s Dawn Compressor Station in the Township of Dawn-Euphemia to its Dover Transmission Station located in the Municipality of Chatham-Kent (“the Proposed Pipeline or the Project”).
2. The Applicant also hereby applies to the Board, pursuant to Section 36 of the Act, for an Order or Orders granting:
  - a) approval of recovery of the cost consequences of all facilities associated with the development of the Proposed Pipeline from ratepayers in accordance with the Board-approved Capital Pass-through criteria forming part of Union’s 2014-2018 Incentive Regulation Mechanism (EB-2013-0202); and,

- b) approval to calculate the revenue requirement and resulting rates of the Project based on a 20-year depreciation term; and,
  - c) approval of an accounting order to establish the Panhandle Reinforcement Project Deferral Account.
3. A map showing the general location of the Proposed Pipeline, and associated facilities and the municipalities, and highways through, under, over, upon or across which the pipeline will pass is presented at Schedule A.
4. The parties affected by this Application are the owners of lands, government agencies and municipalities over which the pipeline will be constructed, and Union's distribution customers with respect to quality of service and security of supply. The persons affected by this Application are the customers resident or located in the Municipalities, the First Nation Reserves and Métis organizations served by Union, together with those to whom Union sells gas, or on whose behalf Union distributes, transmits or stores gas. It is impractical to set out in this Application the names and addresses of such persons because they are too numerous.
5. The Applicant now therefore applies to the Board for an Order or Orders for approval of recovery of the cost consequences and granting leave to construct the Proposed Pipeline as described above.
6. The address for service for Union is:

Union Gas Limited  
P.O. Box 2001  
50 Keil Drive North  
Chatham, Ontario N7M 5M1

Attention: Karen Hockin  
Manager, Regulatory Initiatives  
Telephone: 519-436-5473

Fax: 519-436-4641  
Email: [khockin@uniongas.com](mailto:khockin@uniongas.com)

**-and-**

Torys LLP  
Suite 3000, 79 Wellington Street West  
P.O. Box 270, Toronto Dominion Centre  
Toronto, Ontario M5K 1N2

Attention: Charles Keizer  
Telephone: 416-865-7512  
Fax: 416-865-7380  
Email: [ckeizer@torys.com](mailto:ckeizer@torys.com)

Dated: June 10, 2016

UNION GAS LIMITED

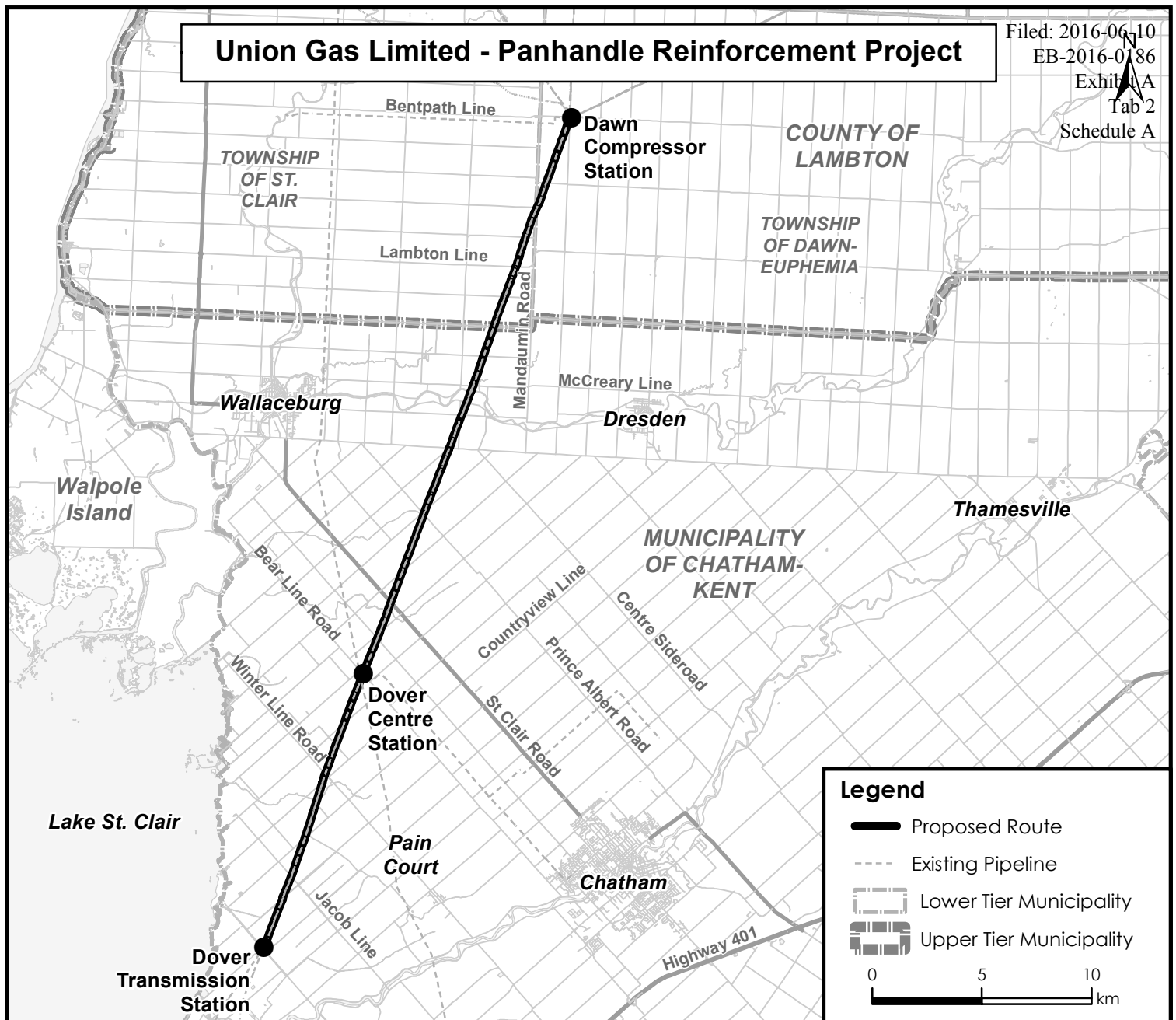
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Karen Hockin, Manager, Regulatory Initiatives

# Union Gas Limited - Panhandle Reinforcement Project

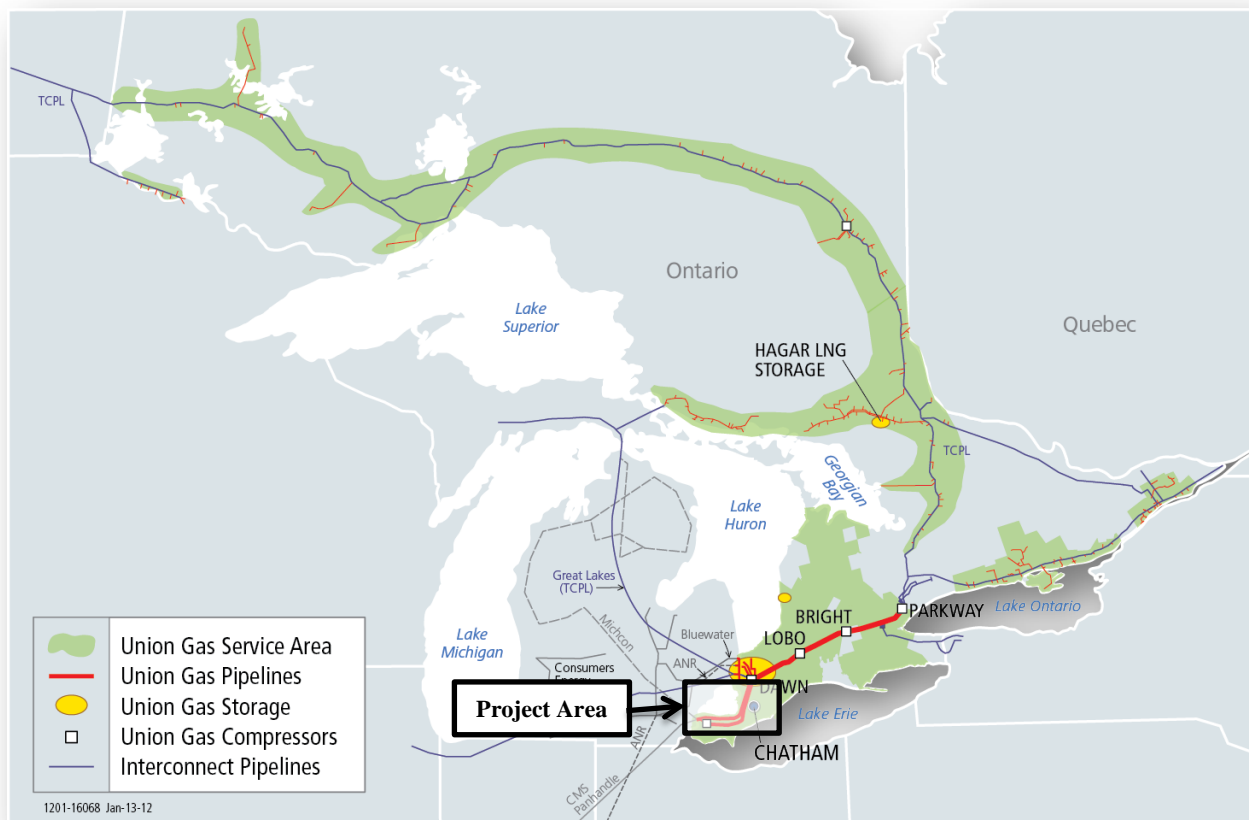
Filed: 2016-06-10  
EB-2016-0186  
Exhibit A  
Tab 2  
Schedule A



## SUMMARY OF APPLICATION

In response to increasing natural gas demand from customers served by the Panhandle Pipeline System (“Panhandle System”), Union is proposing to reinforce the Panhandle System by constructing approximately 40 kilometres of NPS 36 pipeline from Union’s Dawn Compressor Station (“Dawn”) in the Township of Dawn-Euphemia to the Dover Transmission Station (“Dover Transmission”) in the Municipality of Chatham-Kent (“Proposed Pipeline” or “the Project”) and completing related station modifications. Figure 3-1 illustrates the Project Area.

Figure 3-1



1 The Panhandle System represents the primary transmission pipeline asset to transport natural gas from  
2 Dawn and the Ojibway Valve Site (“Ojibway”) in Windsor to high pressure distribution pipelines  
3 serving residential, commercial and industrial in-franchise markets in Chatham-Kent, Windsor,  
4 Lakeshore, Leamington, Kingsville, Essex, Amherstburg, LaSalle, and Tecumseh (the “Market”). The  
5 Panhandle System is comprised of an existing NPS 16 and NPS 20 pipeline. The high pressure  
6 distribution pipelines move natural gas to intermediate pressure distribution pipelines which supply  
7 natural gas to in-franchise customers. Union has served the Market for decades using the existing NPS  
8 16 and NPS 20 pipelines with limited pipeline reinforcement. For a more detailed illustration of the  
9 Market and the Panhandle System, please refer to Exhibit A, Tab 4, Figure 4-1.

10  
11 In the last five years however, Union has experienced significant growth in the in-franchise markets  
12 served by the Panhandle System, particularly in the Greenhouse market and has also received a  
13 significant number of requests for firm service due to the number of days of interruption over the past  
14 few years and the associated cost of alternate fuel required during an interruption. This growth uses  
15 capacity on the Panhandle System to move gas from Dawn to the Market and Union is no longer able  
16 to meet all firm service requests. As a result of this growth, reinforcement is needed on the Panhandle  
17 System. Hydraulic analysis shows that the operational requirements of the Panhandle System will not  
18 be met for the Winter 2017/2018 assuming forecast growth to a Design Day demand of 623 TJ/d and  
19 no changes to existing facilities. In order to continue to provide service to new general service and  
20 contract customers, additional capacity is required on the Panhandle System by November 1, 2017.  
21 Economic development in Southern Ontario is dependent on the availability of natural gas to support  
22 commercial and industrial business and the residents employed at those businesses. In fact, Union has

1 advised Municipalities and customers across all market sectors that reinforcement of the Panhandle  
2 System is required before future expansions can take place in their communities. This includes the  
3 needs of Market customers such as Chrysler in Windsor and the Windsor Regional Hospital – Ouellette  
4 Campus. It also includes several greenhouse operators waiting for incremental firm service and general  
5 service customers (new attachments) requiring service in Winter 2017/18. In addition to customer  
6 benefits, natural gas provides a competitive advantage for commercial and industrial businesses. So  
7 much so, the absence of available natural gas capacity may result in customers delaying or cancelling  
8 plans to expand their operations. It also creates a real risk that customers will look to establish their  
9 operations in different jurisdictions where natural gas is available. This risk is further supported by a  
10 letter provided by the President and CEO of Can Art Aluminum Extrusion Inc., a manufacturing  
11 company specializing in the aluminum extrusion sector in Windsor. In its letter, Can Art states:

12  
13 *“I can categorically and without reservation state that without the availability of natural gas for our*  
14 *business, our present expansion plans would be altered and ultimately we would look to expand in the*  
15 *USA, with the real possibility of moving all our businesses there due to a very attractive open door*  
16 *policy, and lower costs.”*

17  
18 The above referenced letter is included at Exhibit A, Tab 4, Schedule 2 and additional Letters of  
19 Support for the Project are included at Exhibit A, Tab 5, Schedule 2. These letters not only support the  
20 Project but also address the urgency of its need.



1 The economic benefits natural gas provides a community are also significant. Such benefits include but  
2 are not limited to:

- 3 • residential energy savings enabling more consumer spending at local businesses and across  
4 the community (e.g. charitable organizations);
- 5 • energy savings supporting the ability of new businesses to be competitive;
- 6 • enhanced ability to attract new residents and new businesses to the community;
- 7 • enhanced ability for existing businesses to grow and expand;
- 8 • increased housing values and resulting property tax assessments; and,
- 9 • municipal energy cost savings in municipal buildings such as arenas and community  
10 centres.

11  
12 The Application by Union is brought in response to the immediate need and forecasted market  
13 demands and lack of available firm capacity on the Panhandle System. The Application consists of the  
14 following requests:

- 15 1) Section 90 (1) of the Ontario Energy Board Act (“the Act”) granting Leave to Construct  
16 approximately 40 kilometres of NPS 36 pipeline from Dawn to Dover Transmission;
- 17 2) Section 36 of the Act granting pre-approval of the recovery of cost consequences of the  
18 Project from ratepayers;
- 19 3) Section 36 of the Act granting an approval to calculate the revenue requirement and  
20 resulting rates of the Project based on a 20-year depreciation term; and,
- 21 4) Section 36 of the Act granting an approval of an accounting order to establish the  
22 Panhandle Reinforcement Project Deferral Account to track any variance between the

1 revenue requirement included in rates for the Project and the actual revenue requirement of  
2 the Project.

3  
4 As detailed at Exhibit A, Tab 7, Schedule 1, the total capital cost of the Project is estimated to be  
5 \$264.5 million, consisting of:

- 6 1) Construction of the Proposed Pipeline at a cost of \$224.0 million; and,
- 7 2) Station modifications at a cost of \$40.5 million.

8  
9 Union is seeking approval of the recovery of the cost consequences of the Project as part of this  
10 proceeding because the Project meets the capital pass-through criteria as determined in Union's 2014-  
11 2018 Incentive Regulation Mechanism ("IRM") proceeding (EB-2013-0202). The intent of the capital  
12 pass-through mechanism is to capture the associated impacts of significant capital investments made in  
13 the IRM term that are considered "not-business-as-usual," as the capital expenditures cannot be  
14 managed in Union's Board-approved capital budget.

15  
16 Union has recognized the urgent need for natural gas infrastructure reinforcement in Southwestern  
17 Ontario. Due to this increased demand for natural gas, Union has been working diligently on the  
18 Project for well over a year. Ontario's Cap and Trade program and the introduction of the Ontario  
19 government's 5-year (2016-2020) Climate Change Action Plan ("CCAP")<sup>1</sup> has resulted in significant  
20 risk to the return of any capital invested in natural gas infrastructure.

21  

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<sup>1</sup> Ontario government's Climate Change Action Plan ("CCAP") released June 8, 2016.

1 A key component of the overall Cap and Trade program is the investment of dollars collected through  
2 the price of carbon in order to reduce the province's GHG emissions. In Ontario, the CCAP details the  
3 government's direction and priorities for spending the Cap and Trade program proceeds, aimed at  
4 achieving its emission reduction targets. Prior to the official release of the CCAP, early reports  
5 indicated that "building code changes that would ensure all 'new homes and small buildings' built in  
6 2030 or later do not use fossil fuels such as natural gas for heat or cooling; by 2050, this requirement  
7 would apply to all buildings." More recently, the government has now stated that it is not banning  
8 natural gas or forcing anyone off of it, however, the contents of the final CCAP appear to include  
9 putting restrictions on the use of natural gas in Ontario in the not too distant future (15 to 35 years). For  
10 example, at page 27 the CCAP states the government intends to update the building code as a means to  
11 support the action of setting lower-carbon standards for new buildings. Specifically, the government  
12 intends to update the code with "long-term energy efficiency targets for new net zero carbon emission  
13 small buildings that will come into effect by 2030 at the latest, and consult on initial changes that will  
14 be effective by 2020." Although the CCAP supports a renewable content requirement for natural gas  
15 and encourages the use of "cleaner, renewable natural gas in the industrial, transportation and buildings  
16 sector"<sup>2</sup>, it promotes alternative energy sources to conventional natural gas use. The CCAP allocates  
17 almost \$4 billion (nearly half of the entire plans' funding) in new grants, rebates and other subsidies  
18 directed toward energy retrofits and efficiency measures aimed at helping homeowners reduce their  
19 carbon footprints by supporting additional choice. In fact, as stated at page 27 of the CCAP, the  
20 government intends to help homeowners "purchase and install low-carbon energy technologies such as

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<sup>2</sup> CCAP, section 6.1, p.28

1 geothermal heat pumps and air-source heat pumps, solar thermal and solar energy generation systems  
2 that reduce reliance on fossil fuels for space and water heating.”  
3

4 The overall objective, content and lack of detail within the CCAP have created a great deal of  
5 uncertainty for Ontario homeowners, businesses and institutions, and potential investors in Ontario  
6 including Union. This uncertainty creates the risk of recovery of needed investment and has caused  
7 Union to reevaluate the cost recovery term and depreciation of any new expansion assets.  
8

9 The use of Board-approved depreciation rates for this infrastructure project results in a weighted  
10 average useful life of approximately 50 years. This depreciation expense would typically be used to  
11 calculate revenue requirements and resulting customer rate impacts.  
12

13 The uncertainty created by Cap and Trade and the CCAP has driven the need for Union to calculate the  
14 revenue requirement and resulting rate impacts based on an estimated 20-year useful life of the Project  
15 assets rather than the weighted average useful life of approximately 50 years based on Board-approved  
16 depreciation rates. Depreciating the asset over a 20-year useful life better aligns the cost with the  
17 timing of the reported restrictions and potential elimination of natural gas heating in homes and  
18 businesses.  
19

20 Union’s choice of 20 years recognizes the changes being proposed by 2030 (when the CCAP indicates  
21 changes to the building code will be made for new small buildings “net carbon zero” targets) and is  
22 based on management’s judgment. Depreciating the facilities over 20 years means that the full cost of

1 the investment is recovered by 2037. Although this will have a greater impact on customer delivery  
2 rates, Union is left with no reasonable alternative. Resulting sales service and direct purchase bill  
3 impacts of all Union in-franchise South rate classes with Panhandle System demands are provided at  
4 Table 3-1. The bill impacts of other Union South in-franchise, Union North in-franchise and ex-  
5 franchise rate classes are not significant. The calculation of all in-franchise bill impacts using a 20-  
6 year useful life and Board-approved depreciation rates is provided at Exhibit A, Tab 8, Schedule 6 and  
7 Exhibit A, Appendix B, Schedule 6, respectively.

Table 3-1  
Bill Impacts of the Panhandle Replacement Project by Rate Class

Line No.	Particulars	20-Year Depreciation		Board-Approved Depreciation		Difference	
		Sales Service (1)	Direct Purchase	Sales Service (1)	Direct Purchase	Sales Service (1)	Direct Purchase
		(a)	(b)	(c)	(d)	(e) = (a-c)	(f) = (b-d)
1	Rate M1	1%	2%	1%	2%	<0.5%	<1%
2	Rate M2	2%	6-8%	1%	4-6%	<1%	2%
3	Rate M4	4-6%	24-27%	3-4%	16-18%	1-2%	8-9%
4	Rate M7	2-5%	17-19%	1-3%	11-12%	1-2%	6-7%
5	Rate T1	2%	14-16%	1%	10-11%	<1%	4-5%
6	Rate T2	1%	18-20%	1%	13-15%	<0.5%	5%

Notes:

(1) Total sales service bill impacts assume Union's gas commodity and transportation rates per EB-2016-0040 (Union's April 2016 QRAM).

8 The total revenue requirement associated with the Project is approximately \$5.0 million in 2017  
9 increasing to \$27.2 million in 2018. The revenue requirement represents the costs associated with the  
10 Project facilities deemed to be in service in 2017 and 2018. The revenue requirement is calculated  
11 based on Union's proposal to depreciate the Project's assets over 20 years rather than Board-approved

1 depreciation rates. The calculation of the total revenue requirement and the underpinning assumptions  
2 are provided at Exhibit A, Tab 8, Schedule 1.

3  
4 To calculate rate impacts, Union used the largest revenue requirement directly attributable to the  
5 Project (rate base, return, interest, tax, depreciation and O&M) between 2017 and 2018 of \$27.2  
6 million net of the incremental Project revenue of \$1.6 million. Union allocated the net revenue  
7 requirement of \$25.6 million to rate classes using Union's proposed Project cost allocation  
8 methodology.

9 As detailed in Exhibit A, Tab 8, Union is proposing an interim allocation of the Project costs during the  
10 IRM term which is different than the 2013 Board-approved cost allocation methodology used for  
11 existing Panhandle System costs. Union is proposing to allocate the Panhandle System demand costs  
12 related to the Project in proportion to the firm Union South in-franchise Panhandle System Design Day  
13 demands, updated to include the incremental Project Design Day demands. This allocation  
14 methodology is consistent with the use of the Panhandle System on Design Day.

15  
16 Union is also proposing to not update the Rate C1 firm long-term transportation rates between Dawn  
17 and St. Clair, Ojibway and Bluewater and the Rate M16 west of Dawn demand rate for the Project  
18 costs during the IRM term. This interim approach better reflects how ex-franchise Rate C1 and Rate  
19 M16 customer use the Panhandle System on Design Day and ensures the allocation of costs and rate  
20 impacts reflect the principles of cost causality. As stated later in this evidence, Union plans to review

1 the cost allocation and rate design for all Panhandle System costs as part of its 2019 Cost of Service  
2 proceeding.

3  
4 As a result of Union's proposed changes, there is: (i) an increase of approximately \$26.0 million  
5 allocated to Union South in-franchise rate classes, (ii) an increase of approximately \$0.4 million  
6 allocated to ex-franchise rate classes and (iii) a decrease of approximately \$0.7 million allocated to  
7 Union North in-franchise rate classes.

8  
9 In comparison to 2016 Board-approved rates per EB-2016-0040 (April 2016 QRAM), the bill impact  
10 for the average Rate M1 residential customer in Union South consuming 2,200 m<sup>3</sup> per year is an  
11 increase of approximately \$8.03 per year. For the average Rate 01 residential customer in Union North  
12 consuming 2,200 m<sup>3</sup> per year, the bill impact is a decrease of approximately \$1.17 per year. The  
13 estimated delivery bill and total bill impacts for Rate M1 and Rate 01 including all other in-franchise  
14 rate classes are provided at Exhibit A, Tab 8, Schedule 6.

15  
16 Stage 1 economics were completed for the Project and results of the Stage 1 DCF analysis are shown at  
17 Exhibit A, Tab 7, Schedule 4. The results indicate a cumulative NPV of (\$212) million and a PI of  
18 0.19 over a DCF term of 20 years. For illustrative purposes, the DCF analysis based on the typical 40  
19 year revenue expectation is shown at Exhibit A, Appendix A, Schedule 1.

20  
21 Union reviewed and compared a number of alternatives to meet the forecasted demand of the  
22 Panhandle System. These alternatives are discussed in Exhibit A, Tab 6. This analysis included an

1 approach which involved incremental gas supply arriving at Ojibway combined with the construction  
2 of incremental pipeline facilities. As stated in Exhibit A, Tab 6, there are no stand-alone commercial  
3 services that can be contracted with a pipeline company or secondary market that would deliver natural  
4 gas via the Panhandle System into the Market distribution networks that will eliminate the need for  
5 additional pipeline and station facilities. Union evaluates project alternatives based on their ability to  
6 provide reliable, secure and diverse supplies to Union's customers at a prudent cost. Union determined  
7 this combination alternative is not preferred as there is limited benefit to bringing additional supply to  
8 Ojibway (see Exhibit A, Tab 6). Union also evaluated an alternative that involved the installation of a  
9 Liquefied Natural Gas ("LNG") plant along the Panhandle System. As stated in Exhibit A, Tab 6, this  
10 alternative is not viable as it cannot meet the required in-service date of November 1, 2017 given the  
11 extended time required to construct the facilities and when considering capital and operating costs, it is  
12 more expensive.

13  
14 The preferred alternative ("the Project") involves the removal of the existing NPS 16 Panhandle  
15 pipeline between Dawn and Dover Transmission and replacing it with a new NPS 36 pipeline. As  
16 detailed in Exhibit A, Tab 6, the preferred alternative provides a number of benefits including:

- 17 • provides market assurance in meeting the growing near term firm demands for the next five  
18 years;
- 19 • positions the Panhandle System and laterals connecting the distribution network to meet long  
20 term Market growth in the most efficient manner;
- 21 • eliminates O&M costs related to future integrity and other maintenance specific to the existing  
22 NPS 16 Panhandle pipeline;



- the new NPS 36 pipeline will be constructed primarily within Union's existing easement; and,
- provides the necessary incremental capacity without the increased reliance on third party gas supply transportation services.

To accommodate the Project, as detailed in Exhibit A, Tab 9, Union will employ a "lift and lay" construction process to install the Proposed Pipeline. Specifically, the existing NPS 16 Panhandle pipeline will be removed (lift) and replaced with the proposed NPS 36 pipeline (lay) in the same easement with the exception of those sections of pipe deemed not practical to remove as determined by an Engineering Assessment, such as major road and watercourse crossing locations. At these locations the NPS 16 Panhandle pipeline will be abandoned in place and a new land right will be obtained for the new NPS 36 pipeline.

The permanent and temporary land rights necessary for the construction of the Proposed Pipeline will be acquired from individual landowners. The majority of the Proposed Pipeline will be constructed within Union's existing easement. Union will only require approximately 1 kilometre in total of new permanent easement (multiple short sections for road and water crossing locations, etc) for the Proposed Pipeline. Union will require approximately 309 acres of temporary land use ("TLU") for construction and top soil storage purposes. Union has initiated meetings with the landowners from whom either permanent easements or TLU rights are required and will continue to meet with those landowners to acquire options for all the necessary lands.

An Environmental Report ("ER") has been prepared for the Project. The ER was prepared to identify

1 potential impacts and related mitigation measures for construction of the NPS 36 pipeline and the  
2 removal of the existing NPS 16 Panhandle pipeline. Union believes that by following its standard  
3 construction practices and adhering to the recommendations and mitigation identified in the ER, there  
4 will be no significant environmental impacts resulting from the construction of the Project. The  
5 cumulative effects assessment completed as part of the ER indicates that no significant cumulative  
6 effects are anticipated from the development of the Proposed Pipeline.

7  
8 To ensure area residents and other key stakeholders were made aware of the Project, Union  
9 implemented a consultation outreach plan. As part of this plan, Union mailed affected individuals a  
10 Project-specific information letter and held two Information Sessions within the Project area. The  
11 purpose of these Information Sessions was to engage with and solicit input from landowners, tenants  
12 and the general public with respect to the Proposed Pipeline. In addition to meeting with landowners,  
13 First Nations and Métis Nations, Union also met with municipal officials and a number of industry and  
14 agricultural associations. The Project was also identified at Union's April 2015 and April 2016  
15 Stakeholder meetings as well as the Board's Natural Gas Market Review (EB-2015-0237). Union will  
16 continue its commitment to public consultation throughout the completion of the Project.

17  
18 Construction of the Project is scheduled to commence in the spring of 2017. The construction schedule  
19 utilizes the favourable summer construction weather thereby minimizing the impact of construction on  
20 agricultural lands and other features such as watercourses.

21  
22 The proposed in-service date for the Project is November 1, 2017. In order to facilitate efficient project

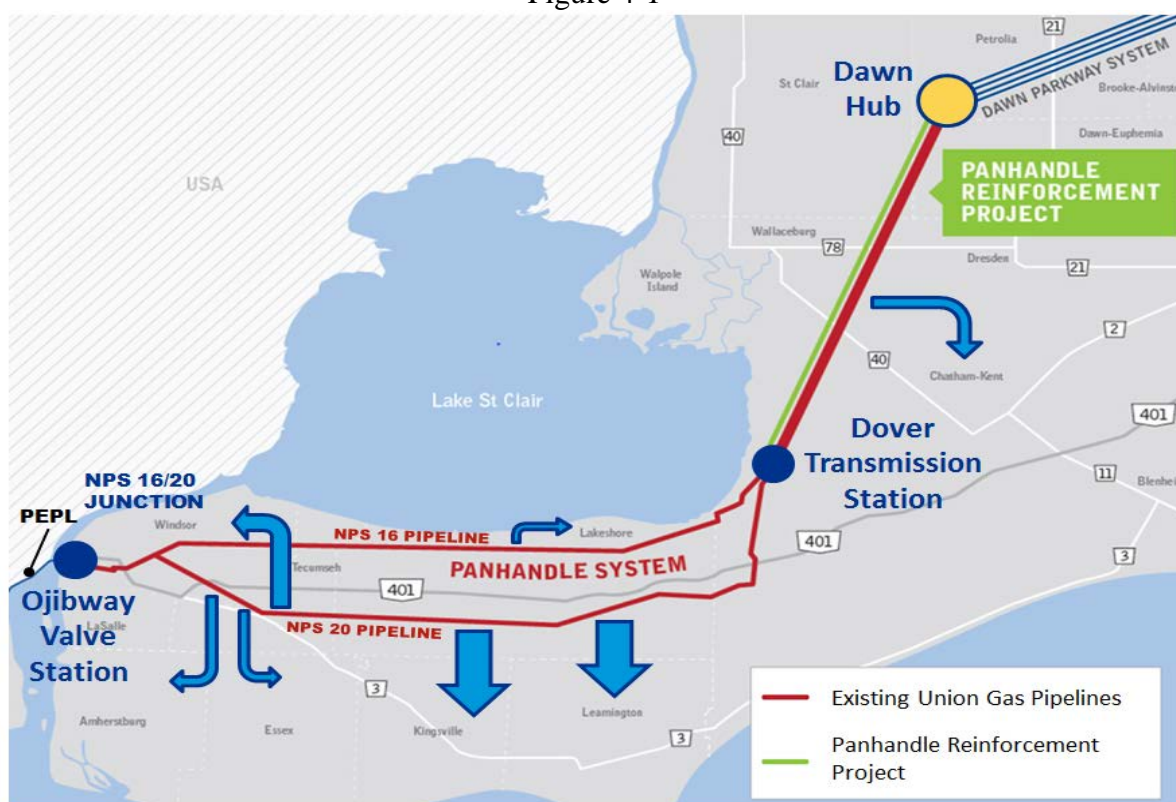
1 development and meet its proposed in-service date, Union respectfully requests the Board issue its  
2 approval in mid March, 2017.

3  
4 As noted earlier, the expansion of the Panhandle System is critical to meet the urgent needs of  
5 customers and is a critical component to ensure economic growth in Southern Ontario. If the Project is  
6 not constructed, economic development in this region of Ontario will be significantly impacted.  
7 Natural gas provides a competitive advantage for commercial and industrial customers. Without  
8 completing the Project as proposed, as further detailed in Exhibit A, Tab 5, economic development in  
9 Southern Ontario will suffer.

## PANHANDLE SYSTEM OVERVIEW- BENEFIT TO ONTARIO

The purpose of this section of evidence is to provide an overview of the Panhandle System. The Panhandle System is the transmission system that supplies natural gas to Union South in-franchise distribution markets in the Municipalities of Chatham-Kent, Windsor, Lakeshore, Leamington, Kingsville, Essex, Amherstburg, LaSalle, and Tecumseh (“the Market”) as well as C1 transportation services between Ojibway<sup>1</sup> and the Dawn Hub (“Panhandle System”). Figure 4-1 illustrates the Market and the Panhandle System.

Figure 4-1



The Panhandle System is critical to providing reliable and affordable natural gas to Union in-franchise residential, commercial, natural gas fired generation, and industrial customers in the Market. A cost

<sup>1</sup> Ojibway is known as the point of interconnection between the Panhandle System and the Panhandle Eastern Pipeline (“PEPL”) system at the international border under the Detroit River.

competitive energy supply is fundamental to the economic well-being and growth in southwestern Ontario. The firm Design Day demand along the Panhandle System is forecasted to grow 19% by 2021 and 37% in total by 2034 with the majority of the growth in the mid-section of the Panhandle System in the Leamington and Kingsville area (approximately 58% by 2021 and 65% by 2034 in that area). Market demand is forecast to exceed the Panhandle System capacity for firm service by Winter 2017/2018. Reinforcing the Panhandle System is a necessary investment in order to attach any customers, even general service customers, and fundamental to the economic well-being of the Market and Ontario. The Proposed Project:

1. Provides competitive and affordable energy supply;
2. Assists to retain industry and business;
3. Helps to encourage economic growth; and
4. Will create employment opportunities.

Recently, industries in the Market have expressed frustration to Union and to the media at the limited availability of firm natural gas service. Industries have considered turning to other jurisdictions to locate facilities and some have already done so. Related media articles can be found at Exhibit A, Tab 4, Schedule 1. A letter from Can Art Aluminum Extrusion Inc., as referenced in the Summary of Application, can be found at Exhibit A, Tab 4, Schedule 2.

### ***Panhandle System***

Union's Panhandle System is a high pressure transmission system made up of two pipelines; an NPS 16 pipeline extending from the Dawn Hub to a point at Ojibway in the City of Windsor, and an NPS 20

1 pipeline extending from the Dawn Hub to where it connects with the NPS 16 pipeline in the City of  
2 Windsor (“NPS 16/20 Junction”). The NPS 16 pipeline was completed in 1951 while the NPS 20  
3 pipeline was completed in 1973. Both the NPS 16 and NPS 20 pipelines travel west from the Dawn  
4 Hub through the Township of Dawn Euphemia, Township of St. Clair, Municipality of Chatham-Kent,  
5 Town of Lakeshore, Town of Tecumseh and the City of Windsor.

6  
7 The NPS 16 pipeline connects to two NPS 12 pipelines at its western terminus that undercross the  
8 Detroit River and connect with Panhandle Eastern Pipeline Company L.P. (“PEPL”), an Energy  
9 Transfer Equity L.P. Company, at the International Border (“the Panhandle River Crossing”). This  
10 interconnection between Union and PEPL was established in 1947 and is commercially known as  
11 “Ojibway”. A schematic of the Panhandle System, showing existing and proposed facilities, is shown  
12 at Exhibit A, Tab 4, Schedule 3.

13  
14 The Panhandle System is the primary transmission pipeline asset that transports natural gas to high  
15 pressure laterals that supply Union’s distribution network serving residential, commercial, natural gas  
16 fired power generation, and industrial customers in the Market. The Panhandle System predominantly  
17 flows from the Dawn Hub west to the Market. Approximately 90% of the demand on the Panhandle  
18 System is served from the Dawn Hub on Design Day.

19  
20 Union has served the Market for decades using the existing NPS 16 and NPS 20 pipelines, with limited  
21 reinforcement. In the last five years, Union has reinforced the high pressure laterals connected to the  
22 existing NPS 20 pipeline and/or to the existing NPS 16 pipeline to support the rapidly growing

Greenhouse market in Leamington and Kingsville<sup>2</sup> but has not expanded or reinforced the Panhandle System. This growth has increased the utilization of the Panhandle System to move gas from the Dawn Hub to the Market and the Panhandle System is nearing capacity.

The Panhandle System also flows from Ojibway east to the Market. Approximately 10% or 60 TJ/d of the demand on the Panhandle System is served through Union's gas supply (to serve system customers) delivered at Ojibway on Design Day. Union relies on these firm deliveries in Design Day analysis of the Panhandle System to help reduce the physical transportation needs from Dawn. Ojibway provides some interconnectivity to the Dawn Hub, enables access to natural gas supplies shipped through the PEPL system in the U.S. and contributes to the security and diversity of supply to the Dawn Hub. Ojibway is not a liquid trading point (it has limited buyers and sellers), but is a trans-shipment point between two pipeline systems. Currently, two ex-franchise shippers (C1) have transportation contracts to transport natural gas from Ojibway to the Dawn Hub on a year round basis. Union must be able to transport these volumes on the Panhandle System on a firm basis as requested by the shipper. However, Union cannot rely on these volumes at Ojibway when designing the system.

The amount of natural gas Union can accept from PEPL and transport from Ojibway toward Dawn is limited by the minimum daily Windsor area consumption and the capacity of the Sandwich Compressor Station located in Tecumseh. Currently, Union has a maximum capability to accept imports of 115 TJ/d at Ojibway on a yearly basis (summer month limitation).

---

<sup>2</sup> Leamington Expansion Phase I (2013) EB-2012-0431 and 2016 Leamington Expansion Pipeline Project (EB-2016-0013)

1 The Dawn Hub is one of the largest and most important North American market hubs. It is also the  
2 main source of supply for Union's South in-franchise customers and Union's Dawn Parkway System.  
3 The Dawn Hub is connected to a combination of interconnecting pipelines and underground natural gas  
4 storage. In Ontario, Union owns 157 Bcf of natural gas storage in 23 pools that are all connected to the  
5 Dawn Hub. In addition, Enbridge Gas Distribution Inc. ("Enbridge") operates 112 Bcf of natural gas  
6 storage (the Tecumseh facilities) that is connected to the Dawn Hub. Dawn is also connected through  
7 various upstream pipelines to approximately 675 Bcf of underground natural gas storage in Michigan.

8  
9 A number of pipelines are connected to the Dawn Hub: Great Lakes Gas Transmission ("GLGT") via  
10 TransCanada, Vector Pipeline, Bluewater Gas Storage, DTE (former Michigan Consolidated), PEPL  
11 via Union's Panhandle System, the Enbridge (Tecumseh) system, and ANR via the Niagara Gas  
12 Transmission (Niagara Link) and Enbridge (Tecumseh) systems. Dawn is also connected to pipelines  
13 at the Ontario/New York border via TransCanada and the Dawn Parkway System that include  
14 Tennessee Gas Pipeline, Dominion Transmission and National Fuel Gas Supply Corporation at the  
15 Niagara import/export point and Empire State Pipeline at the Chippewa import/export point.

16  
17 The Dawn Hub is one of the most physically traded, liquid hubs in North America and is the most  
18 physically traded natural gas hub in the Great Lakes region. The liquidity of the Dawn Hub is the result  
19 of the combination of:

- 20 1. access to underground storage;
- 21 2. interconnections with upstream pipelines;



3. take away capacity to growth markets;
4. a large number of buyers and sellers of natural gas; and,
5. price transparency.

The depth and liquidity of the market at the Dawn Hub provides value to all Ontario customers by way of competitive natural gas commodity prices, attracting natural gas supply to Ontario. The Market benefits from having direct access to the Dawn Hub using the Panhandle System.

### ***Summary***

The Panhandle System is a critical natural gas pipeline system that supports residential, commercial, natural gas fired generation and industrial customers west of the Dawn Hub. The Panhandle System was built in the 1940s through the early 1970s and is nearing capacity with increasing firm demand. New pipeline infrastructure is required to support the economic well-being of the Market and Ontario and fuel the growth potential by having access to firm natural gas supplies.

## County headed for gas shortage



**Windsor Star**

**Published: March 16th, 2016**

**Byline: Julie Kotsis**

**Section: City & Region**

**Page: A3**

The provincial government needs to approve a plan to address a critical shortage of natural gas that will stymie future development in Essex County, says Warden Tom Bain.

"We're getting to the point now where it could be a crisis situation if there was a real (increase in) demand," Bain said.

He said the tipping point was a recently approved facility on Patillo Road in Lakeshore that is drawing off the system but has also had to put in a backup generating system to handle its needs.

"(It) maximized the capacity that Union Gas has on the north shore," Bain said.

"So now anybody that taps in there would have to build a backup system."

If capacity isn't increased, "it would mean these companies (would incur) a lot of extra cost to build a backup system or it may mean, and hopefully not, that any new companies ... (or) new building construction, they're going to go elsewhere."

In fact, Bain said that's already happened with some greenhouse growers heading to Ohio instead of building or expanding in the Leamington and Kingsville areas.

Greenhouse owners have also felt the pinch from a lack of hydro. Bain said a new hydro line is not coming until 2018.

"So that's not helping, well it's helping but we need it like tomorrow," he said.

"Now we're finding that we're running into the same situation, that we're going to soon

be in a crisis situation with a shortage of gas, so we have to get the government to help us push this line through.”

Union Gas is proposing to increase the capacity of its Panhandle Transmission System, which services customers in Windsor-Essex, Chatham-Kent and surrounding areas, by installing a new 36-inch diameter pipeline to replace the current 16-inch diameter pipeline.

But Union Gas must get approval from the Ontario Energy Board for the project and officials are asking for support from county council.

“We are currently putting together a justification to present to the OEB to gain approval for this expansion,” Andrea Sequin, district manager for Windsor and Chatham, said in a letter to Bain. “It’s a matter of showing (the Ontario Energy Board) just how urgent the matter is and getting them to move,” Bain said.

County council meets Wednesday at 7 p.m. at the Essex Civic Centre.

## **Inadequate energy infrastructure could stall future county development**



**Windsor Star**

**Published: March 18th, 2016**

**Byline: Julie Kotsis, Windsor Star**

**Section: Local News**

Future development of the region’s billion dollar greenhouse and agricultural sectors will be jeopardized if a proposed \$12.3-million natural gas pipeline project in Leamington is denied by the province’s energy regulator.

An application filed in January by Union Gas for a seven-kilometre pipeline, which would serve the growing greenhouse and agricultural markets in Leamington, is awaiting approval by the Ontario Energy Board.

“The expansion of the sector has driven the need for more natural gas in the area,” said Justine Taylor, energy and environment co-ordinator for the Ontario Greenhouse Vegetable Growers association.

A denial of the project “would mean that expansion in the Kingsville and Leamington area would be limited” and growers would have to look to other areas of the province to expand, or they would have to look across the border, Taylor said.

The region is the centre of the province’s greenhouse industry, with 2,000 acres of peppers, tomatoes and cucumbers growing indoors. Taylor said greenhouse production methods rely heavily on energy, particularly natural gas.

Taylor said a strong case has been made to allow Union Gas to construct a larger pipeline in Leamington that would provide the much needed capacity for heating and other energy needs in the south end of the county.

“The OEB needs to see evidence that there is a need and the growers have demonstrated that to Union Gas,” she said. “That was done before the applications.

“This winter’s been very gentle, so it’s not been so bad. Ideally (we’d like to see it completed) before next winter.”

In its application, Union Gas requested approval by June so that construction can begin this summer.

“The energy infrastructure in the county certainly needs some attention,” said Matt Marchand, president and CEO of the Windsor-Essex Regional Chamber of Commerce.

Marchand said an increase in the natural gas supply is needed to power the growing agricultural sector and not just greenhouses.

“We have about a billion dollars, at minimum, industry in agriculture in the county,” he said. “Our goal is to double those exports by 2020.

“As the world population grows demand for food will really expand and we’re going to be in a strong position here in Windsor-Essex to capitalize on that.”

Marchand said 70 to 80 per cent of agricultural products produced here are exported.

“Energy infrastructure needs to keep pace with our ability to grow, produce and export our agricultural products,” he said.

Rakesh Naidu, interim CEO of the WindsorEssex Economic Development Corporation, said his group has been working with Union Gas and also had meetings with provincial officials to discuss both the need for more natural gas and hydro service.

New companies and existing companies that want to expand “don’t necessarily have enough (capacity),” Naidu said. “This is critical. It’s really needed for us to make a case to bring in more investment.”

Essex County Warden Tom Bain said job creation is one of the top priorities in the region and if companies can't or won't locate here or are unable to expand their operations, there will be no new jobs.

"We've found now that one of the big areas for us to concentrate on in economic development is expansion of what we have," said Bain, who also sits on the board of the economic development corporation.

"About 90 per cent of the new jobs (in this area) are created from expansion, but you have to have the hydro power, you have to have the gas, you've got to have those there for them to expand."

County council agreed Wednesday to send a letter of support to Union Gas for a second proposed natural gas pipeline expansion that would more than double the size of the main line that supplies gas to all of Chatham-Kent and Windsor and Essex County.

If approved, that project would begin in 2017.

The proposed expansion would involve replacing the current 16-inch diameter pipeline with a 36-inch diameter pipe that runs from the Township of Dawn-Euphemia to Chatham-Kent.

And while Bain said the county isn't in a crisis situation yet, there could be days of high peak demand where industries will not get all of the natural gas they need.

"We need this pipeline because as each municipality in Essex County, as Windsor, as Chatham-Kent continue to add more homes, more development, more industry, it keeps tapping into what's there," he said.

"We need a larger supply coming down our way."

May 31, 2016

Ontario Energy Board  
P.O. Box 2319  
27<sup>th</sup> Floor  
2300 Yonge Street  
Toronto, Ontario  
M4P 1E4

Attention: Kristen Walli, Board Secretary

Re: Union Gas Panhandle Reinforcement Project.

Dear Ms. Walli,

I am writing in regards to an impending application to the Ontario Energy Board (OEB), for the Panhandle Reinforcement Project.

I am the President and CEO of Can Art Aluminum Extrusion Inc. Can Art is a manufacturing company specializing in the aluminum extrusion sector. Our products are used in various markets including building and construction, architectural, distribution, electrical, furniture and transportation.

At the present time, Can Art employs some 350 people in Ontario and is currently building a new plant in Lakeshore, Ontario which will employ an additional 86 people. The present plant in Lakeshore currently employs 175 people.

Can Art uses a significant volume of natural gas in its process. There are two primary reasons for the use of this fuel. Firstly it has a significantly lower cost compared to any alternate, and secondly, the equipment used to heat aluminum is specifically tailored to use natural gas.

I can categorically and without reservation state that without the availability of natural gas for our business, our present expansion plans would be altered and ultimately we would look to expand in the USA, with the real possibility of moving all of our businesses there due to a very attractive open door policy, and lower costs.

I respectfully urge you to support manufacturing businesses that rely on natural gas and their respective employees. We have clearly learned that our economy is heavily dependent on manufacturing, and it is imperative and incumbent on us all to ensure that this part of our economy remains stable and strong.

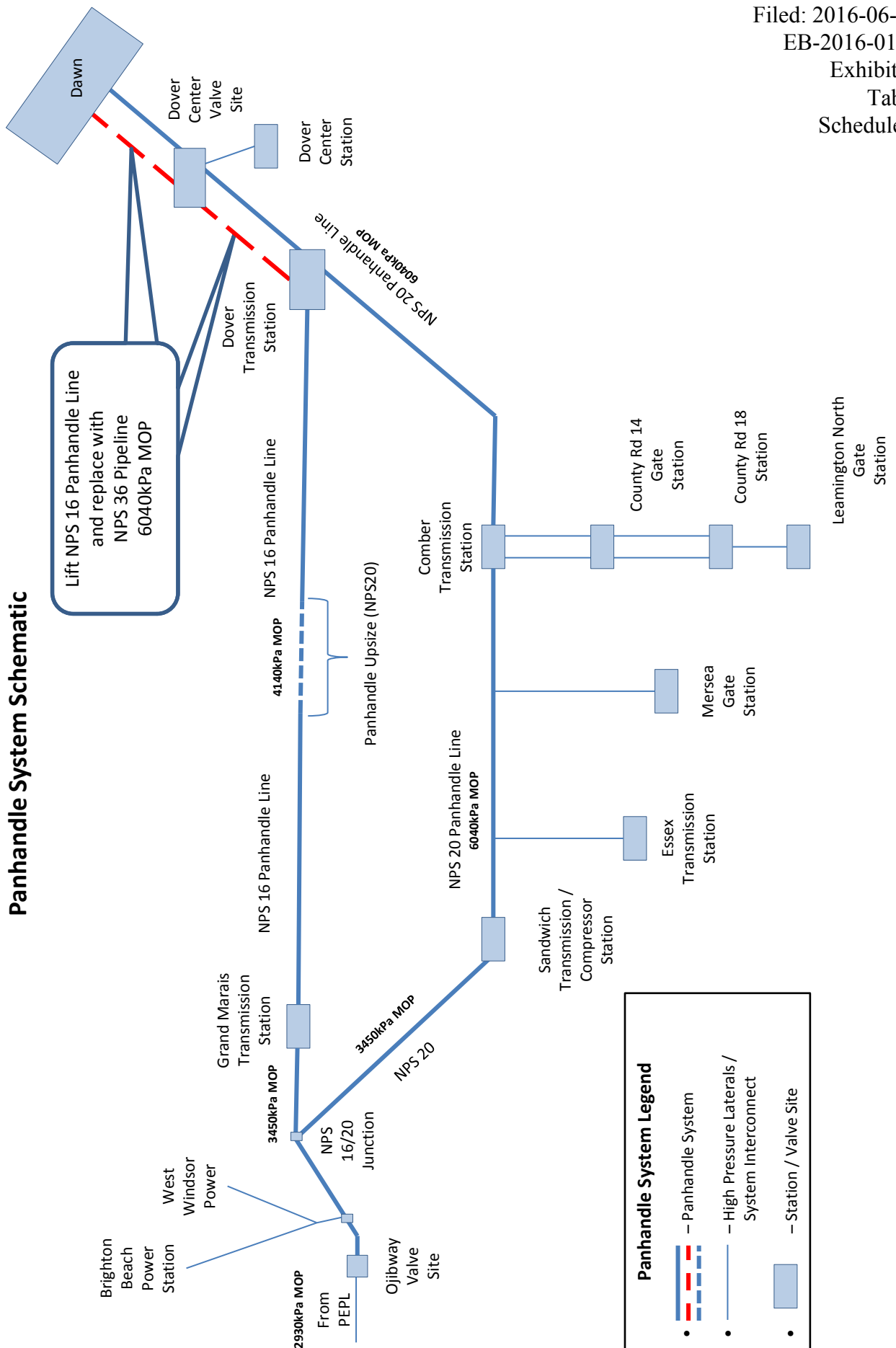
Respectfully,



Robert A. Saroli  
President and CEO  
Can Art Aluminum Extrusion Inc.

# Panhandle Reinforcement Project

## Panhandle System Schematic



## **FACILITIES AND GROWTH**

The purpose of this section of evidence is i) to review the current operation of the Panhandle System and, ii) to outline the Panhandle System growth and reinforcement requirements. This evidence is comprised of the following sections:

1. Panhandle System Design
2. Design Day Firm and Interruptible Demand
3. Current Panhandle System Constraints
4. Panhandle System Growth
5. Efforts to Manage Market Needs to Date
6. Impact of Project Not Proceeding
7. Panhandle System Reinforcement Timing

Union transports natural gas to delivery locations along the Panhandle System to meet energy demands and pressure requirements of Union's customers located in the Market. The primary functions of the Panhandle System include:

- i. Transportation of natural gas to meet in-franchise demands. Natural gas is delivered to take off points along the pipeline system between Dawn and Ojibway for in-franchise general service and contract rate customers; and
- ii. Transportation of Union's gas supply deliveries for sales service customers and transportation of ex-franchise storage and transportation customer contracts from Ojibway easterly.



1           ***1. Panhandle System Design***

2     Union models the capacity of the Panhandle System to meet firm in-franchise demand on Design Day.  
3     The flow of gas moves in a westerly direction from Dawn to the Market on Design Day. The Design  
4     Day weather condition for the Southern area of Union Gas is 43.1 Degree Days (43.1DD), which  
5     represents an average daily temperature of -25.1 degrees centigrade. This degree day is the coldest  
6     historical day based upon weather data from the London Airport. The Design Day model of the  
7     Panhandle System includes the following assumptions:

- 8           1. All in-franchise interruptible customers have been curtailed;
- 9           2. All in-franchise customers consume volumes equivalent to Design Day estimates, which  
10           are derived from firm contract demand, historical consumption, and forecast growth;
- 11           3. There are no supply failures of Union deliveries of 60 TJ/d arriving at Ojibway;
- 12           4. Ex-franchise C1 Ojibway to Dawn transportation contracts not assumed to be flowing;
- 13           5. System cannot operate above its maximum operating pressure;
- 14           6. Required pressure and supply are available from Dawn;
- 15           7. Minimum pressures for laterals and stations supplying in-franchise customers are met;
- 16           8. Must operate within station flow capacity constraints;
- 17           9. Minimum contractual delivery pressure at Brighton Beach Power Station (“BBPS”) of 1724  
18           kPag is met; and,
- 19           10. Minimum delivery pressure at Leamington North Gate Station of 2275 kPag is met.

20  
21     This evidence assumes the 2016 Leamington Expansion Pipeline Project (EB-2016-0013) has been  
22     Board-approved, constructed, and in-service for November 1, 2016.

2. *Design Day Firm and Interruptible Demand*

Design Day Demand (Firm Demand)

Union plans its facilities to meet the demands on the coldest day, defined to be the Design Day. The majority of the customers served by the Panhandle System are heat sensitive and their maximum demands occur during the coldest day.

The Design Day demand is defined as the amount of firm demand that Union is committed to supply through its system on a Design Day. The total Design Day demand for the in-franchise market is the sum of the firm demands of Union's in-franchise general service and contract rate customers connected to the system. Interruptible in-franchise demands are curtailed and are not included in Design Day demand.

The general service (Rate M1 and Rate M2) customers consist of residential, commercial and small industrial customers. Approximately 50% of the firm demand served by the Panhandle System is for the general service market.

The contract rate market accounts for about 50% of the firm demand served by the Panhandle System. The contract rate demand consists of large commercial, greenhouses, institutional, industrial and power generation customers. The mix is 45% power generation, 30% greenhouse and 25% large commercial, institutional and industrial customers.

Union has received a large number of requests for new firm service and for conversion of existing interruptible natural gas service to firm, from greenhouse growers in the Chatham, Leamington and Kingsville areas, all of which Union cannot accommodate without facilities expansion.

Interruptible Demand

When the temperatures are warmer than Design Day temperatures, firm demand is less than Design Day and there is capability available on the system to serve some of the interruptible demand. The warmer the temperature, the more interruptible demand can be served, which is contractually limited to 40 days of interruption per year.

Currently there is a significant amount of interruptible demand served from the Panhandle System, equivalent to approximately 20% of the firm Design Day volume. The majority of this demand is greenhouse and power generating customers. Many existing interruptible customers are now looking to contract for firm services and do not want to rely on interruptible services.

The Panhandle System was at capacity for interruptible service as of Winter 2015/2016, but as a result of the 2016 Leamington Expansion Pipeline Project (EB-2016-0013) there is some interruptible capacity available. New and expanding customers are not requesting interruptible service, but some customers are willing to take interruptible service on a short-term basis as a bridge until firm service becomes available.

On an operational basis, Union has been able to manage physical interruptions based on C1 Ojibway to Dawn transportation activity. This activity allows interruptible customers to be served on colder days where otherwise they would need to be interrupted, provided the C1 volumes are delivered to Union at Ojibway.

Union interrupted the Panhandle System for a total of 19 days during Winter 2014/2015, and one day during the extremely warm Winter 2015/2016.

### ***3. Current Panhandle System Constraints***

As described in Exhibit A, Tab 4, the Panhandle System consists of two pipelines; an NPS 20 pipeline and an NPS 16 pipeline. The Panhandle System connects to the PEPL system via two NPS 12 river crossing pipelines. Exhibit A, Tab 4, Schedule 3 shows a schematic of the Panhandle System.

The NPS 16 pipeline has a Maximum Operating Pressure (“MOP”) of 6040 kPag from Dawn to the Dover Transmission Station (“Dover Transmission”) in the former Township of Dover. Between Dover Transmission and the Grand Marais Transmission Station (“Grand Marais”), the MOP is 4140 kPag. Between Grand Marais and Ojibway the MOP is 3450 kPag. The Detroit River Crossing MOP is lower than the rest of the Panhandle System at 2930 kPag.

The NPS 20 pipeline has a MOP of 6040 kPag between Dawn and the Sandwich Transmission Station (“Sandwich”), located in the Town of Tecumseh. Sandwich also includes a compressor (“Sandwich Compressor”) that facilitates the easterly flow of gas from Ojibway to Dawn during times when the

Windsor market is insufficient to consume all of the Ojibway supply. The MOP of the NPS 20 pipeline between Sandwich and the NPS 16/20 Junction is 3450 kPag.

The Panhandle System has two constraints:

- i. The pipelines that feed Brighton Beach Power Station (“BBPS”) and West Windsor Power Station (“WWPS”) are located at the extreme western end of the Panhandle System and are connected to the Panhandle System at a valve site just east of Ojibway. The pressure constraint for the entire Panhandle System is located at the outlet of the BBPS customer station, where the contracted minimum delivery pressure must be maintained at or above 1724 kPag; and,
- ii. The Leamington North Gate Station is the endpoint of the North Leamington Line pipeline off of the NPS 20 Panhandle. This station must maintain a minimum inlet pressure of 2275 kPag.

The Panhandle System is currently nearing its Design Day capacity. There is limited capacity available to connect load in Chatham-Kent, depending on location, as the majority of Chatham-Kent is served from the Panhandle System east of Dover Transmission. Less capacity is available west of Dover Transmission to serve Windsor, Leamington and all communities in Essex County.

The 2016 Leamington Expansion Pipeline Project (EB-2016-0013) will be fully contracted when placed in-service for Winter 2016/2017 and the Panhandle System will continue to be at Design Day capacity until the Proposed Pipeline is constructed.

1           **4.    *Panhandle System Growth***

2    The Panhandle System transports natural gas to serve the energy demands of Union's customers in the  
3    municipalities of Chatham-Kent, Windsor, Lakeshore, Leamington, Kingsville, Essex, Amherstburg,  
4    LaSalle and Tecumseh. Over the past five years, there has been an increasing demand for firm service  
5    from both existing and new customers served by the Panhandle System. Requests have been received  
6    from general service customers, consisting of residential, commercial and small industrial customers,  
7    and contract rate customers, with the majority of requests coming from greenhouse customers in  
8    Leamington and Kingsville. In addition, many of Union's existing interruptible customers have  
9    expressed an interest in converting from their current interruptible service to firm service, which will  
10   further increase Design Day demand.

11  
12   Union is forecasting significant commercial and industrial demand for firm capacity. Recently, Union  
13   issued a request for Expressions of Interest as part of the 2016 Leamington Expansion Pipeline Project  
14   to assess the market demands for that project. The Leamington area is one of the areas of growth fed  
15   by the Panhandle System. The response to the request far exceeded the capacity that Union could make  
16   available through that project. A total of 80 TJ/d of firm demand was requested, of which 32 TJ/d is to  
17   be served by the Leamington Expansion Project. More specifically, Union was unable to serve  
18   approximately 48 TJ/day of identified firm demand in the Leamington - Kingsville area. Union has  
19   identified incremental demand for firm service across the entire market, including the new Windsor  
20   Mega hospital, the new Gordie Howe International Bridge, CNG facilities for transport fleets, and load  
21   increases for existing industrial customers, further reinforcing the need for incremental capacity. Union

forecasts that the total cumulative increase in firm Design Day demand between 2017 and 2021, including the unmet 48 TJ/d of Leamington - Kingsville demand, will be approximately 106 TJ/day.

Since Winter 2012/2013, Design Day demand has increased from 490 TJ/d to a forecasted demand of 565 TJ/d in Winter 2016/2017, and to 671 TJ/d in Winter 2021/2022, as shown in Table 5-1 below.

Table 5-1 - Design Day (TJ/d)

Panhandle	Rate Class	Historical				Forecast					
		W 12/13	W 13/14	W 14/15	W 15/16	W 16/17 (Leamington Expansion Project)	W 17/18 (Panhandle Reinforcement Project)	W 18/19	W 19/20	W 20/21	W 21/22
System Capacity (43.1 IOFF) (TJ/d)		490	527	529	529	565	671	671	671	671	671
System Demand (43.1 IOFF) (TJ/d)	M1/ M2	278	284	308	292	295	297	299	302	304	308
	M4	49	64	44	45	52	79	92	102	109	116
	M5	3	2	8	5	11	11	11	11	11	11
	M7	5	4	7	15	29	46	46	46	46	46
	T-1	155	162	34	31	37	48	48	48	43	48
	T-2	0	0	127	141	141	147	147	147	147	147
System Demand (43.1 IOFF) (TJ/d)	Total	490	515	527	528	565	623	638	651	661	671

Affordable energy is key to the development of both communities and businesses. Affordable energy promotes growth in the economy, provides savings for residential customers and helps maintain the global competitiveness of Ontario's businesses. Natural gas is the most affordable energy source available to customers.

In addition to individual customer benefits, the economic benefits natural gas can provide a community are also significant. Such benefits include:

- i. Residential energy savings enabling more consumer spending at local businesses and across the community (i.e. charitable organizations);

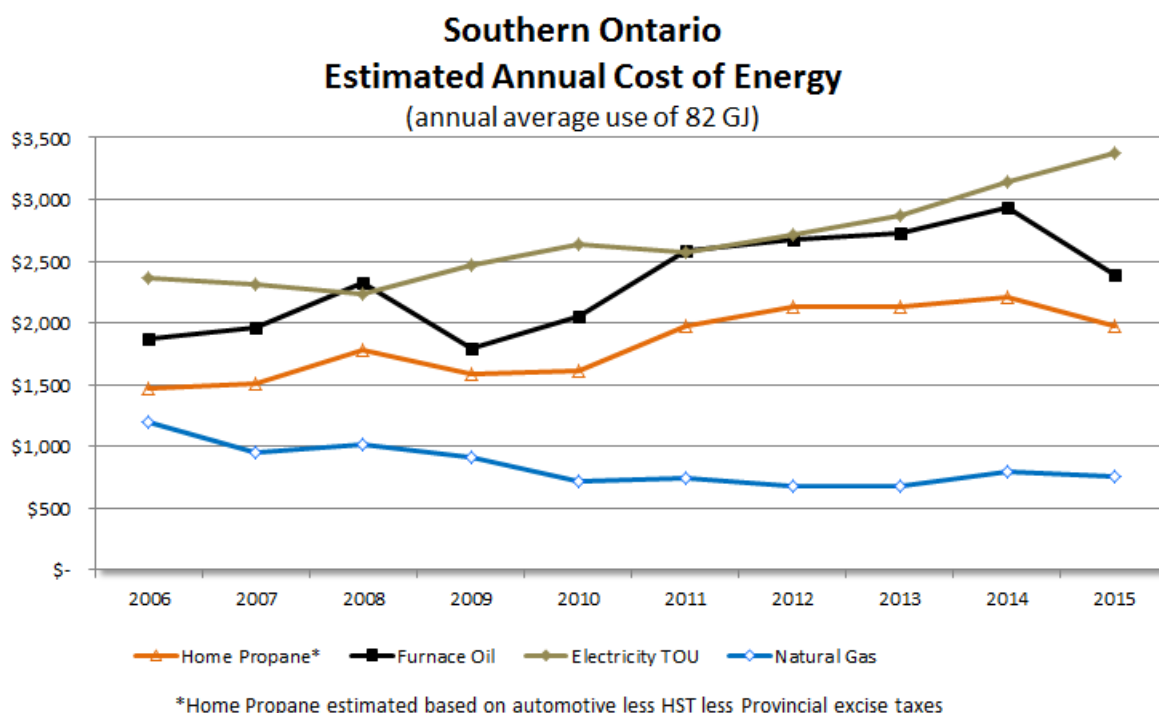
- 1       ii.       Energy savings support ability of local businesses to remain competitive, employing people
- 2               in the community;
- 3       iii.       Enhanced ability to attract new residents and new businesses to the community;
- 4       iv.       Increased housing values and resulting property tax assessments; and,
- 5       v.       Municipal energy cost savings in municipal buildings such as arenas and community
- 6               centres.

#### 8   Residential Customers

9   Within the Market the predominant alternative energy sources to natural gas for residential customers  
10 are propane and electricity. Both of these alternatives are significantly more expensive than natural gas  
11 as shown in Figure 5-1. For example, a residential customer who uses 2,200 m<sup>3</sup> per year of natural gas  
12 in 2015 would pay approximately \$1,200 more per year for propane and approximately \$2,300 more  
13 per year for electricity, relative to natural gas.



Figure 5-1  
Estimated Annual Cost of Alternative Energy Sources (\$/yr)<sup>1</sup>



### Commercial/Industrial Customers

In addition to the significant savings from heating load requirements, commercial and industrial customers are increasingly looking to natural gas to mitigate the high cost of electricity. The ability for these customers, such as the planned Mega hospital in Windsor, greenhouses and other customers within the Market, to reduce their reliance on electricity from the grid through the use of natural gas fired Combined Heat and Power (“CHP”) units can have a significant impact on their overall energy cost and help reduce emissions of CO<sub>2</sub>. Ontario Greenhouse and Vegetable Growers (“OGVG”)

<sup>1</sup> Based on April 2015 Union Gas cost comparisons including all volumetric and fixed charges appearing on consumer energy bills, with data sourced from: The Kent Group for propane and heating oil (rates for London); OEB time of use rates and utility specific charges (rates for London); and Union Gas rate schedules. All figures based on average annual use of 82 GJ or 2,200 m3 of residential consumption for home heating and water heating.

1 members, for example, are heavily reliant on energy, particularly natural gas. Over one third of  
2 greenhouse production costs are energy-related. If natural gas is not available, customers such as  
3 greenhouses will be forced to either use a far more expensive alternative, which will threaten their  
4 competitiveness, or move their operations to an area with more affordable energy. Please refer to  
5 Exhibit A, Tab 4, Schedule 1 for copies of two media articles related to this issue, noting “*any new*  
6 *companies ... (or) new building construction, they’re going to go elsewhere....that’s already happened*  
7 *with some greenhouse growers heading to Ohio instead of building or expanding in the Leamington*  
8 *and Kingsville areas*”.

9  
10 Many industries also use natural gas as a feed stock within their various processes. As a result, access  
11 to natural gas is vital when determining where to locate new facilities.

### 12 13 Future Growth of Panhandle System

14 To forecast future Design Day demand and to identify reinforcement facilities required to support  
15 forecast growth on the Panhandle System, Union used historical attachments for general service  
16 customers in addition to a load growth forecast for contract rate customers, including unfulfilled  
17 demand requests from the 2016 Leamington Expansion Pipeline Project. The information was  
18 compiled into a 20-year Panhandle Growth Forecast 2015-2034. Growth is expected to occur across  
19 the entire Panhandle System.

20  
21 The Panhandle System growth is expected to be predominantly heat sensitive. Design Day forecast  
22 demand growth for the Panhandle System is shown in Table 5-2.

Table 5-2 – Design Day Forecast Growth

<b>Timeframe</b>	<b>Design Day Requirement (TJ/d)</b>
November 1, 2016 (Post Leamington Expansion <sup>2</sup> )	565
2017 – 2021 Forecast Growth	106
2022 – 2034 Forecast Growth	99
<b>Total 2034 Design Day Requirements on the Panhandle System</b>	<b>770</b>

Union forecasts that residential customer attachments in the Market will increase by approximately 6000 customers between 2017 and 2021 provided enough system capacity exists. Actual and forecast residential customer attachments are shown in Table 5-3 below.

Table 5-3 – Residential Customer Attachments

	<b>Actual</b>				<b>Forecast</b>					
<b>Year</b>	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
<b>Number of residential attachments</b>	1266	1051	1261	1294	1200	1200	1200	1200	1200	1200

Based on this demand forecast, future natural gas supply and facility needs can be identified, evaluated, analyzed and scheduled to meet the future growth demands on the system. The advantages of this long-term planning approach can be summarized as follows:

- i. Through the identification of future growth areas, Union is more responsive to customer needs;

<sup>2</sup> 2016 Leamington Expansion Pipeline Project (EB-2016-0013)

- 1       ii.       The most efficient means of serving the forecast growth is identified, including any
- 2               facilities; and,
- 3       iii.       Long-term security of supply to the overall system can be achieved.

4

5       The timing of new natural gas supply, including facilities, is based on Union's customer attachments

6       and load forecasts. The objective of this analysis is to identify the optimum means of supplying the

7       forecast growth on the Panhandle System, including any new supply and facility requirements.

8

9       Economic Impacts

10       The economic impacts resulting from the Project will help support job growth, increase property tax

11       revenue for the affected municipalities and tax revenue for the province. Additional detail specific to

12       these economic impacts is included in Exhibit A, Tab 7. Concurrent with this commitment to growth

13       and extending natural gas service, recognition of the Ontario government's goal of reducing

14       greenhouse gas emissions is essential.

15

16       Demand Side Management

17       Since the 1990s, Union has successfully implemented DSM initiatives under the Ontario Energy Board

18       ("the Board") frameworks to help reduce natural gas consumption and thereby reduce the carbon

19       footprint of natural gas consumers. Union has a suite of DSM offerings available for customers, as

20       detailed in its 2015-2020 DSM Plan (EB-2015-0029).

21

22       Union's DSM programs include:

- i. Resource acquisition programs that seek to achieve direct, measurable natural gas savings on a customer-by-customer basis;
- ii. Low-income programming designed to address the specific needs of this customer segment to achieve energy savings;
- iii. Custom offerings that seek to generate long-term and cost effective energy savings, including a mix of customer incentives, education and awareness for commercial and industrial customers across all segments; and,
- iv. Market Transformation programs that seek to make a permanent change in the marketplace to increase market share for high-efficiency products or services.

The impact of Union's DSM activity for in-franchise customers is embedded in the Design Day requirement. The Design Day demands for the Panhandle System are based on the previous winter's actual daily measured volumes and as such take into account in-place DSM program impacts.

Union has reviewed the annual savings from DSM programs in the Market. The reduction in consumption as a result of DSM programs is not sufficient to offset load growth in the Market. Participation in Union's DSM programs in the Market resulted in an average reduction in annual consumption of 920 TJ per year. Design Day demand on the Panhandle System continued to increase each year over the same time period, despite reductions in annual consumption due to DSM.

1 Cap and Trade

2 The expansion of natural gas service into new and existing service areas may appear to be inconsistent  
3 with the Ontario government's intent to implement a Cap and Trade program whose objective is to  
4 significantly reduce greenhouse gas emissions. However, as outlined earlier in this submission, there  
5 are significant price advantages of natural gas in comparison to alternate fuel sources such as propane,  
6 oil and electricity. Union expects that the Ontario government's proposed Cap and Trade program will  
7 increase the cost of all fuels with associated greenhouse gas emissions. Since natural gas has lower  
8 greenhouse gas emissions than oil and propane, Union expects the costs of those fuels will increase by  
9 at least as much as natural gas. The impact on electricity prices will be lower due to the electricity fuel  
10 mix<sup>3</sup>. However, natural gas will remain an economic option for customers in a low carbon economy as  
11 the price differential between natural gas and electricity is so high.

12  
13 In addition to the economic benefits of natural gas relative to alternative fuels, natural gas also provides  
14 a lower carbon-intensive option to those alternate fuels. Although not included in the forecast, Union  
15 may see an increase in demand for natural gas as customers who have previously relied on diesel, oil,  
16 propane or coal as a primary or backup fuel source may convert to natural gas in an effort to reduce  
17 carbon emissions.

18  
19 The impacts of carbon pricing on natural gas demand are not yet known. The Ontario government  
20 released its final Cap and Trade regulations on May 19, 2016. Certain components of the Cap and  
21 Trade program that were not included in the final regulations (i.e. offsets, early reduction credits) will

---

<sup>3</sup> This does not take into account the cost of new power generation, electric transmission and electric distribution facilities that may be necessary.

1 be issued as separate regulations or as a revision to the final regulation. These components will also  
2 have a bearing on the expected costs of the Cap and Trade program.  
3

4 The Board's Cap and Trade framework development is expected to be completed by October, 2016 and  
5 will reflect the final Cap and Trade regulations and legislation. After the Cap and Trade framework is  
6 finalized, natural gas distributors will be required to file utility specific applications with the Board.  
7 This process has started with Board staff stakeholder discussions and the release of the OEB Staff  
8 Discussion Paper.<sup>4</sup>  
9

#### 10 **5. *Efforts to Manage Market Needs to Date***

11 Since the existing NPS 16 and NPS 20 pipelines were installed, the markets these pipelines supply have  
12 continued to grow. In serving this growth Union has been able to defer, until now, reinforcement on  
13 the Panhandle System by constructing downstream facilities such as Leamington Expansion Phase I  
14 and the 2016 Leamington Expansion Pipeline Project, and increasing reliance on Union's firm gas  
15 supply arriving at Ojibway. As part of the Union South gas supply plan, some of the gas supply  
16 volumes delivered to Union for in-franchise general sales service customers arrives at Ojibway. Prior to  
17 2013, Union did not consider its own gas supply arriving at Ojibway to support Design Day market  
18 demands. Today, Union relies on 60 TJ/d of this gas supply arriving on Design Day to help reduce the  
19 physical transportation needs from Dawn to Ojibway. Even with this added volume, the pipeline is still  
20 at capacity effective November 1, 2017.  
21

---

<sup>4</sup> EB-2015-0363 Staff Discussion Paper on a Cap and Trade Regulatory Framework for the Natural Gas Utilities.

1 In an attempt to promote the most efficient expansion of the Panhandle System, while minimizing the  
2 overall cost to ratepayers, for the first time Union conducted a reverse open season for its in-franchise  
3 contract rate customers. The reverse open season was targeted at customers who hold firm capacity on  
4 the Panhandle System to determine if any of those customers wanted to reduce their firm contract  
5 demand ("Firm CD") and/or convert their Firm CD to interruptible distribution service before the end  
6 of their contract term. Union conducted the reverse open season to promote the most efficient  
7 expansion of the Panhandle System by ensuring that customers who may hold excess firm capacity had  
8 the opportunity to return that capacity to the system. Union issued the reverse open season to  
9 customers on May 11, 2016 with responses due back to Union on May 18, 2016. Union did not receive  
10 any responses to this reverse open season. The reverse open season letter is attached at Exhibit A, Tab  
11 5, Schedule 1.

12  
13 The aforementioned efforts that have, in the past, allowed Union to serve growth in absence of  
14 Panhandle System reinforcement, can no longer meet Market demand. Significant growth in demands  
15 in the past few years has utilized the remaining capability of the Panhandle System. This has resulted  
16 in reduced pressures along the NPS 20 pipeline such that additional looping or laterals from the NPS 20  
17 pipeline into the Leamington - Kingsville market will not yield the necessary capacity to serve new  
18 growth without bringing higher pressure gas from Dawn closer to the Market. Similarly, incremental  
19 supply at Ojibway is only suited to efficiently serve demands in the far west end of the Market in  
20 Windsor (between Ojibway and Sandwich Compressor) and does not provide the increase in pressures  
21 along the NPS 20 pipeline that are needed to support growth in Leamington - Kingsville. In order to  
22 serve firm demand growth, the Panhandle System needs reinforcement.



1           **6.    *Impact of Proposed Pipeline not Proceeding***

2   Economic development in Southern Ontario is dependent on the availability of natural gas to support  
3   commercial and industrial business and the residents employed at those businesses. If the Proposed  
4   Pipeline is not constructed, economic development in Southern Ontario will suffer and the benefits  
5   identified in the following paragraphs would not occur. Recent discussions with Mayors, CAOs, local  
6   Chamber of Commerce and Economic Development officers revealed that 80-90% of current economic  
7   development opportunities were companies that rely on access to natural gas. In the absence of  
8   available firm capacity, many customers will look elsewhere to establish or expand their operations.  
9   To further illustrate this point, Letters of Support for the Project are included at Exhibit A, Tab 5,  
10   Schedule 2.

11  
12   The growth of the agriculture industry in Southern Ontario is vital to the economic prosperity of the  
13   region. The Greenhouse sector is one area of the agriculture industry that is particularly reliant on  
14   natural gas and has a significant impact on the local economy. Natural gas is uniquely suited to the  
15   Greenhouse sector. It is used to heat greenhouses and, commonly the CO<sub>2</sub> that would normally be  
16   emitted can be used within the greenhouse where it is consumed by the growing plants. The main  
17   alternate fuels used in the Greenhouse sector are oil and diesel. These fuels are not only more  
18   expensive than natural gas but also prevent the greenhouse operations from using the CO<sub>2</sub> emissions  
19   within the greenhouse because other elements within the exhaust of these fuels will harm the plants. As  
20   a result, without natural gas not only is it likely that a more expensive and higher carbon intensive  
21   energy source needs to be procured for heat, a source of CO<sub>2</sub> will also need to be acquired.

1 Every acre of greenhouse development creates jobs for five employees, results in significant capital  
2 investment of approximately \$700,000 to \$800,000 per acre and results in additional spin-off  
3 employment and produces approximately \$330,000 worth of produce (farm gate value)<sup>5</sup>. The  
4 Greenhouse market in Southern Ontario has experienced significant growth, increasing in size from  
5 approximately 1,500 acres in 2007 to approximately 2,400 acres in 2016. This industry provides  
6 approximately 12,000 jobs to Southern Ontario and supports food processing plants and packagers  
7 located in the area.

8  
9 Local Economic Development officers indicated that Ohio, Michigan and New York are areas that  
10 would likely take advantage of any shift away from natural gas in Ontario and make this a key selling  
11 point to try to attract industries currently in Ontario or looking to locate in Ontario. Choosing to locate  
12 businesses into the U.S. instead of Ontario has already occurred. Two Ontario greenhouse operators  
13 chose to expand in Ohio, instead of Ontario.

14  
15 The agricultural sector is not the only industry in the area that relies heavily on natural gas. The  
16 automotive sector also requires natural gas. Windsor is home to major automotive manufacturers and  
17 supporting tier 1 and tier 2 automotive suppliers, employing thousands of people in the area. Natural  
18 gas is used in paint baking, paint shop humidification, and melting metal for auto parts and cannot be  
19 easily substituted with other energy sources.

20  

---

<sup>5</sup> OGVG 2015 Fact Sheet

1 Additionally, Ontario's 401 highway which ends in Windsor has been identified as one of the busiest  
2 highways in North America and supports a major export point of goods in Canada. Both the Federal  
3 and Provincial governments have announced plans to reduce the emissions created by this corridor by  
4 converting heavy and medium duty trucks to compressed and liquefied natural gas. Without access to  
5 natural gas and the needed infrastructure, the required compressed natural gas refueling stations will  
6 not be able to be built in an area critical to the movement of goods and services.

7  
8 Union has also advised Municipalities and customers across all market sectors that reinforcement of the  
9 Panhandle System is required before future natural gas expansions can take place in their communities.  
10 Please refer to Exhibit A, Tab 5, Schedule 3 for copies of the letters sent to municipalities in early April  
11 2016.

12  
13 Without the required natural gas capacity, there is a risk businesses will delay or cancel plans to  
14 expand, or may establish their operations in different jurisdictions where reliable, affordable energy is  
15 available. Further, without this incremental capacity, residential developments, schools, hospitals as  
16 well as other small volume customers in the Market may require an alternative energy source which, as  
17 discussed above, is significantly more expensive than natural gas and may be less clean burning than  
18 natural gas. In doing so, this will put additional pressure on the finances and operating budgets of the  
19 residents and businesses within the Market. Expansion of the Panhandle System to meet the urgent  
20 needs of area customers, is a critical component to ensure economic growth in Southern Ontario. If the  
21 Project is not constructed, economic development in this region of Ontario will be significantly  
22 impacted.

1           **7.    *Panhandle System Reinforcement Timing***

2    Hydraulic analysis shows that the operational requirements of the Panhandle System will not be met for  
3    Winter 2017/2018 assuming continued growth to a Design Day demand of 623 TJ/d and no changes to  
4    existing facilities. In order to continue to provide service to new general service and contract  
5    customers, additional capacity is required by November 1, 2017. A review of Union's Proposed  
6    Pipeline as well as alternatives to meet the increased customer demands of the Panhandle System is  
7    provided in Exhibit A, Tab 6.

# Binding Reverse Open Season 2016: Panhandle System Firm Distribution Service

**May 11, 2016**

Union Gas Limited (“**Union Gas**”) has received requests for natural gas distribution services, to start November 1, 2016, from customers served by Union Gas’ Panhandle Transmission System (“**Panhandle System**”). The Panhandle System serves residential, commercial and industrial in-franchise markets in Chatham- Kent, Windsor, Lakeshore, Leamington, Kingsville, Essex, Amherstburg, LaSalle, and Tecumseh (“**the Market**”).

The Panhandle System is nearing capacity and in response to the increasing firm demands by the Market, Union Gas is proposing to construct pipeline and station facilities (the “**Panhandle Reinforcement Project**”) along the Panhandle System. The construction of the Panhandle Reinforcement Project is planned for the summer of 2017, subject to Ontario Energy Board approval and is proposed to be in-service November 1, 2017.

Growth of the firm distribution service on the Panhandle System can be satisfied through the expansion of physical facilities on the system and/or through a reduction in the current firm contractual commitments with existing firm contract rate customers on the system. In order to promote the most efficient expansion of the Panhandle System, while minimizing the overall costs to ratepayers, Union Gas is conducting a reverse open season to solicit commitment from existing firm contract rate customers in the Market that want to reduce their firm contract demand (“Firm CD”) or convert their Firm CD to interruptible distribution service on the Panhandle System before the end of their primary contract term.

Existing firm contract rate customers in the Market (served by the Panhandle System) who hold a firm distribution service contract may elect to:

1. Reduce all or a portion of their Firm CD before the end of the initial term of their contract, or;
2. Convert all or a portion of their Firm CD to interruptible distribution service.

Effective November 1, 2016 or November 1, 2017

Completing the attached binding Firm CD Reduction Form (“**Bid Form**”) will serve to advise Union Gas of your binding commitment to reduce existing contracted firm distribution service or convert firm distribution service to an interruptible distribution service. If you do not submit the Bid Form, your current service level will continue and will not be impacted.

To be eligible to reduce your firm distribution service or to convert all or a portion of your firm distribution service to interruptible distribution service, Bid Forms **must be received prior to 2 p.m. Eastern Time on May 18, 2016**. By 2 p.m. Eastern Time on May 19, 2016, Union Gas will review and acknowledge all Bid Forms received.

Union has the sole discretion to accept or reject the bid, in whole or in part. If a bid is accepted, in whole or in part, Union Gas will notify the capacity holder by 2 p.m. Eastern Time on May 25, 2016.

Bids will be assessed according to the amount of firm distribution service elected to be reduced or converted to interruptible distribution service and the impact on the Panhandle System.

If you have any questions, please contact your account manager.

## Binding Firm CD Reduction Bid Form

### Binding Reverse Open Season 2016: Panhandle System Firm Distribution Service

Please complete, sign and return this Binding Firm CD Reduction Bid Form on or before 2 p.m. Eastern Time on May 18, 2016 via email to:

[panhandle@uniongas.com](mailto:panhandle@uniongas.com)

In response to Union Gas' Binding Reverse Open Season: Panhandle System Firm Distribution Service, dated May 11, 2016, **(Please print clearly your company name here)**

\_\_\_\_\_, ("Customer") irrevocably and firmly confirms Customer's request to reduce or convert all or a portion of its firm distribution service as of Nov. 1, 2016 or November 1, 2017, as outlined below:

Contract ID (SA#)		
Reduction Start Date	Nov. 1, 2016	Nov. 1, 2017
Reduction of Firm Contracted Demand Service (m <sup>3</sup> /day)		
Conversion of Firm Contract Demand to Interruptible Distribution Service (m <sup>3</sup> /day)		

It is understood that by 2 p.m. Eastern Time on May 19, 2016, Union Gas will review and acknowledge all Bid Forms received. Union has the sole discretion to accept or reject the bid. If a bid is accepted, Union Gas will notify the capacity holder by 2 p.m. Eastern Time on May 25, 2016.

Acknowledged and agreed by: \_\_\_\_\_

\_\_\_\_\_  
**Signature**

\_\_\_\_\_  
**Phone**

\_\_\_\_\_  
**Name (please print)**

\_\_\_\_\_  
**Fax**

\_\_\_\_\_  
**Title**

\_\_\_\_\_  
**Date**

Office of the Mayor / CEO



*Randy R. Hope*



315 King Street West  
P.O. Box 640  
Chatham, Ontario  
N7M 5K8

Telephone: 519.436.3219  
Fax No.: 519.436.3236

Email: [RandyHope@chatham-kent.ca](mailto:RandyHope@chatham-kent.ca)

*Municipality of Chatham-Kent*

March 15, 2016

Ms. Andrea Seguin  
District Manager Windsor/Chatham  
Union Gas Limited  
3840 Rhodes Dr.  
Windsor ON N9A 6N7

**RE: Union Gas Panhandle Reinforcement Project**

Dear Ms. Seguin:

Please accept this letter of support for the Union Gas Panhandle Reinforcement Project.

Chatham-Kent is a municipality of 104 thousand people located in the heart of Southwestern Ontario with Lake Erie on the south and Lake St. Clair on the west. It is comprised of almost 25 hundred square kilometres of very flat, very intensively farmed land surrounded by water.

In order for future growth in Chatham-Kent to be realized, sufficient natural gas infrastructure will be required. Currently, resources in the Windsor-Essex-Chatham-Kent area are at capacity and an expansion of service will be necessary to support future economic development in the region.

The Municipality of Chatham-Kent fully supports this project and looks forward to an ongoing positive relationship with Union Gas. Should you require any further information, please do not hesitate to contact me directly by telephone at 519.436.3219 or by email at [randyhope@chatham-kent.ca](mailto:randyhope@chatham-kent.ca).

Sincerely,

A handwritten signature in black ink, appearing to read "Randy R. Hope".

Randy R. Hope, Mayor/CEO  
Municipality of Chatham-Kent



Office of the Warden, County of Essex

Warden Tom Bain

March 18, 2016

Union Gas Limited  
Attn: Ms. Andrea Seguin  
District Manager Windsor/Chatham  
3840 Rhodes Dr.  
Windsor, ON N9A 6N7

Dear Ms. Seguin:

**Re: Union Gas Panhandle Reinforcement Project**

---

On behalf of the Corporation of the County of Essex, I am writing to indicate our support for the aforementioned Union Gas Panhandle Reinforcement Project.

Being Canada's southernmost point, with a population of 177,720, the region boasts the warmest climate in all of Ontario. Surrounded by three bodies of water – Lake Erie, the Detroit River and Lake St. Clair, Essex County has booming tourism and agri-business industries and is in the enviable position of being a gateway to the United States markets via the Detroit-Windsor border.

A thriving, diverse manufacturing industry combined with a skilled workforce and the proximity to U.S. markets and the 401 corridor, make Essex County an ideal location for new businesses to locate.

Agri-business is continually expanding in Essex County. We are home to North America's largest greenhouse industry, with over 1,600 acres under glass and 450 more planned for the near-term. Growers are diversifying into non-traditional crops and nutraceutical herbs. The mild climate also accommodates 17 commercial wineries - and growing - plus food processors and packagers with national and international distribution.

In order for future growth in Essex County to be realized, sufficient natural gas infrastructure will be required. Currently, resources in the Windsor-



Essex-Chatham-Kent area are at capacity and an expansion of service will be necessary in order to support future (economic) development in the region.

With this in mind, the Council of the County of Essex passed a resolution at its March 16, 2016 meeting, strongly in support of this project. We look forward to an ongoing positive relationship with Union Gas.

Regards,

A handwritten signature in cursive script that reads "Tom Bain".

Tom Bain  
Warden – County of Essex

TB:sw

March 21, 2016

Union Gas Limited  
3840 Rhodes Dr.  
Windsor, ON N9A 6N7

Attn: Ms. Andrea Seguin, District Manager Windsor/Chatham

Dear Ms. Seguin:

Re: Union Gas Panhandle Reinforcement Project

On behalf of the Municipality of Leamington, I am writing to indicate our support for the Union Gas Panhandle Reinforcement Project.

Leamington, with a population of 30,000 supports a growing Agriculture Sector primarily led by the greenhouse industry. The Ontario Vegetable Growers Association speaks to the significant acreage, growth and demand for energy and infrastructure for vegetable products but included in this industry are also flower and medical crops that are poised for growth. With current demand for export, our greenhouse producers also look to an expansion in the growing season to aid in market position and energy infrastructure is necessary to support this growth.

Leamington also supports a significant manufacturing industry focused on fabrication and food and beverage production that continues to show growth that is expected to continue to develop with a favorable foreign exchange rate and demand for Canadian products in the marketplace.

With zero development fees as an investment stimulus, we are still lacking in energy infrastructure that will increase bricks and mortar investment in our industrial and commercial development areas which will help improve our overall tax assessment position.

In order for future growth in Leamington to be realized, sufficient natural gas infrastructure will be required. Currently, resources in the Windsor-Essex-Chatham-Kent area are at capacity and an expansion of service will be necessary in order to support future economic development in the region.

With this in mind, the Municipality of Leamington is strongly in support of this project and look forward to an ongoing positive relationship with Union Gas.

Sincerely,



John Paterson  
Mayor



Ontario Greenhouse Vegetable Growers  
32 Seneca Road  
Leamington, Ontario  
N8H 5H7  
(519) 326-2604 / 1-800-265-6926  
(519) 326-7842 Fax  
[www.ontariogreenhouse.com](http://www.ontariogreenhouse.com)

April 6, 2016

Attention: Mr. Patrick Boyer  
Manager, Greenhouse, REM, Wholesale Markets  
Union Gas Ltd  
P.O. Box 2001  
Chatham, Ontario, N7M 5M1

**Re: Union Gas Panhandle Transmission System Expansion Project**

Dear Mr. Boyer:

On behalf of the Ontario Greenhouse Vegetable Growers (OGVG), I am writing to indicate our support for the aforementioned Union Gas Panhandle Transmission System Expansion project, with a proposed construction timeline of 2017.

OGVG represents approximately 200 greenhouse vegetable growers in Ontario who are responsible for 2,700 acres of greenhouse tomato, pepper, and cucumber production in the province. The majority of this acreage, 2,427 acres, is located in Essex, Chatham-Kent and Lambton counties. Ontario's greenhouse sector has a consistent track record of growth, expanding at 5.8% annualized over the past 8 years. We expect this growth will continue into the future and predict the sector could grow by 750 acres over the next 5 years, contributing an additional \$1.3 billion to the Ontario economy and supporting over 3,000 new jobs.

In order for this growth and development to be realized sufficient access to natural gas infrastructure will be required. Currently, resources in the Essex and Chatham-Kent regions are at capacity and an expansion of service will be necessary in order to support further economic development in the region. Furthermore, many growers in the region are on interruptible service contracts as firm service is not currently available. Increased access to firm service, such as will be provided by this expansion, will greatly add to the stability of production economics as growers will not be required to purchase alternative fuel during periods of peak market demand.

With this in mind, the Ontario greenhouse growers are strongly in support of this expansion project and look forward to an ongoing positive relationship with both Union Gas and the Ontario Energy Board.

Yours truly,

A handwritten signature in black ink, appearing to read "Rick Seguin".

Rick Seguin  
General Manager, OGVG



CORPORATION OF THE  
**TOWNSHIP OF DAWN-EUPHEMIA**

4591 Lambton Line R.R.#4, Dresden, Ontario N0P 1M0

Tel: (519) 692-5148 Fax: (519) 692-5511 Public Works Dept: (519) 692-5018

May 10, 2016

Mr. Christopher B. A. Young, CPA, CGA  
Administration Manager, STO  
Union Gas Limited, Dawn Operations Centre  
3332 Bentpath Line  
Dresden, ON N0M 1M0

Dear Mr. Young:

Re: Letter of Support (OEB) – Panhandle Reinforcement Project

On behalf of the Council of the Township of Dawn-Euphemia, I am pleased to provide this letter of support for the Panhandle Reinforcement Project. We understand that this letter, along with others, will be submitted to the Ontario Energy Board as a component of the Project approval process.

The Township of Dawn-Euphemia, a small rural municipality located in southern Lambton County, is home to the uniquely situated Union Gas *Dawn Hub* – the largest natural gas storage complex in North America.

The Panhandle Project, a vital element in the expansion plans at Dawn, contributes notably to the ongoing development of Union Gas's infrastructure plans to safely bring competitively priced natural gas sourced at Dawn to the residential and business customers in the surrounding regions. Planned infrastructure development is significant not only to municipalities, but to Union Gas's continued systems development progress and expansion, as the company ensures the Dawn Hub remains competitive and highly capable to bring cheap, affordable, reliable natural gas to meet growing demands throughout the region.

Most recently, Union Gas – Dawn Operations staff attended a Council meeting to update Council members on various initiatives, plans and projects. Company staff reiterated their continued commitment to ensuring concerns with any of their project(s) within the boundaries of the municipality are promptly addressed and impacts to the community minimized.

We encourage the Ontario Energy Board to favourable review Union Gas's application for the Panhandle Reinforcement Project.

On behalf of Council,

Alan Broad, Mayor



Township of St. Clair

Chief Administrative Officer	519-867-2021
Administration / Clerks Dept.	519-867-2021
Finance & Treasury Dept.	519-867-2024
Water Dept.	519-867-2128
Engineering Dept.	519-867-2125
Public Works Dept.	519-867-2993
Fire Dept. Administration	519-481-0111

May 20, 2016

Union Gas Limited  
Attn: Brian Lennie  
745 Richmond Street  
Chatham, ON N7M 5J5

Dear Mr. Lennie,

**Re: Support for Union Gas Panhandle Reinforcement Project**

On behalf of the Corporation of the Township of St. Clair, and all of its stakeholders, I am writing to indicate our support for the Union Gas Panhandle Reinforcement Project.

The Township of St. Clair is home too, and dependent upon, several major refineries and other thriving heavy industrial developments, each of whom depends on the supply of competitively priced, and safely delivered natural gas. Specifically, within the past few years, the Township has become home to two natural gas-fired energy plants, with one projected to come online in Fall 2016.

In order for the projected growth of the Township of St. Clair to be realized, the continued supply of competitively priced natural gas is paramount. With the recent loss of jobs and accompanying assessment from the Lambton Generating Station, the Township cannot afford to lose out on potential developments due to a lack of capacity of natural gas supply to the area.

It is for the above reasons the Township of St. Clair is in absolute favour of the Panhandle Reinforcement Project and that a motion was passed during the regular meeting on May 16, 2016 to demonstrate such support. The Township of St. Clair strongly encourages the Ontario Energy Board to commission this project.

Kind Regards,

Steve Arnold, Mayor



## TOWN OF LAKESHORE

May 24, 2016

419 Notre Dame St.  
Belle River, ON N0R 1A0

Union Gas Limited  
Attn: Ms. Andrea Seguin  
District Manager Windsor/Chatham  
3840 Rhodes Dr.  
Windsor, ON N9A 6N7

Dear Ms. Seguin:

**Re: Union Gas Panhandle Reinforcement Project**

On behalf of the Council of the Town of Lakeshore, I am pleased to offer our support for the aforementioned Union Gas Panhandle Reinforcement Project.

Lakeshore with a population of 36,200 is in the top 13 percentile in Canada in size, the 7<sup>th</sup> safest community in Canada, is the fastest growing, highly educated as well as high income and the largest concentration of families and seniors in the region. Located approximately 30 minutes from the gateway that leads to the United States markets via the Detroit-Windsor border.

A thriving, diverse manufacturing industry combined with a skilled workforce and the proximity to U.S. markets and the 401 corridor, make Lakeshore an ideal location for new businesses to locate.

In order for future growth to continue in Lakeshore, sufficient natural gas infrastructure will be required. Natural Gas resources are at capacity in the Windsor-Essex county area, therefore an expansion of service is necessary to support future economic development initiatives.

Trusting this support for the reinforcement project will be given due consideration, I remain.

Yours truly,

Tom Bain  
Mayor



Alliance de Chatham-Kent pour la santé

Campuses  
80 Grand Ave. W.  
Chatham, ON

325 Margaret Ave.  
Wallaceburg, ON

Mailing Address  
P. O. Box 2030  
Chatham, ON N7M 5L9

May 26th, 2016

Ontario Energy Board  
PO Box 2319  
27th Floor  
2300 Yonge Street  
Toronto, Ontario M4P 1E4

Attention: Kristen Walli, Board Secretary

Complexes  
80, avenue Grand ouest  
Chatham, ON

325, avenue Margaret  
Wallaceburg, ON

Addresse postale  
C.P. 2030  
Chatham, ON N7M 5L9

**RE: Union Gas Panhandle Reinforcement Project**

Dear Ms. Walli,

On behalf of the Chatham-Kent Health Alliance, I am writing to demonstrate our support for the proposed Union Gas natural gas pipeline expansion project. The project is designed to increase growth capacity for the Chatham/Windsor/Leamington areas, and is scheduled for completion in 2017.

Without this pipeline project the Hospital is at risk for not only supporting the needs of our capital infrastructure redevelopment strategy, but more importantly, meeting the daily operational needs of the hospital. We are currently served by an interruptible natural gas distribution contract, which allows Union Gas to interrupt the supply of natural gas when the temperatures drop excessively. We are then required to burn alternative fuels within the main boiler plants. In most cases the alternative fuel is No 2 Oil which is very expensive in comparison to, and leaves a larger carbon footprint than natural gas.

As a result, the Chatham-Kent Health Alliance is in full support of the pipeline project.

Sincerely,

Beth Hall  
Director of Support Services  
Chatham-Kent Health Alliance

cc Sarah Padfield, Vice President and Chief Operating Officer  
Union Gas Ltd.





## Facility Support

Ontario Energy Board  
PO Box 2319  
27<sup>th</sup> Floor  
2300 Yonge Street  
Toronto, Ontario M4P 1E4

May 27<sup>th</sup>, 2016

Attention: **Kristen Walli**  
Board Secretary

RE: **Union Gas Panhandle Reinforcement Project**

Dear Ms. Walli,

We are aware of a proposal put forth by Union Gas Limited, known as the 'Panhandle Reinforcement Project', that is currently being deliberated. This project is intended to increase capacity of their infrastructure to deliver natural gas to southwestern Ontario in general, and specifically addresses delivery issues to the Windsor area. Our experience is that these issues have increased greatly over the past couple years and is already a point of concern for healthcare providers in the immediate region.

In order to ensure the continued efficient operation of our facility, and to accommodate the expected growth and development of healthcare in the region in general, sufficient access to natural gas infrastructure is required. Based on our understanding of the project, it's timely completion is essential to ensure the success of the changes planned for the very near future, let alone provide an ability to operate efficiently now.

On behalf of Hotel-Dieu Grace Healthcare, I am writing to indicate our strong support for the Union Gas Panhandle Reinforcement Project, which has a proposed construction timeline of 2017.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Richard White', is written over a light blue horizontal line.

Richard White  
Director, Facility Support





# THE CITY OF WINDSOR

OFFICE OF THE MAYOR

DREW DILKENS, DBA  
MAYOR

Filed: 2016-06-10  
EB-2016-0186  
Exhibit A  
Tab 5  
Schedule 2  
Page 11 of 20

May 30, 2016

Union Gas Limited  
3840 Rhodes Drive  
Windsor, Ontario  
N9A 6N7

Attention: Ms. Andrea Seguin, District Manager Windsor/Chatham

Dear Ms. Seguin:

**RE: Union Gas Panhandle Reinforcement Project**

On behalf of the Corporation of the City of Windsor, I am pleased to express support for the Union Gas Panhandle Reinforcement Project.

The City of Windsor's main objective is to continue to maintain support our current businesses and to promote all new opportunities. An important contributor to this goal is through an expansion of services throughout this region.

In order for future growth in Windsor to be realized, sufficient natural gas infrastructure will be required. Currently, resources in the Windsor-Essex-Chatham Kent area are at capacity and an expansion of service will be necessary in order to support future economic development in the region.

As a result, the City of Windsor strongly supports this project and looks forward to the continued strong relationship with Union Gas.

Sincerely

Drew Dilkens  
Mayor



**Ontario Federation of Agriculture**

**Ontario AgriCentre**

100 Stone Road West, Suite 206, Guelph, Ontario N1G 5L3  
Tel: (519) 821-8883 • Fax: (519) 821-8810 • [www.ofa.on.ca](http://www.ofa.on.ca)

May 30, 2016

Union Gas Limited  
P.O. Box 2100  
50 Keil Drive North  
Chatham, ON  
N7M 5M1

Attention: Jacqueline Caillé  
Director, Residential Commercial and Industrial Sales

Regarding: Union Gas Panhandle Transmission Expansion Proposal

Dear Ms. Caillé,

OFA believes natural gas is the best infrastructure investment that can be made to support the agri-food sector and rural communities across the province. However, access must be reliably sourced in sufficient quantity to preserve existing production, and develop new business. OFA supports Union Gas Limited's proposal to enhance the southwestern Ontario Panhandle Transmission System.

OFA was encouraged when Union Gas Limited, acting on requests from farmers to expand capacity in the Leamington area, submitted proposal EB-2016-0013 to the OEB. Once completed, this expansion will still not satisfy the existing and growing needs of Ontario's expanding greenhouse sector, and growers will continue to rely on interruptible service contracts.

This is the case with the broader Essex, Chatham-Kent and Lambton areas, where greenhouse operations cannot secure sufficient quantities of natural gas. Many growers in these areas rely on interruptible service contracts and must plan for alternate fuel sourcing during peak demand. To retain existing industry and sustain further economic growth in southwestern Ontario, OFA supports Union Gas Limited plans to expand capacity to the Panhandle Transmission System. We look forward to working with Union Gas Limited and the OEB to advance this proposal.

Yours truly,

Ian Nokes  
Energy & Environmental Economic Policy  
OFA Farm Policy Research Department

May 31, 2016

Ontario Energy Board

To whom it may concern,

This letter is being forwarded to support the application by Union Gas to expand capacity through its Panhandle upgrade project.

Manufacturing in Ontario is an ever-changing environment and energy costs and availability can be a challenge for Fiat Chrysler Automobile's operations in the province. FCA Canada operates three major manufacturing facilities and many smaller facilities and warehouses in Ontario. Our facility in Windsor, Ontario, known as Windsor Assembly Plant (WAP) was recently retooled to make the all new, world class, Chrysler Pacifica.

A dependable supply of natural gas is critical to the operation of WAP. Analysis of our current and future demand for natural gas at WAP concludes that there will be a requirement for additional natural gas supply starting in the Fall of 2016. The Panhandle upgrade project should ensure the capacity for this increased demand is available.

Uninterrupted and firm natural gas delivery is critical to the operation of WAP. As a three shift operation, WAP cannot tolerate an interruption in supply or insufficient capacity. We have been in on-going discussions with representatives at Union Gas to ensure that they have a full understanding of the natural gas requirements at WAP and the impact to the operation if supply is not available.

Should you have any questions or concerns regarding our support for this application please do not hesitate to contact us.

Sincerely,

 6-1-2016

Dereck Hawco  
Commodity Specialist, Energy, Utilities & Fuels  
Indirect Purchasing  
Fiat Chrysler Automobiles  
248-512-4710

May 31, 2016

Ontario Energy Board  
P.O. Box 2319  
27<sup>th</sup> Floor  
2300 Yonge Street  
Toronto, Ontario  
M4P 1E4

Attention: Kristen Walli, Board Secretary

Re: Union Gas Panhandle Reinforcement Project.

Dear Ms. Walli,

I am writing in regards to an impending application to the Ontario Energy Board (OEB), for the Panhandle Reinforcement Project.

I am the President and CEO of Can Art Aluminum Extrusion Inc. Can Art is a manufacturing company specializing in the aluminum extrusion sector. Our products are used in various markets including building and construction, architectural, distribution, electrical, furniture and transportation.

At the present time, Can Art employs some 350 people in Ontario and is currently building a new plant in Lakeshore, Ontario which will employ an additional 86 people. The present plant in Lakeshore currently employs 175 people.

Can Art uses a significant volume of natural gas in its process. There are two primary reasons for the use of this fuel. Firstly it has a significantly lower cost compared to any alternate, and secondly, the equipment used to heat aluminum is specifically tailored to use natural gas.

I can categorically and without reservation state that without the availability of natural gas for our business, our present expansion plans would be altered and ultimately we would look to expand in the USA, with the real possibility of moving all of our businesses there due to a very attractive open door policy, and lower costs.

I respectfully urge you to support manufacturing businesses that rely on natural gas and their respective employees. We have clearly learned that our economy is heavily dependent on manufacturing, and it is imperative and incumbent on us all to ensure that this part of our economy remains stable and strong.

Respectfully,



Robert A. Saroli  
President and CEO  
Can Art Aluminum Extrusion Inc.



**Office of the County Warden**

789 Broadway Street, Box 3000  
Wyoming, ON N0N 1T0

June 1, 2016

Steven Jelich  
District Manager, London/Sarnia  
Union Gas Ltd.  
109 Commissioners Rd. West  
London, ON N6J 1X7

**Re: Union Gas Panhandle Reinforcement Project**

On behalf of The Corporation of the County of Lambton, I am writing to indicate the support of the County for the Union Gas Panhandle Reinforcement Project.

With a population of nearly 130,000 people, Lambton is located on the border with the United States. 65% of the American market can be reached within a one day drive from Sarnia. The Community is located on the 400 series highway, as well as the St. Clair River and has direct access to the St. Lawrence Seaway Marine Shipping Network. It is the fourth busiest international crossing in Ontario in total vehicles, and the second busiest for commercial traffic. It is also connected to the American and Canadian markets through the CN Rail international tunnel.

Lambton has a robust economy rooted in chemical production, bio-based manufacturing, research and fabrication, agriculture, automotive, and engineering. Its industries are interconnected within the south west region of the province, particularly with Windsor-Essex and Chatham-Kent.

The Union Gas Dawn Hub is located within the Township of Dawn-Euphemia, in the southern end of our County. It is the largest natural gas storage complex in North America. Natural gas is clean, affordable, and reliable. Projects such as the Panhandle Reinforcement Project will increase viability and competitiveness of the Dawn Hub and are good for the entire southwest region.

Lambton County strongly supports the Panhandle Reinforcement Project. The region has long had a positive working relationship with Union Gas and urges the Board to support the approval of their proposed project.

Sincerely,

Bev MacDougall  
Warden

BM/mm





**WINDSOR REGIONAL HOSPITAL**  
**OUTSTANDING CARE – NO EXCEPTIONS!**

June 1, 2016

Kristen Walli, Board Secretary  
Ontario Energy Board  
PO Box 2319  
27<sup>th</sup> Floor  
2300 Yonge Street  
Toronto, ON M4P 1E4

Dear Ms. Walli,

**Re: Union Gas Panhandle Reinforcement Project**

On behalf of the Windsor Regional Hospitals, Windsor, Ontario, I am writing to indicate our support for the Union Gas Panhandle Reinforcement Project, which has a proposed construction timeline of 2017.

In order to ensure the continued success of our health care facilities (two major in-patient acute care sites in Windsor, ON) sufficient, uninterrupted access to natural gas is required. Currently the gas transmission resources in the Windsor, Essex and Chatham-Kent region are at capacity. Our natural gas deliveries can and are interrupted by Union Gas. We are then required to burn alternative fuels within the main boiler plants. Our Ouellette campus is unable to safely burn alternative fuels and a significant capital investment would be required to do so. These are taxpayer funds that would and should be allocated to direct patient care. In addition, the alternative fuel is a No. 2 Fuel Oil which is very expensive in comparison and leaves a larger carbon footprint than natural gas.

Finally, Windsor Regional Hospital is also planning to replace its two existing facilities with a new state of the art, 1.7 million square foot facility. A non-interruptable natural gas service should be a given for both our current facilities and planned new facility.

Windsor Regional Hospital supports this project.

Regards,

Kevin Marshall  
Director – Corporate Services  
Windsor Regional Hospital

c.c.: Mark Fathers, CFO and VP Finance and Corporate Services, Windsor Regional Hospital  
Hugh Cumming, Union Gas  
Todd Marentette, Union Gas

## WINDSOR-ESSEX REGIONAL Chamber of Commerce

---

June 6, 2016

Union Gas Limited  
3840 Rhodes Drive  
Windsor, Ontario  
N9A 6N7

Attention: Mr. Collier, District Manager Windsor-Chatham

Dear Mr. Collier:

Re: Union Gas Panhandle Reinforcement Project

The Windsor Essex Regional Chamber is pleased to provide you with a letter of support for the Union Gas Panhandle Reinforcement Project.

Depending on how one measure's it, agriculture and automotive is the number one or number two industries in Ontario and in Windsor Essex. Both of these industries are also the largest of our exporters into the United States and beyond which drive economic growth, jobs and prosperity for our region and the Province of Ontario.

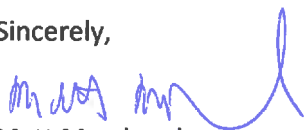
The automotive sector is our region's largest employer contributing nearly 30% of regional GDP and is known for its excellence in Advanced Manufacturing, Innovation and excellent workforce. In order to expand and attract new business, access to natural gas is absolutely essential.

With respect to agriculture, we are working with our agriculture members to double exports by 2020 as per the Premier's challenge. Windsor Essex is the leader in Canada in Greenhouse production (2000 acres) and is growing by 8-10% year. We estimate an additional 1800 acres of greenhouses will be built in addition to what we have now. Infrastructure to enable this growth is needed since we are at capacity right now. In addition, we have 17 wineries in the region as well that need reliable access to natural gas.

Therefore, the Union Gas Panhandle Reinforcement Project is a critical component to ensure economic growth across the spectrum and the Windsor Essex Chamber supports this essential regional project.

We look forward to working with Union Gas and let me know if you need any additional information.

Sincerely,



Matt Marchand  
President and CEO  
Windsor Essex Regional Chamber of Commerce

cc. Dr. Janice Forsyth Chair of the Board

June 6, 2016

Union Gas Limited  
3840 Rhodes Drive  
Windsor, ON  
N9A 6N7

Attention: Mr. Sean Collier – District Manager, Windsor/Chatham

**RE: Union Gas Panhandle Reinforcement Project**

Dear Mr. Collier:

On behalf of the WindsorEssex Economic Development Corporation I am pleased to provide this letter of support for the Panhandle Reinforcement Project in conjunction with the Union Gas application to the Ontario Energy Board and Project approval process.

As the leading economic development agency in the Windsor and Essex County region, we are responsible for advancing economic development to grow and sustain prosperity in the region. Our main focus is to develop and execute strategies to retain, expand, attract and help new businesses start up in the Windsor-Essex region.

Our region has experienced a positive economic trend with the recovery of the auto sector since the 2008-09 recession including: a \$2 billion investment by FCA in the massive renovation and retooling of its Windsor Assembly Plant - also resulting in the addition of 1,200 new employees; \$9M investment in facilities by Hiram Walker & Sons for increased production and a wider range of products; and the completion of the Rt. Hon. Herb Gray Parkway, a \$1.4B highway infrastructure project, leading to the soon-to-be constructed Gordie Howe International Bridge, an estimated \$4.8B project with expected completion in 2020. Trade through the Windsor-Detroit corridor will increase, generating more opportunities for growth, particularly in the Construction and Transportation/Logistics sectors.

The Windsor-Essex region is the manufacturing heartland of Ontario and proudly hosts two prominent OEMs; FCA Canada and its renowned Windsor Assembly Plant, the Ford Motor Company's Essex Engine Plant and Windsor Engine Plant. In addition, the region boasts an industry profile of more than 1000 manufacturers, \$3.3B in annual GDP in manufacturing – 28% of our region's total, 90 plus auto and parts manufacturers and in excess of 250 machine tool, die and mold manufacturers, the largest in Canada. The GDP totals for the last two years has surpassed pre-recession levels. Although many sectors in the economy have seen steady improvement, the manufacturing sector and its related facilities has witnessed dramatic expansion. Growth of this nature requires an available, affordable, and sustainable energy infrastructure.



We saw the unemployment at over 15% during the worst of the recession, and most recently witnessed that rate drop from 9.7% in December 2015 to 6.4% in April 2016. The labour force increased from 169,500 to 172,600 during that four month period alone. The FCA investment has resulted in an increase in hiring at several feeder plants.

The agri-business sector in Windsor-Essex, which includes a greenhouse cluster growing beyond 2,500 acres, and many food processing facilities, felt little impact from the recession and actually emerged as a thriving sector during that challenging time and continues to do so. This sector in particular has a large natural gas requirement where its high-tech diversification has demonstrated an increased demand for this resource. Our agri-businesses, specifically the greenhouse industry, would benefit greatly from an enhanced natural gas pipeline, providing increased infrastructure and resources necessary for expansion that would help secure their footprint in Windsor-Essex rather than losing this investment to a U.S. jurisdiction.

Many agencies have noted the improvement in the Windsor-Essex economy. The Conference Board of Canada ranked the Windsor Census Metropolitan Area 6<sup>th</sup> in Canada for GDP growth in 2015 and expect continued growth at 2% in 2016. CMHC noted that housing starts in the Windsor CMA rose from 60 in Q1 of 2015 to 150 in Q1 2016. CBRE reported an industrial vacancy rate of only 2.9% in Q1 2016, compared to 7.2% one year earlier. The relative lack of existing industrial real estate, coupled with the need by many manufacturers to expand their facilities, is likely to lead to new industrial construction in the near term. Again, both the expanded and new facilities will have a significant natural gas requirement.

As we tackle the challenge of the lack of investment incentives and increasing electricity costs, we continue to compete with low-cost jurisdictions to attract new investment. We are at a competitive disadvantage if we cannot sell our region as offering dependable and sustainable resources. This makes it extremely difficult to play to our strengths in our key sectors where significant investments have already been made in green energy initiatives.

All of the above examples demonstrate the necessary support for the enhancement of the Union Gas Panhandle Reinforcement Project which is crucial to supporting current and future economic development in all of our key sectors and critical to attracting new investment. The WindsorEssex Economic Development Corporation encourages the Ontario Energy Board to seek a favourable review of the application for this Project.

Kind Regards,



Rakesh Naidu – Chief Executive Officer (Interim)  
Windsor Essex Economic Development Corporation



318 Erie Street South, Leamington, ON N8H 3C5; 519-326-2721  
[www.leamingtonchamber.com](http://www.leamingtonchamber.com); [wendyp@leamingtonchamber.com](mailto:wendyp@leamingtonchamber.com)

June 7, 2016

Union Gas Limited  
3840 Rhodes Drive  
Windsor, ON N9A 6N7

Attn: Ms. Andrea Seguin

Re: Union Gas Panhandle Reinforcement Project

Dear Ms. Seguin:

On behalf of the Leamington District Chamber of Commerce, I am writing to indicate our support for the Union Gas Panhandle Reinforcement Project.

Leamington supports a growing Agriculture Sector primarily led by the greenhouse industry. With the current demand for export, our greenhouse producers also look to an expansion in the growing season to aid in market position and energy infrastructure that is necessary to support this growth.

Leamington also supports a significant manufacturing industry focused on fabrication and food and beverage production that continues to show growth and is expected to continue to develop with a favorable foreign exchange rate and demand for Canadian products in the marketplace.

Leamington is lacking the energy infrastructure that will increase the investment in our industrial and commercial development areas thus causing economic impact in our community.

In order for future growth in Leamington, sufficient natural gas infrastructure will be required. At present Windsor-Essex-Chatham-Kent area are at capacity and an expansion of service will be necessary in order to support future economic development in this region.

With this in mind, the Leamington District Chamber of Commerce strongly supports this project and look forward to our ongoing positive relationship with Union Gas.

Sincerely,

Wendy Parsons  
General Manager

Corey Robertson  
President

Mayor Santos  
2021 Division Road North  
Kingsville, ON  
N9Y 2Y9

Dear: Mayor Santos,

I am writing you today to highlight an important issue regarding the availability of natural gas service in your area.

As you may be aware, the Panhandle natural gas transmission system which serves homes and businesses in Southwestern Ontario, including your community, is nearing capacity.

When planning our pipeline system, we include a provision for normal future growth which is sufficient to accommodate most new requests for natural gas service. There has however, been a larger than anticipated growth in the area which has resulted in the need for an expansion sooner than expected.

In response, we have been working for some time now, on plans to expand our Panhandle pipeline system in order to secure the continued reliable delivery of natural gas to existing customers and to serve future growth in demand for firm service in area.

As you can appreciate however, this process can be lengthy to allow sufficient time for public consultation, a thorough environmental assessment, to obtain the necessary permits and complete the required regulatory process.

The good news is, we are well along in this process and expect to file an application for this project with the Ontario Energy Board in late spring. If regulatory approval is received, we are targeting construction in 2017.

In the interim, if you are working to attract new customers to the area that will require large volumes of natural gas, we ask that you reach out to us directly before making any commitments regarding natural gas availability.

We will work directly with them to determine their natural gas needs, and explore every option we have to meet their needs.

We appreciate our long and close relationship with the (insert municipality / City) and I hope the above information is helpful. Should you or your staff have any questions, please do not hesitate to contact me.

Sincerely,  


Andrea Seguin  
Windsor/Chatham District Manager, Union Gas

Mr. Matt Marchand  
President & CEO  
Windsor-Essex Regional Chamber of Commerce  
2575 Ouellette Place  
Windsor, ON N8X 1L9

Dear: Matt,

I am writing you today to highlight an important issue regarding the availability of natural gas service in your area.

As you may be aware, the Panhandle natural gas transmission system which serves homes and businesses in Southwestern Ontario, including your community, is nearing capacity.

When planning our pipeline system, we include a provision for normal future growth which is sufficient to accommodate most new requests for natural gas service. There has however, been a larger than anticipated growth in the area which has resulted in the need for an expansion sooner than expected.

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The good news is, we are well along in this process and expect to file an application for this project with the Ontario Energy Board in late spring. If regulatory approval is received, we are targeting construction in 2017.

In the interim, if you are working to attract new customers to the area that will require large volumes of natural gas, we ask that you reach out to us directly before making any commitments regarding natural gas availability.

We will work directly with them to determine their natural gas needs, and explore every option we have to meet their needs.

We appreciate our long and close relationship with the (insert municipality / City) and I hope the above information is helpful. Should you or your staff have any questions, please do not hesitate to contact me.

Sincerely,



Andrea Seguin  
Windsor/Chatham District Manager, Union Gas

Mayor John Paterson  
Municipality of Leamington  
111 Erie Street North  
Leamington, ON N8H 2X9

Dear: Mayor Paterson

I am writing you today to highlight an important issue regarding the availability of natural gas service in your area.

As you may be aware, the Panhandle natural gas transmission system which serves homes and businesses in Southwestern Ontario, including your community, is nearing capacity.

When planning our pipeline system, we include a provision for normal future growth which is sufficient to accommodate most new requests for natural gas service. There has however, been a larger than anticipated growth in the area which has resulted in the need for an expansion sooner than expected.

In response, we have been working for some time now, on plans to expand our Panhandle pipeline system in order to secure the continued reliable delivery of natural gas to existing customers and to serve future growth in demand for firm service in area.

As you can appreciate however, this process can be lengthy to allow sufficient time for public consultation, a thorough environmental assessment, to obtain the necessary permits and complete the required regulatory process.

The good news is, we are well along in this process and expect to file an application for this project with the Ontario Energy Board in late spring. If regulatory approval is received, we are targeting construction in 2017.

In the interim, if you are working to attract new customers to the area that will require large volumes of natural gas, we ask that you reach out to us directly before making any commitments regarding natural gas availability.

We will work directly with them to determine their natural gas needs, and explore every option we have to meet their needs.

We appreciate our long and close relationship with the (insert municipality / City) and I hope the above information is helpful. Should you or your staff have any questions, please do not hesitate to contact me.

Sincerely,



Andrea Seguin  
Windsor/Chatham District Manager, Union Gas



Mayor Tom Bain  
419 Notre Dame St.  
Belle River, ON  
NOR 1A0

Dear: Mayor Bain,

I am writing you today to highlight an important issue regarding the availability of natural gas service in your area.

As you may be aware, the Panhandle natural gas transmission system which serves homes and businesses in Southwestern Ontario, including your community, is nearing capacity.

When planning our pipeline system, we include a provision for normal future growth which is sufficient to accommodate most new requests for natural gas service. There has however, been a larger than anticipated growth in the area which has resulted in the need for an expansion sooner than expected.

In response, we have been working for some time now, on plans to expand our Panhandle pipeline system in order to secure the continued reliable delivery of natural gas to existing customers and to serve future growth in demand for firm service in area.

As you can appreciate however, this process can be lengthy to allow sufficient time for public consultation, a thorough environmental assessment, to obtain the necessary permits and complete the required regulatory process.

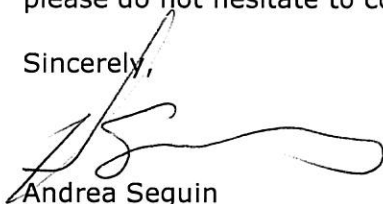
The good news is, we are well along in this process and expect to file an application for this project with the Ontario Energy Board in late spring. If regulatory approval is received, we are targeting construction in 2017.

In the interim, if you are working to attract new customers to the area that will require large volumes of natural gas, we ask that you reach out to us directly before making any commitments regarding natural gas availability.

We will work directly with them to determine their natural gas needs, and explore every option we have to meet their needs.

We appreciate our long and close relationship with the (insert municipality / City) and I hope the above information is helpful. Should you or your staff have any questions, please do not hesitate to contact me.

Sincerely,



Andrea Seguin  
Windsor/Chatham District Manager, Union Gas

Mayor Hope  
315 King St W.  
PO Box 640  
Chatham, ON N7M 5K8

Dear: Mayor Hope,

I am writing you today to highlight an important issue regarding the availability of natural gas service in your area.

As you may be aware, the Panhandle natural gas transmission system which serves homes and businesses in Southwestern Ontario, including your community, is nearing capacity.

When planning our pipeline system, we include a provision for normal future growth which is sufficient to accommodate most new requests for natural gas service. There has however, been a larger than anticipated growth in the area which has resulted in the need for an expansion sooner than expected.

In response, we have been working for some time now, on plans to expand our Panhandle pipeline system in order to secure the continued reliable delivery of natural gas to existing customers and to serve future growth in demand for firm service in area.

As you can appreciate however, this process can be lengthy to allow sufficient time for public consultation, a thorough environmental assessment, to obtain the necessary permits and complete the required regulatory process.

The good news is, we are well along in this process and expect to file an application for this project with the Ontario Energy Board in late spring. If regulatory approval is received, we are targeting construction in 2017.

In the interim, if you are working to attract new customers to the area that will require large volumes of natural gas, we ask that you reach out to us directly before making any commitments regarding natural gas availability.

We will work directly with them to determine their natural gas needs, and explore every option we have to meet their needs.

We appreciate our long and close relationship with the (insert municipality / City) and I hope the above information is helpful. Should you or your staff have any questions, please do not hesitate to contact me.

Sincerely,



Andrea Seguin  
Windsor/Chatham District Manager, Union Gas

Mr. Rakesh Naidu  
Windsor Essex Economic Development Corporation  
Centre for Engineering Innovation  
700 California Avenue, Suite 200  
Windsor, ON N9B 2Z2

Dear: Mr. Naidu,

I am writing you today to highlight an important issue regarding the availability of natural gas service in your area.

As you may be aware, the Panhandle natural gas transmission system which serves homes and businesses in Southwestern Ontario, including your community, is nearing capacity.

When planning our pipeline system, we include a provision for normal future growth which is sufficient to accommodate most new requests for natural gas service. There has however, been a larger than anticipated growth in the area which has resulted in the need for an expansion sooner than expected.

In response, we have been working for some time now, on plans to expand our Panhandle pipeline system in order to secure the continued reliable delivery of natural gas to existing customers and to serve future growth in demand for firm service in area.

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In the interim, if you are working to attract new customers to the area that will require large volumes of natural gas, we ask that you reach out to us directly before making any commitments regarding natural gas availability.

We will work directly with them to determine their natural gas needs, and explore every option we have to meet their needs.

We appreciate our long and close relationship with the (insert municipality / City) and I hope the above information is helpful. Should you or your staff have any questions, please do not hesitate to contact me.

Sincerely,



Andrea Seguin  
Windsor/Chatham District Manager, Union Gas



## **PROPOSED FACILITIES AND ALTERNATIVES**

The purpose of this section of evidence is to review and compare the various alternatives Union evaluated to meet the growing Design Day demand of the Panhandle System. The preferred alternative is the Proposed Pipeline, which is the replacement of the existing NPS 16 pipeline with a new NPS 36 pipeline from Dawn to Dover Transmission Station.

This evidence is comprised of the following sections:

1. Description of Alternatives
2. Description of Alternative Evaluation Criteria
3. Assessment of Alternatives
4. Proposed Solution

### ***1. Description of Alternatives***

Union evaluated alternatives that included the construction of additional pipeline and upgrades to existing station facilities along the Panhandle System. Union also assessed a Liquefied Natural Gas alternative, and an alternative that included contracting for incremental gas supply to the Panhandle System at Ojibway through Panhandle Eastern Pipeline Company L.P. (“PEPL”) firm transportation service contracts. For the purpose of this evidence, the following alternatives were identified and assessed:

- New pipeline from Dawn along the Panhandle System (NPS 30 or NPS 36 lift and lay);

- New Liquefied Natural Gas (“LNG”) Plant along the Panhandle System to provide peaking supply; and,
- New pipeline with incremental deliveries at Ojibway.

## ***2. Description of Alternative Evaluation Criteria***

In completing its evaluation of each alternative, Union considered two main criteria: i) Design and Operational Requirements; and, ii) Net Present Value (“NPV”) Cost.

i) Design and Operational Requirements: The Panhandle System provides customers firm natural gas requirements while meeting the minimum inlet pressures necessary to supply downstream distribution systems. An acceptable alternative must be able to maintain these minimum pressure parameters on a Design Day and meet Design Day delivery requirements.

The alternatives are intended to serve five years of forecast growth (2017-2021) and lay a foundation for expected future growth. Beginning in 2017, the existing Design Day demands plus the forecasted growth will exceed the current Panhandle System capacity, and therefore reinforcement is required. As described in Exhibit A, Tab 5, the Design Day demand of the Panhandle System is forecast to grow from 565 TJ/d to 671 TJ/d by 2021. The alternatives, therefore, are required to provide 106 TJ/d of incremental capacity to the Panhandle System to move natural gas to the distribution networks it supplies. Each alternative is evaluated using this same time horizon, while considering the longer term growth forecast in choosing the preferred alternative. Facilities required to support the forecasted growth beyond 2021 are not being proposed as part of this Application.

ii) Net Present Value (“NPV”) Cost: Union evaluated the NPV of each viable alternative. The NPV of the Proposed Pipeline and the alternatives are shown in Exhibit A, Tab 7, Table 7-1.

### ***3. Assessment of Alternatives***

Each alternative was evaluated based on the need for incremental transmission capacity of approximately 106 TJ/d effective November 1, 2017. The facilities are required to provide incremental capacity to the Panhandle System and meet the forecasted five year firm Design Day growth. Providing incremental capacity for at least five years offers assurance to the Market that capacity will exist to meet the growing needs of residential, commercial and industrial customers. The following summarizes the assessment findings for each alternative identified above.

#### **3.1 New Pipeline from Dawn along the Panhandle System**

Union reviewed an alternative consisting of constructing a new 40-kilometre NPS 30 pipeline from Dawn to Dover Transmission. This alternative also required measurement and station upgrades at Dawn and upgrades at three stations (Dover Centre, Dover Transmission and Mersea Gate) along the Panhandle System. The estimated capital cost of this alternative is \$264 million. The existing NPS 16 pipeline would remain in service.

Union then reviewed a further pipeline alternative consisting of removing (lift) 40 kilometres of the existing NPS 16 pipeline and replacing (lay) with a new NPS 36 pipeline from Dawn to Dover Transmission. This alternative also required measurement and station upgrades at Dawn and upgrading

1 three stations (Dover Centre, Dover Transmission and Mersea Gate) along the Panhandle System. The  
2 estimated capital cost of this alternative is \$264.5 million. A cost comparison of a new NPS 30  
3 pipeline and new NPS 36 pipeline can be found at Exhibit A, Tab 6, Schedule 1.

4  
5 The 40-kilometre NPS 36 lift and lay alternative is the most viable economic and environmental  
6 pipeline alternative. The capital costs of the new NPS 36 pipeline and new NPS 30 pipeline are  
7 virtually the same and each pipeline provides approximately the same incremental capacity. The NPS  
8 36 pipeline will require greater material, contractor labour and pipeline removal costs, but these costs  
9 are offset by land easement savings. The majority of the new NPS 36 pipeline will be constructed  
10 within the existing NPS 16 pipeline permanent easement compared to the new NPS 30 pipeline  
11 alternative, which requires new permanent easements for the entire length of the pipeline. Based on the  
12 preferred lift and lay alternative, Union retained Stantec Consulting Limited (“Stantec”) to prepare an  
13 Environmental Report (“ER”), consistent with the Board’s Environmental Guidelines to identify  
14 potential impacts and associated mitigation. Additional information about the ER and a copy of the  
15 document can be found in Exhibit A, Tab 10.

16  
17 While capital costs are comparable for the two options, the NPS 36 lift and lay option has an economic  
18 benefit because it eliminates ongoing integrity costs associated with the existing NPS 16 pipeline from  
19 Dawn to Dover Transmission.

20  
21 The NPS 16 pipeline continues to be operated safely and, like other transmission pipelines, requires a  
22 variety of integrity work. That integrity work includes inline inspection and integrity digs, depth of

1 cover surveys and remediation, class location surveys and remediation, leak surveys, and corrosion  
2 surveys. The existing NPS 16 pipeline does not need to be replaced due to integrity issues; however,  
3 these programs are increasingly costly due to the vintage of the pipeline. The removal of the NPS 16  
4 pipeline avoids future integrity costs for the NPS 16 pipeline in the Dawn to Dover Transmission  
5 segment.

6  
7 The proposed NPS 36 pipeline reinforcement of the Dawn to Dover Transmission segment creates the  
8 opportunity to eliminate the existing NPS 16 pipeline segment and avoid integrity costs without  
9 incremental capital costs compared to the new NPS 30 pipeline build alternative. The lift and lay  
10 alternative will avoid ongoing operating and maintenance costs, with a NPV of (\$12) million over 20  
11 years, related to future integrity and other maintenance (class locations, pipeline lowering, etc.) work  
12 on the existing NPS 16 pipeline. The cost assumptions for the (\$12) million NPV can be found at  
13 Exhibit A, Tab 6, Schedule 2. Ongoing integrity costs for a new NPS 30 pipeline would be similar to  
14 costs for a new NPS 36 pipeline. Based on the above, the NPS 36 lift and lay option (Proposed  
15 Pipeline) has a favorable NPV of (\$212) million compared to a (\$224) million NPV of a new NPS 30  
16 pipeline option.

17  
18 The Proposed Pipeline best positions the Panhandle System to meet long-term growth in the most  
19 efficient manner. Since the NPS 16 pipeline was installed in 1951 and the NPS 20 pipeline in 1973,  
20 downstream reinforcement projects<sup>1</sup> have been a primary means of meeting demand growth in the  
21 Market. These projects have enabled firm demand growth to be served by utilizing the remaining

---

<sup>1</sup> Leamington Expansion Phase I (2013) EB-2012-0431 and 2016 Leamington Expansion Pipeline Project (EB-2016-0013)

1 capability of the Panhandle System. This growth has resulted in reduced pressures along the NPS 20  
2 pipeline downstream of Dover Transmission. Consequently, additional downstream reinforcement  
3 projects would not provide a great deal of additional capacity to the Market. The Proposed Pipeline  
4 raises the pipeline pressures along the entire existing NPS 20 pipeline, unlocking additional capability  
5 on the existing downstream pipelines by providing those facilities with a higher inlet pressure.

6  
7 Alternatives to the Proposed Pipeline require the existing NPS 16 pipeline to continue to operate. The  
8 NPV of those alternatives therefore include the (\$12) million NPV for operating and maintenance  
9 related to the integrity work.

### 11 3.2 New Liquefied Natural Gas (“LNG”) plant along Panhandle System

12 Installation of an LNG plant along the Panhandle System was also evaluated as an alternative. The  
13 system would benefit if an LNG plant was built capable of injecting additional supply into the  
14 Panhandle System to meet peak demands. This option is not viable as it cannot meet the required in-  
15 service date of November 1, 2017 given the extended time required to construct the facilities.

16  
17 The LNG plant would be constructed along the existing NPS 20 pipeline near the Comber  
18 Transmission Station (“Comber”) with the capability to liquefy and store 1.2 PJ of LNG and vapourize  
19 LNG to serve the Design Day demand. The cost of the LNG plant, including the annual operating costs  
20 for the liquefaction, storage, vaporization, compression and site development, is estimated to be \$48  
21 million more on a NPV basis than the Proposed Pipeline. This includes (\$12) million related to the  
22 existing NPS 16 pipeline integrity costs.

1  
2 In addition, the LNG alternative would require a longer lead time for project development, construction  
3 and permitting of approximately three (2019) to five (2021) years, and would not meet the required in  
4 service date of November 1, 2017.

5  
6 Union also considered a compressed natural gas (“CNG”) alternative. Under this alternative CNG  
7 would be produced at Dawn and injected into the NPS 20 pipeline in the Comber area. This alternative  
8 is not only cost prohibitive but it creates a logistical concern. On a Design Day, approximately 513  
9 trailer loads of CNG would need to be trucked into the Comber area during the day. This is not  
10 practical and creates a significant supply risk. For this reason, CNG is not a viable alternative.

### 11 12 3.3 New Pipeline with Incremental Deliveries at Ojibway

13 This alternative includes Union contracting for an incremental 34 TJ/d of supply at Ojibway<sup>2</sup> plus  
14 installing incremental pipeline and station facilities along the Panhandle System to serve the remainder  
15 of the demand from Dawn.

16  
17 There are no stand-alone commercial services that can be contracted with a pipeline company or  
18 secondary market that would deliver natural gas via the Panhandle System into the distribution  
19 networks that will eliminate the need for additional pipeline and station facilities. In this case, pipeline  
20 and station facilities are required in addition to any commercial arrangement in order to integrate the

---

<sup>2</sup> This would bring the total contracted Union deliveries at Ojibway to 94 TJ/d, which maximizes Union’s import capability given the 115 TJ/d limit and the existing renewable Ojibway to Dawn capacity of 21 TJ/d held by a third party.

1 additional supply into Union's transmission and distribution system and meet the growing Design Day  
2 demands across the Market.

3  
4 In evaluating the potential of incremental gas supply delivered at Ojibway, Union adhered to its Gas  
5 Supply Planning Principles<sup>3</sup> which focus on providing reliable, secure and diverse supplies to Union's  
6 customers at a prudent cost. These principles are applied when Union reviews transportation  
7 alternatives and makes decisions with respect to serving its customers.

8  
9 For any commercial service to be considered viable, the commercial service must be firm with ongoing  
10 renewal rights and renewal notice of at least three years. This is to ensure that if a commercial service  
11 is no longer available in the future, Union has sufficient time to contract for other supply and/or  
12 construct required facilities.

13  
14 For this alternative, Union took a balanced approach between a physical and commercial service to  
15 meeting an additional 106 TJ/d of Design Day demand and meet the evaluation criteria. When  
16 evaluating this alternative, the following need to be taken into consideration:

- 17 • Incremental Gas supply costs related to an incremental 34 TJ/d of supply at Ojibway and  
18 related risks;
- 19 • Cost of Required incremental Union pipeline and station facilities along the Panhandle  
20 System to serve the remainder of the demand from Dawn (outlined below);

---

<sup>3</sup> Refer to EB-2014-0182 Exhibit A, Tab 5



- 1           • The continued Integrity work costs on the segment of NPS 16 pipeline not being replaced;
- 2           and,
- 3           • Longer term facilities requirements.

4

5   Incremental Gas Supply Delivered at Ojibway

6   Based on discussions with PEPL, PEPL is offering Union an additional 34 TJ/d of firm renewable  
7   capacity with an Ojibway delivery point contracted over a long-term (i.e. 10 years) period that would  
8   originate in the Panhandle Field Zone (long haul). PEPL has also provided indicative rates for firm  
9   service for the 34 TJ/d of long haul, long-term firm service.

10

11   Union also does not have specific renewal rights or any right of first refusal (“ROFR”) on 21 TJ/d of its  
12   existing 60 TJ/d of PEPL capacity after October 31, 2017. PEPL has provided indicative rates for firm  
13   service over a long-term (i.e. 10 years) period on the total existing 60 TJ/d of capacity.

14

15   The total PEPL capacity offered to Union of 94 TJ/d is currently under negotiation. The current  
16   contract terms of the offering are limited by the term, price and availability. The PEPL offer expires on  
17   June 30, 2016 and Union is unaware if this capacity will be available in the future. Union cannot be  
18   guaranteed access to any PEPL capacity greater than the 39 TJ/d it currently holds that is subject to a  
19   ROFR.

20

21   Union has also estimated that, on a forecasted basis, the landed cost of PEPL Field Zone supply  
22   delivered to Union at Ojibway over a 10 year term (2016 to 2026) is approximately \$0.30/GJ higher

1 than the cost of Dawn sourced supply over the same period. Assuming the additional 34 TJ/d of  
2 supply, this would amount to an annual premium of approximately \$3.7 million as compared to the  
3 Dawn supplied option, equating to a NPV premium of \$22 million over the 10 year period.

4  
5 These factors highlight the potential issues of having to rely on third party gas supply services to meet  
6 an in-franchise firm demand requirement in place of, or in supplement to, a Union facility option.

7  
8 This alternative can carry a large degree of price, term and capacity uncertainty, and poses risk to the  
9 Market when relying on third party gas supply services at Ojibway to meet demand. The risks of term,  
10 price and availability are further described below:

11  
12 **Term Risk** relates to the uncertainty on how long a shipper would have to commit to transportation  
13 capacity in the future related to having a ROFR. For example, when a contract has ROFR rights and  
14 renews, it means that once the primary term of the contract ends, if another party is willing to contract  
15 for a longer term, the original contract holder would have to match that term to retain the rights to the  
16 capacity. This would then reoccur each time the primary term ended. Therefore, you would not know  
17 what term you may need to contract for in the future to retain the capacity.

18  
19 **Price Risk** is twofold. First the transportation capacity would have a risk around the level of the tolls  
20 on the pipeline going forward. To have renewal or ROFR rights, pipelines will require contracting at  
21 maximum tolls. These maximum tolls can change over time. Even if the maximum tolls were locked  
22 in for the primary term, the term following the renewal or ROFR period, would likely have different

tolls. The second area of price risk is the gas commodity price. Gas prices will change from time to time based on the market factors at the time the purchase is made.

**Availability Risk** relates to whether or not transportation capacity is available from time to time. Should a contract not have renewal or ROFR rights (i.e. not be a term contract at maximum tolls) then the availability of the transportation capacity would be in question after the initial term of the transportation arrangement.

Based on these additional factors, this alternative is not preferred.

#### Cost of Required Incremental Facilities

The pipeline and station facilities required in addition to 94 TJ/d of firm deliveries at Ojibway are:

- i.* Replace (lift) 27 kilometres of the existing NPS 16 pipeline from Dawn to the Dover Centre Station and replace (lay) with a new NPS 36 pipeline plus upgrade Dawn, Dover Centre and Mersea stations along the Panhandle System;
- ii.* Install approximately 16 kilometres of NPS 12 pipeline from the existing NPS 20 pipeline into the Town of Kingsville and build a new station to serve the distribution network; and,
- iii.* Install approximately 12 kilometres of NPS 6 pipeline looping upstream of McCormick Station in the Municipality of Essex.

This alternative requires a significant amount of pipeline and station facilities to be constructed in addition to the increase in Ojibway deliveries. While Ojibway deliveries are well-suited to satisfy

demands in the Windsor market, which is in close proximity to Ojibway, they are not efficient for satisfying demands further upstream on the Panhandle System. Incremental Ojibway deliveries yield diminished returns to serve demand beyond the Windsor market between Sandwich and Dawn (i.e. for each 1 GJ of incremental Ojibway deliveries, less than 1 GJ of capacity is created east of Sandwich). As a result, significant transmission and high pressure distribution reinforcement is also required. This alternative has an estimated capital cost of \$235 million.

#### Continued Integrity work costs on NPS 16 pipeline

In addition, this alternative will also require 13 kilometres of NPS 16 pipeline to remain in place at a NPV cost for the ongoing integrity and maintenance of approximately (\$3) million.

The NPV of this alternative, including the gas cost premium and ongoing maintenance is (\$205) million compared to a (\$212) million NPV of the Proposed Pipeline. Although this alternative is slightly less costly than the Proposed Pipeline on a NPV basis, it is not the preferred option due to the risk factors identified above and the higher costs associated with longer term growth. See Exhibit A, Tab 6, Table 6-1.

#### Longer Term Facility Requirements

The long-term demand (2022-2034) along the Panhandle System is expected to grow by a further 99 TJ/d. With further demand, additional pipeline and station facilities are required to meet long-term demand. In reviewing the long-term facility requirements, all alternatives will require the installation of the Proposed Pipeline. In addition, downstream reinforcement projects connecting into the

distribution network, and ultimately further Panhandle System reinforcement west of Dover Transmission, will be required. Regardless of project scope, the long-term solution to respond to the growing Panhandle System requires increasing the capacity of the Panhandle System beginning at Dawn heading westerly to maintain the required system delivery pressures and serve the growing Design Day demands, as proposed in this Project.

Given that the alternatives presented serve only five years of Design Day demand growth, it is important to consider the additional facilities required in 2022 to continue to meet the ongoing need of the Market. In Table 6-1, Union compares the incremental reinforcement facilities required in 2022 (year 6 of the growth) for the Proposed Pipeline and the alternative that includes incremental Ojibway deliveries. The comparison illustrates that the most economic option over the longer term is the Proposed Pipeline. Please refer to the economic analysis in Exhibit A, Tab 7, Table 7-2.

Table 6-1  
Incremental Reinforcement Facilities Comparison in 2022

<u>Base Facilities 2017-2021</u>	<b>Proposed Pipeline</b>	<b>New Pipeline with Incremental Deliveries at Ojibway</b>
<b>Incremental Facilities in 2022</b>	16 kilometres of NPS 12 pipeline from the NPS 20 pipeline into the Town of Kingsville and build a new station to feed the distribution network.	Lift remaining 13 kilometres of existing NPS 16 pipeline and lay NPS 36 pipeline from Dover Centre to Dover Transmission
	12 kilometres of NPS 6 pipeline looping upstream of McCormick Station in the Municipality of Essex.	
<b>Incremental Capital in 2022</b>	\$40 million	\$99 million
<b>Total Capital</b>	\$305 million	\$334 million
<b>Total NPV</b>	<b>\$(239) million</b>	<b>\$(271) million</b>

1        ***iv. Proposed Solution***

2        To provide reliable, secure, economic natural gas supply to meet the growing Design Day demand of  
3        the Panhandle System, Union is proposing to replace 40 kilometres of the existing NPS 16 pipeline  
4        from Dawn to Dover Transmission with a new NPS 36 pipeline along with supporting station  
5        infrastructure upgrades at Dawn and three other stations. This Proposed Pipeline will have an in-service  
6        date of November 1, 2017. The Proposed Pipeline is illustrated in the schematic filed at Exhibit A, Tab  
7        4, Schedule 3.

8  
9        The Proposed Pipeline provides many benefits and is the best alternative for the following reasons:

- 10        1. Provides market assurance in meeting the growing near term firm demands along the  
11        Panhandle System for the next five years;
- 12        2. Positions the Panhandle System and the laterals connecting the distribution network to meet  
13        the long term growth in the most efficient manner. Since the Proposed Pipeline is an  
14        upstream transmission reinforcement, one of the its key benefits is that it raises the pipeline  
15        pressures along the entire NPS 20 pipeline, unlocking additional capability on downstream  
16        pipelines by providing those facilities with a higher inlet pressure;
- 17        3. Eliminates operating and maintenance costs related to future integrity and other  
18        maintenance associated with the existing NPS 16 pipeline between Dawn and Dover  
19        Transmission;
- 20        4. The new NPS 36 pipeline will be constructed primarily within Union's existing easement;  
21        and,

- 1        5.    Provides the necessary incremental capacity without the increased reliance on third party
- 2            gas supply transportation services, which contain price, term and capacity risk at a cost
- 3            premium.

## COST COMPARISON OF NPS 36 vs NPS 30 PIPELINES

<b>Panhandle Reinforcement - Mainline Only</b>	<b>Proposed Lift NPS 16 and Lay NPS 36</b>	<b>Alternative NPS 30 Pipeline in new easement</b>
Materials	\$16,578,000	\$14,578,000
Construction and Labour		
Labour	\$142,000,000	\$139,500,000
Pipeline Removal	\$2,730,000	\$0
Lands/Land Rights	\$31,417,000	\$38,117,000
Contingencies	\$28,909,000	\$28,909,000
Interest During Construction	\$2,321,000	\$2,321,000
<b>Total Estimated Pipeline Capital Costs – 2017 Construction</b>	<b>\$223,955,000</b>	<b>\$223,425,000</b>



Integrity Maintenance Cost Assumptions for Panhandle NPS 16 Pipeline

Expected Maintenance Activity Description	Frequency, Expected Cost, Cost Category
Class Location Replacement <ul style="list-style-type: none"> <li>Replace potentially 1 segment (500 m long) every 10 years</li> </ul>	Starting in 2018 and every 10 years <ul style="list-style-type: none"> <li>\$1,000,000</li> </ul> <i>100% Capital</i>
Depth of Cover Remediation <ul style="list-style-type: none"> <li>Remediate 12 locations which are currently identified which require lowering via replacement</li> <li>Remediate an additional 2 segments every 10 years</li> </ul>	One time replacement in each of 2017, 2018 <ul style="list-style-type: none"> <li>\$1,200,000 ( Assumes \$200,000 per segment X 6)</li> </ul> Starting in 2028 and every 10 years <ul style="list-style-type: none"> <li>\$400,000</li> <li>(Assumes \$200,000 per segment)</li> </ul> <i>100% Capital</i>
Aerial Crossings <ul style="list-style-type: none"> <li>Remediate 2 currently identified aerial crossings via replacement</li> </ul>	One time replacement in 2017 <ul style="list-style-type: none"> <li>\$400,000</li> </ul> <i>100% Capital</i>
Pig NPS 16 according to integrity management program <ul style="list-style-type: none"> <li>Inline Inspect with combo tool + AFD</li> </ul>	Starting in 2017 and every 7 yrs. <ul style="list-style-type: none"> <li>\$400,000 per inspections</li> </ul> <i>100% O&amp;M</i>
Digs associated with integrity management program <ul style="list-style-type: none"> <li>Digs/pig cycle: 10-20</li> <li>\$/Dig: \$200,000</li> </ul>	Starting in 2017 and every 7 yrs. <ul style="list-style-type: none"> <li>Range of \$2,000,000 to \$4,000,000. (\$3,000,000 included in NPV calculation, assumes 15 digs).</li> </ul> <i>90% Capital/ 10% O&amp;M</i>
Digs associated with identified top side dents <ul style="list-style-type: none"> <li>Digs: 8</li> </ul>	One time work to address 8 known features <ul style="list-style-type: none"> <li>\$1,600,000 in 2017</li> <li>(Assumes \$200,000 per dig)</li> </ul> <i>90% Capital/ 10% O&amp;M</i>

*Note: survey costs (i.e. class location, depth of cover, easement encroachment, and leakage) and non-integrity related operating and maintenance costs for the NPS 16 were deemed not material and not quantified for purposes of the NPV analysis.*

## PROJECT COSTS AND ECONOMICS

The purpose of this evidence is to describe the costs and economics of the Proposed Pipeline and the economics of the alternative facilities considered.

### *Proposed Facilities*

For the Project, Union will be constructing the following facilities at a total cost of \$264.5 million (see Exhibit A, Tab 7, Schedule 1):

- Removal of the existing NPS 16 pipeline and construction of 40 kilometres of new NPS 36 pipeline at an estimated cost of \$224 million.
- Modifications to the Panhandle measurement and regulation facilities in the Dawn Yard at an estimated capital cost of \$24.8 million.
- Modifications to Dover Transmission at an estimated capital cost of \$8.8 million.
- Modifications to the Dover Center Station at an estimated capital cost of \$2.8 million.
- Modifications to the Mersea Gate Station at an estimated capital cost of \$4.1 million.

All of the facilities are forecast to be in-service for 2017 as further described in Exhibit A, Tab 5.

The amounts shown in Exhibit A, Tab 7, Schedule 1 cover all costs related to materials, construction and labour, environmental protection measures, contingencies, and interest during construction (“IDC”).

The total material cost covers the cost of all pipe, valves, fittings, coatings, associated equipment, miscellaneous items and stores overheads. The material costs are based on historical records as well as more recent quotes received and purchases made.

The total construction and labour cost covers the costs of the installation of the pipeline and related station facilities. It includes the cost of all labour on the Project. The installation costs are based on Project-specific information and quotes, along with historical records and are adjusted for current market conditions.

The environmental protection costs are shown at Exhibit A, Tab 10, Schedule 3. These costs are identified as pre-construction related, construction related and post-construction related. These costs are included in Exhibit A, Tab 7, Schedule 1.

## ***Project Economics***

### **Economic Feasibility Tests**

Union employs a three-stage analysis to assess the economic feasibility of projects in accordance with OEB recommendations from the E.B.O. 134 Report on System Expansion. This methodology is consistent with Union's past Dawn Parkway System facility applications.

Stage 1 consists of a discounted cash flow ("DCF") analysis specific to Union. All incremental cash inflows and outflows resulting from the Project are identified. The net present value ("NPV") of the cash inflows is divided by the NPV of the cash outflows to arrive at a profitability index ("PI"). If the

NPV of the cash inflows is equal to or greater than the NPV of the cash outflows, the PI is equal to or greater than one and the project is considered economic based on current approved rates.

If the project NPV is less than \$0 or the PI is less than 1.0, a Stage 2 benefit/cost analysis may be undertaken in order to quantify benefits and costs accruing to Union's customers as a result of the project. The NPV of quantified benefits to customers resulting from the project is added to the project NPV from Stage 1 and then discounted at a social discount rate in order to calculate the direct net benefit of the project to Union's customers. The project is considered to be in the public interest if the net benefit is greater than \$0.

The Stage 3 analysis considers other quantifiable benefits and costs related to the construction of the Project that are not included in the Stage 2 analysis, and other non-quantifiable public interest considerations.

#### Stage 1 – Project Specific Discounted Cash Flow (DCF) Analysis

Stage 1 economics were completed for the Project and results of the Stage 1 DCF analysis are shown at Exhibit A, Tab 7, Schedule 4. The results indicate a cumulative NPV of (\$212) million and a PI of 0.19 over a DCF term of 20 years.

In light of the uncertainty created by Cap and Trade and the Climate Change Action Plan ("CCAP") (described in Exhibit A, Tab 3), the DCF has been completed on the basis of a 20-year term. For illustrative purposes the DCF based on the typical 40-year revenue expectation is provided at Exhibit A, Appendix A, Schedule 1.

Incremental cash inflows are estimated based on the transmission component (“transmission margin”) of the customers’ rates. The revenue calculation for the transmission margin is provided at Exhibit A, Tab 7, Schedule 3.

Incremental cash outflows include the cost of the Project facilities as shown in Exhibit A, Tab 7, Schedule 1. The capital costs exclude general overheads, which would be incurred whether or not the Project proceeds. IDC is included for capital costs incurred prior to the in-service date of November 1, 2017.

All cash flows are discounted using Union’s after tax incremental weighted average cost of capital. The average cost of capital is the weighted average of the expected incremental cost of each of the components of the capital structure in the same proportions as approved in Union’s 2013 Rebasing application (EB-2011-0210).

The Project economics have been evaluated over a 20-year period. A summary of the key input parameters used in the economic analysis are shown on Exhibit A, Tab 7, Schedule 2.

#### Stage 1 DCF for Alternatives

The alternatives to the Proposed Pipeline are described in Exhibit A, Tab 6.

The NPV of the Proposed Pipeline and the alternatives are summarized in Table 7-1. The full descriptions and specific facilities of these as well as additional alternatives that were considered but found not to be viable, are described in Exhibit A, Tab 6.

Table 7-1  
Stage 1 NPV of Proposal and Alternative (\$ Millions) – 20-year Term

	Description	NPV
	Proposed Pipeline (Includes New 40km NPS 36)	\$(212)
Alt 1	New Pipeline from Dawn along the Panhandle System (New 40 km NPS 30 Pipeline, Retain existing NPS 16 in service)	\$(224)
Alt 2	New Pipelines + Incremental Deliveries at Ojibway	\$(205)

The difference in capital cost of the Project relative to Alternative 1 (construct a NPS 30 pipeline and retain the NPS 16 pipeline in service) is \$0.5 million. Retaining the existing NPS 16 pipeline in service has a NPV cost of approximately \$12 million over a 20-year term. The cost parameters for this outcome are filed at Exhibit A, Tab 6, Schedule 2.

Table 7-1 shows the NPV based on facilities required for a five-year term. A longer term perspective requires additional facilities in year 6. Table 7-2 shows the NPV of the Project and Alternative 2. The NPV of the Project and Alternative 2 are close at five years, and the Project is approximately \$32 million favorable on a six-year view. The description of the facilities required in 2022 (year 6) can be found at Exhibit A, Tab 6, Table 6-1.

Table 7-2  
Stage 1 NPV of Proposal and Alternative 2 (\$ Millions) - 20-year Term

Description	NPV Assets 5 Yrs	NPV Assets 6 Yrs
Proposed Pipeline	\$(212)	\$(239)
Alternative 2	\$(205)	\$(271)

### Stage 2 – Benefit/Cost Analysis

A Stage 2 analysis may be undertaken when the Stage 1 NPV is less than zero. The Stage 2 analysis considers the estimated energy cost savings that accrue directly to Union’s in-franchise customers as a result of using natural gas instead of another fuel to meet their energy requirements. The Stage 2 NPV energy cost savings are estimated to be approximately \$805 million. The results and assumptions can be found in Exhibit A, Tab 7, Schedule 5.

### Stage 3 – Other Public Interest Considerations

There are a number of other public interest factors for consideration as a result of the addition of the Project. Some are quantifiable and others are not readily quantifiable. Quantifiable factors include the GDP, taxes and employment impacts. Other less quantifiable impacts include, but are not limited to, energy choice options and environmental benefits. These factors are detailed below.

### ***Economic Benefits for Ontario***

A report titled The Economic Impact of Ontario’s Infrastructure Investment Program, (the “Report”) was produced by the Conference Board of Canada and published April 2013. This public report quantifies the economic impact of infrastructure spending in Ontario and can be found at Exhibit A,

Tab 7, Schedule 7. The figures from this Report were also used to estimate the GDP impact of Union's recent transmission facilities applications including Dawn Parkway 2016 Expansion<sup>1</sup>, 2017 Dawn Parkway Project<sup>2</sup> and Burlington Oakville Pipeline<sup>3</sup>.

Union has used the metrics in the Report to estimate the economic impact of this Project to the Province of Ontario. The construction of the Project will provide direct and indirect economic benefits to Ontario estimated at approximately \$296 million. Exhibit A, Tab 7, Schedule 6 shows how this figure is derived. The economic impact figures in Exhibit A, Tab 7, Schedule 6 use factors from the Report plus the NPV of the direct taxes paid by Union from the DCF found at Exhibit A, Tab 6, Schedule 4.

#### Employment

The construction of this Project will result in additional direct and indirect employment. There will be additional employment of persons directly involved in the construction of the Project. In addition there is a trickledown effect on employment. As referenced in the Report, approximately 1,670 jobs are created for each \$100.0 million of infrastructure spending (16.7 jobs per \$1.0 million). The Project is estimated to create approximately 3,800 jobs as referenced in Exhibit A, Tab 7, Schedule 6.

#### Utility Taxes

A decision to proceed with this Project will result in Union paying taxes directly to various levels of government. These taxes include Ontario income taxes and municipal taxes paid by Union as a direct

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<sup>1</sup> EB-2014-0261

<sup>2</sup> EB-2015-0200

<sup>3</sup> EB-2014-0182



1 result of the Project and are included as costs in the Stage 1 analysis. These taxes are not true  
2 economic costs of the Project since they represent transfer payments within the economy that are  
3 available for redistribution by the federal, provincial and municipal governments. The net present value  
4 of Ontario income taxes and municipal taxes payable by Union related to the proposed facilities over  
5 the 20-year project life is approximately \$35 million with a further \$21 million paid to the Federal  
6 Government. These figures are further detailed in Exhibit A, Tab 7, Schedule 6. These taxes are in  
7 addition to the benefits referenced in the Report. The figures in the Report are based on government  
8 investment in infrastructure and as such income and property taxes are not included.

#### 10 Employer Health Taxes

11 The additional employment that will result from the construction of this Project will generate additional  
12 employer health tax payments to aid in covering the cost of providing health services in Ontario.

#### 14 Environmental Effects

15 Natural gas, because of its clean-burning properties, has an increasingly important role to play in  
16 reducing the environmental impacts of energy use. The use of natural gas either with or in place of  
17 other fossil fuels, in residential, commercial, industrial and transportation applications reduces the  
18 environmental impact in two key areas. First of all, the process is frequently more efficient, reducing  
19 total energy use. Secondly, natural gas pollutant release per unit of energy is less than other fossil  
20 fuels.

21  
22 Some of the inherent advantages of natural gas are as follows:

- a. Unlike the combustion of both coal and cheaper grades of fuel oil for electrical power generation, natural gas combustion produces virtually no sulphur dioxide – the most significant component to acid rain formation.
- b. Natural gas vehicles emit up to 90% less carbon monoxide than gasoline-powered vehicles.
- c. Natural gas combustion also emits significantly lower amounts of reactive hydrocarbons and nitrogen oxides – the key photochemical agents in the formation of urban smog.
- d. For stationary power generation, natural gas can reduce carbon dioxide emissions by approximately 50% per unit of energy when compared to coal and by 35% when compared to fuel oil.

#### Summary of Stages 1 to 3

Table 7-3 shows the NPV calculated for the 3-stage economic analysis completed for the Project.

Table 7-3  
NPV \$ Millions – 20-year Term

Stage	NPV
Stage 1	(\$212)
Stage 2	+ \$805
Stage 3	+ 296
Total	+ \$889

On February 21, 2013, the Board issued a new requirement to the Filing Guidelines on the Economic Tests for Transmission Pipeline Applications with respect to E.B.O. 134 (EB-2012-0092). This new requirement is:

*“Any project brought before the Board for approval should be supported by an assessment of the potential impacts of the proposed natural gas pipeline(s) on the existing transportation pipeline*

*infrastructure in Ontario, including an assessment of the impacts on Ontario consumers in terms of cost, rates, reliability and access to supplies.”*

These impacts have been addressed throughout this Application. Table 7-4 summarizes the impacts and provides references where more detailed analysis can be found.

Table 7-4

Entity Impacted		Summary of Impact	Reference
Existing Infrastructure	Union	Union is proposing to remove 40 kilometres of NPS 16 pipeline and replace with a NPS 36 pipeline from Dawn, including station upgrades along the Panhandle System	Exhibit A, Tab 6
	Other Transportation Pipelines	Application not dependent upon any interconnected pipeline building capacity. Transportation services from another pipeline system cannot meet the demands or provide services in relation to Union’s Panhandle System	N/A
Impacts to Ontario consumers	Costs and Rates	The rate impact for in-franchise and ex-franchise customers can be found in this Application  Impact to TransCanada’s costs or rates is not applicable	Exhibit A, Tab 8
	Reliability and Access to Supplies	This Project supports the growing firm demands along Union’s Panhandle System which feeds the Chatham to Windsor distribution area  The Project will initiate at Dawn, with access to reliable, affordable and diverse natural gas supplies and suppliers at the liquid Dawn Hub.	Exhibit A, Tab 5

TOTAL ESTIMATED PIPELINE & STATION COSTS

	Mainline	Dawn M&R	Dover Centre Stn	Dover Transmission Stn	Mersea Gate Stn
Materials	\$16,578,000	\$3,958,000	\$381,000	\$2,162,000	\$721,000
Construction and Labour	\$176,147,000	\$17,399,000	\$2,056,000	\$5,362,000	\$2,790,000
Contingencies	\$28,909,000	\$3,204,000	\$365,000	\$1,128,000	\$527,000
Interest During Construction	\$2,321,000	\$251,000	\$43,000	\$116,000	\$50,000
Total Estimated Capital Costs – 2017 Construction	\$223,955,000	\$24,812,000	\$2,845,000	\$8,768,000	\$4,088,000
					\$264,468,000

<b>Panhandle Looping (36" Lift and Lay)</b> <b>InService Date: Nov-01-2017</b> <b>(Project Specific DCF Analysis)</b>  <b>Stage 1 DCF - Listing of Key Input</b> <b>Parameters, Values and Assumptions</b> <b>(\$000'S)</b>	
<b>Discounting Assumptions</b>  Project Time Horizon  Discount Rate	20 years commencing at facilities in-service date of 01 Nov 17  Incremental after-tax weighted average cost of capital of 5.10%
<b>Key DCF Input Parameters, Values and Assumptions</b>  <b>Net Cash Inflow:</b> Incremental Revenue: Transmission margin portion of customer rates  Operating and Maintenance Expense Incremental Tax Expenses: Municipal Tax Income Tax Rate  CCA Rates: CCA Classes: Eligible Capital Expenditure (ECE) Class 1 Transmission Structures Class 8 Transmission Measurement & Regulation Class 49 Transmission Mains	Approved per EB-2015-0340 Effective January 1, 2016  Estimated incremental cost  Estimated incremental cost 26.50%  Declining balance depreciation rates by CCA class: 7% 6% 20% 8%
<b>Cash Outflow:</b> Incremental Capital Costs Attributed  Change in Working Capital	Refer to Schedule 1  5.0513% applied to O&M

**Calculation of Revenue (Transmission Margins)**

**PanHandle Looping (36" Lift and Lay)**

**InService Date: Nov-01-2017**

<b>Project Year</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
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Transmission costs are recovered from Contract rate classes based on Firm Contract Demand (CD)  
Transmission costs are recovered from general service based on quantity consumed

**Contract Methodology: Total CD \* 12 \*Transmission Margin**

Transmission Margin \$/M3 / month	1,147	1,450	1,704	1,905	2,086	2,086	2,086	2,086	2,086	2,086
Contract Demand 10^3m^3	\$1,470	\$1,857	\$2,184	\$2,441	\$2,673	\$2,673	\$2,673	\$2,673	\$2,673	\$2,673
Transmission Margin Contract Class										

**General Service Methodology: Quantity \* General Service Transmission Margin**

Transmission Margin \$/M3 consumed	2,684	5,369	8,053	10,738	13,422	13,422	13,422	13,422	13,422	13,422
General Service Annual Quantity 10^3 M^3	\$32	\$64	\$96	\$128	\$160	\$160	\$160	\$160	\$160	\$160
Transmission Margin General Service Class										

**Revenue Summary**

Transmission Margin Contract Class	\$1,470	\$1,857	\$2,184	\$2,441	\$2,673	\$2,673	\$2,673	\$2,673	\$2,673	\$2,673
Transmission Margin General Service Class	\$32	\$64	\$96	\$128	\$160	\$160	\$160	\$160	\$160	\$160
Total Revenue	\$1,502	\$1,921	\$2,280	\$2,569	\$2,833	\$2,833	\$2,833	\$2,833	\$2,833	\$2,833

**Project NPV**  
**DCF term 20 years**

[illegible]

**Project NPV**  
**DCF term 20 years**

<u>Profitability Index</u>						
By Year PI	0.15	0.16	0.17	0.17	0.18	0.18
Project PI						



Stage 2 (Customer Fuel Savings) Data for Panhandle Project Assumptions

Line	(a)	(b)	(c)	(d)=b-c
	Fuel Prices	\$/m <sup>3</sup>	Gas \$/m <sup>3</sup>	Diff \$/m <sup>3</sup>
1	Heating Oil	0.61	0.19	0.42
2	Number 6 Oil	0.37	0.19	0.18
3	Diesel	0.58	0.19	0.40
4	Propane	0.54	0.19	0.36
5	Electricity	1.20	0.19	1.02

Fuel Mix in the Event Gas is Not Available

	(e)	(f)	g= d*e	h= d*f
	General Service	Contract	General Service	Contract
Heating Oil	35%	-	0.148	-
Number 6 Oil	-	60%	-	0.107
Diesel	-	25%		0.099
Propane	15%	15%	0.053	0.053
Electricity	50%	-	0.508	-
Total %	100%	100%		
Weighted Savings \$/m <sup>3</sup>			0.709	0.260

Gas and alternative fuel prices are the average posted prices for the 12 month period June 2015 to May 2016

**Carbon Prices**

	<u>2017</u>	<u>2018</u>	<u>2019</u>	<u>2020</u>	<u>2021</u>	<u>2022</u>	<u>2023</u>
Cost per tonne	\$19	\$22	\$22	\$24	\$25	\$27	\$29
	<u>2024</u>	<u>2025</u>	<u>2026</u>	<u>2027</u>	<u>2028</u>	<u>2029</u>	<u>2030</u>
Cost per tonne	\$31	\$34	\$50	\$60	\$70	\$85	\$95

**Use and market assumptions**

Contract sized customers demands were segmented into conversion from Interruptible; and new firm loads

**Conversion of Interruptible to Firm**

Alternative fuel use was calculated based on a number of days of interruption

The rate schedule permits up to 40 days interruption

The Stage 2 assessment used a conservative figure of 20 days

Since these customers are currently a gas customer under IT service, the alternative fuel use is only on days of interruption

**Calculations for IT customer**

	Contract Demand for customers
Times	Days of Interruptions
Equals	Annual alternative fuel use
Times	Weighted Average Savings per M3
Equals	Annual Fuel Savings

**Calculations for New Firm Load**

Forecasted new load was reduced by 25% as a factor to indicate potential customers may not make incremental investments in a geographic zone that does not have access to natural gas. Potential customers would invest in another country or another part of Ontario/Canada where the lower cost energy was available.

It is impossible to determine a specific load loss, Union has assumed 25% as reasonable proxy.

	Forecasted annual new firm demand
	Minus 25.0%
Equals	Potential annual new firm load
Times	Weighted Average Savings per M3
Equals	Annual Fuel Savings

**Discount Rate for Net Present Values** 4.0%

**Length of Term for Fuel Savings**

Stage 2 estimated based on 20 years, with sensitivitiy for general service for 40 years

**Present Value of Customer Fuel Savings**

Figures in \$ millions	20 Years	40 Years
	NPV	NPV
General Service	220	334
Contract Customers	585	585
Total Fuel Savings \$ Millions	805	919

Panhandle Looping (36" Lift and Lay) Economic  
Benefits from Infrastructure Spending  
Figures in \$ Millions

Line No	Description	Note	Capex Spend Out of Country (a)	Capex Spend within Ontario (b)	Capex Spend within Canada Excluding Ontario (c)	Capex Total (d)= sum (a-c)	
1	Proposed Facilities		\$ 33	\$ 229	\$ 2	\$ 264.5	
2							
3	% of Total Spend		12%	87%	1%	100%	Line 1 /Total Line 1 Col (d)
4							
5	GDP						
6	GDP Factor	(a)		1.14			Source : Schedule 7-7
7	GDP Impact \$ Millions			\$ 261			Line 1 * Line 6
8							
9	Employment (Jobs)						
10	Jobs Factor	(b)		16.7			Source : Schedule 7-7
11	Jobs Created			3,830			Line 1 * Line 10
12							
13	Taxes Paid by Union Gas	(c)					
14	Property Tax			\$ 19			Source: NPV DCF
15	Provincial Income Tax			\$ 16			Source: NPV DCF
16	Total Provincial Taxes			\$ 35			
17	Federal Income Tax			\$ 21			Source: NPV DCF
18	Total Taxes Paid			<u>\$ 56</u>			
19							
20	Total Value to Ontario						
21	GDP Impact \$ Millions			\$ 261			Line 7
22	Total Provincial Taxes			\$ 35			Line 16
23	NPV Total Value to Ontario			<u>\$ 296</u>			

Notes:

Schedule 7-7 : The Economic Impact of Ontario's Infrastructure Investment Program Conference Board of Canada

(a) Schedule 7-7 page 7 (\$ Real GDP \$ 114 million for each \$ 100 million invested)= 1.14

(b) Schedule 7-7 page 7 (1,670 jobs for each \$ 100 million invested ) = 1670/100 = 16.70 per \$ 1million

(c) Net Present Value taxes by Union paid over 20 years

The Conference Board of Canada  
Insights You Can Count On



Briefing April 2013

# The Economic Impact of Ontario's Infrastructure Investment Program

## At a Glance

- ♦ Ontario's public infrastructure spending has important repercussions on the provincial economy, employment, and the income of its residents.
- ♦ As infrastructure projects are completed, they bolster the stock of physical capital and boost productivity in the private sector.
- ♦ Ontario's past and planned public infrastructure spending over 2006 to 2014 lifts the province's real productive capacity by 2.1 per cent by 2014 and adds \$1,044 (in constant 2012 dollars) to the average income per resident.

## INTRODUCTION

This briefing follows and updates an earlier study<sup>1</sup> to assess the contribution of Ontario's infrastructure investment program to the province's economy. Our findings suggest that the direct employment and purchases generated by public infrastructure spending have substantial impacts on the economy. However, the long-term benefits are just as important. Evidence from research conducted in Canada, the United States, and other jurisdictions suggests that there is a robust link between the stock of public infrastructure and the level of income in an economy. As infrastructure projects are completed, they bolster the stock of physical capital and boost potential output.

<sup>1</sup> Antunes, Beckman, and Johnson, *The Economic Impact of Public Infrastructure in Ontario*.

2 | The Economic Impact of Ontario's Infrastructure Investment Program—April 2013

And, more importantly, there is a high degree of interdependence between the quality and quantity of public infrastructure and the performance (productivity) of an economy's business sector. Thus, we utilize findings from the literature to quantify the impact of Ontario's past and planned infrastructure spending on the province's potential output and the income of its residents.

It is important to note that we assess only the benefits of Ontario's past and planned infrastructure spending on the economy. We do not attempt to quantify the potential benefits of additional public savings (should the funds not have been spent) or of alternate spending.

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**While the direct employment and purchases generated by public infrastructure spending have substantial impacts on the economy, the long-term benefits are as important.**

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First, we present results of the economic impact stemming from the construction and purchases generated by Ontario's infrastructure spending. The following section looks at the long-term benefits of the same spending on the productive capacity of Ontario's economy. The final section concludes.

## THE ECONOMIC IMPACT OF ONTARIO'S INFRASTRUCTURE SPENDING

In this section, we rely on the Conference Board's proprietary model of the Ontario economy to quantify the economic impact of infrastructure spending. The analysis captures not only the effects of direct spending on construction and machinery, but also supply chain and other impacts related to the employment and purchases generated by Ontario's public infrastructure spending program. In effect, we assess the impacts associated with increased economic activity directly related to the construction phase of the infrastructure spending program. But because infrastructure spending builds assets whose economic useful life will extend beyond the construction phase, in the next section we quantify the long-term impact that the increased stock of public capital has on Ontario's potential output and the income of its residents.

## DATA

The Ontario Ministry of Infrastructure provided the Conference Board with past and planned public capital investment expenditures over the fiscal years running from 2005–06 to 2014–15, as shown in Table 1.

The data were converted to a calendar-year basis, resulting in data spanning a period of nine years from 2006 to 2014. Because there are large differences between the economic impacts obtained from labour-intensive construction and those obtained from machinery and equipment (M&E) investment (because of higher import content), it was necessary to break out the capital investment spending by type of asset. We relied on historical data from Statistics Canada's Private and Public Investment Intentions Survey to split the public capital investment data between construction (or what is termed "structures") and M&E investment, depending on the broad sectors to which the funds were allotted. The investment spending categories were transportation, education, health, and "other" (a combination of sectors such as water, the environment, municipal and local infrastructure, and justice). Furthermore, the government construction and M&E deflators from Statistics Canada's Provincial and Territorial Economic Accounts were used to convert nominal capital expenditures displayed in Table 1 into real terms—that is, adjusted for inflation.

## KEY ASSUMPTIONS AND METHODOLOGY

Aggregate infrastructure investment data were used to "shock" the Conference Board's provincial economic model of Ontario—that is, show the effect that infrastructure spending has had on Ontario's economy. The model simulations were performed over 2006 to 2014.

The shock to the Conference Board's Ontario economic model was to real public construction investment and real public machinery and equipment (M&E) capital outlays. The government construction and M&E deflators from Statistics Canada's Provincial and Territorial Economic Accounts were used to deflate the public investment data provided by the Ministry of Infrastructure in 2002 dollars. (Deflators are used to convert nominal capital expenditures into real terms—that is, adjusted for inflation.) As a point of interest, the two government capital investment deflators have very different trends over history. From 2006 to 2011, M&E prices remained relatively



**Table 1**  
Annual Gross Infrastructure Expenditure  
(\$ millions)

Sector	Actual							Planned		
	2005–06	2006–07	2007–08	2008–09	2009–10	2010–11	2011–12	2012–13	2013–14	2014–15
Transportation <sup>1</sup>	3,272	3,126	4,020	3,012	4,235	4,430	4,754	5,753		
Health	461	558	1,340	2,525	2,860	3,064	3,043	3,247		
Education <sup>2</sup>	1,524	1,806	2,324	1,690	2,001	2,163	2,368	2,405	2,363	1,672
Other	1,349	1,617	3,115	1,763	1,870	1,955	2,520	2,492	1,735	1,057
Stimulus investments	n.a.	n.a.	n.a.	n.a.	1,616	3,598	n.a.	n.a.	n.a.	n.a.
<b>Subtotal</b>	<b>6,606</b>	<b>7,107</b>	<b>10,798</b>	<b>8,991</b>	<b>12,582</b>	<b>15,209</b>	<b>12,685</b>	<b>13,897</b>	<b>13,611</b>	<b>11,994</b>
Less: Other partner funding <sup>3</sup>	n.a.	n.a.	441	531	620	597	1,268	1,018	707	638
<b>Total excluding partner funding</b>	<b>n.a.</b>	<b>n.a.</b>	<b>10,357</b>	<b>8,459</b>	<b>11,961</b>	<b>14,612</b>	<b>11,417</b>	<b>12,879</b>	<b>12,904</b>	<b>11,356</b>
Less: Flow-throughs <sup>4</sup>	244	246	273	221	1,133	340	438	335	416	196
<b>Total provincial expenditure</b>	<b>6,362</b>	<b>6,861</b>	<b>10,525</b>	<b>8,238</b>	<b>10,829</b>	<b>14,272</b>	<b>10,979</b>	<b>12,544</b>	<b>12,488</b>	<b>11,159</b>

1 Transportation includes planning activities, property acquisition, highway service centres, and other infrastructure programs (e.g., municipal/local roads/remote airports).

2 Figures include updates since Quarterly Finances, August 2012.

3 Third-party contributions to capital investment in the consolidated sectors (schools, colleges, and hospitals).

4 Mostly federal government transfers for capital investments. Reported only as a footnote in FES for 2005–06, 2006–07, and 2007–08.

Source: Ontario Ministry of Infrastructure.

flat, partly because a robust Canadian dollar made imported M&E cheaper. On the other hand, construction prices advanced by nearly 25 per cent over the same period due to rising construction material costs and wage pressures.

Data from the Conference Board's latest provincial forecast were used to extend the deflators over the 2012 to 2014 period. The decline in M&E prices suggests that the government purchasing power for this type of capital grew more strongly over 2006 to 2011 (a trend that should continue through to 2014) and that in inflation-adjusted terms, a larger share of infrastructure spending is allotted to M&E than to structures. (See Chart 1.)

**Chart 1**

Real Provincial Infrastructure Spending: Machinery and Equipment, and Structures  
(2002 \$ millions)



Sources: Infrastructure Ontario; Statistics Canada; The Conference Board of Canada.

#### 4 | The Economic Impact of Ontario's Infrastructure Investment Program—April 2013

The Conference Board's macroeconomic model of the Ontario economy was used to quantify the impact of the real capital investment streams estimated for 2006 to 2014. The analysis evaluates the combined direct, indirect, and induced economic impacts, where:

- ♦ **Direct impact** measures the value-added<sup>2</sup> on the economy of the increased public capital spending on those firms that would either build structures or manufacture equipment. Because demand for M&E has a high import content, the direct effect on the Ontario economy is muted. Nonetheless, the increased demand will generate domestic activity in the transportation sector.
- ♦ **Indirect impact** (or supply chain impact) measures the value-added that the "direct impact firms" generate economically through their demand for intermediate inputs or other support services. For example, increased construction activity will lift demand for utilities, transportation, financial, and insurance services.
- ♦ **Induced impacts** are derived when employees of the aforementioned industries spend their earnings and owners spend their profits. These purchases lead to more employment, wages, income, and tax revenues, and can be felt across a wide range of industries.

Thus, increased investment in infrastructure will not only have direct impacts on the economy (on construction, for example) but will also spread through the economy through a series of multiplier effects. Supply chain effects are first felt on demand for industries that are direct suppliers. Second-round induced effects produce a widespread impact (albeit usually smaller) on all sectors of the economy, largely through a general increase in consumer spending. The overall economic multiplier is calculated as the sum of all value-added impacts (direct, indirect, and induced) divided by the initial spending on infrastructure (in constant dollars).

It is important to note that the initial constant dollar value of the public capital investment does not result in a one-to-one increase in real GDP. This is because a significant portion of the investment is assumed to go

toward the purchase of M&E, much of which is imported. Moreover, even as demand is lifted for M&E produced in Ontario, the lift in demand for manufactured goods will require intermediate inputs purchased from suppliers that may be outside the provincial boundaries. This dependence of the supply chain on imported components will determine the level of leakages and the extent to which the overall economic multiplier is reduced.

The Conference Board's provincial forecasting model captures the sum of the direct, indirect, and induced impacts on Ontario's economy, based on its estimated historical relationships. The model incorporates a detailed modelling of prices, households, and businesses. It also provides economic impact results for a wide range of economic indicators.

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**Increased investment in infrastructure will not only have direct impacts on the economy but will also spread through the economy through a series of multiplier effects.**

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Some key points and assumptions about the methodology are worth mentioning. The Conference Board's Ontario forecasting model contains only a partial accounting of government revenues (including direct and indirect tax revenues). In addition, government accounts in the Conference Board's Ontario models are based on national accounts data and not on the public accounts. In principle, one can assume that the impact of the shock on a national account and public account basis would be similar. Finally, although the shock has only small effects on costs and prices, these variables do move in response to a change in economic activity. Price effects are assumed to be too small to have an impact on monetary policy or the value of the currency.

#### FINDINGS

Cumulative infrastructure spending will total an estimated \$96.7 billion, in current dollars, from 2006 to 2014. In real 2002 dollars, the cumulative value of the past and planned investment will be \$89.7 billion, with \$39.9 billion toward structures and \$49.8 billion toward

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<sup>2</sup> Value-added, or net output, is the difference between total revenue and the sum of expenses on parts, materials, and services used in the production process. Summing the value-added across all industries in a region will yield the GDP in that region.



machinery and equipment. Table 2 summarizes the impact of Ontario's infrastructure investment program on key economic indicators.

Not surprisingly, the investment spending will have wide-spread impacts on the Ontario economy. From 2006 to 2014, the average contribution to real GDP—including direct, indirect, and induced impacts—is about \$11.3 billion per year, helping to support roughly 167,000 jobs per year. It is interesting to note that the increase in Ontario's economic activity associated with infrastructure spending has a positive impact on net interprovincial migration. The result is an increase in population and a boost to housing starts and residential construction.

The increase in employment lifts up personal income in current dollars by an annual average of \$7.4 billion from 2006 to 2014, while corporate profits are up by \$2.2 billion per year on average. Increases in personal income and corporate profits help push up total income (GDP in current dollars) in Ontario by an average of \$12.6 billion per year from 2006 to 2014.

A sizable benefit accrues back to federal and provincial governments. The boost to personal income results in an average annual increase of \$1.6 billion in personal income tax collection, while increases in profits yield an average increase of \$583 million per year in corporate income taxes over 2006 to 2014 for federal and

**Table 2**

Total Public Infrastructure Investment—Economic Impact in Ontario  
(key economic indicators)\*

	2006	2007	2008	2009	2010	2011	2012	2013	2014	Annual average
<b>Investments</b>										
Total investment generated (\$ millions)	6,736	9,609	8,810	10,181	13,411	11,802	12,152	12,502	11,491	10,744
Total investment generated (2002 \$ millions)	6,673	9,375	8,174	9,460	12,755	10,743	10,865	11,241	10,378	9,963
Structures (2002 \$ millions)	3,282	4,545	3,921	4,273	5,498	4,848	4,808	4,685	4,050	4,434
Machinery and equipment (2002 \$ millions)	3,391	4,831	4,253	5,188	7,257	5,895	6,056	6,556	6,327	5,528
<b>Effects</b>										
Real GDP at market prices (2002 \$ millions)	7,546	10,796	8,525	9,308	14,071	12,390	12,847	13,440	13,041	11,329
GDP at market prices (\$ millions)	7,966	11,643	8,875	10,333	15,748	13,742	14,533	15,332	14,927	12,567
Personal income (\$ millions)	4,268	6,251	5,451	6,141	9,205	8,340	8,660	9,250	9,424	7,443
Corporate profits (\$ millions)	1,288	1,790	170	1,556	3,075	1,947	2,865	3,652	3,804	2,239
Population of labour force age	8,555	15,697	23,580	31,533	41,457	51,892	62,140	72,532	82,310	43,300
Employment	107,016	152,049	129,474	142,289	208,423	185,181	188,310	194,756	191,563	166,562
Unemployment rate (level difference in rate)	-0.65	-0.91	-0.76	-0.83	-1.20	-1.05	-1.06	-1.08	-1.05	
Retail sales (\$ millions)	3,553	5,066	5,343	4,671	5,809	6,677	7,054	7,428	7,951	5,950
Housing starts	2,584	5,998	4,308	3,301	7,575	6,666	6,592	6,964	7,139	5,681
Personal income tax collections (\$ millions)	996	1,476	1,255	1,341	1,906	1,725	1,779	1,883	1,870	1,581
Corporate income tax collections (\$ millions)	450	601	49	570	877	437	625	792	846	583
Total indirect taxes (\$ millions)	761	1,209	1,262	951	1,348	1,790	1,963	2,156	2,530	1,552

\*level difference = shock minus control, except where otherwise indicated

Sources: Ontario Ministry of Infrastructure; The Conference Board of Canada.

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provincial governments. Indirect taxes (which consist largely of sales taxes) are boosted by the lift to income and consumer spending, up on average by \$1.6 billion per year over the simulation period. It is interesting to note that the provincial government recoups roughly \$16.7 billion in cumulative personal and corporate income taxes and indirect taxes over the 2006 to 2014 period. This compares with the cumulative \$96.7 billion spent on the province's infrastructure program.

Table 3 shows the impact of increased infrastructure spending on the components of real GDP by spending category. The direct impact of the shock shows up in real government fixed capital formation, averaging a lift of just under \$10 billion per year. The increase in public investment and associated boost to economic activity results in a sizable lift to private investment—up about \$3.6 billion per year. As we will see in the following section, there is an important relationship between infrastructure spending and private sector productivity. This \$3.6 billion can be spent on various investments, including improving existing capital and acquiring new

technologies. It also reflects the induced aspects of higher household income leading to increased residential spending.

However, the import content associated with the private and public sectors' lift to M&E investment represents a leakage that offsets the overall impact on Ontario's economy. Additional imports are required to meet the extra demand for consumer goods resulting from increased employment and income. As a result of this extra demand, imports increase by an average of \$10.5 billion per year from 2006 to 2014, dampening the total impact on real GDP. Export volumes are unaffected by the shock, given stable external demand and our assumption that the simulation has no impact on the exchange rate. Real government spending on goods and services is also generally unaffected by the simulation assumptions.

The economic impact results on real GDP by industry are presented in Table 4. The largest impact is on the construction industry, which increases by an average of \$3 billion per year. Manufacturing industries also

**Table 3**

Total Public Infrastructure Investment—Economic Impact in Ontario  
(real GDP expenditure-based)

2002 \$ millions (market prices)*	2006	2007	2008	2009	2010	2011	2012	2013	2014	Annual average
<b>Final domestic demand</b>	<b>13,632</b>	<b>19,310</b>	<b>17,342</b>	<b>17,966</b>	<b>24,550</b>	<b>23,042</b>	<b>23,454</b>	<b>24,014</b>	<b>23,417</b>	<b>20,747</b>
Consumer expenditures	4,392	6,464	6,023	5,311	7,808	8,233	8,638	9,031	9,756	7,295
Government spending on goods and services	0	2	4	5	5	8	10	13	16	7
Gross fixed capital formation	9,478	13,202	11,617	12,944	17,158	15,145	15,153	15,332	13,977	13,778
Government	6,851	9,570	8,317	9,488	12,640	10,782	10,837	11,031	10,036	9,950
Private	2,492	3,420	3,146	3,237	4,213	4,179	4,125	4,097	3,818	3,636
Residential construction	88	130	119	139	205	186	192	202	205	163
Non-residential structures	976	1,333	1,190	1,267	1,607	1,494	1,486	1,450	1,291	1,344
Machinery and equipment	1,518	2,095	1,979	1,944	2,582	2,753	2,669	2,668	2,548	2,306
<b>Net exports</b>	<b>-6,673</b>	<b>-9,411</b>	<b>-9,817</b>	<b>-9,606</b>	<b>-11,643</b>	<b>-11,885</b>	<b>-11,824</b>	<b>-11,769</b>	<b>-11,531</b>	<b>-10,462</b>
Exports	0	0	0	0	0	0	0	0	0	0
Imports	6,673	9,411	9,818	9,606	11,643	11,885	11,824	11,769	11,531	10,462
<b>Gross domestic product at market prices</b>	<b>7,546</b>	<b>10,796</b>	<b>8,525</b>	<b>9,308</b>	<b>14,071</b>	<b>12,390</b>	<b>12,847</b>	<b>13,440</b>	<b>13,041</b>	<b>11,329</b>

\*level difference = shock minus control, except where otherwise indicated  
Source: The Conference Board of Canada.



**Table 4**

Total Public Infrastructure Investment—Economic Impact in Ontario  
(real GDP by industry)\*

	2006	2007	2008	2009	2010	2011	2012	2013	2014	Annual average
<b>Real GDP at basic prices (2002 \$ millions)</b>	<b>7,529</b>	<b>10,757</b>	<b>8,187</b>	<b>9,154</b>	<b>14,452</b>	<b>12,386</b>	<b>12,855</b>	<b>13,698</b>	<b>13,409</b>	<b>11,381</b>
<b>Total goods</b>	<b>4,044</b>	<b>5,705</b>	<b>4,216</b>	<b>4,818</b>	<b>7,481</b>	<b>6,184</b>	<b>6,340</b>	<b>6,673</b>	<b>6,270</b>	<b>5,748</b>
Primary sector	266	386	197	310	582	368	399	457	418	376
Manufacturing	1,495	2,150	1,291	1,543	3,016	2,358	2,489	2,815	2,837	2,222
Construction	2,175	3,009	2,609	2,836	3,664	3,267	3,249	3,179	2,786	2,975
Utilities	107	160	120	129	218	191	204	222	229	176
<b>Business services</b>	<b>3,486</b>	<b>5,052</b>	<b>3,969</b>	<b>4,334</b>	<b>6,969</b>	<b>6,199</b>	<b>6,512</b>	<b>7,021</b>	<b>7,134</b>	<b>5,631</b>
Transportation, storage, and communication	328	479	306	391	712	554	596	668	669	523
Wholesale and retail trade	1,546	2,236	1,870	1,868	2,901	2,631	2,719	2,889	2,972	2,404
Finance, insurance, and real estate	579	847	653	736	1,221	1,179	1,267	1,368	1,408	1,029
Community, business, and personal services	1,033	1,489	1,140	1,338	2,135	1,835	1,930	2,095	2,085	1,676
<b>Public administration and defence</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>2</b>

\*level difference = shock minus control except where otherwise indicated

Source: The Conference Board of Canada.

experience a sizable boost, with sectors such as the fabricated metals industry and the electrical equipment and component manufacturing industry benefiting from the investment. Business services industries also experience an increase in demand for services that include architecture, engineering, and computer system design. The services sector also benefits from the induced impacts, where higher employment and wages bolster household spending. In total, output in business services increases by an average of \$5.6 billion per year over 2006 to 2014.

The overall economic multiplier is calculated as the total change in real GDP divided by the initial constant-dollar increase in infrastructure spending. Our estimates indicate that for every \$100 million (inflation-adjusted) invested in public infrastructure, real GDP is boosted by \$114 million and roughly 1,670 person-years of employment are created or supported. In other words, for each \$100 million of public infrastructure investment, about 1,670 jobs will be created for one year.

Table 5 breaks down the employment gains by industry. Construction employment is up sharply—nearly 49,000 construction jobs are supported annually by Ontario's infrastructure program. Business services employment is up by more than 88,400 jobs annually, encompassing a wide range of sectors that include, for example, transportation, financial services, wholesale and retail, and others. The job creation stimulated by the infrastructure spending will have helped keep Ontarians in the province, lowering the outflow of interprovincial migrants and boosting population. This, along with an increase in labour force participation and a reduction in the number of unemployed, helps meet the demand for workers. Overall, the number of unemployed people is reduced by about 62,500 per year, lowering the unemployment rate by just under 1 percentage point.

**Table 5**

Total Public Infrastructure Investment—Economic Impact in Ontario  
(employment by industry)\*

	2006	2007	2008	2009	2010	2011	2012	2013	2014	Annual average
<b>Total employment</b>	<b>107,016</b>	<b>152,049</b>	<b>129,474</b>	<b>142,289</b>	<b>208,423</b>	<b>185,181</b>	<b>188,310</b>	<b>194,756</b>	<b>191,563</b>	<b>166,562</b>
Primary sector	3,281	4,537	2,439	4,749	9,659	5,192	5,952	6,822	6,164	5,422
Manufacturing	15,960	21,844	14,605	16,910	29,437	24,847	25,564	27,808	27,970	22,772
Construction	31,672	44,866	46,455	48,097	58,085	56,805	54,508	51,827	48,267	48,953
Utilities	515	885	725	736	1,237	1,016	1,127	1,178	1,214	959
Business services	55,587	79,910	65,235	71,777	109,982	97,287	101,117	107,070	107,884	88,428
Public administration and defence	2	7	16	21	23	34	41	53	65	29
<b>Unemployment</b>	<b>-41,029</b>	<b>-58,384</b>	<b>-49,535</b>	<b>-52,068</b>	<b>-77,038</b>	<b>-69,141</b>	<b>-70,282</b>	<b>-72,724</b>	<b>-72,327</b>	<b>-62,503</b>
Unemployment rate (level difference in rate)	-0.65	-0.91	-0.76	-0.83	-1.20	-1.05	-1.06	-1.08	-1.05	

\*level difference = shock minus control, except where otherwise indicated  
Source: The Conference Board of Canada.

## PUBLIC CAPITAL'S CONTRIBUTION TO PRIVATE SECTOR PRODUCTION

In our 2010 study,<sup>3</sup> we reported on the widespread benefits of public infrastructure spending. Public capital includes schools, hospitals, utilities, and transportation, as well as recreational and cultural infrastructure. We noted that public capital helps private sector production by providing an educated and healthy population as well as transportation and other infrastructure relied on by businesses. In essence, public capital provides the environment that businesses need to operate, and by doing so helps boost private sector productivity. As we saw in the previous section, infrastructure investments can also lead to private sector investments in new technologies and capital.

Specifically, we found that public capital had contributed significantly to labour productivity over the past 30 years and that the contribution had strengthened over the 2000s in comparison with the previous two decades due to an increasing contribution of public capital to the overall growth in capital stock in Ontario. We found that,

from 2000 to 2008, public capital contributed 0.23 percentage points per year to labour productivity's growth of 0.93 per cent per year—or that public capital was responsible for roughly a quarter of overall labour productivity growth in recent years.

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**Public capital provides the environment that businesses need to operate—thereby boosting private sector productivity.**

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In this section, we update our 2010 findings by quantifying the potential benefits that public capital has brought to private sector production. We assess the potential benefit that Ontario's infrastructure program, over the 2006 to 2014 period, has on the economy and on the level of income that Ontarians earn today.

The methodology relies on simplifying the complex production that occurs in the economy to a single equation, where total output is a function of capital, labour, and total factor productivity. Total factor productivity (TFP) captures the efficiency with which capital and labour mix to create output, and is essentially the motor of

3 Antunes, Beckman, and Johnson, *The Economic Impact of Public Infrastructure in Ontario*.



economic prosperity. Positive TFP growth contributes, one for one, to overall GDP growth and labour productivity. Moreover, it remains the key long-term driver of competitiveness and real per capita income. Note that in the production function approach, public capital is not captured explicitly, but is instead nestled in the TFP variable. Therefore, public capital is a component of TFP that is estimated and split out from TFP.

According to our framework,<sup>4</sup> TFP is influenced by the stock of public capital through the following formulation:

$$\text{Equation 1: } \Delta \ln(\text{TFP}_t) = \Delta \ln(\text{TFP}^*_t) + \beta_g \Delta \ln(G_t)$$

Where TFP\* is TFP excluding public capital,  $G_t$  is the real stock of public capital, and  $\beta_g$  is the output elasticity of public capital. The subscript  $t$  denotes time. The equation simply states that for a 1 per cent change in the stock of public capital, TFP would rise by  $\beta_g$  per cent. The difficulty is that  $\beta_g$  is unknown and not directly measurable, since we do not know the market price of public capital. However, Macdonald<sup>5</sup> estimates  $\beta_g$  for Canadian infrastructure to be around 0.1, with warnings that there is considerable range around the estimate. We use this estimate, and a margin around it, to estimate the contribution that Ontario's past and planned investments in infrastructure have had on Ontario's residents today.

## FINDINGS

Using the same infrastructure spending estimates as in the previous section, we find that Ontario's past and planned public infrastructure spending over 2006 to 2014 provides a significant and permanent boost to the province's overall potential output. In addition to the economic activity generated by the construction phase of projects, the cumulative increase in the stock of public capital helped boost the province's real productive capacity by 1.9 per cent in 2012 and, accounting for future planned investments, increases to 2.1 per cent by 2014. This represents an increase in the average income of Ontario residents of \$902 per person in

2012, increasing to \$1,044 per resident by 2014 (in constant 2012 dollars). These estimates are based on Macdonald's national estimate ( $\beta_g$  of 0.1) for the output elasticity of public capital.

This increase in real income per capita is due to the impact of increased infrastructure investment on Ontario's potential output as projects are completed. For example, income gains can come in the form of reduced time spent in traffic after transportation infrastructure is completed. These longer-term benefits come in addition to the economic impacts associated with the construction phase discussed above.

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**Ontario's past and planned public infrastructure spending over 2006 to 2014 provides a significant and permanent boost to the province's overall potential output.**

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It is important to note that the methodology on which these results are based relies on an approximated relationship between production, labour, and capital inputs. The theoretical foundation for the "production function" used is common in the literature and is useful for capturing effects of overall public infrastructure on the economy. However, this does not mean that the mathematical relationship between public infrastructure investment and productivity will hold equally for all public investment projects. Some infrastructure projects may have more direct impacts on productivity than others. Consider, for example, transportation infrastructure versus recreational or cultural infrastructure: while both provide benefits to society, they will likely contribute very differently to private sector productivity. In Table 6 we provide a wide range of estimates that bound some of this variation in different types of public capital and their benefits to productivity.

The impact of past and planned infrastructure spending under various assumptions about the strength of the link between public capital and TFP is displayed in Table 6. The range of increases in real productivity capacity lies between 1.1 and 2.6 per cent in 2012, with the range increasing to between 1.2 to 3.0 per cent in 2014. At a minimum, the average Ontarian is earning \$536 more

<sup>4</sup> The derivation of the impact of public capital on total factor productivity is developed in the technical notes to this briefing. See text box "Technical Notes."

<sup>5</sup> Macdonald, "An Examination of Public Capital's Role in Production."

**Table 6**  
Change in Productive Capacity Associated With Ontario's Public Infrastructure Spending From 2006 to 2014  
(in constant 2012 \$)

	Alternate values for output elasticity of capital		
	<i>Bg</i> = 0.06	<i>Bg</i> = 0.10	<i>Bg</i> = 0.14
Percentage change in real productivity capacity in 2012	1.1	1.9	2.6
Percentage change in real productivity capacity in 2014	1.2	2.1	3.0
Change in income per Ontario resident in 2012	536	902	1,274
Change in income per Ontario resident in 2014	620	1,044	1,477

Source: The Conference Board of Canada.

per year today because of investments in infrastructure that occurred over 2006 to 2012. And if investments progress as planned through to 2014, the minimum benefit grows to \$620 per person in 2014 (in constant 2012 dollars).

## CONCLUSION

In this briefing, we examine the benefits of Ontario's infrastructure spending program on the provincial economy. We look at the economic impacts associated with the direct employment and purchases generated by public infrastructure spending. In addition, we quantify the benefits of the same infrastructure spending on the province's potential output and the income of its residents.

Past and planned infrastructure spending will total an estimated \$96.7 billion, in current dollars, from 2006 to 2014. Not surprisingly, the investment spending will have widespread impacts on the Canadian economy. From 2006 to 2014, the average contribution to real GDP—including direct, indirect, and induced impacts—is about \$11.3 billion per year, helping to support roughly 167,000 jobs per year. The complementary nature of public and private capital investments is reflected in the analysis: the \$10-billion annual increase in public investment results in an average annual boost to private sector investment of \$3.6 billion. A sizable benefit accrues back to the federal and provincial governments. The lift to income and profits helps generate nearly \$3.7 billion per year in taxes over 2006 to 2014. It is interesting to note that the provincial government recoups roughly

\$16.7 billion in cumulative personal and corporate income taxes and indirect taxes over the 2006 to 2014 period. This compares with the cumulative \$96.7 billion spent on the province's infrastructure program.

The economic multiplier associated with infrastructure spending is calculated as the total change in real GDP divided by the initial constant dollar increase in infrastructure spending. Our estimates indicate that for every \$100 million (inflation-adjusted) invested in public infrastructure, real GDP is boosted by \$114 million and roughly 1,670 person-years of employment are supported. In other words, for each \$100 million of public infrastructure investment, about 1,670 jobs will be created for one year.

Moreover, as infrastructure projects are completed, they bolster the stock of physical capital and boost the productive capacity of the economy over the long term. There is strong evidence in the literature about the link between public capital and private sector productivity; however, the strength of the relationship is difficult to establish with certainty. Thus, we quantify the impact of past and planned infrastructure spending using various assumptions about the strength of the link between public capital and productivity. The mid-point among these assumptions suggests that, in addition to the economic activity generated by the construction phase of projects, Ontario's past and planned public infrastructure spending over 2006 to 2014 lifts the province's real productive capacity by 2.1 per cent by 2014. This represents an increase in the average income of Ontarians of \$1,044 per person by 2014 (in constant 2012 dollars).



# Technical Notes

Here we develop the framework that allows us to isolate the impact of public capital on total factor productivity.

We start with an aggregate production function of Ontario's economy. We use the standard Cobb-Douglas production function:

$$(1) \quad GDP_t = (TFP_t) * (L_t^{\beta_l}) * (K_t^{\beta_k})$$

Here,  $GDP$  is total output generated in the business sector,  $TFP$  is total factor productivity, and  $L$  and  $K$  are measures for labour composition and capital stock in the business sector.  $\beta_l$  and  $\beta_k$  represent the elasticities of labour and capital—in other words, the responsiveness of output to changes in labour or capital. The year is denoted by the subscript  $t$ .

First, we estimate the elasticity of labour ( $\beta_l$ ) as the proportion of nominal labour income in the business sector out of total income in the business-sector economy. From there, we take the standard economic assumptions of competitive markets and constant returns to scale to generate ( $\beta_l + \beta_k = 1$ ).

Second, we take the logarithmic difference of (1) and get:

$$(2) \quad \Delta \ln(GDP_t) = \Delta \ln(TFP_t) + \beta_l \Delta \ln(L_t) + \beta_k \Delta \ln(K_t)$$

Total factor productivity is the only unknown variable in the equation, so it is calculated as the residual when all other changes in GDP are accounted for by labour and capital.

Third, to estimate the contribution to labour productivity, we subtract the change in hours worked from the change in GDP in equation (2) to get:

$$(3) \quad \Delta \ln \left( \frac{GDP_t}{Hrs_t} \right) = \Delta \ln(TFP_t) + \beta_l \Delta \ln \left( \frac{L_t}{Hrs_t} \right) + \beta_k \Delta \ln \left( \frac{K_t}{Hrs_t} \right)$$

This equation shows the relationship between labour productivity in the business sector (on the left-hand side) and the components that contribute to this productivity (TFP, labour composition, and business sector capital).

Note that public capital is not included in equation (3).

Because TFP is calculated as a residual, public capital has been lumped in with it. Therefore, we separate out public capital from TFP:

$$(4) \quad \Delta \ln(TFP_t) = \Delta \ln(TFP^*_t) + \beta_g \Delta \ln(G_t)$$

... where  $G_t$  is the public capital stock and  $\beta_g$  is the output elasticity of public capital.

The unknown variable in equation (4) is the output elasticity of public capital,  $\beta_g$ . Measuring this is a challenging exercise because we do not know the market price of public capital and there are no close proxies where private companies have created public infrastructure in Ontario that would yield a market price. Macdonald points out that estimates of TFP and the elasticity of public capital are statistically very hard to disentangle in the traditional production function approach because both track trend GDP in a similar fashion.<sup>1</sup> Macdonald estimates  $\beta_g$  for Canadian infrastructure<sup>2</sup> to be around 0.1 and warns there is a considerable range around the estimate. We use this estimate for the output elasticity of public capital in this analysis, but we also provide estimates for  $\beta_g = 0.06$  and  $\beta_g = 0.14$  to assess the sensitivity of results under different assumptions.

The analysis was based on the infrastructure investment data provided by the Ontario Ministry of Infrastructure over the 2006 to 2014 period. We utilized a modified version of our model's potential output block that separates the contribution of public and private capital based on the output elasticities presented here.

1 Macdonald. "An Examination of Public Capital's Role in Production."

2 Macdonald's 2008 paper includes all investments made by the public administration sector defined as the North American Industry Classification System (NAICS) 91 industry in his definition of public capital. Our study uses a broader definition that includes schools and hospitals.

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### Acknowledgements

This research was undertaken by The Conference Board of Canada for Infrastructure Ontario. In keeping with Conference Board guidelines for financed research, the design and method of research, as well as the content of this briefing, were determined solely by the Conference Board. The research was conducted by Pedro Antunes, Director, and Jacqueline Palladini, Economist, both of the Board's National and Provincial Forecast Group.

The authors would like to acknowledge and thank Ryan Macdonald, Senior Economist with Statistics Canada's Economic Analysis Division, and Paul Darby, Deputy Chief Economist at the Conference Board, for their valuable input on earlier drafts of this research.

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## **CAPITAL PASS-THROUGH AND RATE IMPACTS**

The purpose of this evidence is to support Union's request for approval of the cost consequences of the Project, including the revenue requirement, proposed cost allocation, rate design and rate impacts associated with the Project.

As part of this application, Union is seeking Board approval of a proposed interim allocation of the Project costs during the IRM term which is different than the 2013 Board-approved cost allocation methodology used for existing Panhandle System costs. Union is also proposing to not update the Rate C1 firm long-term transportation rates between Dawn and St. Clair, Ojibway and Bluewater as well as Rate M16 west of Dawn demand rate for the Project costs during the IRM term. Union is proposing this interim approach during the IRM term for the Project to ensure the allocation of costs and rate impacts reflect the principles of cost causality. Union will review the cost allocation and rate design for all Panhandle System costs as part of its 2019 Cost of Service proceeding.

This evidence is organized into the following sections:

1. Capital Pass-Through Mechanism
2. Panhandle Reinforcement Project Revenue Requirement and Revenue Deficiency
3. Cost Allocation
  - 3.1 Proposed Project Cost Allocation
  - 3.2 Current Board-Approved Cost Allocation Methodology
  - 3.3 Comparison of Proposed vs. Current Board-Approved Cost Allocation Methodology

1           4.    Ex-franchise Rate Design

2                   4.1   Rate C1 Transportation Charges

3                   4.2   Rate M16 Transportation Charges

4                   4.3   In-franchise Benefit of Storage and Transmission Margin

5           5.    Proposed Treatment of Incremental Project Revenue

6           6.    Comparison of the Board-Approved and Proposed Cost Allocation and Rate Design

7           7.    Bill Impacts and Rate Implementation

8  
9           ***1.    Capital Pass-Through Mechanism***

10   Union is seeking approval of the recovery of the cost consequences of the Project as part of this  
11   proceeding because it meets the capital pass-through criteria as determined in Union's 2014-2018  
12   Incentive Regulation Mechanism ("IRM") proceeding (EB-2013-0202). Given the magnitude of the  
13   Project, Union is not able to proceed with the development of the Project without reasonable certainty  
14   of cost recovery.

15  
16   The intent of the capital pass-through mechanism ("CPM") in Union's Board Approved 2014-2018  
17   IRM is to adjust rates during the IRM term to reflect the associated impacts of significant capital  
18   investments made throughout the IRM term. Such investments are considered "not-business-as-usual".  
19   "Not-business-as-usual" refers to capital expenditures that are significant and cannot be managed  
20   within Union's Board-approved capital budget.

The key components of the CPM are:

- Any qualifying project must exceed two financial thresholds, related to both revenue shortfall and capital cost;
- Any qualifying project will be subject to a full regulatory review, either in a Leave-to-Construct proceeding or in a rates proceeding, but prior to being included in rates; and,
- Any qualifying project will be subject to both annual revenue requirement true-ups during the IRM term and an end-of-term qualification assessment.

The Board established eight criteria for approving a CPM during the EB-2013-0202 proceeding. A major capital project must meet the criteria to be included in rates during the IRM term. The criteria were subject to the settlement agreement and approved by the Board on October 7, 2013. The Project meets each of the criteria as follows:

Criterion	Applicability
i) A minimum increase, or a minimum decrease, of \$5 million in net delivery revenue requirement for a single new project (the “Rate Impact Threshold”).	The net revenue requirement associated with the Project using the parameters outlined in the EB-2013-0202 settlement agreement is \$0.1 million in 2017 and \$16.1 million in 2018, as provided at Exhibit A, Appendix B, Schedule 1. As part of this application, Union is proposing a 20-year useful life of the Project assets for depreciation expense purposes which results in a net revenue requirement of \$4.8 million in 2017 and \$25.6 million in 2018 as provided at Exhibit A, Tab 8, Schedule 1.
ii) The capital cost of the Project must exceed \$50 million.	The capital cost of the Project is \$264.5 million.
iii) The Project is outside the base rates on which the IRM is set.	The Project was not included in 2013 base rates.
iv) The Project must be needed to serve customers and/or to maintain system safety, reliability or integrity, and cannot reasonably be delayed, and is demonstrated to be the most cost effective manner of achieving the Project's objective relative to the reasonably available alternatives.	Please see Exhibit A, Tab 5 with respect to the need for the Project. Please see Exhibit A, Tab 6 regarding the alternatives considered.
v) The Project will be identified to stakeholders and the Board as soon as possible, including in that year's IRM stakeholder review session where practical.	The Project was identified during: <ul style="list-style-type: none"> <li>• Union's April 2015 Stakeholder meetings</li> <li>• EB-2015-0237 Natural Gas Market Review proceeding</li> <li>• Union's April 2016 Stakeholder meetings</li> </ul>

vi)	The Project will be subject to a full regulatory review; for any project that requires leave-to-construct approval of the Board, the full regulatory review in which the applicant must demonstrate need, safety or reliability purposes, and economic viability prior to inclusion in rates will be conducted in that proceeding.	The Project is subject to leave-to-construct approval, and there will be a full regulatory review within the present case.
vii)	Union will allocate the net revenue requirement using EB-2011-0210 Board-approved cost allocation methodologies. Any party, including Union, may take any position with respect to the proposed allocation for any particular capital project during review of the Project, or its rate impacts, by the Board.	Union has proposed an interim cost allocation during the IRM term for the Project that is different than the EB-2011-0210 Board-approved cost allocation methodologies. Union's proposal is described further in Exhibit A, Tab 8.
viii)	The project will include a deferral account request to capture any differences between the forecast annual net delivery revenue requirement and the actual net delivery revenue requirement for each year of the IRM for which the project is included in rates.	The request for a deferral account is included at Exhibit A, Tab 8, Schedule 8.

The Board has applied these criteria in Union's Parkway West, Brantford to Kirkwall/Parkway D, 2016 Lobo C and Hamilton to Milton, Burlington Oakville Pipeline, and 2017 Dawn Parkway Project applications. In those proceedings, the Board granted pre-approval of cost recovery in recognition of the magnitude of the proposed expenditure and the consistency with the regulatory structure proposed in the IRM. In approving the applications for the Parkway West and Brantford to Kirkwall/Parkway D projects, the Board stated:

*"However given the magnitude of the expenditure that is proposed, the Board is of the view that Union's request is reasonable and consistent with the overall regulatory structure. Recovery of these costs is specifically contemplated in the IRM settlement agreement approved by the Board." (p. 14, EB-2012-0451/EB-2012-0433/EB-2013-0074 Decision and Order, January 30, 2014)*

1           **2.     *Panhandle Reinforcement Project Revenue Requirement and Revenue Deficiency***

2     The total revenue requirement associated with the Project is approximately \$5.0 million in 2017 and  
3     \$27.2 million in 2018. The revenue requirement represents the costs associated with the Project  
4     facilities forecasted to be in service in 2017 and 2018. The revenue requirement is calculated based on  
5     Union's proposal to depreciate the Project's assets using a 20-year estimate of the useful life rather than  
6     Board-approved depreciation rates, as identified in Exhibit A, Tab 3.

7  
8     The net revenue requirement of \$4.8 million in 2017 and \$25.6 million in 2018 represents the revenue  
9     deficiency of the Project and is calculated as the total annual Project revenue requirement less the  
10    incremental Project revenue of \$0.3 million in 2017 and \$1.6 million in 2018. The incremental Project  
11    revenue is calculated as the transmission margin included in delivery rates multiplied by the  
12    incremental demands created by the Project.

13  
14    The calculation of the total revenue requirement and the net revenue requirement for 2017 and 2018  
15    and the underpinning assumptions are provided at Exhibit A, Tab 8, Schedule 1. Information regarding  
16    the Project calculated using Board-Approved depreciation rates can be found at Exhibit A, Appendix B.

17  
18           **3.     *Cost Allocation***

19    Union is proposing an interim cost allocation of the Project costs for the remainder of Union's 2014-  
20    2018 IRM term. Union will review the cost allocation for all Panhandle System costs as part of its  
21    2019 Cost of Service proceeding.

22

**3.1 Proposed Project Cost Allocation**

Union is proposing to allocate the Panhandle System demand costs related to the Project in proportion to the firm Union South in-franchise Panhandle System Design Day demands, updated to include the incremental firm Project Design Day demands. This allocation methodology is consistent with the use of the Panhandle System on Design Day.

The proposed cost allocation factor is based on the 2013 Board-approved in-franchise Panhandle System firm Design Day demands of 12,102  $10^3\text{m}^3/\text{d}$  updated to include the incremental Project firm Design Day demands in 2017 and 2018. The incremental firm Design Day demands of the Project are 1,492  $10^3\text{m}^3/\text{d}$  (or 58 TJ/d) in 2017 and 392  $10^3\text{m}^3/\text{d}$  (or 15 TJ/d) in 2018, for total incremental demands of 1,884  $10^3\text{m}^3/\text{d}$  (or 73 TJ/d) by 2018. A summary of the proposed Project cost allocation factors are provided in Table 8-1. The detailed calculation of the proposed 2017 and 2018 Project cost allocation factors by rate class is provided at Exhibit A, Tab 8, Schedule 2, lines 19-25.

Union will maintain the allocation of existing Panhandle System demand costs in proportion to the 2013 Board-approved allocation methodology as provided at Section 3.2.

Table 8-1  
Proposed Project Cost Allocation Factors

Line No.	Particulars (10 <sup>3</sup> m <sup>3</sup> /d)	2013 Panhandle Design Day Demands (a)	Incremental 2017 Project Design Day Demands (b)	Total 2017 Allocation Factor (c) = (a+b)	Incremental 2018 Project Design Day Demands (d)	Total 2018 Allocation Factor (e) = (c+d)
1	Rate M1	5,567	28	5,595	28	5,623
2	Rate M2	1,870	24	1,894	21	1,915
3	Rate M4	929	696	1,625	343	1,968
4	Rate M5	30	-	30	-	30
5	Rate M7	131	439	570	-	570
6	Rate T1	524	154	678	-	678
7	Rate T2	3,051	151	3,202	-	3,202
8	Total	12,102	1,492	13,594	392	13,986

1 Union is proposing a cost allocation for the Project that is different than the Board-approved cost  
2 allocation methodology because the existing methodology allocates costs based on the combined  
3 Panhandle System and St. Clair System. With the addition of the significant Project costs related only  
4 to the Panhandle System and no change to the cost of the St. Clair System, the use of the combined  
5 system for cost allocation purposes no longer reflects the costs to serve the customers on each  
6 respective transmission system. The 2018 Project costs of approximately \$27.2 million represents a  
7 significant increase over the 2013 Board-approved total combined system costs of \$7.1 million.  
8  
9 Union's proposed interim allocation of Project costs based on the Panhandle System Design Day  
10 demands better reflects the principles of cost causality during the remainder of the IRM term than the  
11 current Board-approved methodology.

1    **3.2    *Current Board-Approved Cost Allocation Methodology***

2    Union's Board-approved cost allocation methodology is based on the firm demands of the combined  
3    Panhandle System and St. Clair System. The St. Clair System includes the St. Clair transmission line  
4    and Union's contracted transportation capacity on the St. Clair Pipelines L.P. system, including the St.  
5    Clair River Crossing and Bluewater Pipeline. In the 2013 Board-approved cost allocation study,  
6    Union categorizes the demand costs for the Panhandle System and St. Clair System as Ojibway/St.  
7    Clair.

8  
9    Union's Board-approved cost allocation methodology of Ojibway/St. Clair demand costs is based on  
10   the maximum design capacity of the combined Panhandle System and St. Clair System. The maximum  
11   design capacity of the combined system is determined as the Panhandle System capacity from Dawn to  
12   Ojibway (Dawn send out) plus the import capacity at the St. Clair River Crossing and Bluewater  
13   Pipeline. The import capacity is set based on the Sarnia market summer capability and represents the  
14   maximum firm annual amount that can be imported at the St. Clair River Crossing and Bluewater  
15   Pipeline.

16  
17   Union provides transportation service on the Panhandle System and St. Clair System to meet Union  
18   South in-franchise demands west of Dawn, ex-franchise Rate C1 transportation services between Dawn  
19   and Ojibway, St. Clair and Bluewater as well as Rate M16 transportation to/from storage pools located  
20   west of Dawn. The allocation to Union South in-franchise rate classes is calculated as the maximum  
21   design capacity excluding the firm contracted ex-franchise Rate C1 and Rate M16 demands. The



allocation to Union South in-franchise rate classes is in proportion to the combined Panhandle System and St. Clair System firm Design Day demands.

Union's current cost allocation reflects the use of the combined transmission systems by allocating 82% to Union South in-franchise rate classes and 18% to ex-franchise Rate C1 and Rate M16, as calculated in Table 8-2, line 2. The detailed calculation of the Ojibway/St. Clair demand cost allocation factor by rate class is provided at Exhibit A, Tab 8, Schedule 2, lines 1-8.

Table 8-2  
2013 Ojibway/St. Clair Demand Allocation Updated to Include the Project

Line No.	Particulars (10 <sup>3</sup> m <sup>3</sup> /d)	Ojibway/St.Clair Design Maximum (a)	Ex-franchise (b)	Remaining In-franchise (1) (c) = (a - b)
<u>2013 Board-Approved Allocation</u>				
1	Allocation Units	15,188	2,737	12,452
2	Allocation (%)	100%	18%	82%
3	Project Capacity (2)	2,739	-	2,739
<u>Total Updated Allocation</u>				
4	Allocation Units (line 1 + line 3)	17,927	2,737	15,191
5	Allocation (%)	100%	15%	85%

Notes:

- (1) Allocated to Union South in-franchise rate classes in proportion to Panhandle System and St. Clair System firm Design Day demands.
- (2) Project design maximum of 2,739 10<sup>3</sup>m<sup>3</sup>/d or 106 TJ/d based on a heat value conversion of 38.55 GJ/10<sup>3</sup>m<sup>3</sup>.

The 2013 Board-approved cost allocation study reflects the maximum design capacity of 15,188 10<sup>3</sup>m<sup>3</sup>/d (or 573 TJ/d)<sup>1</sup>, which includes the Panhandle System capacity of 12,355 10<sup>3</sup>m<sup>3</sup> (or 466 TJ/d)<sup>1</sup> and St. Clair System import capacity of 2,833 10<sup>3</sup>m<sup>3</sup>/d (or 107 TJ/d)<sup>1</sup>. Of the total maximum design capacity of 15,188 10<sup>3</sup>m<sup>3</sup>/d, the firm long-term ex-franchise Rate C1 and Rate M16 demands represent

<sup>1</sup> Energy conversion based on the 2013 Board-approved heat value of 37.75 GJ/10<sup>3</sup>m<sup>3</sup>.

2,737  $10^3\text{m}^3/\text{d}$  and the remaining 12,452  $10^3\text{m}^3/\text{d}$  is allocated to Union South in-franchise rate classes. The allocation to Union South in-franchise rate classes is in proportion to the combined Panhandle System and St. Clair System firm Design Day demands. The methodology for allocating Panhandle System and St. Clair System demand costs was most recently reviewed and approved by the Board in EB-2011-0210 (Union's 2013 Cost of Service proceeding).

To update the 2013 Board-approved Ojibway/St. Clair demand allocation for the Project, Union increased the maximum design quantity by the total capacity of 2,739  $10^3\text{m}^3/\text{d}$  (or 106 TJ/d)<sup>2</sup> created by the Project. As a result, the maximum design capacity increased to a total capacity of 17,927  $10^3\text{m}^3/\text{d}$ , as provided at Table 8-2, line 4. The change in the maximum design capacity results in an increase to the Union South in-franchise allocation by approximately 3%, from 82% to 85%. Consistent with the Board-approved methodology, the allocation to Union South in-franchise rate classes is in proportion to the combined Panhandle System and St. Clair System firm Design Day demands, updated to include the incremental Project Design Day demands of 1,492  $10^3\text{m}^3/\text{d}$  in 2017 and 392  $10^3\text{m}^3/\text{d}$  in 2018 for a total of 1,884  $10^3\text{m}^3/\text{d}$  in 2018. The detailed calculation of the Ojibway/St. Clair demand cost allocation factor by rate class, updated for the Project, is provided at Exhibit A, Tab 8, Schedule 2, lines 9-18.

### **3.3 Comparison of Proposed vs. Current Board-Approved Cost Allocation Methodology**

A comparison of the Board-approved allocation factor and the proposed Project allocation factor is summarized in Table 8-3.

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<sup>2</sup> Energy conversion for the Project is based on a heat value of 38.55 GJ/ $10^3\text{m}^3$ .

Table 8-3  
Comparison of Board-Approved vs. Proposed 2018 Project Cost Allocation Factors

Line No.	Rate Class	Board-Approved Allocation		Proposed Allocation		Variance	
		(10 <sup>3</sup> m <sup>3</sup> /d)	(%)	(10 <sup>3</sup> m <sup>3</sup> /d)	(%)	(10 <sup>3</sup> m <sup>3</sup> /d)	(%)
		(a)	(b)	(c)	(d)	(e) = (c-a)	(f) = (d-b)
1	Rate M1	3,789	21%	5,623	40%	1,834	19%
2	Rate M2	1,289	7%	1,915	14%	627	7%
3	Rate M4	1,174	7%	1,968	14%	793	8%
4	Rate M5	18	0%	30	0%	12	0%
5	Rate M7	338	2%	570	4%	232	2%
6	Rate T1	1,023	6%	678	5%	(345)	-1%
7	Rate T2	7,560	42%	3,202	23%	(4,357)	-19%
8	Total In-franchise	15,191	85%	13,986	100%	(1,204)	15%
9	Rate C1	2,264	13%	-	0%	(2,264)	-13%
10	Rate M16	473	3%	-	0%	(473)	-3%
11	Total Ex-franchise	2,737	15%	-	0%	(2,737)	-15%
12	Total	17,927	100%	13,986	100%	(3,941)	

Union's proposed allocation of the Project-related costs results in a decrease in the allocation factor of Rate T1, Rate T2, Rate C1 and Rate M16 and an equal and offsetting increase to the allocation factors of the remaining Union South in-franchise rate classes. There is no impact to Union North rate classes related to Union's proposed cost allocation compared to the Board-approved cost allocation.

The allocation to Rate T1 and Rate T2 decreases as a result of the difference between the Board-approved allocation factor based on the combined Panhandle System and St. Clair System Design Day demands and the proposed allocation based on the Design Day demands on the Panhandle System only. The Rate T1 and Rate T2 Design Day demands on the St. Clair System are proportionately greater than the updated Design Day demands on the Panhandle System. By excluding the Design Day demands on the St. Clair System in the allocation of the Project costs, the Rate T1 and Rate T2 allocation decreases by 1% (from 6% to 5%) and 19% (from 42% to 23%), respectively. The Rate T1 and Rate T2 Design

Day demands and the detailed calculation of the Board-approved and proposed cost allocation factors are provided at Exhibit A, Tab 8, Schedule 2.

#### ***4. Ex-franchise Rate Design***

Union's proposed Project cost allocation does not include an allocation of costs to ex-franchise Rate C1 and Rate M16. Accordingly, Union is proposing to not update the Rate C1 firm long-term transportation rates between Dawn and Ojibway, St. Clair and Bluewater as well as Rate M16 west of Dawn demand rate for the Project costs during the remainder of the IRM term. This interim proposal is appropriate because it better reflects how ex-franchise Rate C1 and Rate M16 customers use the Panhandle System on Design Day and avoids rate impacts that are not reflective of cost causation principles. This approach is also consistent with the current rate design process that provides in-franchise customers with a benefit from ex-franchise transmission revenue generated on the Panhandle System and St. Clair System.

Union will review the Rate C1 and Rate M16 rate design for the Panhandle System and St. Clair System as part of its 2019 Cost of Service proceeding.

#### ***4.1 Rate C1 Transportation Charges***

Union sets a common cost-based Rate C1 long-term (greater than one year) firm transportation rate for service between Dawn and Ojibway, St. Clair and Bluewater. The common demand rate is set based on an average unit rate of the combined Panhandle System and St. Clair System. The rate is calculated as the total Panhandle System and St. Clair System demand costs divided by the maximum design

1 capacity provided in Table 8-2. The demand rate also includes the recovery of costs associated with  
2 system integrity space reserved for Rate C1. The current Board-approved Rate C1 demand rate for the  
3 long-term firm service between Dawn and Ojibway, St. Clair and Bluewater is set at \$1.055/GJ/mo or  
4 \$0.035/GJ/d, as calculated in Table 8-4.

Table 8-4  
Calculation of the Current-Approved Rate C1 Long-Term Firm Transportation Demand Rate  
Between Dawn and Ojibway, St. Clair and Bluewater

Line No.	Particulars	10 <sup>3</sup> m <sup>3</sup> (a)	GJ (1) (b)
1	Ojibway/St. Clair Demand Costs (\$000's)	7,089	7,089
2	Maximum design capacity	15,188	573,357
<u>Monthly Demand per Unit (\$/d/mo)</u>			
3	Ojibway/St. Clair Demand (line 1 x 1000/line 2/12)	38.89	1.030
4	Contingency Demand (2)	1.09	0.029
5	IRM Adjustments	(0.15)	(0.004)
6	Total Rate C1 (\$/d/mo)	39.83	1.055
7	Total Daily Demand (\$/d) (line 6 x 12/365)	1.310	0.035

Notes:

- (1) Energy conversion based on 2013 Board-approved heat value of 37.75 GJ/10<sup>3</sup>m<sup>3</sup>.
- (2) Contingency demand included in Rate C1, per EB-2011-0210, Rate Order, Working Papers, Schedule 32, line 17.

5 To the extent that capacity is available, Union also provides interruptible and short-term (one year or  
6 less) firm transportation service between Dawn and Ojibway, St. Clair and Bluewater at negotiated  
7 rates of up to a maximum of \$75/GJ. The negotiated short-term cross franchise rates allow Union to  
8 sell additional ex-franchise transportation services on a short-term basis based on market conditions.  
9 If Union were to update the firm long-term Rate C1 transportation rate for the Project costs, the  
10 increase in Project demands relative to the Project costs results in an increase of the average unit rate of

1 the combined Panhandle System and St. Clair System from \$0.035 GJ/d to \$0.147 GJ/d (or 323%).

2 The comparison of average unit rates is shown in Table 8-5.

Table 8-5  
Average Unit Rate of the Panhandle System and St. Clair System Including Project Cost

Line No.	Particulars	Current Approved (1) (a)	Project Update (2) (b)	Total Including Project (c)	Change (d) = (b / a)
1	Ojibway/St. Clair Demand Costs (\$000's)	7,089	28,992	36,081	409%
2	Maximum day demand	15,188	2,739	17,927	18%
<u>Monthly Demand per Unit (\$/10<sup>3</sup>m<sup>3</sup>/d/mo)</u>					
3	Ojibway/St. Clair Demand (line 1 x 1000/line 2/12)	38.89	882.08	167.72	331%
4	Contingency Demand	1.09	-	1.09	0%
5	IRM Adjustments	(0.15)	-	(0.15)	0%
6	Total Rate C1	39.83	882.08	168.66	323%
7	Total Daily Demand/Average Unit Rate (\$/GJ/d) (line 6 x 12/365/37.75)	0.035	0.768	0.147	323%

Notes:

- (1) Per Table 8-4.
- (2) Project update Ojibway/St. Clair demand costs per Table 8-7.

3 Given the change in the total average unit cost of the Panhandle System relative to the St. Clair System,  
4 which has remained unchanged as a result of the Project, it is not reasonable to update the common  
5 Rate C1 long-term rate between Dawn and Ojibway, St. Clair and Bluewater for the remainder of the  
6 IRM term. The current Board-approved methodology was reasonable when the two systems had  
7 similar costs per unit of demand. However, the addition of the Project costs creates a large difference  
8 in the cost per unit of demand between the two systems, which no longer reflects the costs to serve the  
9 St. Clair System or ex-franchise Rate C1.

Further, the firm long-term ex-franchise Rate C1 demands do not require the Project facilities on Design Day. The Panhandle System is a westerly peaking system on Design Day with a portion of in-franchise demands being served easterly from gas imported at Ojibway. The Design Day demands that flow westerly from Dawn are all required to serve Union South in-franchise demands. While Union offers a service from Dawn to Ojibway, St. Clair and Bluewater, there are no long-term firm ex-franchise contracts that flow westerly from Dawn under Rate C1. Union's firm long-term Rate C1 contracts flow easterly to Dawn and are not considered on Design Day because ex-franchise customers have no contractual obligation to supply gas to Union's system. To the extent ex-franchise customers use their contracted capacity on Design Day, the demands would flow easterly to Dawn (counter flow), based on the Rate C1 long-term firm transportation contracts (from Ojibway to Dawn).

#### ***4.2 Rate M16 Transportation Charges***

Rate M16 customers provide a contribution to the recovery of Panhandle System costs through the Rate M16 west of Dawn demand rate. The demand rate is set equal to the Rate C1 long-term firm transportation rate between Dawn and Ojibway, as calculated in Table 8-4. This rate design recognizes that storage pool operators located west of Dawn use the Panhandle System to transport gas to and from their storage pool.

Consistent with Rate C1, Union does not consider Rate M16 west of Dawn contracted capacity on Design Day, as the customer has no contractual obligation to supply gas to Union's system. If Rate M16 transportation volumes were to flow on Design Day, it is expected they would be counter flow to the Design Day requirements of the Panhandle System based on the winter operations of the customer.

#### ***4.3 In-franchise Benefit of Storage and Transmission Margin***

During a cost of service proceeding, any forecast incremental revenue for ex-franchise storage and transportation services greater than the allocated costs is credited to in-franchise customers through Union's rate design process. In Union's 2013 Cost of Service, the ex-franchise transportation margin credited to in-franchise customers was approximately \$9.6 million, of which approximately \$3.4 million was related to short-term and long-term transportation on the Panhandle System and St. Clair System.

If Union were to increase the firm long-term Rate C1 demand rate by 323% (per Table 8-5), it is unlikely that ex-franchise customers would continue to contract for the same level of firm long-term service on the Panhandle System and St. Clair System. If Union were to use the Board-approved methodology, Union South in-franchise customers would receive a reduced cost allocation during the IRM term, which would not be supported by incremental firm long-term ex-franchise Rate C1 revenue. Accordingly, Union is proposing to not update the Rate C1 long-term firm transportation rate for the Project costs.



**5. *Proposed Treatment of Incremental Project Revenue***

Union is proposing to credit the allocation of Project costs calculated using the total revenue requirement by the incremental Project revenue by rate class as provided at Table 8-6. The incremental revenue for the Project is calculated as the transmission margin included in delivery rates multiplied by the forecasted incremental demands created by the Project. This approach allows Union to match the incremental revenue associated with the Project with the amount that is expected to be collected through delivery rates.

Table 8-6  
Incremental Project Revenue by Project Year

Line No.	Particulars (\$000's)	2017 (a)	2018 (b)
1	Rate M1	5	37
2	Rate M2	4	37
3	Rate M4	122	906
4	Rate M5	-	-
5	Rate M7	77	380
6	Rate T1	23	116
7	Rate T2	19	96
8	Total	250	1,572

Union has been able to account for the incremental revenue in previous CPM proceedings as incremental billing unit adjustments in setting the M12 Dawn-Parkway demand rate. Union cannot use a similar approach for this Project because the distribution and transmission costs and billing units are bundled into its Union South in-franchise delivery rates and cannot separately bill transmission from distribution.

1           **6.     *Comparison of the Board-Approved and Proposed Cost Allocation and Rate Design***

2     To compare the Board-approved cost allocation to the proposed cost allocation, Union added the  
3     largest revenue requirement directly attributable to the Project (rate base, return, interest, tax,  
4     depreciation and O&M) between 2017 and 2018 of \$27.2 million to Union's 2013 Board-approved cost  
5     allocation study (updated per EB-2013-0365).

6  
7     In both Union's Board-approved and proposed cost allocation, the addition of the 2018 Project costs of  
8     \$27.2 million results in cost allocation impacts of \$29.0 million related to the Project and (\$1.8) million  
9     related to other cost study functions, such as distribution, storage and other transmission. As provided  
10    at Table 8-7, the \$29.0 million related to the Project is comprised of \$27.4 million of Project costs and  
11    a shift of indirect costs of \$1.6 million. The (\$1.8) million of costs related to distribution, storage and  
12    other transmission-related functions is comprised of (\$0.2) million of Project costs and a shift of  
13    indirect costs of (\$1.6) million. The detailed 2018 Board-approved and proposed cost allocation  
14    impacts of the Project are provided at Exhibit A, Tab 8, Schedule 3 and Schedule 4, respectively.

Table 8-7  
Summary of the Cost Allocation Impacts of the 2018 Project Costs

Line No.	Particulars (\$000's)	Project-related Ojibway/St.Clair Demand (1) (a)	Distribution, Storage and Other Transmission (1) (b)	Total Project Costs (2) (c) = (a + b)
1	Project Costs (Excluding Taxes)	26,517	-	26,517
2	Project-Related Income and Property Taxes	838	(176)	662
3	Total Project Costs	27,355	(176)	27,179
4	Indirect Costs	1,637	(1,637)	-
5	Total	28,992	(1,813)	27,179

Notes:

- (1) Exhibit A, Tab 8, Schedule 4, line 26.  
(2) Exhibit A, Tab 8, Schedule 1, column (b).

By adding the rate base and operating costs associated with the Project to the 2013 Board-approved cost allocation study, there is a re-allocation of cost components that are functionalized based on rate base and O&M (general plant, administrative and general expenses, and general operations and engineering costs). Based on the 2018 Project costs, there is a shift of \$1.6 million of indirect costs from distribution, storage and other transmission-related functions to the Project-related Ojibway/St. Clair demand costs (Table 8-7, line 4). There is also an allocation of \$0.7 million of Project-related property and income taxes across the distribution, storage and transmission functions based on the Board-approved cost allocation methodology for property and income taxes. Of the \$0.7 million of Project-related property and income taxes, \$0.8 million is related to the Project and (\$0.2) million is related to the distribution, storage and other transmission-related functions (Table 8-7, line 2).

A comparison of the 2018 impacts, net of the incremental project revenue, for Union South in-franchise, ex-franchise and Union North in-franchise customers based on Union's Board-approved and

1 the proposed allocation is provided at Table 8-8. The detailed comparison of the Board-approved and  
2 proposed cost allocation of the 2018 Project costs, net of the incremental Project revenue, is provided at  
3 Exhibit A, Tab 8, Schedule 5.

Table 8-8  
Comparison of Board-Approved and Proposed  
2018 Project Cost Allocation Impacts

Line No.	Particulars (\$000's)	Board-Approved (a)	Proposed (b)	Difference (c) = (b - a)
	<u>In-franchise South</u>			
1	Rate M1	4,978	10,553	5,576
2	Rate M2	1,927	3,824	1,897
3	Rate M4	1,177	3,143	1,966
4	Rate M5	(2)	32	34
5	Rate M7	254	796	542
6	Rate T1	1,520	1,252	(268)
7	Rate T2	11,818	6,316	(5,502)
8	Other	8	8	-
9	Total In-franchise South	21,680	25,925	4,245
	<u>Ex-franchise</u>			
10	Rate C1	3,594	79	(3,514)
11	Rate M16	714	(16)	(731)
12	Other	286	286	-
13	Total Ex-franchise	4,595	350	(4,245)
14	Total In-franchise North	(667)	(667)	-
15	Net Revenue Requirement	25,607	25,607	-

4 As a result of Union's proposed allocation, the net revenue requirement results in: (i) an increase of  
5 approximately \$26.0 million allocated to Union South in-franchise rate classes, (ii) an increase of  
6 approximately \$0.4 million allocated to ex-franchise rate classes and (iii) a decrease of approximately  
7 \$0.7 million allocated to Union North in-franchise rate classes, per Table 8-8, column (b).

1 If Union were to use the Board-approved allocation of Project costs in 2018, the net revenue  
2 requirement results in: (i) an increase of approximately \$21.7 million allocated to Union South in-  
3 franchise rate classes, (ii) an increase of approximately \$4.6 million allocated to ex-franchise rate  
4 classes and (iii) a decrease of approximately \$0.7 million allocated to Union North in-franchise rate  
5 classes, per Table 8-8, column (a).

6  
7 Based on the proposed Project cost allocation, the impact on Union South in-franchise rate classes is a  
8 rate increase as a result of the allocation of Project costs. Union South in-franchise rate classes will  
9 bear \$29.0 million of the incremental Project-related Ojibway/St. Clair demand costs. The \$29.0  
10 million is partially offset by the reduction in the allocation of indirect costs of (\$1.2) million, Project-  
11 related taxes of (\$0.3) million and the incremental project revenue credit of (\$1.6) million. Please see  
12 Exhibit A, Tab 8, Schedule 4, line 11, columns (d), (g), and (f) for the proposed cost allocation and  
13 Table 8-6 for the incremental project revenue.

14  
15 The impact on ex-franchise rate classes is a rate increase as a result of the shift in indirect costs of \$0.4  
16 million. Please see Exhibit A, Tab 8, Schedule 4, line 17.

17  
18 The impact on Union North in-franchise rate classes is a rate reduction as a result of the shift in indirect  
19 costs of (\$0.8) million and the allocation of Project property and income taxes of \$0.1 million. Please  
20 see Exhibit A, Tab 8, Schedule 4, line 23.

**7. Bill Impacts and Rate Implementation**

Compared to 2016 Board-approved rates per EB-2016-0040 (April 2016 QRAM), the bill impact for the average Rate M1 residential customer in Union South consuming 2,200 m<sup>3</sup> per year is an increase of approximately \$8.03 per year. For the average Rate 01 residential customer in Union North consuming 2,200 m<sup>3</sup> per year, the bill impact is a decrease of approximately \$1.17 per year. The estimated sales service and direct purchase impacts for Union South in-franchise rate classes is provided at Table 8-9. The detailed calculation of all in-franchise bill impacts is provided at Exhibit A, Tab 8, Schedule 6.

Table 8-9  
Union South In-franchise Estimated 2018  
Sales Service and Direct Purchase Bill Impacts

Line No.	Rate Class	Sales Service (a)	Direct Purchase (b)
1	Rate M1	1%	2%
2	Rate M2	2%	6-8%
3	Rate M4	4-6%	24-27%
4	Rate M5	0%	0%
5	Rate M7	2-5%	17-19%
6	Rate M9	0%	0%
7	Rate M10	0%	-1%
8	Rate T1	2%	14-16%
9	Rate T2	1%	18-20%
10	Rate T3	0%	0%

As described earlier, Union is proposing no changes to ex-franchise long-term Rate C1 firm transportation service between Dawn and Ojibway, St. Clair and Bluewater as well as Rate M16 west of Dawn demand rates as a result of the Project costs. The rate impacts of other ex-franchise rate classes are not significant.

1 Union proposes to build the annual costs associated with the Project of \$4.8 million in 2017 and \$25.6  
2 million in 2018 into Union South delivery rates and Union North delivery, gas supply transportation  
3 and storage rates based on the cost estimates included in this application. Please see Exhibit A, Tab 8,  
4 Schedule 7 for the proposed annual 2017 and 2018 net revenue requirement by rate class to be included  
5 in rates.

6  
7 Union proposes to record any variance between what is approved in rates for the Project and the actual  
8 annual revenue requirement of the Project in a new deferral account. Union will dispose of any balance  
9 in the deferral account as part of Union's annual non-commodity deferral account disposition  
10 proceeding. The proposed draft accounting order is provided at Exhibit A, Tab 8, Schedule 8.

UNION GAS LIMITED  
Panhandle Reinforcement Project Revenue Requirement

Line No.	Particulars (\$000's)	2017 (a)	2018 (b)
	<u>Rate Base Investment</u>		
1	Capital Expenditures	243,651	20,818
2	Average Investment	26,990	241,849
	<u>Revenue Requirement Calculation:</u>		
	<u>Operating Expenses:</u>		
3	Operating and Maintenance Expenses (1)	3	15
4	Depreciation Expense (2)	6,008	12,536
5	Property Taxes	261	1,569
6	Total Operating Expenses	<u>6,271</u>	<u>14,120</u>
7	Required Return (5.775% x line 2) (3)	1,559	13,966
	<u>Income Taxes:</u>		
8	Income Taxes - Equity Return (4)	312	2,799
9	Income Taxes - Utility Timing Differences (5)	(3,123)	(3,706)
10	Total Income Taxes	<u>(2,811)</u>	<u>(907)</u>
11	Total Revenue Requirement (line 6 + line 7 + line 10)	<u>5,019</u>	<u>27,179</u>
12	Incremental Project Revenue	<u>250</u>	<u>1,572</u>
13	Net Revenue Requirement (line 11 - line 12)	<u>4,768</u>	<u>25,607</u>

Notes:

- (1) Expenses include incremental O&M for stations and pipe.
- (2) Depreciation expense based on an estimated 20-year useful life of the Project assets.
- (3) The required return of 5.775% assumes a capital structure of 64% long-term debt at 4.00% and 36% common equity at the 2013 Board-approved return of 8.93% (0.64 x 0.0400 + 0.36 x 0.0893).  
The 2018 required return calculation is as follows:  
\$241.849 million x 64% x 4.00% = \$6.191 million plus  
\$241.849 million x 36% x 8.93% = \$7.775 million for a total of \$13.966 million.
- (4) Taxes related to the equity component of the return at a tax rate of 26.5%.
- (5) Taxes related to utility timing differences are negative as the capital cost allowance deduction in arriving at taxable income exceeds the provision of book depreciation in the year.



Line No.	Particulars (10 <sup>3</sup> m <sup>3</sup> /d)
	<u>2013 Board-Approved Allocation Methodology</u>
1	Ojibway/St. Clair Design Maximum Capacity
2	Less: C1 Transportation - Ojibway/St. Clair Firm Demand
3	Less: M16 Firm Demand (West of Dawn)
4	Remaining Pipe Capacity to be Allocated to In-Franchise
5	2013 Panhandle Firm Design Day Demands
6	2013 Sarnia Industrial Line Firm Design Day Demands
7	Total Firm Design Day Demands
8	2013 Board-Approved Allocation Methodology
	<u>2013 Board-Approved Allocation Methodology Updated for Project</u>
9	2013 Approved Ojibway/St. Clair Demand Allocator
10	Less: C1 Transportation - Ojibway/St. Clair Firm Demand
11	Less: M16 Firm Demand (West of Dawn)
12	Add: Incremental Capacity related to the Project
13	Remaining Pipe Capacity to be Allocated to In-Franchise
14	2013 Panhandle Firm Design Day Demands
15	2013 Sarnia Industrial Line Firm Design Day Demands
16	2018 Incremental Firm Design Day Demands for the Project
17	Total Firm Design Day Demands
18	2013 Board-Approved Allocation Methodology Updated for Project
	<u>Proposed 2017 Project Allocation Factor</u>
19	2013 Panhandle Firm Design Day Demands
20	2017 Incremental Firm Design Day Demands for the Project
21	Proposed 2017 Project Allocation Factor
	<u>Proposed 2018 Project Allocation Factor</u>
22	2013 Panhandle Firm Design Day Demands
23	2017 Incremental Firm Design Day Demands for the Project
24	2018 Incremental Firm Design Day Demands for the Project
25	Proposed 2018 Project Allocation Factor

### (1) In-f

- (1) In-franchise capacity (Line 4) allocated using total Panhandle and St. Clair Dele
- (2) Incremental capacity of  $2,739 \times 10^3 \text{ m}^3/\text{d}$  equal to  $106 \text{ TJ/d}$  based on a heat value
- (3) In-franchise capacity (Line 13) allocated using total Panhandle, St. Clair, and

UNION GAS LIMITED  
2018 Cost Allocation Impacts of the Panhandle Reinforcement Project - Board-Approved Cost Allocation

Line No.	Particulars	Total Cost Allocation Impacts (\$000's) (a) = (b + e + i)	Cost Allocation Change in Demands (1) (\$000's) (b)	Project-related Ojibway/St. Clair Demand Costs (2)			Other Functional Classifications (4)		
				Project Costs (3) (\$000's) (c)	Indirect Costs (\$000's) (d)	Total (\$000's) (e) = (c + d)	Project Costs (3) (\$000's) (g)	Indirect Costs (\$000's) (h)	Total (\$000's) (i) = (g + h)
1	Rate M1	5,015	(53)	5,781	346	6,127	75	(1,134)	(1,060)
2	Rate M2	1,964	(12)	1,966	118	2,084	(10)	(98)	(108)
3	Rate M4	2,083	234	1,792	107	1,899	(41)	(9)	(50)
4	Rate M5	(2)	(0)	27	2	29	13	(43)	(30)
5	Rate M7	634	102	516	31	547	(12)	(3)	(14)
6	Rate M9	1	-	-	-	-	1	0	1
7	Rate M10	(0)	-	-	-	-	0	(0)	(0)
8	Rate T1	1,636	20	1,561	93	1,655	(37)	(2)	(39)
9	Rate T2	11,914	(96)	11,536	690	12,226	(319)	103	(216)
10	Rate T3	7	-	-	-	-	5	2	7
11	Subtotal - Union South	23,252	195	23,180	1,387	24,567	(326)	(1,184)	(1,510)
12	Excess Utility Space	(20)	-	-	-	-	(2)	(19)	(20)
13	Rate C1	3,594	(161)	3,454	207	3,661	(110)	204	94
14	Rate M12	306	-	-	-	-	149	158	306
15	Rate M13	0	-	-	-	-	(0)	0	0
16	Rate M16	714	(34)	721	43	765	(23)	7	(16)
17	Subtotal - Ex-franchise	4,595	(195)	4,176	250	4,426	13	351	364
18	Rate 01	(498)	-	-	-	-	94	(593)	(498)
19	Rate 10	(63)	-	-	-	-	16	(79)	(63)
20	Rate 20	(50)	-	-	-	-	12	(62)	(50)
21	Rate 100	(40)	-	-	-	-	11	(50)	(40)
22	Rate 25	(15)	-	-	-	-	4	(19)	(15)
23	Subtotal - Union North	(667)	-	-	-	-	136	(803)	(667)
24	In-franchise (line 11 + line 23)	22,585	195	23,180	1,387	24,567	(189)	(1,988)	(2,177)
25	Ex-franchise (line 17)	4,595	(195)	4,176	250	4,426	13	351	364
26	Total	27,179	-	27,355	1,637	28,992	(176)	(1,637)	(1,813)

Notes:

- (1) Allocation of the 2013 Board-approved Ojibway/St. Clair Demand costs updated to include the incremental Panhandle Project design capacity of 2,739 10<sup>3</sup>m<sup>3</sup>/d.
- (2) The Project costs of \$27.355 million and Indirect costs of \$1.637 million are allocated in proportion to Exhibit A, Tab 8, Schedule 2, line 18.
- (3) The total 2018 Project costs of \$27.179 million include \$27.355 million directly allocated to the Ojibway/St. Clair functional classification and (\$0.176) million of property, income taxes and working capital allocated to distribution, storage and other transmission-related functional classifications.
- (4) Includes distribution, storage and other transmission including Ojibway/St. Clair Demand costs that are not Project-related.

UNION GAS LIMITED  
2018 Cost Allocation Impacts of the Panhandle Reinforcement Project - Proposed Cost Allocation

Line No.	Particulars	Total Cost Allocation Impacts (\$000's) (a) = (d + h)	Project-related Ojibway/St. Clair Demand Costs (1)			Other Functional Classifications (3)		
			Project Costs (2) (\$000's) (b)	Indirect Costs (\$000's) (c)	Total (\$000's) (d) = (b + c) (e)	Project Costs (2) (\$000's) (f)	Indirect Costs (\$000's) (g)	Total (\$000's) (h) = (f + g)
1	Rate M1	10,591	10,997	658	11,656	68	(1,133)	(1,065)
2	Rate M2	3,861	3,746	224	3,971	(11)	(98)	(109)
3	Rate M4	4,049	3,849	230	4,079	(12)	(18)	(30)
4	Rate M5	32	59	4	62	13	(43)	(30)
5	Rate M7	1,176	1,115	67	1,181	1	(6)	(5)
6	Rate M9	1	-	-	-	1	0	1
7	Rate M10	(0)	-	-	-	0	(0)	(0)
8	Rate T1	1,368	1,326	79	1,405	(35)	(3)	(37)
9	Rate T2	6,412	6,264	375	6,638	(331)	105	(226)
10	Rate T3	7	-	-	-	5	2	7
11	Subtotal - Union South	27,497	27,355	1,637	28,992	(301)	(1,194)	(1,496)
12	Excess Utility Space	(20)	-	-	-	(2)	(19)	(20)
13	Rate C1	79	-	-	-	(130)	210	79
14	Rate M12	306	-	-	-	149	158	306
15	Rate M13	0	-	-	-	(0)	0	0
16	Rate M16	(16)	-	-	-	(27)	11	(16)
17	Subtotal - Ex-franchise	350	-	-	-	(11)	360	350
18	Rate 01	(498)	-	-	-	94	(593)	(498)
19	Rate 10	(63)	-	-	-	16	(79)	(63)
20	Rate 20	(50)	-	-	-	12	(62)	(50)
21	Rate 100	(40)	-	-	-	11	(50)	(40)
22	Rate 25	(15)	-	-	-	4	(19)	(15)
23	Subtotal - Union North	(667)	-	-	-	136	(803)	(667)
24	In-franchise (line 11 + line 23)	26,830	27,355	1,637	28,992	(165)	(1,997)	(2,163)
25	Ex-franchise (line 17)	350	-	-	-	(11)	360	350
26	Total	27,179	27,355	1,637	28,992	(176)	(1,637)	(1,813)

Notes:

- (1) The Project costs of \$27.355 million and the indirect costs of \$1.637 million are allocated in proportion to Exhibit A, Tab 8, Schedule 2, line 25.
- (2) The total 2018 Project costs of \$27.179 million include \$27.355 million directly allocated to the Ojibway/St. Clair Demand functional classification and (\$0.176) million of property, income taxes and working capital allocated to distribution, storage and other transmission-related functional classifications.
- (3) Includes distribution, storage and other transmission including Ojibway/St. Clair Demand costs that are not Project-related.

UNION GAS LIMITED  
Comparison of the Board-Approved and Proposed Cost Allocation of the 2018 Panhandle Reinforcement Project Costs

Line No.	Particulars	Board-Approved Cost Allocation (1) (\$000's) (a)	(b)	Project Revenue Adjustment (2) (\$000's) (c)	Total Rate Impact based on Board-Approved Cost Allocation (\$000's) (d) = (a + c)	(e)	Proposed Cost Allocation (3) (\$000's) (f)	(g)	Project Revenue Adjustment (2) (\$000's) (h)	Total Rate Impact based on Proposed Cost Allocation (\$000's) (i) = (f + h)	(j)	Difference (\$000's) (k) = (i - d)	(l) = (j / d)
1	Rate M1	5,015	18%	(37)	4,978	19%	10,591	39%	(37)	10,553	41%	5,576	111%
2	Rate M2	1,964	7%	(37)	1,927	8%	3,861	14%	(37)	3,824	15%	1,897	97%
3	Rate M4	2,083	8%	(906)	1,177	5%	4,049	15%	(906)	3,143	12%	1,966	94%
4	Rate M5	(2)	0%	-	(2)	0%	32	0%	-	32	0%	34	-1923%
5	Rate M7	634	2%	(380)	254	1%	1,176	4%	(380)	796	3%	542	85%
6	Rate M9	1	0%	-	1	0%	1	0%	-	1	0%	-	0%
7	Rate M10	(0)	0%	-	(0)	0%	(0)	0%	-	(0)	0%	-	0%
8	Rate T1	1,636	6%	(116)	1,520	6%	1,368	5%	(116)	1,252	5%	(268)	-16%
9	Rate T2	11,914	44%	(96)	11,818	46%	6,412	24%	(96)	6,316	25%	(5,502)	-46%
10	Rate T3	7	0%	-	7	0%	7	0%	-	7	0%	-	0%
11	Subtotal - Union South	23,252	86%	(1,572)	21,680	85%	27,497	101%	(1,572)	25,925	101%	4,245	18%
12	Excess Utility Space	(20)	0%	-	(20)	0%	(20)	0%	-	(20)	0%	-	0%
13	Rate C1	3,594	13%	-	3,594	14%	79	0%	-	79	0%	(3,514)	-98%
14	Rate M12	306	1%	-	306	1%	306	1%	-	306	1%	-	0%
15	Rate M13	0	0%	-	0	0%	0	0%	-	0	0%	-	0%
16	Rate M16	714	3%	-	714	3%	(16)	0%	-	(16)	0%	(731)	-102%
17	Subtotal - Ex-franchise	4,595	17%	-	4,595	18%	350	1%	-	350	1%	(4,245)	-92%
18	Rate 01	(498)	-2%	-	(498)	-2%	(498)	-2%	-	(498)	-2%	(0)	0%
19	Rate 10	(63)	0%	-	(63)	0%	(63)	0%	-	(63)	0%	(0)	0%
20	Rate 20	(50)	0%	-	(50)	0%	(50)	0%	-	(50)	0%	(0)	0%
21	Rate 100	(40)	0%	-	(40)	0%	(40)	0%	-	(40)	0%	-	0%
22	Rate 25	(15)	0%	-	(15)	0%	(15)	0%	-	(15)	0%	-	0%
23	Subtotal - Union North	(667)	-2%	-	(667)	-3%	(667)	-2%	-	(667)	-3%	(0)	0%
24	In-franchise (line 11 + line 23)	22,585	83%	(1,572)	21,013	82%	26,830	99%	(1,572)	25,258	99%	4,245	19%
25	Ex-franchise (line 17)	4,595	17%	-	4,595	18%	350	1%	-	350	1%	(4,245)	-92%
26	Total	27,179	100%	(1,572)	25,607	100%	27,179	100%	(1,572)	25,607	100%	-	0%

Notes:

- (1) See Exhibit A, Tab 8, Schedule 3.  
(2) Total Project revenue, per Exhibit A, Tab 8, Schedule 1, line 12, column (b).  
(3) See Exhibit A, Tab 8, Schedule 4.

UNION GAS LIMITED  
Calculation of Sales Service and Direct Purchase Impacts for Typical Small and Large Customers - Union North

Line No.	Particulars	EB-2016-0040 Approved 01-Apr-16 (1)		EB-2016-0186 Proposed 01-Jan-18		Impact		
		Annual Bill	Unit Rate	Annual Bill	Unit Rate	Unit Rate Change	Annual Bill Change	
		(\$)	(cents/m <sup>3</sup> )	(\$)	(cents/m <sup>3</sup> )	(cents/m <sup>3</sup> )	(\$)	(%)
		(a)	(b)	(c)	(d)	(e) = (d-b)	(f) = (c-a)	(g) = (f/a)
	<u>Small Rate 01</u>							
1	Delivery Charges	435	19.7552	434	19.7048	(0.0504)	(1.11)	-0.3%
2	Gas Supply Charges	481	21.8483	481	21.8454	(0.0029)	(0.06)	0.0%
3	Total Bill	915	41.6035	914	41.5502	(0.0533)	(1.17)	-0.1%
4	Sales Service Impact						(1.17)	-0.1%
5	Bundled-T (Direct Purchase) Impact						(1.17)	-0.2%
	<u>Small Rate 10</u>							
6	Delivery Charges	4,232	7.0530	4,217	7.0288	(0.0242)	(14.51)	-0.3%
7	Gas Supply Charges	13,109	21.8483	13,107	21.8454	(0.0029)	(1.73)	0.0%
8	Total Bill	17,341	28.9013	17,325	28.8742	(0.0271)	(16.24)	-0.1%
9	Sales Service Impact						(16.24)	-0.1%
10	Bundled-T (Direct Purchase) Impact						(16.24)	-0.1%
	<u>Large Rate 10</u>							
11	Delivery Charges	13,579	5.4315	13,541	5.4164	(0.0150)	(37.62)	-0.3%
12	Gas Supply Charges	54,621	21.8483	54,614	21.8454	(0.0029)	(7.20)	0.0%
13	Total Bill	68,199	27.2798	68,155	27.2618	(0.0179)	(44.82)	-0.1%
14	Sales Service Impact						(44.82)	-0.1%
15	Bundled-T (Direct Purchase) Impact						(44.82)	-0.1%
	<u>Small Rate 20</u>							
16	Delivery Charges	73,272	2.4424	72,937	2.4312	(0.0112)	(334.73)	-0.5%
17	Gas Supply Charges	573,432	19.1144	573,347	19.1116	(0.0029)	(85.68)	0.0%
18	Total Bill	646,704	21.5568	646,284	21.5428	(0.0140)	(420.41)	-0.1%
19	Sales Service Impact						(420.41)	-0.1%
20	Bundled-T (Direct Purchase) Impact						(420.41)	-0.1%
	<u>Large Rate 20</u>							
21	Delivery Charges	281,495	1.8766	280,472	1.8698	(0.0068)	(1,022.33)	-0.4%
22	Gas Supply Charges	2,659,156	17.7277	2,658,789	17.7253	(0.0024)	(367.21)	0.0%
23	Total Bill	2,940,651	19.6043	2,939,261	19.5951	(0.0093)	(1,389.54)	0.0%
24	Sales Service Impact						(1,389.54)	0.0%
25	Bundled-T (Direct Purchase) Impact						(1,389.54)	-0.1%
	<u>Average Rate 25</u>							
26	Delivery Charges	62,814	2.7611	62,598	2.7516	(0.0095)	(216.15)	-0.3%
27	Gas Supply Charges	303,844	13.3558	303,844	13.3558	-	-	0.0%
28	Total Bill	366,658	16.1168	366,442	16.1073	(0.0095)	(216.15)	-0.1%
29	Sales Service Impact						(216.15)	-0.1%
30	T-Service (Direct Purchase) Impact						(216.15)	-0.3%
	<u>Small Rate 100</u>							
31	Delivery Charges	260,184	0.9636	259,444	0.9609	(0.0027)	(739.80)	-0.3%
32	Gas Supply Charges	5,353,074	19.8262	5,353,074	19.8262	-	-	0.0%
33	Total Bill	5,613,258	20.7898	5,612,518	20.7871	(0.0027)	(739.80)	0.0%
34	Sales Service Impact						(739.80)	0.0%
35	T-Service (Direct Purchase) Impact						(739.80)	-0.3%
	<u>Large Rate 100</u>							
36	Delivery Charges	2,106,720	0.8778	2,101,477	0.8756	(0.0022)	(5,242.80)	-0.2%
37	Gas Supply Charges	46,488,914	19.3704	46,488,914	19.3704	-	-	0.0%
38	Total Bill	48,595,635	20.2482	48,590,392	20.2460	(0.0022)	(5,242.80)	0.0%
39	Sales Service Impact						(5,242.80)	0.0%
40	T-Service (Direct Purchase) Impact						(5,242.80)	-0.2%

Notes:

(1) Reflects Board-approved rates per Appendix A in Union's April 2016 QRAM filing (EB-2016-0040).

UNION GAS LIMITED  
Calculation of Sales Service and Direct Purchase Impacts for Typical Small and Large Customers - Union South

Line No.	Particulars	EB-2016-0040 Approved 01-Apr-16 (1)		EB-2016-0186 Proposed 01-Jan-18		Impact		
		Annual Bill	Unit Rate	Annual Bill	Unit Rate	Unit Rate Change	Annual Bill Change	
		(\$)	(cents/m <sup>3</sup> )	(\$)	(cents/m <sup>3</sup> )	(cents/m <sup>3</sup> )	(\$)	(%)
		(a)	(b)	(c)	(d)	(e) = (d-b)	(f) = (c-a)	(g) = (f/a)
	<u>Small Rate M1</u>							
1	Delivery Charges	346	15.7046	354	16.0698	0.3652	8.03	2.3%
2	Gas Supply Charges	299	13.5856	299	13.5856	-	-	0.0%
3	Total Bill	644	29.2902	652	29.6554	0.3652	8.03	1.2%
4	Sales Service Impact						8.03	1.2%
5	Direct Purchase Impact						8.03	2.3%
	<u>Small Rate M2</u>							
6	Delivery Charges	3,297	5.4947	3,503	5.8375	0.3428	205.71	6.2%
7	Gas Supply Charges	8,151	13.5856	8,151	13.5856	-	-	0.0%
8	Total Bill	11,448	19.0803	11,654	19.4231	0.3428	205.71	1.8%
9	Sales Service Impact						205.71	1.8%
10	Direct Purchase Impact						205.71	6.2%
	<u>Large Rate M2</u>							
11	Delivery Charges	10,642	4.2566	11,462	4.5847	0.3281	820.27	7.7%
12	Gas Supply Charges	33,964	13.5856	33,964	13.5856	-	-	0.0%
13	Total Bill	44,606	17.8422	45,426	18.1703	0.3281	820.27	1.8%
14	Sales Service Impact						820.27	1.8%
15	Direct Purchase Impact						820.27	7.7%
	<u>Small Rate M4</u>							
16	Delivery Charges	37,374	4.2713	46,440	5.3074	1.0361	9,065.95	24.3%
17	Gas Supply Charges	118,874	13.5856	118,874	13.5856	-	-	0.0%
18	Total Bill	156,248	17.8569	165,314	18.8930	1.0361	9,065.95	5.8%
19	Sales Service Impact						9,065.95	5.8%
20	Direct Purchase Impact						9,065.95	24.3%
	<u>Large Rate M4</u>							
21	Delivery Charges	277,378	2.3115	351,384	2.9282	0.6167	74,006.01	26.7%
22	Gas Supply Charges	1,630,272	13.5856	1,630,272	13.5856	-	-	0.0%
23	Total Bill	1,907,650	15.8971	1,981,656	16.5138	0.6167	74,006.01	3.9%
24	Sales Service Impact						74,006.01	3.9%
25	Direct Purchase Impact						74,006.01	26.7%
	<u>Small Rate M5</u>							
26	Delivery Charges	30,596	3.7086	30,512	3.6984	(0.0102)	(84.11)	-0.3%
27	Gas Supply Charges	112,081	13.5856	112,081	13.5856	-	-	0.0%
28	Total Bill	142,677	17.2942	142,593	17.2840	(0.0102)	(84.11)	-0.1%
29	Sales Service Impact						(84.11)	-0.1%
30	Direct Purchase Impact						(84.11)	-0.3%
	<u>Large Rate M5</u>							
31	Delivery Charges	169,794	2.6122	169,431	2.6066	(0.0056)	(362.18)	-0.2%
32	Gas Supply Charges	883,064	13.5856	883,064	13.5856	-	-	0.0%
33	Total Bill	1,052,858	16.1978	1,052,495	16.1922	(0.0056)	(362.18)	0.0%
34	Sales Service Impact						(362.18)	0.0%
35	Direct Purchase Impact						(362.18)	-0.2%
	<u>Small Rate M7</u>							
36	Delivery Charges	656,550	1.8237	767,507	2.1320	0.3082	110,957.22	16.9%
37	Gas Supply Charges	4,890,816	13.5856	4,890,816	13.5856	-	-	0.0%
38	Total Bill	5,547,366	15.4093	5,658,323	15.7176	0.3082	110,957.22	2.0%
39	Sales Service Impact						110,957.22	2.0%
40	Direct Purchase Impact						110,957.22	16.9%
	<u>Large Rate M7</u>							
41	Delivery Charges	2,513,626	4.8339	2,997,803	5.7650	0.9311	484,176.96	19.3%
42	Gas Supply Charges	7,064,512	13.5856	7,064,512	13.5856	-	-	0.0%
43	Total Bill	9,578,138	18.4195	10,062,315	19.3506	0.9311	484,176.96	5.1%
44	Sales Service Impact						484,176.96	5.1%
45	Direct Purchase Impact						484,176.96	19.3%

Notes:

(1) Reflects Board-approved rates per Appendix A in Union's April 2016 QRAM filing (EB-2016-0040).

UNION GAS LIMITED  
Calculation of Sales Service and Direct Purchase Impacts for Typical Small and Large Customers - Union South

Line No.	Particulars	EB-2016-0040 Approved 01-Apr-16 (1)		EB-2016-0186 Proposed 01-Jan-18		Impact		
		Annual Bill	Unit Rate	Annual Bill	Unit Rate	Unit Rate Change	Annual Bill Change	
		(\$)	(cents/m <sup>3</sup> )	(\$)	(cents/m <sup>3</sup> )	(cents/m <sup>3</sup> )	(\$)	(%)
		(a)	(b)	(c)	(d)	(e) = (d-b)	(f) = (c-a)	(g) = (f/a)
	<u>Large Rate M9</u>							
1	Delivery Charges	384,526	1.9057	384,883	1.9074	0.0018	357.04	0.1%
2	Gas Supply Charges	2,741,302	13.5856	2,741,302	13.5856	-	-	0.0%
3	Total Bill	3,125,829	15.4913	3,126,186	15.4930	0.0018	357.04	0.0%
4	Sales Service Impact						357.04	0.0%
5	Direct Purchase Impact						357.04	0.1%
	<u>Average Rate M10</u>							
6	Delivery Charges	5,570	5.8937	5,536	5.8584	(0.0353)	(33.36)	-0.6%
7	Gas Supply Charges	12,838	13.5856	12,838	13.5856	-	-	0.0%
8	Total Bill	18,408	19.4793	18,375	19.4440	(0.0353)	(33.36)	-0.2%
9	Sales Service Impact						(33.36)	-0.2%
10	Direct Purchase Impact						(33.36)	-0.6%
	<u>Small Rate T1</u>							
11	Delivery Charges	132,068	1.7523	150,193	1.9927	0.2405	18,124.88	13.7%
12	Gas Supply Charges	1,023,947	13.5856	1,023,947	13.5856	-	-	0.0%
13	Total Bill	1,156,015	15.3379	1,174,140	15.5783	0.2405	18,124.88	1.6%
14	Sales Service Impact						18,124.88	1.6%
15	Direct Purchase Impact						18,124.88	13.7%
	<u>Average Rate T1</u>							
16	Delivery Charges	201,822	1.7450	231,696	2.0033	0.2583	29,874.43	14.8%
17	Gas Supply Charges	1,571,302	13.5856	1,571,302	13.5856	-	-	0.0%
18	Total Bill	1,773,124	15.3306	1,802,998	15.5889	0.2583	29,874.43	1.7%
19	Sales Service Impact						29,874.43	1.7%
20	Direct Purchase Impact						29,874.43	14.8%
	<u>Large Rate T1</u>							
21	Delivery Charges	445,903	1.7402	516,897	2.0172	0.2771	70,993.82	15.9%
22	Gas Supply Charges	3,481,185	13.5856	3,481,185	13.5856	-	-	0.0%
23	Total Bill	3,927,088	15.3258	3,998,082	15.6028	0.2771	70,993.82	1.8%
24	Sales Service Impact						70,993.82	1.8%
25	Direct Purchase Impact						70,993.82	15.9%
	<u>Small Rate T2</u>							
26	Delivery Charges	511,030	0.8624	602,656	1.0170	0.1546	91,625.96	17.9%
27	Gas Supply Charges	8,050,283	13.5856	8,050,283	13.5856	-	-	0.0%
28	Total Bill	8,561,313	14.4480	8,652,939	14.6026	0.1546	91,625.96	1.1%
29	Sales Service Impact						91,625.96	1.1%
30	Direct Purchase Impact						91,625.96	17.9%
	<u>Average Rate T2</u>							
31	Delivery Charges	1,186,197	0.5997	1,417,724	0.7168	0.1171	231,526.53	19.5%
32	Gas Supply Charges	26,870,938	13.5856	26,870,938	13.5856	-	-	0.0%
33	Total Bill	28,057,135	14.1853	28,288,662	14.3024	0.1171	231,526.53	0.8%
34	Sales Service Impact						231,526.53	0.8%
35	Direct Purchase Impact						231,526.53	19.5%
	<u>Large Rate T2</u>							
36	Delivery Charges	1,936,196	0.5232	2,322,811	0.6276	0.1045	386,614.64	20.0%
37	Gas Supply Charges	50,278,811	13.5856	50,278,811	13.5856	-	-	0.0%
38	Total Bill	52,215,008	14.1088	52,601,622	14.2132	0.1045	386,614.64	0.7%
39	Sales Service Impact						386,614.64	0.7%
40	Direct Purchase Impact						386,614.64	20.0%
	<u>Large Rate T3</u>							
41	Delivery Charges	3,552,739	1.3027	3,565,851	1.3076	0.0048	13,112.16	0.4%
42	Gas Supply Charges	37,049,561	13.5856	37,049,561	13.5856	-	-	0.0%
43	Total Bill	40,602,300	14.8883	40,615,413	14.8932	0.0048	13,112.16	0.0%
44	Sales Service Impact						13,112.16	0.0%
45	Direct Purchase Impact						13,112.16	0.4%

Notes:

(1) Reflects Board-approved rates per Appendix A in Union's April 2016 QRAM filing (EB-2016-0040).

UNION GAS LIMITED  
Panhandle Reinforcement Project Revenue Requirement by Rate Class

Line No.	Particulars (\$000's)	2017			2018		
		Total Revenue Requirement (a)	Incremental Project Revenue (b)	Net Revenue Requirement (c) = (a+b)	Total Revenue Requirement (e)	Incremental Project Revenue (f)	Net Revenue Requirement (g) = (e+f)
				Variance (d) = (g-c)			
1	Rate M1	2,167	(5)	2,162	10,591	(37)	10,553
2	Rate M2	954	(4)	950	3,861	(37)	3,824
3	Rate M4	932	(122)	811	4,049	(906)	3,143
4	Rate M5	(18)	-	(18)	32	-	32
5	Rate M7	331	(77)	254	1,176	(380)	796
6	Rate M9	(2)	-	(2)	1	-	1
7	Rate M10	(0)	-	(0)	(0)	-	(0)
8	Rate T1	358	(23)	334	1,368	(116)	1,252
9	Rate T2	1,613	(19)	1,593	6,412	(96)	6,316
10	Rate T3	(14)	-	(14)	7	-	7
11	Subtotal - Union South	6,320	(250)	6,070	27,497	(1,572)	25,925
12	Excess Utility Space	(18)	-	(18)	(20)	-	(20)
13	Rate C1	(61)	-	(61)	79	-	79
14	Rate M12	(488)	-	(488)	306	-	306
15	Rate M13	(0)	-	(0)	0	-	0
16	Rate M16	(15)	-	(15)	(16)	-	(16)
17	Subtotal - Ex-franchise	(582)	-	(582)	350	-	350
18	Rate 01	(524)	-	(524)	(498)	-	(498)
19	Rate 10	(79)	-	(79)	(63)	-	(63)
20	Rate 20	(57)	-	(57)	(50)	-	(50)
21	Rate 100	(44)	-	(44)	(40)	-	(40)
22	Rate 25	(16)	-	(16)	(15)	-	(15)
23	Subtotal - Union North	(720)	-	(720)	(667)	-	(667)
24	In-franchise	5,600	(250)	5,350	26,830	(1,572)	25,258
25	Ex-franchise	(582)	-	(582)	350	-	350
26	Total	5,019	(250)	4,768	27,179	(1,572)	25,607

Notes:

(1) Exhibit A, Tab 8, Schedule 5, column (i).



**UNION GAS LIMITED**

**Accounting Entries for  
Panhandle Reinforcement Project Costs  
Deferral Account No. 179-XXX**

Account numbers are from the Uniform System of Accounts for Gas Utilities, Class A prescribed under the Ontario Energy Board Act.

Debit	-	Account No.179-XXX Other Deferred Charges – Panhandle Reinforcement Project Costs
Credit	-	Account No. 579 Miscellaneous Operating Revenue

To record, as a debit (credit) in Deferral Account No. 179-XXX, the difference between the actual revenue requirement related to the costs for the Panhandle Reinforcement Project and the revenue requirement included in rates as approved by the Board.

Debit	-	Account No.179-XXX Other Deferred Charges – Panhandle Reinforcement Project Costs
Credit	-	Account No. 323 Other Interest Expense

To record, as a debit (credit) in Deferral Account No. 179-XXX, interest on the balance in Deferral Account No. 179- XXX. Simple interest will be computed monthly on the opening balance in the said account in accordance with the methodology approved by the Board in EB-2006-0117.

## ENGINEERING AND CONSTRUCTION

### *Proposed Facilities*

Union is proposing to reinforce the Panhandle System by constructing approximately 40 kilometres of NPS 36 pipeline from Union's Dawn Compressor Station ("Dawn") in the Township of Dawn Euphemia to the Dover Transmission Station ("Dover Transmission") in the Municipality of Chatham-Kent. The Project also requires station modifications at Dawn, as well as at the Mersea Gate Station, Dover Centre Station and Dover Transmission.

To install the Proposed Pipeline, Union will use a "lift and lay" construction process. Specifically, the existing NPS 16 pipeline will be removed (lift) and the new NPS 36 pipeline will be installed in the same easement as that used for the NPS 16 (lay) except where pipeline abandonment sections are required.

### *Project Schedule*

Exhibit A, Tab 9, Schedule 1 provides the overall Project and construction schedule. Construction of the Project will begin in the spring of 2017. The construction schedule takes advantage of the drier summer months thereby minimizing the impact of construction on agricultural lands and other features such as watercourses.

1    ***Design***

2    All the design, installation and testing of the Proposed Pipeline and station modifications will be  
3    completed in accordance with the requirements of Ontario Regulation 210/01, Oil and Gas Pipeline  
4    Systems under the Technical Standards and Safety Act 2000. This regulation governs the installation  
5    of pipelines in the Province of Ontario. The design meets or exceeds the requirements of current CSA  
6    Z662-15 Standard in accordance with the Code Adoption document under the Ontario Regulations.

7  
8    The pipe design depends on which Class Location the pipeline is located within. To determine Class  
9    Location, CSA Z662-15 uses a classification system that takes into account land use and population  
10   density. The classifications are as follows:

- 11       1)    Class 1 areas consist of 10 or fewer dwellings;  
12       2)    Class 2 areas consist of 11 to 45 dwellings, or a building occupied by 20 or more persons  
13             during normal use such as playgrounds, recreational areas, or other places of public  
14             assembly as well as industrial installations;  
15       3)    Class 3 areas consist of 46 or more dwellings; and,  
16       4)    Class 4 contains a prevalence of buildings intended for human occupancy with 4 or more  
17             stories above ground.

18  
19   The Class Location boundaries are determined by a sliding boundary 1.6 kilometres long by 400 metres  
20   wide centered over the Proposed Pipeline. This method covers existing development. This is  
21   supplemented with information for future development through discussions with landowners and

municipalities. The Proposed Pipeline may be designed to accommodate a higher Class Location to be compatible with future development.

There is a mix of Class 1 and Class 2 locations along the Proposed Pipeline route.

As per CSA Z662 a design factor of 0.8 and the appropriate location factors are applied in the Class Locations. The temperature and joint factors are 1.0 in all locations. A location factor of 0.9 was used for Class 1 and 2 Locations with the following exceptions where a location factor of 0.625 was used:

- 1) when crossing any public right of ways including roads, highways, public streets, railways and major rivers;
- 2) for any fabrications such as stations or valve sites; and,
- 3) for pipeline undercrossings.

The Proposed Pipeline design parameters will be in accordance with the Figure 9-1:

Figure 9-1 – Design Parameters

<b>NPS 36</b>	<b>Class 1 &amp; 2 General</b>	<b>Class 1 &amp; 2 Other (roads/railways)</b>
Location Factor	1.0 and 0.9	0.625
Design Factor	0.8	0.8
Maximum Operating Pressure	6040 kPa	6040 kPa
Test Medium	Water	Water
Test Duration	24 hours	24 hours
Minimum Test Pressure	9653 kPa	9653 kPa
Valve and Flange Ratings	PN 100 (ANSI 600)	PN 100 (ANSI 600)

Minimum Depth of Cover	1.0 metre	1.0 metre
------------------------	-----------	-----------

### ***Pipeline Specifications***

Minimum pipe specifications are shown in Figure 9-2. The Project will use NPS 36 pipe which has an outside diameter of 914 mm. Union anticipates sourcing two separate wall thickness and a single grade to meet the varying design conditions listed above. Pipe with a location factor of 0.9 and above uses 9.6 mm wall thickness and a specified minimum grade of 483 MPa. Pipe with a location factor of 0.625 uses 13.5 mm wall thickness and a specified minimum grade of 483 MPa.

Figure 9-2 – Minimum Pipe Specifications

	<b>NPS36</b>
Size	914 mm
Grade	483 MPa
Wall thickness	9.6 mm/13.5 mm
Category	Category II
Coating	Fusion Bond Epoxy (FBE)/Abrasion Resistant Overcoat (ARO)

The NPS 36 pipe will be manufactured using a spiral Double Submerged Arc Weld (“DSAW”). As per code, the pipe will be manufactured to CSA Z245.1 (latest edition). The pipe is designed to provide the required maximum operating pressure (“MOP”) of 6040 kPa using the various location factors.

The rating of all valves, flanges and fittings will be PN 100 rated for 9930 kPa.

Based on the pipe specifications provided above, the hoop stress of the piping will be as listed in Figure 9-3. The pipeline design will be suitable for Class 3 (13.5 mm wall thickness) and Class 2 (9.6 mm wall thickness) developments.

Figure 9-3 – Pipeline Hoop Stress

Design Factor	Location Factor	Wall Thickness (mm)	Pipe Grade (MPa)	% SMYS
0.8	0.9	9.6	483	59.5
0.8	0.625	13.5	483	42.3

Minimum depth of cover required will be 1.0 metre from top of pipe to final grade. Where required additional cover, will be, used to accommodate planned or existing underground facilities, roads, railway and watercourse crossings. In agricultural areas the minimum depth of cover will be 1.2 metres, except where bedrock is encountered at a depth less than 1.2 metres, in which case the pipe will be installed with the same cover as the bedrock, but not less than 1.0 metres below grade.

### ***Proposed Station Modifications***

The Project requires modifications to four existing stations – Dawn, Mersea Gate Station, Dover Centre Station and Dover Transmission.

At Dawn, the modifications proposed include: installation of four new ultrasonic flow meters to provide check measurement and measurement for odourant injection control; upgrades to the existing odourant systems; installation of two new flow control valves; installation of one new NPS 42

1 interconnect pipe and isolating valve to provide the Panhandle System access to compression from  
2 Dawn North; and, the reconfiguration of the existing combined pig launching facilities for the existing  
3 NPS 16 and NPS 20 pipelines plus the addition of a new NPS 36 pig launcher and associated piping.  
4

5 The Dawn Station modifications relate to increasing the capacity of the Dawn Station flow into the  
6 Panhandle System through both the proposed and existing pipelines and to provide connections to the  
7 proposed NPS 36 pipeline. This includes providing check measurement into each of the NPS 36 and  
8 NPS 20 pipelines as well as gas chromatograph capability for measuring heat content of gas.  
9

10 The Mersea Gate Station upgrades include the replacement of the existing inlet filter, boiler, boiler  
11 building and heat exchanger. In addition, the existing pressure control will be replaced and, the existing  
12 NPS 6 station inlet pipeline will be replaced with NPS 8 pipe.  
13

14 Dover Centre Station changes include expansion of the existing site footprint to accommodate the  
15 larger NPS 36 pipeline and new communication panel plus the installation of a new NPS 36 valve with  
16 remote control actuation facilities and associated crossover piping between the proposed NPS 36  
17 pipeline and existing NPS 20 pipeline.  
18

19 The primary modifications planned for Dover Transmission include the expansion of the existing site  
20 footprint to allow for the installation of new NPS 16 and NPS 36 pig launcher and receiver facilities  
21 plus the installation of associated valves and piping facilities.

***Pipeline Construction***

Exhibit A, Tab 9, Schedule 2 describes the general techniques and methods of construction that Union will employ for the construction of the Proposed Pipeline. It details such activities as clearing, grading, stringing of pipe, trenching, welding, backfill, tile repair and clean-up.

As noted earlier, Union will use a “lift and lay” construction process to install the Proposed Pipeline. The existing NPS 16 pipeline will be removed and replaced with the proposed NPS 36 pipeline with the exception of those sections of pipe deemed to be not practical as determined by an Engineering Assessment such as major road and watercourse crossing locations. These locations identified as part of the Engineering Assessment will be abandoned in place and a new land right obtained. The CSA Z662-15 and TSSA abandonment guidelines will be followed for all pipe abandoned in place. The TSSA guidelines can be found at Exhibit A, Tab 9, Schedule 3 and CSA Z662-15, Section 10.16 can be found at Exhibit A, Tab 9, Schedule 4.

Prior to the removal of the NPS 16 pipeline, the right-of-way (“ROW”) will be prepared using Union’s standard construction procedures for topsoil stripping, clearing, grading, pre-tiling, etc. Once the ROW has been prepared, a narrow trench will be dug directly above the NPS 16 pipeline allowing the pipe to be lifted out of the ground. The pipe will be cut into sections and removed from the ROW. The disturbed area resulting from the removal of the pipe will then be backfilled to the topsoil level and compacted to create a suitable ROW for the installation of the new NPS 36 pipeline. The new NPS 36 pipeline will then be installed using similar construction techniques employed for a typical ROW. A typical lift and lay cross-section can be found at Exhibit A, Tab 9, Schedule 5. The Proposed Pipeline



1 will be tested hydrostatically with water for a period of 24 hours as per Union's specification. Testing  
2 will adhere to the requirements of CSA Z662-11 Oil and Gas Pipeline Systems Section 8. Fabrication  
3 tests that are fully exposed or are above ground will require at a minimum, a one-hour pressure test.  
4 Locations for hydrostatic testing water sources have not yet been determined and will be developed in  
5 conjunction with the Pipeline Contractor closer to the start of construction. Union will work with the  
6 Pipeline Contractor to locate a water source that is the most economical and creates the least  
7 environmental impact.

8  
9 After the test water is removed, the line will be dried. A caliper tool will be run to check for dents or  
10 ovality. Cathodic protection will be applied to the completed pipeline.

11  
12 Union anticipates no issues obtaining material for the pipeline component of this Project within the  
13 proposed timelines. Union also anticipates no problem in obtaining a Pipeline Contractor to complete  
14 the proposed construction.

15  
16 Union will construct the Proposed Pipeline in compliance with its current construction procedures,  
17 environmental mitigation identified in the Environmental Report (see Exhibit A, Tab 10, Schedule 1),  
18 permit conditions and commitments to Regulators and landowners. Union continuously updates and  
19 refines its construction procedures to minimize potential impacts to lands and has since seen many  
20 improvements as a result of better construction practices. Union will consult with each municipality in  
21 order to obtain the required permits and/or approvals for the Project and to comply with the intent of  
22 local municipal by-laws where required. Union's Landowner Relations Agent ("LRA") will contact  
23 each landowner along the route prior to construction to obtain site specific requirements such as

1 livestock fencing and access points. This information is included in the construction contract so that  
2 the Pipeline Contractor is contractually obligated to fulfill all commitments made to the landowner.  
3 The visit also provides an informal opportunity to answer questions and discuss construction plans.  
4

5 Pre-construction tiling will be completed if timing and soil conditions permit. This is done to minimize  
6 disruption to field drainage systems and farm operations that may result from pipeline construction.  
7 Union retains a qualified drainage consultant to determine if a property that contains a field drainage  
8 system could benefit from pre-construction tiling. Union's drainage consultant will be contacting the  
9 landowners to discuss their tile needs. Landowner approval is required for tiling work conducted  
10 outside of the easement. The drainage consultant will prepare a tiling plan and provide a copy of the  
11 plan to both Union and the landowner.  
12

13 For trees removed within the proposed easement and temporary working space, Union has a  
14 reforestation plan that consists of replanting twice the woodlot area cleared for construction.  
15 Coniferous and deciduous seedlings native to Ontario are planted on the landowner's property if  
16 requested, and maintained up to a period of five years or until the trees reach a free-to-grow status  
17 defined by a height of one metre and free of adjacent brush competition. Replanting must be done in  
18 accordance with Union's policies regarding tree planting so that the easement is left open for access to  
19 the pipeline and aerial patrol.  
20

21 All necessary permits, approvals and authorizations will be obtained. Union expects to receive all  
22 approvals prior to construction.

- 1 Union will provide inspection staff to ensure that contractual obligations between Union and the
- 2 Contractor, Provincial Ministries, Municipal governments and landowners are complied with.

2017 PANHANDLE REINFORCEMENT - PROJECT SCHEDULE

Phase	2015			2016												2017											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Environmental																											
EA Report																											
Environmental Field Studies																											
Environmental Permitting																											
Land Access & Land Rights																											
Access to Lands																											
Land Rights Negotiation																											
Engineering & Construction																											
Preliminary Design																											
Detailed Design																											
Long Lead Material Ordered																											
Construction & Commissioning																											
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

## **GENERAL TECHNIQUES AND METHODS OF CONSTRUCTION**

1. Pipeline construction is divided into several crews that create a mobile assembly line. Each crew performs a different function, with a finished product left behind when the last crew has completed its work.
2. Union Gas will provide its own inspection staff to ensure the contractor meets its contractual obligations.
3. Surveyors stake and delineate all permanent and temporary easement limits. The stakes are replaced as needed throughout the construction season to ensure all construction activity remains within the easement limits.
4. Where possible, trees are cleared in the winter before construction to avoid avian nesting concerns. If the land cannot be accessed in the winter an ornithologist will inspect the site and direct any avian mitigation needed. Logs are stacked at the side of the easement for landowner use, if requested.
5. At the start of construction, all utilities that will be crossed or paralleled closely by the pipeline will be located.
6. The contractor's clearing crew braces and cuts all fences crossing the easement and installs any required temporary gates. This crew clears small brush and crops on the easement and temporary working areas.
7. The access crew constructs approaches through road, highway, and railway ditches to allow equipment onto the working side of the easement. This crew also builds roads through wet areas to allow heavy equipment operation. The grading crew strips a certain width of topsoil with bulldozers and graders so that it will not be mixed with the subsoil later removed from the trench. In hilly terrain, the grade is levelled to provide a stable working surface.
8. The contractor erects safety barricades around excavations adjacent to roads. Flagmen and signs are used for traffic control. The easement is fenced nightly at all access points.
9. Union's Operation's Group isolates the existing NPS 16 Panhandle pipeline and purges all gas from the section to be removed. It is then clearly staked and located in the field. The existing

trench is then excavated exposing the existing pipeline. The spoil material is placed onto the easement, adjacent to the trench, and separate from the topsoil. The existing NPS 16 pipeline is removed from the trench, cut into sections and trucked off site. The trench is then backfilled.

10. The existing pipe (NPS 16) that cannot be removed within road allowance, at main watercourse crossings and in environmentally sensitive areas can be abandoned in place. The abandoned sections are capped and filled with grout, a low density concrete.
11. The Surveyor then establishes the location where the proposed pipeline is to be installed and stakes the running line at the specified distance from the edge of the easement. The distance from the start of the pipeline (or other suitable point) is marked on the stakes.
12. The stringing crew then lays the joints of pipe on wooden skids on the working side of the easement adjacent to the proposed trench area. Wherever possible, the stringing trucks hauling the pipe travel down the centre of the proposed trench to minimize compaction effects.
13. If required, the bending crew bends introduces bends into the pipeline joints to ensure it follows the topography of the landscape and lays flat at the bottom of the trench to be excavated. Side bends may also be introduced for slight changes in direction.
14. The contractor, by use of a trenching machine or hoe excavator, will excavate a trench approximately 1.5 metre (bottom) and 2.4 meter (top) in width for the pipeline, depending on ground conditions at the time. Accesses across the easement including laneways are left unexcavated where requested by the landowner. All tile cut during trench excavation is flagged at the trench and easement limits to signify to the tile repair crew that a repair is required. All tile is measured and recorded as to size, location, depth, type and quality. This information is kept on file with the Company. If a repair is necessary in the future, the Company has an accurate method of locating the tile.
15. Bedrock will be removed by mechanical means such as a “hoe ram” where practical. Where rock is encountered that is too hard to mechanically excavate, blasting will be conducted in accordance with Union’s construction procedures and the *Canadian Explosives Act*. The contractor will obtain all necessary permits and comply with all legal requirements in

connection with the use, storage and transportation of explosives. All blasts will be matted and vibrations will be monitored to ensure there is no damage to adjacent pipelines, utilities and dwellings. No bedrock is anticipated on this project.

16. Concurrent to trenching, the contractor may utilize a Trenchless Method to install the pipe at road, stream/ditch and railway crossings. These methods may include auger boring or horizontal directional drilling.

Boring operation involves a large excavation on both sides of the proposed crossing to allow room for the boring equipment to be operated and the pipe to be installed at the proper elevation. Augers placed in a bore pipe are used to bore beneath the proposed crossing thereby not disrupting the surface features at the crossing site. When the bore pipe exits on the far side of the crossing, the augers are removed, the carrier pipe is attached to the bore pipe, and the bore pipe is pulled back, drawing the carrier pipe into place.

Directional drilling method involves setting up a receiving hole and an exit hole, drilling a pilot hole on the design path, reaming the pilot hole larger by passing a cutting tool and pulling the carrier pipe back through the bore hole.

17. Next, the pipe between roads, accesses, laneways, and streams is welded into one continuous length. All welds are ultrasonically and/or radiographically inspected and then coated and lowered into the trench. After sections of pipe are lowered into the trench, subsoil is backfilled by a drag line, bulldozer or backhoe. If the excavated material contains too much rock for direct backfilling, it may be sifted to separate the fine parts from the rock. If such separation is not possible due to the consistency of the material or if a large quantity of rock remains, the unsuitable materials will be hauled away and sand brought in for backfilling.
18. The tie-in crew is responsible for the installation of pipe across accesses and laneways to minimize the length of time that these accesses are out of service to the landowner. The tie-in crew is also responsible for the pipeline installation at most river and stream crossings. It is also responsible for tying in the bore and horizontally drilled sections of pipe to the trenched in sections of pipe.

19. The pipe is filled with water and hydrostatically tested to prove its integrity. After the test water is removed and the line dried, an electronic sizing tool is run through the pipeline to check for ovality and dents. Cathodic protection is applied to the completed pipeline.
20. After the trench is backfilled, any cut cross-easement tile is repaired. Unless otherwise specified by the landowner or municipality, tile repairs are made by excavating back into the bank along the tile run a minimum distance of 1.2 metres and placing clear stone as a foundation for a high density or perforated steel drainage pipe. The new drainage pipe is cut to the appropriate length and installed between the two exposed tile ends. Prior to actual setting of the support pipe, the existing tile run is checked to ensure that it is clear and undamaged within the limits of the easement. If it is not, further tile is excavated and the damaged tile is replaced to the edge of the easement. The area is then backfilled to the degree necessary to hold the tile and secure the support pipe. The landowner or municipal representative is asked to inspect each tile repair prior to backfill completion. Union undertakes that it is responsible for the tile repair resulting from construction and will stand good for the tile repairs at any further date after construction of the pipeline. Union retains the services of a tile consultant to determine if it is better to repair individual tiles crossing the easement or install a header system. Where a header system is used, additional tiles running parallel to the pipeline on the easement are installed during final clean-up activities.
21. The clean-up crew is the last crew on the property. Excess subsoil displaced by the new NPS 36 pipeline will be used to bring the easement up to the proper and original grade. On farmland, it prepares the subsoil on the stripped portion of the easement by subsoiling or deep chisel ploughing to break up compaction and picking all stones down to 100 millimetres in diameter. The trench line is crowned with enough subsoil to allow for trench settlement. Excess subsoil is removed to an acceptable location on the landowner's property or hauled to a disposal site. Topsoil is then replaced using a drag line or backhoe and small bulldozers to minimize compaction. The working side of the easement is then chisel ploughed and stone picked. The entire easement may be cultivated and stone picked again if requested by the landowner. The clean-up crew will also repair fences, pick up debris, replace sod in landscaped areas and reseed sensitive areas such as woodlots, ditch banks and stream crossings.



22. Clean up will be completed during the year of construction. Union will return the year after construction to repair deficiencies and address any outstanding concerns from the landowner.
23. When the clean-up is completed, the landowner is asked by a Company representative to sign Union's standard Release Agreement if satisfied with the clean-up. This Agreement, when signed, allows release of payment for the clean-up to the contractor. This Agreement in no way releases the Company from its obligation for tile repairs, compensation for damages and/or further clean-up as required due to erosion or subsidence directly related to pipeline construction.



## **PIPELINE ABANDONMENT CHECKLIST**

### **PLANNING**

1. Has subsidence been considered for pipelines having a diameter greater than 323.9 mm (12 inches)?
2. Has the pipeline company notified the landowners and proper authorities (municipalities, MOE, MTO, MNR, etc.) of the abandonment?
3. Have abandonment procedures for crossings been agreed upon by utilities (road, railway, pipelines, etc.) and authorities responsible for rivers and streams crossed by the pipeline?
4. Has consideration been given to the effect of drainage in the area surrounding the abandoned pipeline, which may act as a conduit for ground water after the pipe is perforated by corrosion?
5. Has consideration been given to the removal of all the aboveground facilities?
6. Has consideration been given to any hazards posed to people, equipment, wildlife or livestock by any apparatus left in place above or underground?

### **IMPLEMENTATION**

1. Has the abandoned pipeline been physically isolated from the live pipeline?
2. Has the pipeline been drained of all fluids and adequately cleaned to prevent ground water contamination from hydrocarbon residue on the pipe wall after the pipe is perforated by corrosion?
3. Have all aboveground facilities been removed and has consideration been given to removing underground facilities such as anode beds and tanks?

### **LIABILITY/RISK MANAGEMENT**

1. Does the pipeline company have a contingency plan to remedy any contamination caused by the abandoned pipeline?
2. Has consideration been given to conducting post-abandonment surveillance programs?
3. Has consideration been given to maintaining signage after the pipeline is abandoned?
4. Has consideration been given to providing a locate service after the pipeline is abandoned?

- f) the class location of the pipeline; and
- g) the means of supporting the piping.

### 10.14.3.2

All phases of the hot-tap operation, other than the welding specified in Clause 10.14.3.1, may be completed at pipeline system operating pressures, provided that the maximum working pressure of the hot-tap equipment involved is not exceeded.

**Note:** *It is not necessary to pressure test a hot-tap fitting after installation; however, if pressure testing is performed, damage to the run pipe caused by the external pressure exceeding the internal pressure should be avoided.*

## 10.15 Deactivation and reactivation of piping

### 10.15.1 Deactivation of piping

#### 10.15.1.1

Operating companies deactivating piping shall

- a) isolate the piping, using blind flanges, weld caps, or blanking plates suitable for the pressure from which the deactivated piping is being isolated;
- b) where required, provide a pressure-relief system; and
- c) fill the piping with a suitable medium, having regard for the intended duration of the deactivation, the effects of the medium on the integrity of the piping, and the potential consequences of a leak.

#### 10.15.1.2

For deactivated piping, operating companies shall

- a) maintain external and internal corrosion control as specified in Clause 9;
- b) where considered appropriate, perform other maintenance activities as specified in Clause 10;
- c) maintain records as specified in Clauses 9.11 and 10.4; and
- d) for piping that is deactivated for more than 18 months, annually confirm the suitability of the deactivation methods used, the corrosion control, and other maintenance activities.

### 10.15.2 Reactivation of piping

#### 10.15.2.1

Prior to reactivating piping, the operating company shall conduct an engineering assessment (see Clause 10.1.1) to determine whether the piping would be suitable for its intended service.

#### 10.15.2.2

Where the engineering assessment indicates that the piping would not be suitable for its intended service, the operating company shall implement measures necessary to make it suitable before reactivating the piping.

## Δ 10.16 Abandonment of pipelines and pipe-type storage vessels

### 10.16.1 General

The decision to abandon a section of a pipeline, whether in place or through removal, shall be made on the basis of a documented abandonment plan that includes the rationale for the abandonment, landowner consultation, effect on terrain and water, road and railway crossings, as well as current and

potential land use. The plan shall consider the potential for safety hazards and environmental damage that could be created by ground subsidence, soil admixing or contamination, groundwater contamination, erosion, and the creation of water conduits.

**Note:** *The NEB Pipeline Abandonment: A Discussion Paper on Technical and Environmental Issues, National Energy Board, Section 2 provides guidance.*

### 10.16.2 Buried pipelines

A buried pipeline that is abandoned in place shall be

- a) emptied of service fluids;
- b) purged or appropriately cleaned or both in a manner that leaves no mobile materials remaining in the pipeline;
- c) physically separated from any in-service piping;
- d) capped, plugged, or otherwise effectively sealed;
- e) cut off at pipeline depth; and
- f) left unpressurized.

**Note:** *Pipelines containing liners or constructed of polymeric pipe might require repeat purging and maintenance to accommodate out gassing of hydrocarbon or H<sub>2</sub>S. See Clause 13.2.8.6.*

### 10.16.3 Removal of related surface equipment

A buried pipeline that has been abandoned in place shall have all related surface equipment removed to pipeline depth, except where surface equipment is within an existing surface facility that is in continuing operation or deactivated. Pipeline signage may be left in place where deemed appropriate.

**Note:** *Examples of such equipment are pipeline risers, liner vent piping, casing vents, underground valve vaults or valve extenders, inspection bell holes, and cathodic protection rectifiers, test posts, or anode wiring.*

### 10.16.4 Aboveground pipelines

Abandoned aboveground pipelines and all related surface equipment shall be removed except where they are part of or within an existing surface facility that is in continuing operation or deactivated.

### 10.16.5 Records



There is a commentary available for this Clause.

Records shall be created and maintained for all of the work conducted to meet the requirements of Clauses 10.16.1 to 10.16.3. Additional records for pipelines that are abandoned in place shall include lengths, diameter, material type (e.g., metallic or non-metallic), spatial characteristics, and where practical, burial depth.

## Δ 10.17 Abandonment of pipeline related facilities

### 10.17.1 General

Pipeline related facilities such as compressors and pump stations shall have all rotating and fixed equipment removed, unless they are still part of an operating or deactivated site. Associated piping, utilities, supports, and foundations shall also be removed.

**Note:** *Testing for site soil contamination and appropriate remediation might be required.*





**ENVIRONMENTAL MATTERS**

An Environmental Report (“ER”) for the Project was completed in 2016 by Stantec Consulting Limited. The ER was prepared to identify potential impacts and related mitigation measures for construction of the proposed NPS 36 pipeline and the removal of the existing NPS 16 pipeline. The proposed “lift and lay” construction process (as outlined in Exhibit A, Tab 9) uses the existing easement and avoids the need for additional permanent easement lands. Specifically, the existing NPS 16 pipeline will be removed (lift) and the new NPS 36 pipeline will be installed in the same easement as that used for the NPS 16 (lay). The new NPS 36 pipeline will parallel the existing NPS 20 pipeline. The ER is included in Exhibit A, Tab 10, Schedule 1.

The ER was forwarded for review to the Ontario Pipeline Coordination Committee (“OPCC”) on June 6, 2016. Copies of the ER were also sent to all affected municipalities, conservation authorities and various First Nations and the Métis Nation of Ontario. The OPCC comments received to date can be found at Exhibit A, Tab 10, Schedule 2.

To inform the public and solicit input from landowners, tenants and the general public with respect to the Project public Information Sessions were held as follows:

- Wednesday February 3, 2016  
5:00 p.m. to 8:00 p.m.  
Dover Kinsmen Club  
7106 Saint-Philippe Line  
Grande Pointe, ON
- Thursday February 4, 2016  
5:00 p.m. to 8:00 p.m.

Lambton-Kent Memorial Agricultural Centre  
1212 North Street  
Dresden, ON

The purpose of the Information Sessions was to provide an opportunity for the public to view information boards about the Project and ask questions and comment on Project specifics, environmental and agricultural land use mitigation measures and the overall Project planning process. Notification of the Information Sessions was completed through newspaper notices and letters.

The ER identifies various mitigation measures to minimize the impacts to the environment as a result of the Proposed Pipeline. Union believes that by following its standard construction practices and adhering to the recommendations and mitigation identified in the ER that the construction and operation of the Proposed Pipeline will have negligible impacts on the environment. The cumulative effects assessment completed as part of the ER indicates that no significant cumulative effects are anticipated from the development of the Proposed Pipeline.

Union will comply with all mitigation measures recommended in the ER.

The estimated environmental protection costs associated with the Project can be found in Exhibit A, Tab 10, Schedule 3.

Union will obtain all necessary environmental permits and approvals prior to construction.

The following provides information on some of the more pertinent aspects of the ER:

1    ***Species at Risk***

2    A number of species at risk are known to or potentially inhabit lands and watercourses along the  
3    pipeline route. Union's consultants have and will continue to assess the pipeline route for species at  
4    risk and will work closely with the Fisheries and Oceans Canada and the Ministry of Natural Resources  
5    and Forestry to develop appropriate mitigation measure to protect species at risk and obtain all required  
6    permits and approvals.

7  
8    ***Agricultural Lands***

9    Measures to be implemented by Union to minimize impacts to soil and agricultural land along the  
10   pipeline route will include:

- 11       •     Union's wet soil shut down practice
- 12       •     Topsoil stripping
- 13       •     Maintaining proper separation between subsoil and topsoil
- 14       •     A pre tiling program to maintain and redirect drainage tile around the easement prior to the  
15           initiation of construction on tiled agricultural lands
- 16       •     Flagging and repairing broken tiles
- 17       •     Retaining a qualified soils expert/inspector
- 18       •     Union's post construction cover crop program

19  
20   ***Soy Bean Cyst Nematode ("SCN")***

21   Union will sample agricultural soils along the pipeline route and any soils imported to the easement  
22   lands for the presence of SCN. Sampling is proposed to take place in summer/fall 2016. In the event



1 that sampling indicates the presence of SCN, Union's SCN management practices will be implemented  
2 on any impacted lands.  
3

#### 4 ***Archaeology***

5 An archaeological assessment will be completed by a licensed archeological firm along the pipeline  
6 route, as recommended in the ER. Union proposes to complete the majority of the archaeological  
7 assessment during the 2016 field season with some remaining assessments to be complete spring 2017.  
8

#### 9 ***Watercourse / Municipal Drain Crossings***

10 The pipeline route crosses a number of watercourses and municipal drains as noted in the ER. All  
11 permits required to complete the crossings will be obtained from Fisheries and Oceans Canada,  
12 Ministry of Natural Resources and Forestry, Lower Thames Valley Conservation Authority, St. Clair  
13 River Conservation Authority and relevant Municipalities prior to construction.  
14

#### 15 ***Ground Water***

16 Union will retain a qualified hydrogeologist to review the existing groundwater conditions along the  
17 pipeline route and inventory the existing wells. The hydrogeologist will then develop and implement a  
18 program for monitoring all wells that could be affected by construction. Union will also follow the  
19 recommendations pertaining to ground water as outlined in the ER and environmental permits.

**Summary of Comments**

**TO BE FILED WHEN RECEIVED**

**TOTAL ESTIMATED ENVIRONMENTAL COSTS**  
**2017 Panhandle Reinforcement Pipeline Project**

**Pre-Construction**

Environmental Assessment	\$	440,000	
Archaeology	\$	705,000	
Aquatic and Terrestrial Surveys	\$	280,000	
Permits	\$	410,000	
Other	\$	150,000	
<b>Total Pre-Construction</b>			<b>\$ 1,985,000</b>

**Construction**

Water Mointoring & Support	\$	335,000	
Agricultural Inspection	\$	286,000	
Environmental Inspection	\$	127,000	
<b>Total Construction</b>			<b>\$ 748,000</b>

**Post Construction**

Environmental Inspection & Monitoring	\$	100,000	
<b>Total Post Construction</b>			<b>\$ 100,000</b>

<b>Total Estimated Environmental Costs</b>	<b>\$</b>	<b><u>2,833,000</u></b>	
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**LAND MATTERS**

***Land Rights for Pipeline Project***

The Project involves the construction of approximately 40 kilometres of new NPS 36 pipeline, however unlike previous pipeline projects; Union is not proposing to acquire a 40-kilometre easement. This Project involves the removal of approximately 40 kilometres of NPS 16 pipeline and replacing it with new NPS 36 pipeline within existing easements. Approximately 39 kilometres of the new NPS 36 pipeline will be constructed within Union's existing easements along the pipeline route. Union will be required to obtain approximately 1 kilometre of new easement for those portions of the Proposed Pipeline which cannot be constructed within Union's existing easement. This construction technique has been received favorably by landowners.

As stated at Exhibit A, Tab 9, Union is proposing to remove the existing NPS 16 pipeline and replace it with a new NPS 36 pipeline within the boundaries of its current easement. The current easement for the NPS 16 pipeline does not restrict the diameter of the pipeline which can be constructed. Union will not be required to obtain a new easement for the construction of the majority of the new NPS 36 pipeline.

As stated in Exhibit A, Tab 9, there will be locations along the Proposed Pipeline where it will not be practical for Union to remove the NPS 16 pipeline so the existing NPS 16 pipeline will be abandoned in place. Such locations are major road and watercourse crossings. At these locations, Union will be approaching landowners for a new easement for the construction of portions of the NPS 36 pipeline.

1 A map showing the Proposed Pipeline location is provided at Exhibit A, Tab 11, Schedule 1.

2 In order to remove the existing NPS 16 pipeline and construct the new NPS 36 pipeline, in addition to  
3 any existing or new permanent easements, Union will also require approximately 309 acres of  
4 Temporary Land Use (“TLU”) area for construction and top soil storage purposes.

5  
6 ***Negotiation of Land Rights***

7 Union has begun meeting with the landowners from whom either permanent easements or TLU rights  
8 are required and will continue to meet with them to acquire the necessary lands.

9  
10 ***Proposed Pipeline Easement Requirements - Form of Easement and TLU***

11 A list of the properties and the approximate dimensions of permanent easements and temporary  
12 easements required for the Proposed Pipeline is outlined in Exhibit A, Tab 11, Schedule 2.

13  
14 For those landowners from whom a new permanent easement will be required for the Proposed  
15 Pipeline, Union’s Form of Easement is attached at Exhibit A, Tab 11, Schedule 3. This agreement  
16 covers the installation, operation, and maintenance of one pipeline. This form of easement has been  
17 amended from the form of easement previously approved by the Board in EB-2014-0261 to include the  
18 amendments to CSA Z662-15 with respect to the prohibition of storage of flammable material, solid or  
19 liquid spoil, refuse waste or effluent on the easement.

1 The TLU agreements are in the form used by Union in the past on similar pipeline projects. These  
2 agreements are usually for a period of two years, beginning in the year of construction. This allows  
3 Union an opportunity to return in the year following construction to perform further clean-up work as  
4 required.

5  
6 ***Landowner Issues***

7 Union implemented a consultation outreach plan to provide landowners, tenants and other interested  
8 parties with information regarding the Proposed Pipeline. Information regarding the Project was  
9 previously distributed through correspondence and meetings with the public. Where formal public  
10 meetings were held, in conjunction with the Environmental Report (Exhibit A, Tab 10, Schedule 1),  
11 directly-affected landowners and agencies were invited by letter while notification to the general public  
12 was made through newspaper advertisements.

13  
14 ***Proposed Stations***

15 In addition to requiring additional easements and TLU for the Project, Union will be modifying the  
16 Dover Transmission Station and the Dover Centre Valve Site. These site modifications will require  
17 that the boundaries of these two stations be expanded by approximately one-fifth of an acre at each.  
18 Union will be approaching the landowners at these two sites to purchase the additional land  
19 requirements for the station expansion.

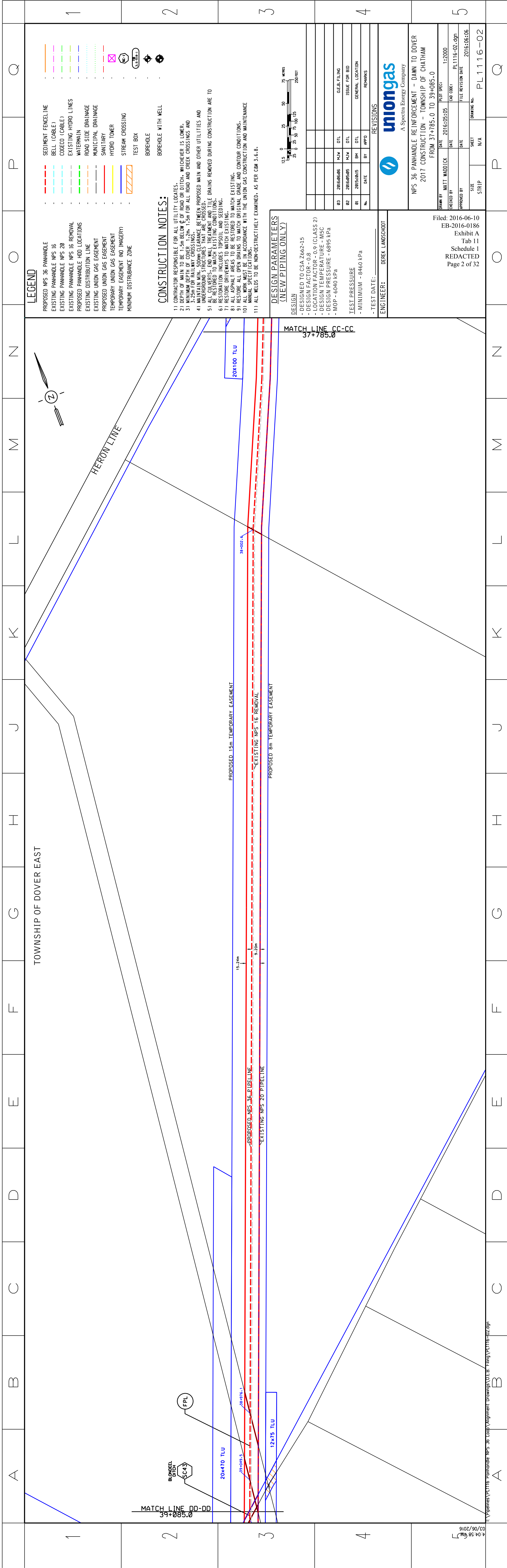
1    ***Construction Monitoring and Commitment Follow-up for Proposed Pipeline***

2    Union has in place a comprehensive Landowner Relations Program which has proven successful on  
3    other projects. The key elements of this program include a Complaint Tracking System and the  
4    assignment of a Landowner Relations Agent (“LRA”) whose mandate is to ensure that commitments  
5    made to landowners are fulfilled, address questions and concerns of the landowners, and serve as a  
6    liaison between landowners, the contractor and Union’s engineering personnel. Union’s Complaint  
7    Resolution System will be used to record, monitor, and ensure follow-up on any complaint or issue  
8    received by Union related to the construction. This process assists in resolving complaints and tracking  
9    the fulfillment of commitments. A process chart and explanatory notes that describe the Complaint  
10   Resolution System are found in Exhibit A, Tab 11, Schedule 4. In addition to the LRA’s duties during  
11   construction, the person assigned to this position will conduct post-construction interviews to capture  
12   any outstanding concerns, including damages, so that they can be resolved; and capture comment so  
13   that they may be considered in the planning of future projects.

14  
15   When clean-up is completed, the landowner will be asked by a Union representative to sign a Clean-up  
16   Acknowledgement Form if satisfied with the clean-up. This form, when signed, releases the contractor  
17   allowing payment for the clean-up on the property. This form in no way releases Union from its  
18   obligation for tile repairs, compensation for damages and/or further clean-up as required due to erosion  
19   or subsidence directly related to pipeline construction.







LEGEND

- PROPOSED NPS 36 PANHANDLE
- EXISTING PANHANDLE NPS 16
- EXISTING PANHANDLE NPS 20
- EXISTING PANHANDLE NPS 16 REMOVAL
- PROPOSED PANHANDLE HDD LOCATIONS
- EXISTING DISTRIBUTION LINE
- EXISTING UNION GAS EASEMENT
- PROPOSED UNION GAS EASEMENT
- TEMPORARY UNION GAS EASEMENT
- TEMPORARY EASEMENT (NO IMAGERY)
- MINIMUM DISTURBANCE ZONE
- SEDIMENT FENCELINE
- BELL (CABLE)
- COGECO (CABLE)
- EXISTING HYDRO LINES
- WATERMAIN
- ROAD SIDE DRAINAGE
- MUNICIPAL DRAINAGE
- SANITARY
- HYDRO TOWER
- STREAM CROSSING
- TEST BOX
- BOREHOLE
- BOREHOLE WITH WELL

CONSTRUCTION NOTES:

- 1) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES.
- 2) DEPTH OF MAIN TO BE 1.5m BELOW  $\phi$  OF ROAD OR DITCH, WHICHEVER IS LOWER.
- 3) MINIMUM DEPTH OF COVER 1.2m, 1.5m FOR ALL ROAD AND CREEK CROSSINGS AND 3.25m FOR RAILWAY CROSSINGS.
- 4) MAINTAIN MIN. 500mm CLEARANCE BETWEEN PROPOSED MAIN AND OTHER UTILITIES AND UNDERGROUND STRUCTURES THAT ARE CROSSED.
- 5) ALL CULVERTS, END WALL TREATMENT AND TILE DRAINS REMOVED DURING CONSTRUCTION ARE TO BE RESTORED TO MATCH EXISTING CONDITIONS.
- 6) RESTORATION INCLUDES TOPSOIL AND SEEDING.
- 7) RESTORE DRIVEWAYS TO MATCH EXISTING.
- 8) ALL ASPHALT AREAS TO BE RESTORED TO MATCH EXISTING.
- 9) RESTORE ALL OPEN DRAINS TO MATCH ORIGINAL GRADE AND CONTOUR CONDITIONS.
- 10) ALL WORK MUST BE IN ACCORDANCE WITH THE UNION GAS CONSTRUCTION AND MAINTENANCE MANUAL SPECIFICATIONS.
- 11) ALL WELDS TO BE NON-DESTRUCTIVELY EXAMINED, AS PER C&M 3.6.8.

DESIGN PARAMETERS  
(NEW PIPING ONLY)

- DESIGN
- DESIGNED TO CSA Z662-15
  - DESIGN FACTOR - 0.8
  - LOCATION FACTOR - 0.9 (CLASS 2)
  - DESIGN TEMPERATURE - WSC
  - DESIGN PRESSURE - 6895 kPa
  - MOP - 6040 kPa
- TEST PRESSURE
- MINIMUM - 8460 kPa
- TEST DATE: \_\_\_\_\_

ENGINEER: DEREK LANDSCHOOT

uniongas

A Spectra Energy Company

NPS 36 PANHANDLE REINFORCEMENT - DAWN TO DOVER

2017 CONSTRUCTION - TOWNSHIP OF CHATHAM

FROM 37+785.0 TO 39+085.0

Drawn By: MATT WADDICK

Checked By: \_\_\_\_\_

Approved By: \_\_\_\_\_

Plot Spec: 1:2000

CAD Code: PL1116-02.dgn

File Revision Date: 2016:06:10

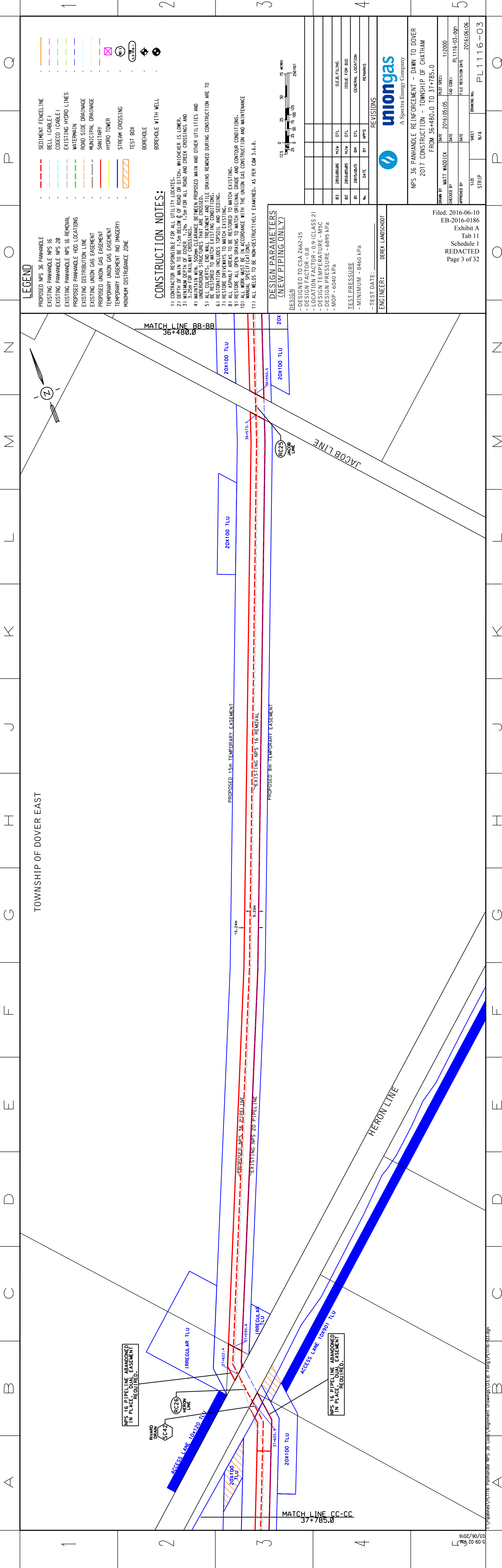
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Sheet: N/A

Drawn No: PL1116-02



TOWNSHIP OF DOVER EAST

LEGEND

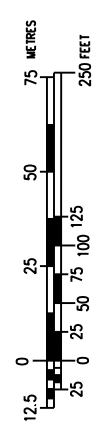
- PROPOSED NPS 36 PANHANDLE
- EXISTING PANHANDLE NPS 16
- EXISTING PANHANDLE NPS 20
- EXISTING PANHANDLE NPS 16 REMOVAL
- PROPOSED PANHANDLE HDD LOCATIONS
- EXISTING DISTRIBUTION LINE
- EXISTING UNION GAS EASEMENT
- PROPOSED UNION GAS EASEMENT
- TEMPORARY UNION GAS EASEMENT
- TEMPORARY EASEMENT (NO IMAGERY)
- MINIMUM DISTURBANCE ZONE
- SEDIMENT FENCELINE
- BELL (CABLE)
- COGECO (CABLE)
- EXISTING HYDRO LINES
- WATERMAIN
- ROAD SIDE DRAINAGE
- MUNICIPAL DRAINAGE
- SANITARY
- HYDRO TOWER
- STREAM CROSSING
- TEST BOX
- BOREHOLE
- BOREHOLE WITH WELL

CONSTRUCTION NOTES:

- 1) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES.
- 2) DEPTH OF MAIN TO BE 1.5m BELOW Q OF ROAD OR DITCH, WHICHEVER IS LOWER.
- 3) MINIMUM DEPTH OF COVER 1.2m, 1.5m FOR ALL ROAD AND CREEK CROSSINGS AND 3.25m FOR RAILWAY CROSSINGS.
- 4) MAINTAIN MIN. 500mm CLEARANCE BETWEEN PROPOSED MAIN AND OTHER UTILITIES AND UNDERGROUND STRUCTURES THAT ARE CROSSED.
- 5) ALL CULVERTS, END WALL TREATMENT AND TILE DRAINS REMOVED DURING CONSTRUCTION ARE TO BE RESTORED TO MATCH EXISTING CONDITIONS.
- 6) RESTORATION INCLUDES TOPSOIL AND SEEDING.
- 7) RESTORE DRIVEWAYS TO MATCH EXISTING.
- 8) ALL ASPHALT AREAS TO BE RESTORED TO MATCH EXISTING.
- 9) RESTORE ALL OPEN DRAINS TO MATCH ORIGINAL GRADE AND CONTOUR CONDITIONS.
- 10) ALL WORK MUST BE IN ACCORDANCE WITH THE UNION GAS CONSTRUCTION AND MAINTENANCE MANUAL SPECIFICATIONS.
- 11) ALL WELDS TO BE NON-DESTRUCTIVELY EXAMINED, AS PER C&M 3.6.8.

DESIGN PARAMETERS  
(NEW PIPING ONLY)

- DESIGN
- DESIGNED TO CSA Z662-15
  - DESIGN FACTOR - 0.8
  - LOCATION FACTOR - 0.9 (CLASS 2)
  - DESIGN TEMPERATURE - WSC
  - DESIGN PRESSURE - 6895 kPa
  - MOP - 6040 kPa
- TEST PRESSURE
- MINIMUM - 8460 kPa
- TEST DATE: \_\_\_\_\_



ENGINEER: DEREK LANDSCHOOT

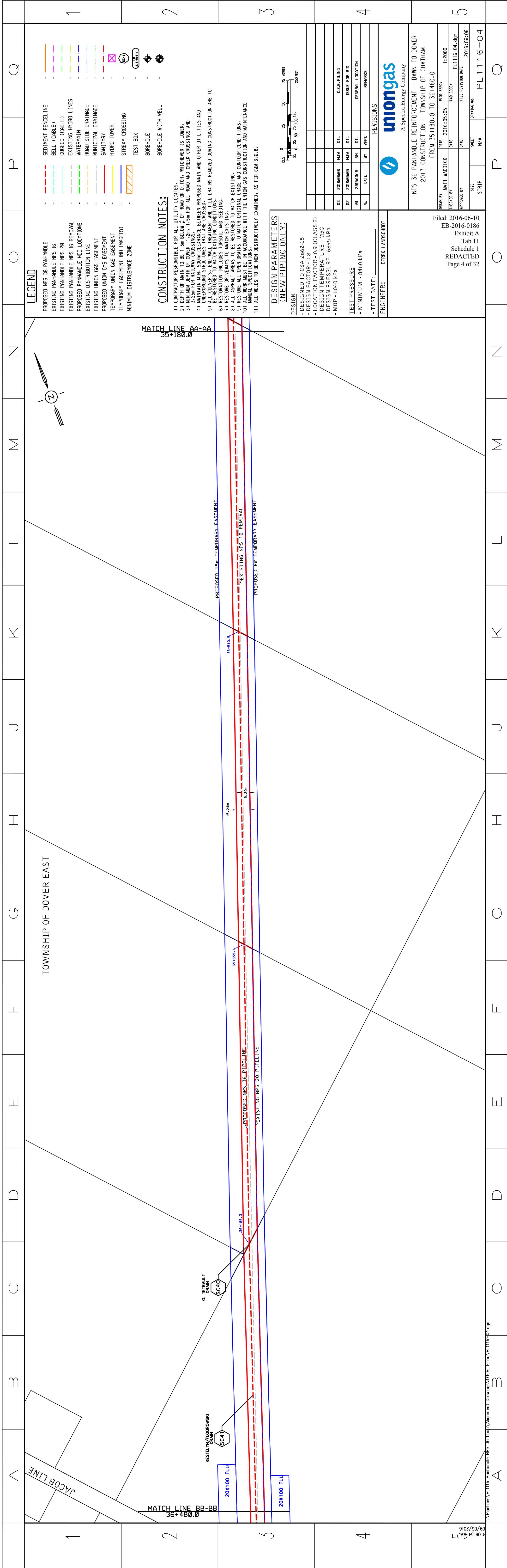


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NPS 36 PANHANDLE REINFORCEMENT - DAWN TO DOVER  
2017 CONSTRUCTION - TOWNSHIP OF CHATHAM  
FROM 36+480.0 TO 37+785.0

Filed: 2016-06-10  
EB-2016-0186  
Exhibit A  
Tab 11  
Schedule 1  
REDACTED  
Page 3 of 32

DRAWN BY	MATT WADDICK	DATE	2016:05:05	PLOT SPEC	1:2000
CHECKED BY		DATE		CAD CODE	PL1116-03.dgn
APPROVED BY		DATE		FILE REVISION DATE	2016:06:06
SIZE	STRIP	SHEET	N/A	DRAWING No.	



LEGEND

- PROPOSED NPS 36 PANHANDLE

- EXISTING PANHANDLE NPS 16

- EXISTING PANHANDLE NPS 20

- EXISTING PANHANDLE NPS 16 REMOVAL

- PROPOSED PANHANDLE HDD LOCATIONS

- EXISTING DISTRIBUTION LINE

- EXISTING UNION GAS EASEMENT

- PROPOSED UNION GAS EASEMENT

- TEMPORARY UNION GAS EASEMENT

- TEMPORARY EASEMENT (NO IMAGERY)

- MINIMUM DISTURBANCE ZONE
- SEDIMENT FENCELINE

- BELL (CABLE)

- COGECO (CABLE)

- EXISTING HYDRO LINES

- WATERMAIN

- ROAD SIDE DRAINAGE

- MUNICIPAL DRAINAGE

- SANITARY

- HYDRO TOWER

- STREAM CROSSING

- TEST BOX

- BOREHOLE

- BOREHOLE WITH WELL

CONSTRUCTION NOTES:

- 1) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES.
- 2) DEPTH OF MAIN TO BE 1.5m BELOW Q OF ROAD OR DITCH, WHICHEVER IS LOWER.
- 3) MINIMUM DEPTH OF COVER 1.2m, 1.5m FOR ALL ROAD AND CREEK CROSSINGS AND 3.25m FOR RAILWAY CROSSINGS.
- 4) MAINTAIN MIN. 500mm CLEARANCE BETWEEN PROPOSED MAIN AND OTHER UTILITIES AND UNDERGROUND STRUCTURES THAT ARE CROSSED.
- 5) ALL CULVERTS, END WALL TREATMENT AND TILE DRAINS REMOVED DURING CONSTRUCTION ARE TO BE RESTORED TO MATCH EXISTING CONDITIONS.
- 6) RESTORATION INCLUDES TOPSOIL AND SEEDING.
- 7) RESTORE DRIVEWAYS TO MATCH EXISTING.
- 8) ALL ASPHALT AREAS TO BE RESTORED TO MATCH EXISTING.
- 9) RESTORE ALL OPEN DRAINS TO MATCH ORIGINAL GRADE AND CONTOUR CONDITIONS.
- 10) ALL WORK MUST BE IN ACCORDANCE WITH THE UNION GAS CONSTRUCTION AND MAINTENANCE MANUAL SPECIFICATIONS.
- 11) ALL WELDS TO BE NON-DESTRUCTIVELY EXAMINED, AS PER C&M 3.6.8.

DESIGN PARAMETERS  
(NEW PIPING ONLY)

- DESIGN
- DESIGNED TO CSA Z662-15
- DESIGN FACTOR - 0.8
- LOCATION FACTOR - 0.9 (CLASS 2)
- DESIGN TEMPERATURE - W5C
- DESIGN PRESSURE - 6895 kPa
- MOP - 6040 kPa
- TEST PRESSURE
- MINIMUM - 8460 kPa

- TEST DATE: \_\_\_\_\_

ENGINEER: DEREK LANDSCHOOT



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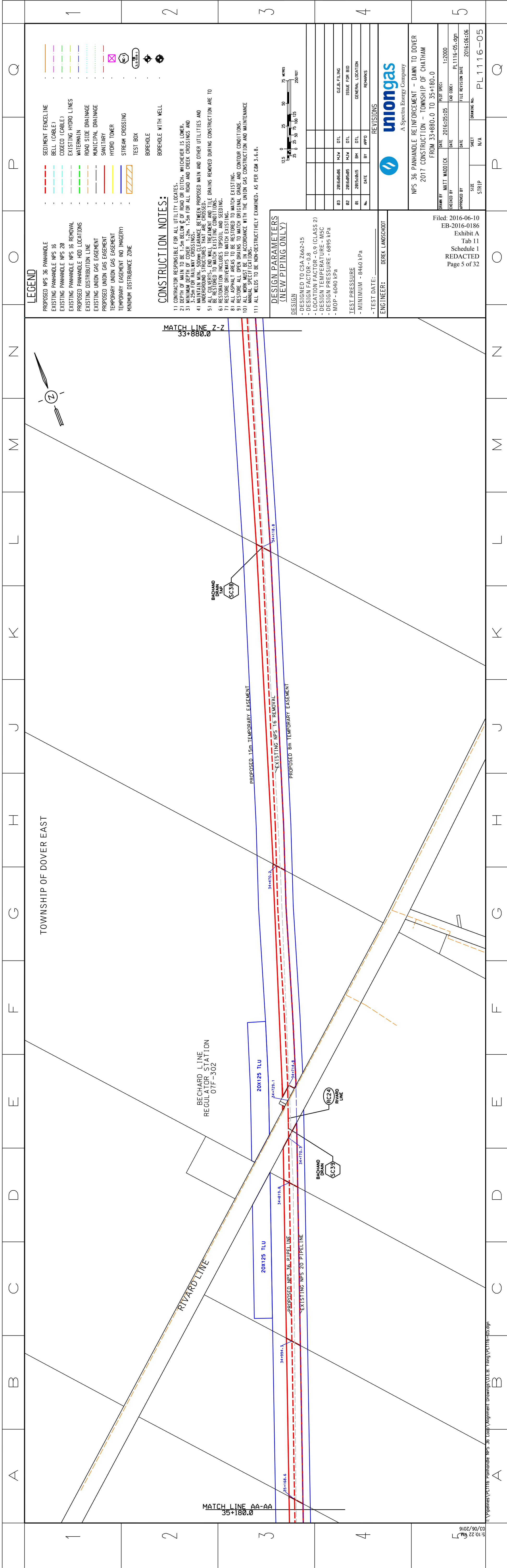
NPS 36 PANHANDLE REINFORCEMENT – DAWN TO DOVER  
2017 CONSTRUCTION – TOWNSHIP OF CHATHAM  
FROM 35+180.0 TO 36+480.0

Filed: 2016-06-10  
EB-2016-0186  
Exhibit A  
Tab 11  
Schedule 1  
REDACTED  
Page 4 of 32

DRAWN BY	MATT WADDICK	DATE	2016:05:05	PLOT SPEC	1:2000
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PL1116-04

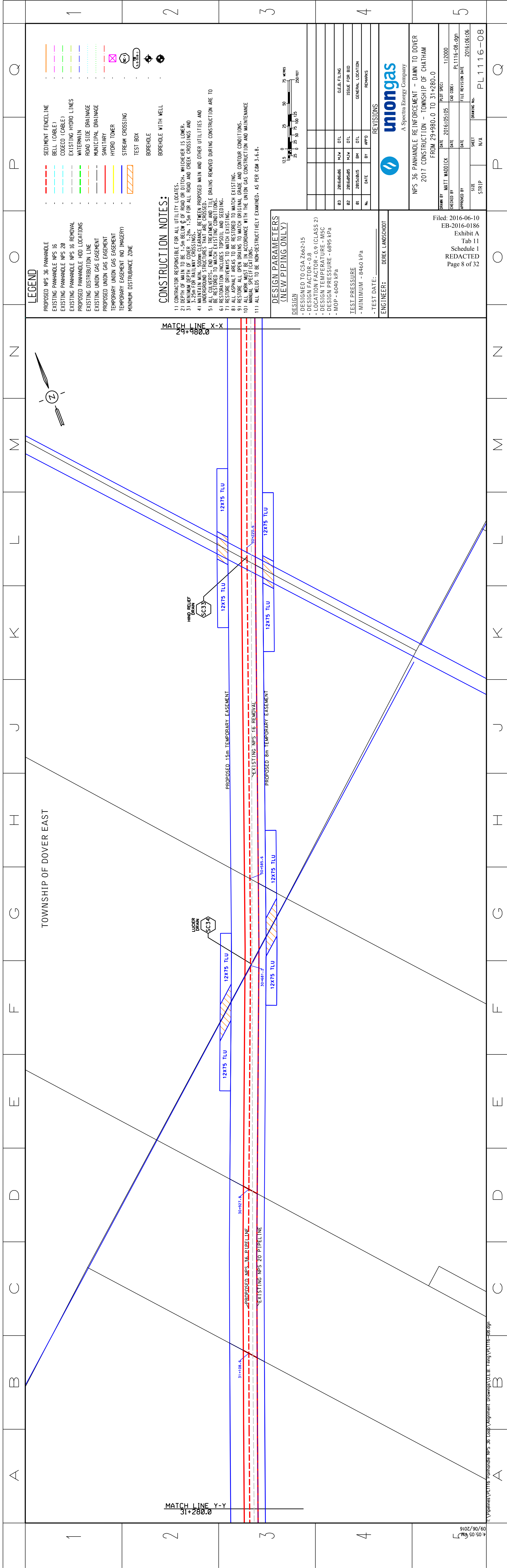






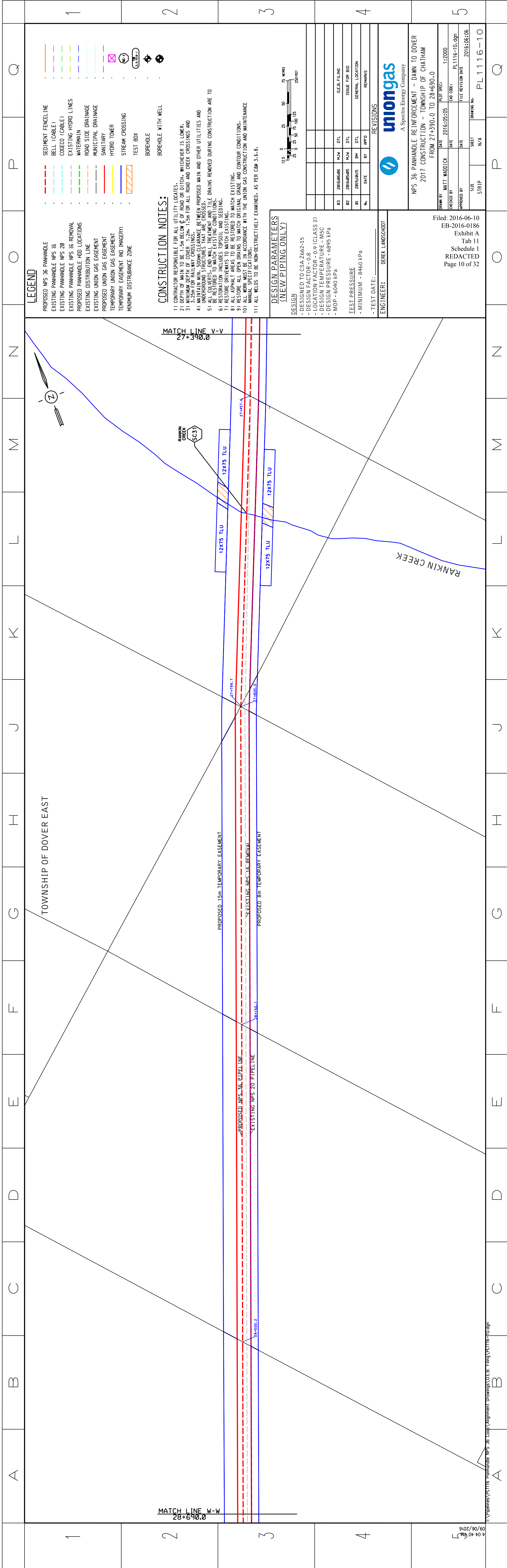












LEGEND

- PROPOSED NPS 36 PANHANDLE
- EXISTING PANHANDLE NPS 16
- EXISTING PANHANDLE NPS 20
- EXISTING PANHANDLE NPS 16 REMOVAL
- PROPOSED PANHANDLE HDD LOCATIONS
- EXISTING DISTRIBUTION LINE
- EXISTING UNION GAS EASEMENT
- PROPOSED UNION GAS EASEMENT
- TEMPORARY UNION GAS EASEMENT
- TEMPORARY EASEMENT (NO IMAGERY)
- MINIMUM DISTURBANCE ZONE
- SEDIMENT FENCELINE
- BELL (CABLE)
- COGECO (CABLE)
- EXISTING HYDRO LINES
- WATERMAIN
- ROAD SIDE DRAINAGE
- MUNICIPAL DRAINAGE
- SANITARY
- HYDRO TOWER
- STREAM CROSSING
- TEST BOX
- BOREHOLE
- BOREHOLE WITH WELL

-

18  
25.5 (8.1)

-

25.5 (8.1)

-

25.5 (8.1)

CONSTRUCTION NOTES:

- 1) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES.
- 2) DEPTH OF MAIN TO BE 1.5m BELOW  $\phi$  OF ROAD OR DITCH, WHICHEVER IS LOWER.
- 3) MINIMUM DEPTH OF COVER 1.2m, 1.5m FOR ALL ROAD AND CREEK CROSSINGS AND 3.25m FOR RAILWAY CROSSINGS.
- 4) MAINTAIN MIN. 500mm CLEARANCE BETWEEN PROPOSED MAIN AND OTHER UTILITIES AND UNDERGROUND STRUCTURES THAT ARE CROSSED.
- 5) ALL CULVERTS, END WALL TREATMENT AND TILE DRAINS REMOVED DURING CONSTRUCTION ARE TO BE RESTORED TO MATCH EXISTING CONDITIONS.
- 6) RESTORATION INCLUDES TOPSOIL AND SEEDING.
- 7) RESTORE DRIVEWAYS TO MATCH EXISTING.
- 8) ALL ASPHALT AREAS TO BE RESTORED TO MATCH EXISTING.
- 9) RESTORE ALL OPEN DRAINS TO MATCH ORIGINAL GRADE AND CONTOUR CONDITIONS.
- 10) ALL WORK MUST BE IN ACCORDANCE WITH THE UNION GAS CONSTRUCTION AND MAINTENANCE MANUAL SPECIFICATIONS.
- 11) ALL WELDS TO BE NON-DESTRUCTIVELY EXAMINED, AS PER C&M 3.6.8.

DESIGN PARAMETERS  
(NEW PIPING ONLY)

- DESIGN
- DESIGNED TO CSA Z662-15
  - DESIGN FACTOR - 0.8
  - LOCATION FACTOR - 0.9 (CLASS 2)
  - DESIGN TEMPERATURE - WSC
  - DESIGN PRESSURE - 6895 kPa
  - MOP - 6040 kPa

TEST PRESSURE

- MINIMUM - 8460 kPa

- TEST DATE: \_\_\_\_\_

ENGINEER: DEREK LANDSCHOOT

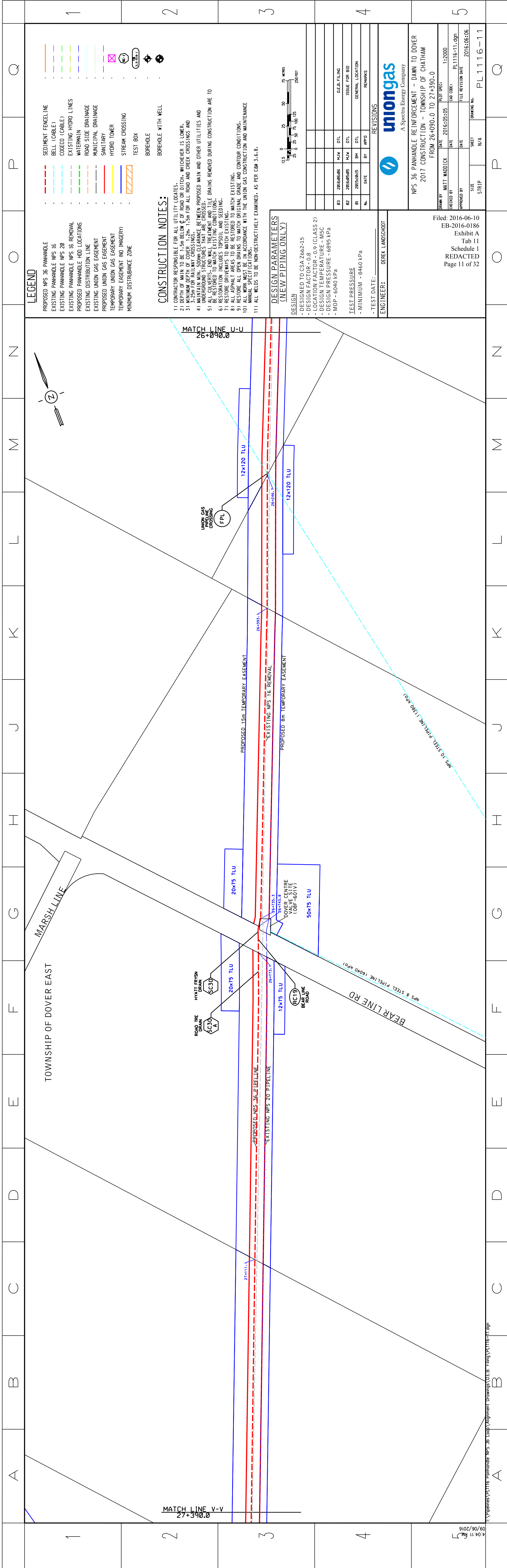


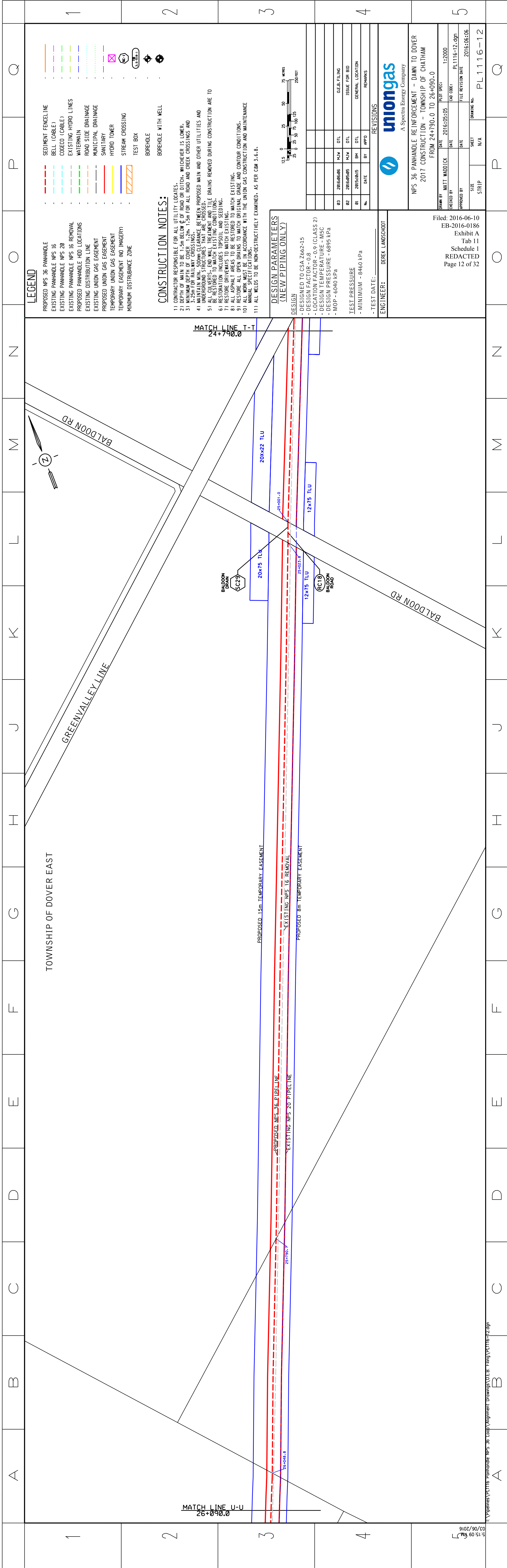
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NPS 36 PANHANDLE REINFORCEMENT – DAWN TO DOVER  
2017 CONSTRUCTION – TOWNSHIP OF CHATHAM  
FROM 27+390.0 TO 28+690.0

Filed: 2016-06-10  
EB-2016-0186  
Exhibit A  
Tab 11  
Schedule 1  
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APPROVED BY		DATE		FILE REVISION DATE	2016:06:06
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LEGEND

- PROPOSED NPS 36 PANHANDLE
- EXISTING PANHANDLE NPS 16
- EXISTING PANHANDLE NPS 20
- EXISTING PANHANDLE NPS 16 REMOVAL
- PROPOSED PANHANDLE HDD LOCATIONS
- EXISTING DISTRIBUTION LINE
- EXISTING UNION GAS EASEMENT
- PROPOSED UNION GAS EASEMENT
- TEMPORARY UNION GAS EASEMENT
- TEMPORARY EASEMENT (NO IMAGERY)
- MINIMUM DISTURBANCE ZONE
- SEDIMENT FENCELINE
- BELL (CABLE)
- COGECO (CABLE)
- EXISTING HYDRO LINES
- WATERMAIN
- ROAD SIDE DRAINAGE
- MUNICIPAL DRAINAGE
- SANITARY
- HYDRO TOWER
- STREAM CROSSING
- TEST BOX
- BOREHOLE
- BOREHOLE WITH WELL

CONSTRUCTION NOTES:

- 1) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES.
- 2) DEPTH OF MAIN TO BE 1.5m BELOW  $\phi$  OF ROAD OR DITCH, WHICHEVER IS LOWER.
- 3) MINIMUM DEPTH OF COVER 1.2m, 1.5m FOR ALL ROAD AND CREEK CROSSINGS AND 3.25m FOR RAILWAY CROSSINGS.
- 4) MAINTAIN MIN. 500mm CLEARANCE BETWEEN PROPOSED MAIN AND OTHER UTILITIES AND UNDERGROUND STRUCTURES THAT ARE CROSSED.
- 5) ALL CULVERTS, END WALL TREATMENT AND TILE DRAINS REMOVED DURING CONSTRUCTION ARE TO BE RESTORED TO MATCH EXISTING CONDITIONS.
- 6) RESTORATION INCLUDES TOPSOIL AND SEEDING.
- 7) RESTORE DRIVEWAYS TO MATCH EXISTING.
- 8) ALL ASPHALT AREAS TO BE RESTORED TO MATCH EXISTING.
- 9) RESTORE ALL OPEN DRAINS TO MATCH ORIGINAL GRADE AND CONTOUR CONDITIONS.
- 10) ALL WORK MUST BE IN ACCORDANCE WITH THE UNION GAS CONSTRUCTION AND MAINTENANCE MANUAL SPECIFICATIONS.
- 11) ALL WELDS TO BE NON-DESTRUCTIVELY EXAMINED, AS PER CAM 3.6-8.

DESIGN PARAMETERS (NEW PIPING ONLY)

- DESIGN
- DESIGNED TO CSA Z662-15
  - DESIGN FACTOR - 0.8
  - LOCATION FACTOR - 0.9 (CLASS 2)
  - DESIGN TEMPERATURE - WSC
  - DESIGN PRESSURE - 6895 kPa
  - MOP - 6040 kPa

TEST PRESSURE

- MINIMUM - 8460 kPa

- TEST DATE: \_\_\_\_\_

ENGINEER: DEREK LANDSCHOOT

REVISIONS

No.	DATE	BY	APP'D	REMARKS
03	2016/06/06	MJW	DTL	O.E.B. FILING
02	2016/05/05	MJW	DTL	ISSUE FOR BID
01	2015/01/15	BM	DTL	GENERAL LOCATION



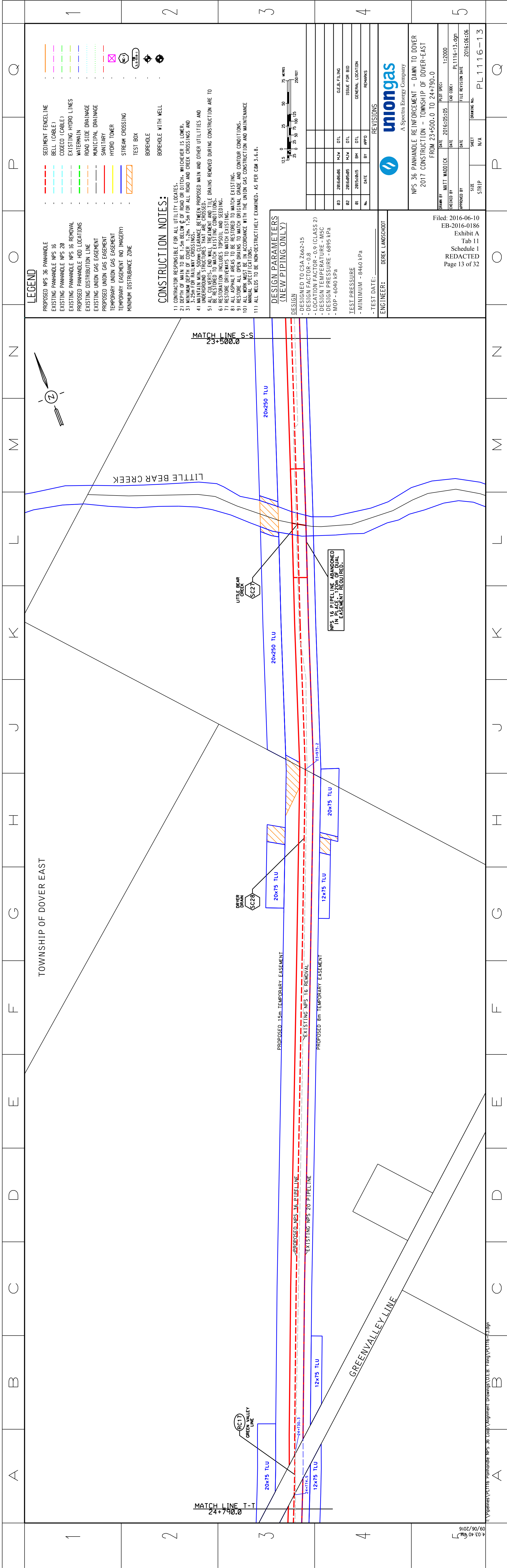
A Spectra Energy Company

NPS 36 PANHANDLE REINFORCEMENT - DAWN TO DOVER  
2017 CONSTRUCTION - TOWNSHIP OF CHATHAM  
FROM 24+790.0 TO 26+090.0

Filed: 2016-06-10  
EB-2016-0186  
Exhibit A  
Tab 11  
Schedule 1  
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APPROVED BY		DATE		FILE REVISION DATE	2016:06:06
SIZE	STRIP	SHEET	N/A	DRAWING No.	PL1116-12





LEGEND

- PROPOSED NPS 36 PANHANDLE

-

EXISTING PANHANDLE NPS 16

-

EXISTING PANHANDLE NPS 20

-

EXISTING PANHANDLE NPS 16 REMOVAL

-

PROPOSED PANHANDLE HDD LOCATIONS

-

EXISTING DISTRIBUTION LINE

-

EXISTING UNION GAS EASEMENT

-

PROPOSED UNION GAS EASEMENT

-

TEMPORARY UNION GAS EASEMENT

-

TEMPORARY EASEMENT (NO IMAGERY)

-

MINIMUM DISTURBANCE ZONE
- SEDIMENT FENCELINE

-

BELL (CABLE)

-

COGECO (CABLE)

-

EXISTING HYDRO LINES

-

WATERMAIN

-

ROAD SIDE DRAINAGE

-

MUNICIPAL DRAINAGE

-

SANITARY

-

HYDRO TOWER

-

STREAM CROSSING

-

TEST BOX

-

BOREHOLE

-

BOREHOLE WITH WELL

CONSTRUCTION NOTES:

- 1) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES.
- 2) DEPTH OF MAIN TO BE 1.5m BELOW  $\phi$  OF ROAD OR DITCH, WHICHEVER IS LOWER.
- 3) MINIMUM DEPTH OF COVER: 1.2m, 1.5m FOR ALL ROAD AND CREEK CROSSINGS AND 3.25m FOR RAILWAY CROSSINGS.
- 4) MAINTAIN MIN. 500mm CLEARANCE BETWEEN PROPOSED MAIN AND OTHER UTILITIES AND UNDERGROUND STRUCTURES THAT ARE CROSSED.
- 5) ALL CULVERTS, END WALL TREATMENT AND TILE DRAINS REMOVED DURING CONSTRUCTION ARE TO BE RESTORED TO MATCH EXISTING CONDITIONS.
- 6) RESTORATION INCLUDES TOPSOIL AND SEEDING.
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- 11) ALL WELDS TO BE NON-DESTRUCTIVELY EXAMINED, AS PER CAM 3.6-8.

DESIGN PARAMETERS  
(NEW PIPING ONLY)

- DESIGN
- DESIGN TO CSA Z662-15
- DESIGN FACTOR - 0.8
- LOCATION FACTOR - 0.9 (CLASS 2)
- DESIGN TEMPERATURE - WSC
- DESIGN PRESSURE - 6895 kPa
- MOP - 6040 kPa

TEST PRESSURE

- MINIMUM - 8460 kPa

- TEST DATE: \_\_\_\_\_

ENGINEER: DEREK LANDSCHOOT



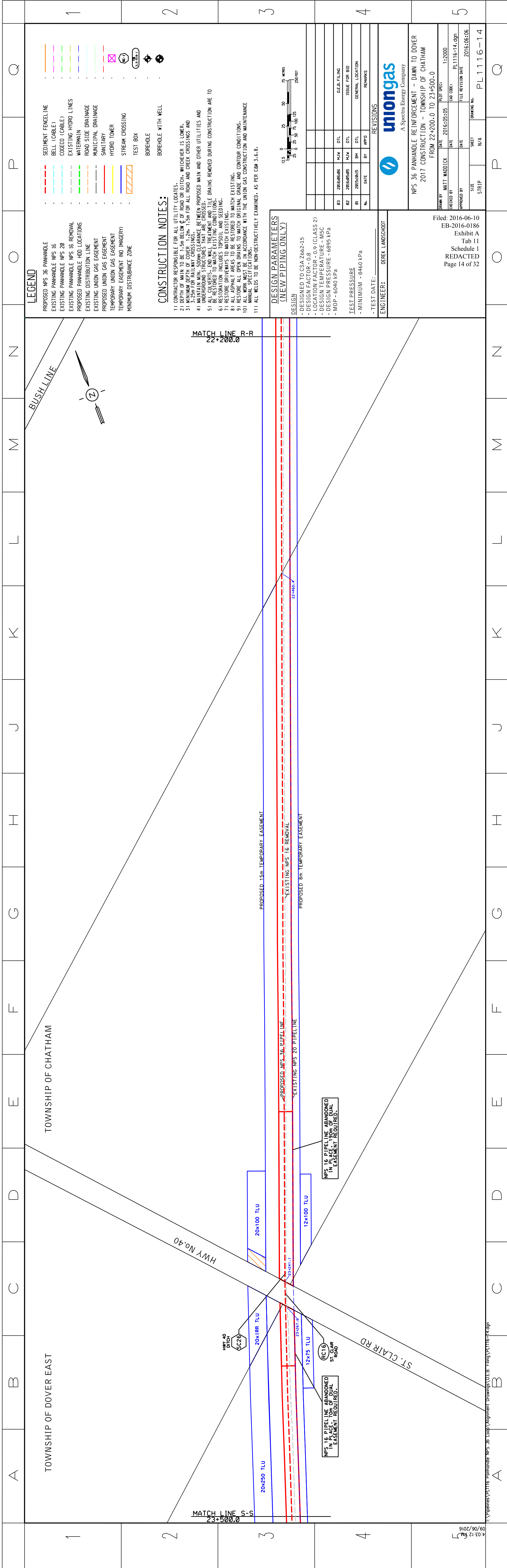
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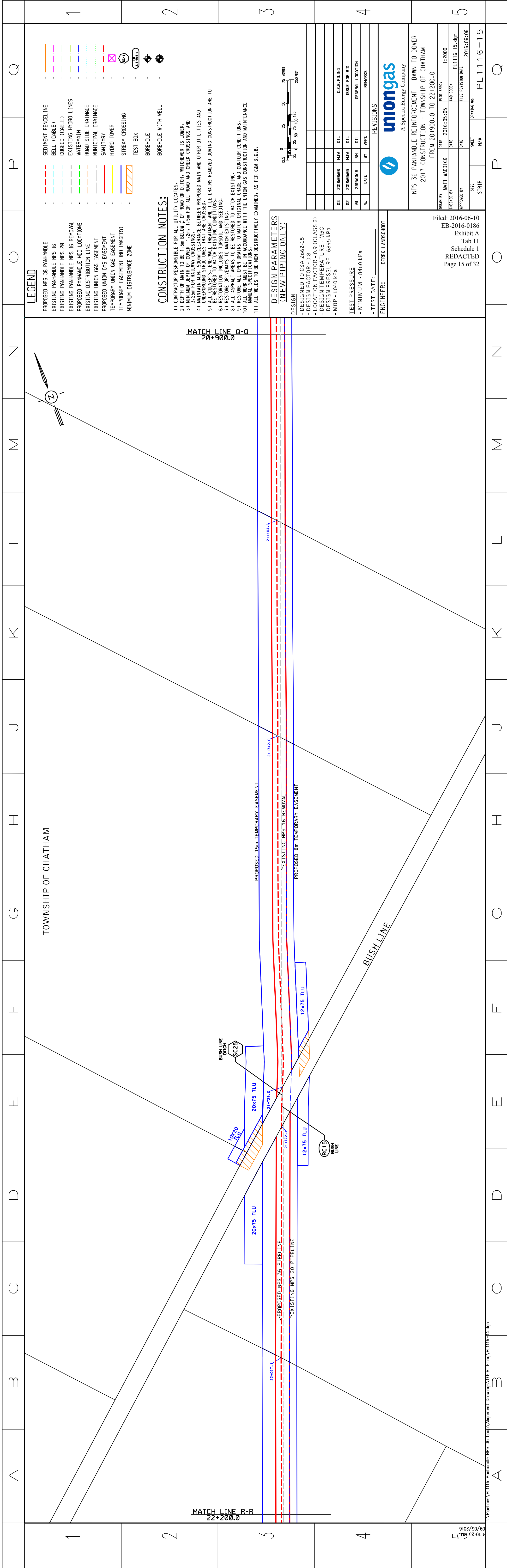
NPS 36 PANHANDLE REINFORCEMENT - DAWN TO DOVER  
2017 CONSTRUCTION - TOWNSHIP OF DOVER-EAST  
FROM 23+500.0 TO 24+790.0

Filed: 2016-06-10  
EB-2016-0186  
Exhibit A  
Tab 11  
Schedule 1  
REDACTED  
Page 13 of 32

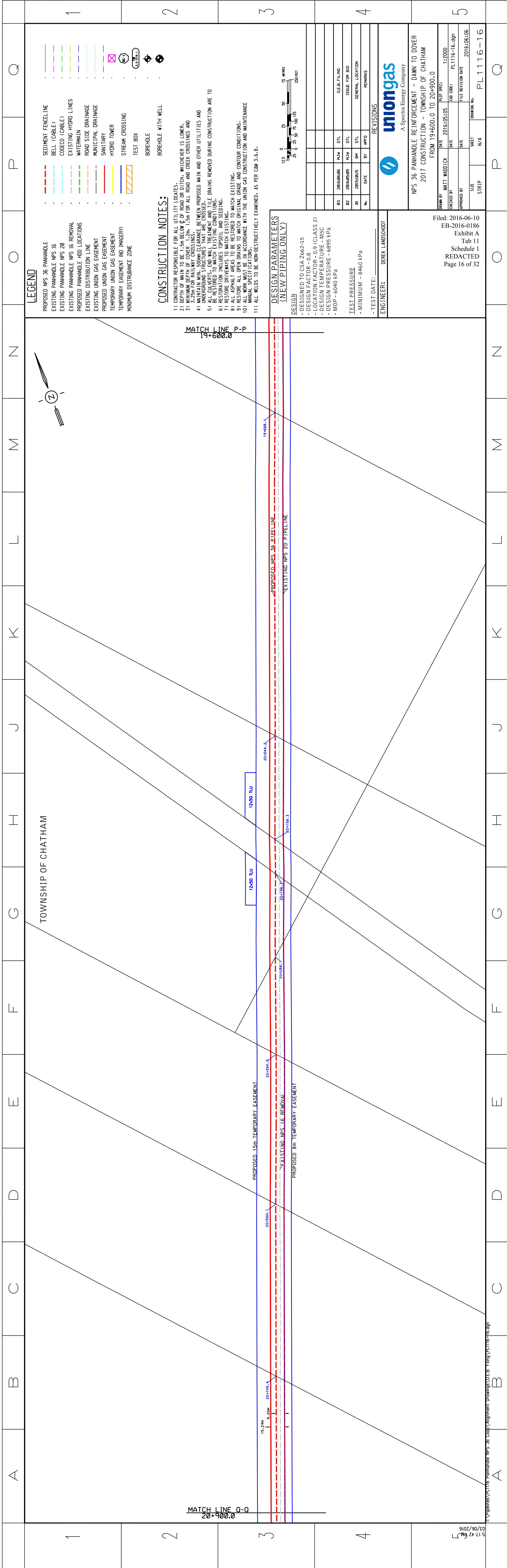
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APPROVED BY		DATE		FILE REVISION DATE	2016:06:06
SIZE	STRIP	SHEET	N/A	DRAWING No.	

PL1116-13









LEGEND

- |                                     |                        |
|-------------------------------------|------------------------|
| - PROPOSED NPS 36 PANHANDLE         | - SEDIMENT FENCELINE   |
| - EXISTING PANHANDLE NPS 16         | - BELL (CABLE)         |
| - EXISTING PANHANDLE NPS 20         | - COGECO (CABLE)       |
| - EXISTING PANHANDLE NPS 16 REMOVAL | - EXISTING HYDRO LINES |
| - PROPOSED PANHANDLE HDD LOCATIONS  | - WATERMAIN            |
| - EXISTING DISTRIBUTION LINE        | - ROAD SIDE DRAINAGE   |
| - EXISTING UNION GAS EASEMENT       | - MUNICIPAL DRAINAGE   |
| - PROPOSED UNION GAS EASEMENT       | - SANITARY             |
| - TEMPORARY UNION GAS EASEMENT      | - HYDRO TOWER          |
| - TEMPORARY EASEMENT (NO IMAGERY)   | - STREAM CROSSING      |
| - MINIMUM DISTURBANCE ZONE          | - TEST BOX             |
|                                     | - BOREHOLE             |
|                                     | - BOREHOLE WITH WELL   |

CONSTRUCTION NOTES:

- 1) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES.
- 2) DEPTH OF MAIN TO BE 1.5m BELOW  $\phi$  OF ROAD OR DITCH, WHICHEVER IS LOWER.
- 3) MINIMUM DEPTH OF COVER 1.2m, 1.5m FOR ALL ROAD AND CREEK CROSSINGS AND 3.25m FOR RAILWAY CROSSINGS.
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- 11) ALL WELDS TO BE NON-DESTRUCTIVELY EXAMINED, AS PER C&M 3.6.8.

DESIGN PARAMETERS  
(NEW PIPING ONLY)

- DESIGN
- DESIGNED TO CSA Z662-15
  - DESIGN FACTOR - 0.8
  - LOCATION FACTOR - 0.9 (CLASS 2)
  - DESIGN TEMPERATURE - WSC
  - DESIGN PRESSURE - 6895 kPa
  - MOP - 6040 kPa
- TEST PRESSURE
- MINIMUM - 8460 kPa

- TEST DATE: \_\_\_\_\_

ENGINEER: DEREK LANDSCHOOT



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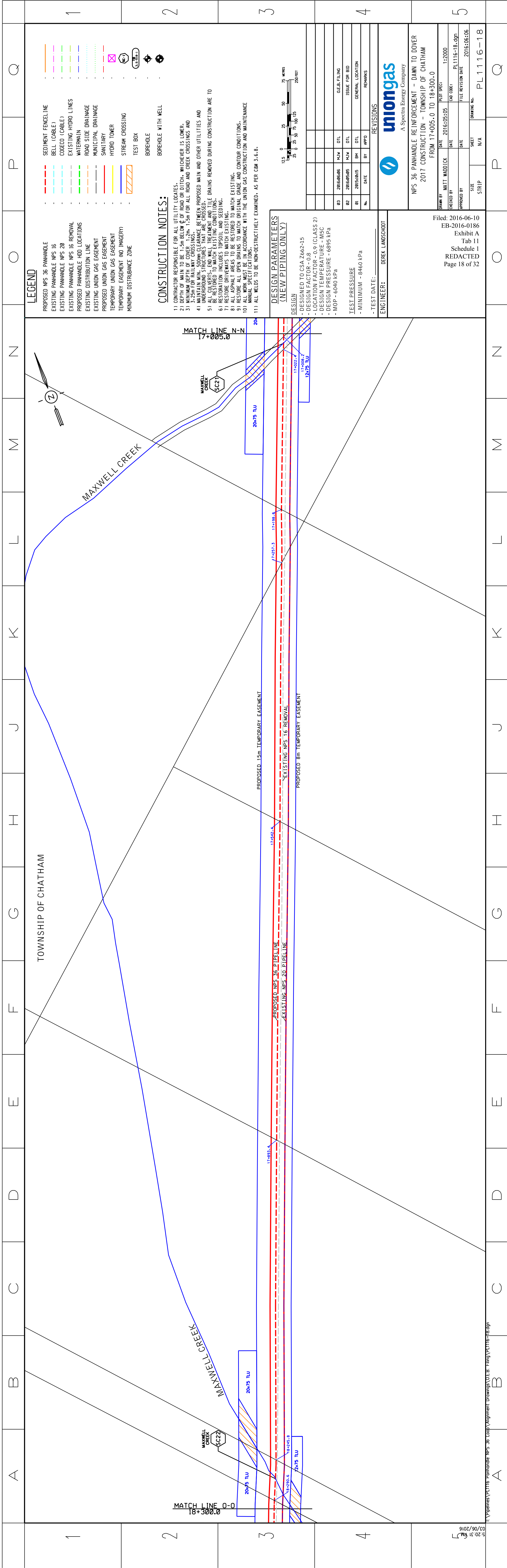
NPS 36 PANHANDLE REINFORCEMENT - DAWN TO DOVER  
2017 CONSTRUCTION - TOWNSHIP OF CHATHAM  
FROM 19+600.0 TO 20+900.0

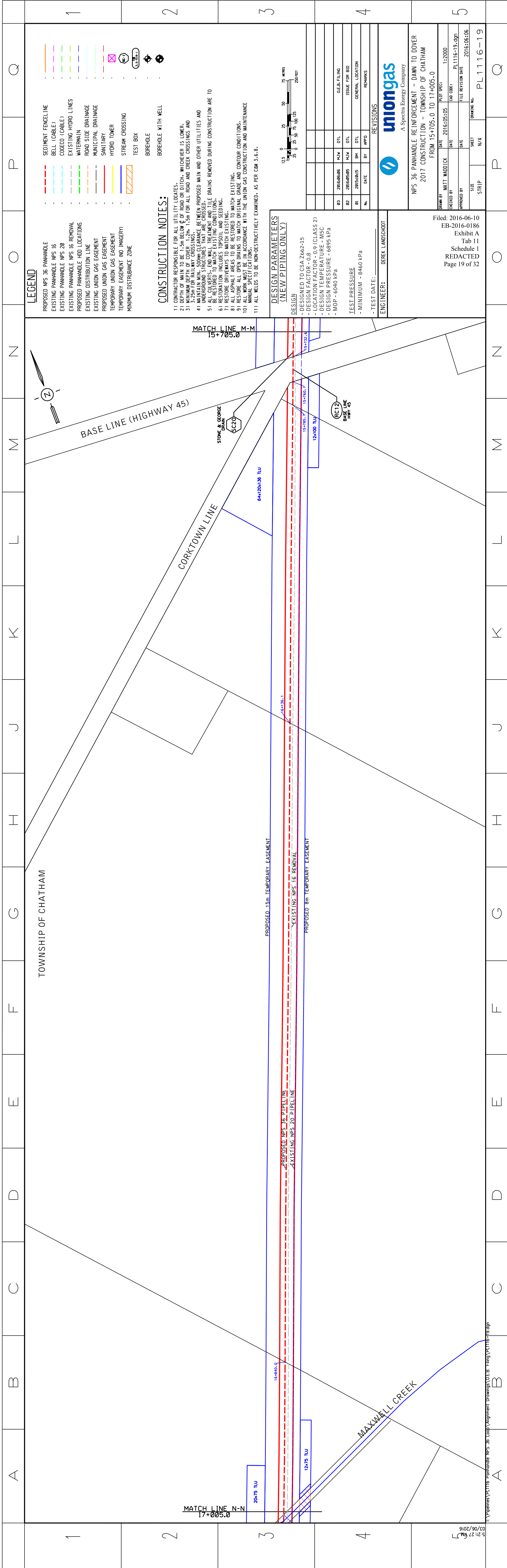
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EB-2016-0186  
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Schedule 1  
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Page 16 of 32

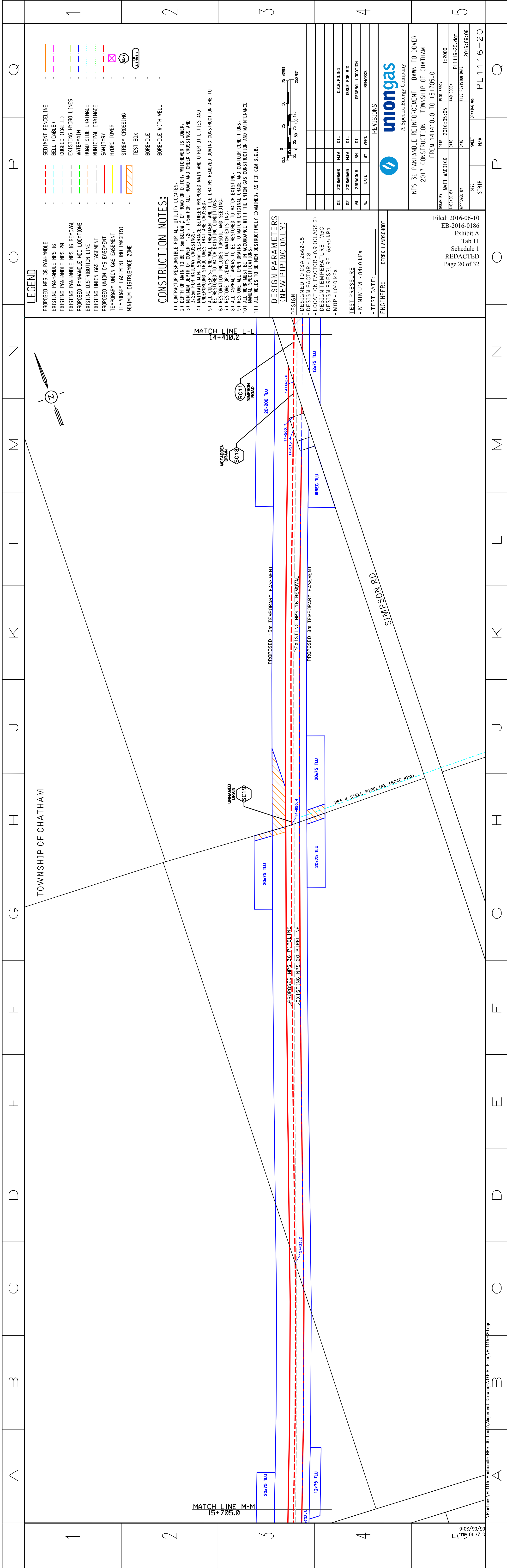
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APPROVED BY		DATE		FILE REVISION DATE	2016:06:06
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LEGEND

- PROPOSED NPS 36 PANHANDLE
- EXISTING PANHANDLE NPS 16
- EXISTING PANHANDLE NPS 20
- EXISTING PANHANDLE NPS 16 REMOVAL
- PROPOSED PANHANDLE HDD LOCATIONS
- EXISTING DISTRIBUTION LINE
- EXISTING UNION GAS EASEMENT
- PROPOSED UNION GAS EASEMENT
- TEMPORARY UNION GAS EASEMENT
- TEMPORARY EASEMENT (NO IMAGERY)
- MINIMUM DISTURBANCE ZONE

-

 SEDIMENT FENCELINE

-

 BELL (CABLE)

-

 CODECO (CABLE)

-

 EXISTING HYDRO LINES

-

 WATERMAIN

-

 ROAD SIDE DRAINAGE

-

 MUNICIPAL DRAINAGE

-

 SANITARY

-

 HYDRO TOWER

-

 STREAM CROSSING

-

 TEST BOX

-

 BOREHOLE

-

 BOREHOLE WITH WELL

CONSTRUCTION NOTES:

- 1) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES.
- 2) DEPTH OF MAIN TO BE 1.5m BELOW  $\phi$  OF ROAD OR DITCH, WHICHEVER IS LOWER.
- 3) MINIMUM DEPTH OF COVER 1.2m, 1.5m FOR ALL ROAD AND CREEK CROSSINGS AND 3.25m FOR RAILWAY CROSSINGS.
- 4) MAINTAIN MIN. 500mm CLEARANCE BETWEEN PROPOSED MAIN AND OTHER UTILITIES AND UNDERGROUND STRUCTURES THAT ARE CROSSED.
- 5) ALL CULVERTS, END WALL TREATMENT AND TILE DRAINS REMOVED DURING CONSTRUCTION ARE TO BE RESTORED TO MATCH EXISTING CONDITIONS.
- 6) RESTORATION INCLUDES TOPSOIL AND SEEDING.
- 7) RESTORE DRIVEWAYS TO MATCH EXISTING.
- 8) ALL ASPHALT AREAS TO BE RESTORED TO MATCH EXISTING.
- 9) RESTORE ALL OPEN DRAINS TO MATCH ORIGINAL GRADE AND CONTOUR CONDITIONS.
- 10) ALL WORK MUST BE IN ACCORDANCE WITH THE UNION GAS CONSTRUCTION AND MAINTENANCE MANUAL SPECIFICATIONS.
- 11) ALL WELDS TO BE NON-DESTRUCTIVELY EXAMINED, AS PER C&M 3.6.8.

DESIGN PARAMETERS  
(NEW PIPING ONLY)

- DESIGN
- DESIGN TO CSA Z662-15
- DESIGN FACTOR - 0.8
- LOCATION FACTOR - 0.9 (CLASS 2)
- DESIGN TEMPERATURE - WSC
- DESIGN PRESSURE - 6895 kPa
- MOP - 6040 kPa

TEST PRESSURE

- MINIMUM - 8460 kPa

- TEST DATE: \_\_\_\_\_

ENGINEER: DEREK LANDSCHOOT



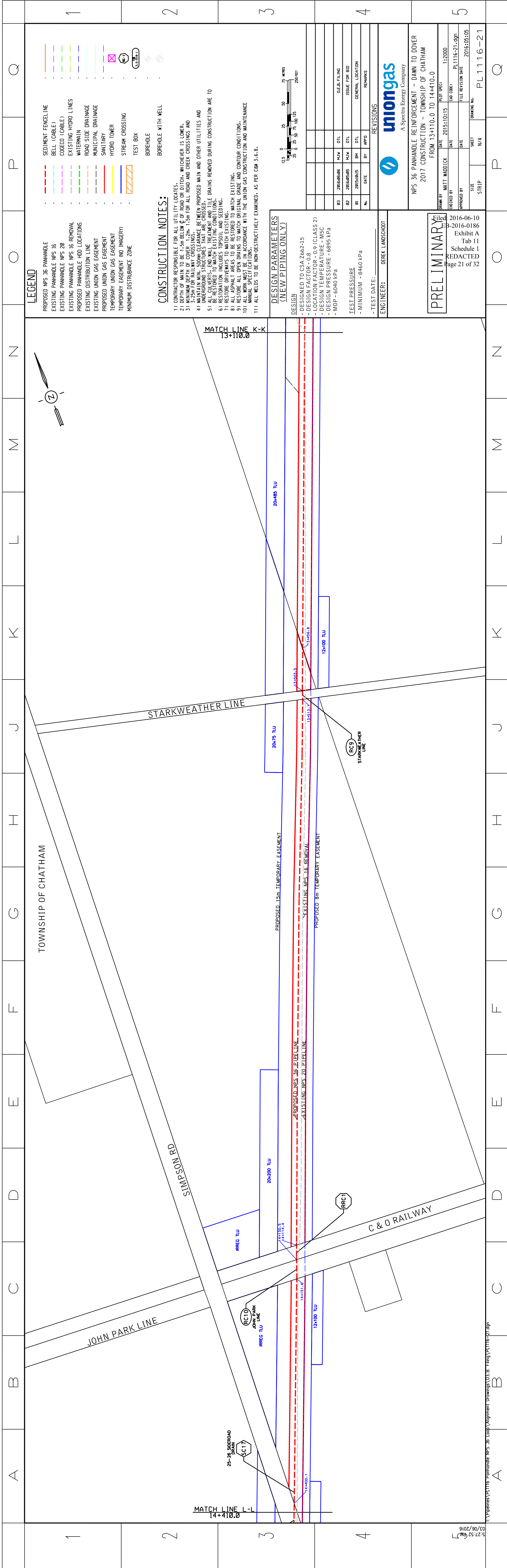
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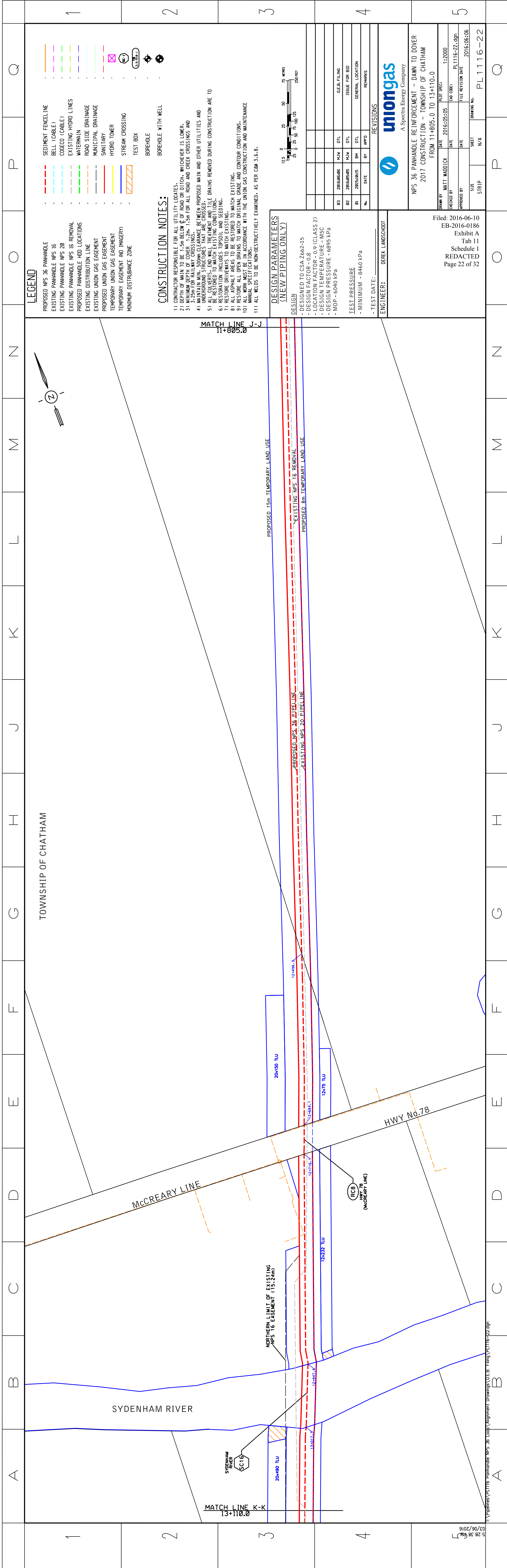
NPS 36 PANHANDLE REINFORCEMENT - DAWN TO DOVER  
2017 CONSTRUCTION - TOWNSHIP OF CHATHAM  
FROM 14+410.0 TO 15+705.0

Filed: 2016-06-10  
EB-2016-0186  
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DRAWN BY	MATT WADDICK	DATE	2016:05:05	PLOT SPEC	1:2000
CHECKED BY		DATE		CAD CODE:	PL1116-20.dgn
APPROVED BY		DATE		FILE REVISION DATE	2016:06:06
SIZE	STRIP	SHEET	N/A	DRAWING No.	PL1116-20







LEGEND

- PROPOSED NPS 36 PANHANDLE
- EXISTING PANHANDLE NPS 16
- EXISTING PANHANDLE NPS 20
- EXISTING PANHANDLE NPS 16 REMOVAL
- PROPOSED PANHANDLE HDD LOCATIONS
- EXISTING DISTRIBUTION LINE
- EXISTING UNION GAS EASEMENT
- PROPOSED UNION GAS EASEMENT
- TEMPORARY UNION GAS EASEMENT
- TEMPORARY EASEMENT (NO IMAGERY)
- MINIMUM DISTURBANCE ZONE
- SEDIMENT FENCELINE
- BELL (CABLE)
- COGECO (CABLE)
- EXISTING HYDRO LINES
- WATERMAIN
- ROAD SIDE DRAINAGE
- MUNICIPAL DRAINAGE
- SANITARY
- HYDRO TOWER
- STREAM CROSSING
- TEST BOX
- BOREHOLE
- BOREHOLE WITH WELL

-

18  
25.5(8.1)

-

25.5(8.1)

-

25.5(8.1)

CONSTRUCTION NOTES:

- 1) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES.
- 2) DEPTH OF MAIN TO BE 1.5m BELOW  $\phi$  OF ROAD OR DITCH, WHICHEVER IS LOWER.
- 3) MINIMUM DEPTH OF COVER 1.2m, 1.5m FOR ALL ROAD AND CREEK CROSSINGS AND 3.25m FOR RAILWAY CROSSINGS.
- 4) MAINTAIN MIN. 500mm CLEARANCE BETWEEN PROPOSED MAIN AND OTHER UTILITIES AND UNDERGROUND STRUCTURES THAT ARE CROSSED.
- 5) ALL CULVERTS, END WALL TREATMENT AND TILE DRAINS REMOVED DURING CONSTRUCTION ARE TO BE RESTORED TO MATCH EXISTING CONDITIONS.
- 6) RESTORATION INCLUDES TOPSOIL AND SEEDING.
- 7) RESTORE DRIVEWAYS TO MATCH EXISTING.
- 8) ALL ASPHALT AREAS TO BE RESTORED TO MATCH EXISTING.
- 9) RESTORE ALL OPEN DRAINS TO MATCH ORIGINAL GRADE AND CONTOUR CONDITIONS.
- 10) ALL WORK MUST BE IN ACCORDANCE WITH THE UNION GAS CONSTRUCTION AND MAINTENANCE MANUAL SPECIFICATIONS.
- 11) ALL WELDS TO BE NON-DESTRUCTIVELY EXAMINED, AS PER C&M 3.6.8.

DESIGN PARAMETERS  
(NEW PIPING ONLY)

- DESIGN
- DESIGN TO CSA Z662-15
  - DESIGN FACTOR - 0.8
  - LOCATION FACTOR - 0.9 (CLASS 2)
  - DESIGN TEMPERATURE - WSC
  - DESIGN PRESSURE - 6895 kPa
  - MOP - 6040 kPa

TEST PRESSURE

- MINIMUM - 8460 kPa

- TEST DATE: \_\_\_\_\_

ENGINEER: DEREK LANDSCHOOT

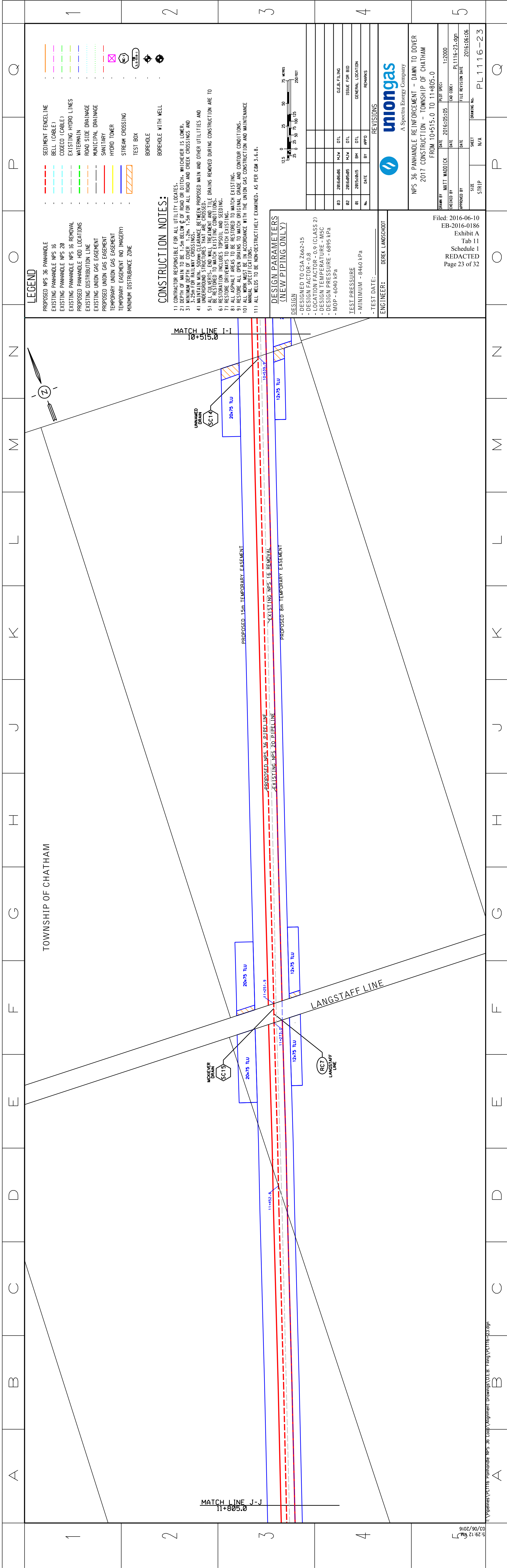


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NPS 36 PANHANDLE REINFORCEMENT - DAWN TO DOVER  
2017 CONSTRUCTION - TOWNSHIP OF CHATHAM  
FROM 11+805.0 TO 13+110.0

Filed: 2016-06-10  
EB-2016-0186  
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DRAWN BY	MATT WADDICK	DATE	2016:05:05	PLOT SPEC:	1:2000
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APPROVED BY		DATE		FILE REVISION DATE	2016:06:06
SIZE	STRIP	SHEET	N/A	DRAWING No.	PL1116-22



LEGEND

- PROPOSED NPS 36 PANHANDLE
- EXISTING PANHANDLE NPS 16
- EXISTING PANHANDLE NPS 20
- EXISTING PANHANDLE NPS 16 REMOVAL
- PROPOSED PANHANDLE HDD LOCATIONS
- EXISTING DISTRIBUTION LINE
- EXISTING UNION GAS EASEMENT
- PROPOSED UNION GAS EASEMENT
- TEMPORARY UNION GAS EASEMENT
- TEMPORARY EASEMENT (NO IMAGERY)
- MINIMUM DISTURBANCE ZONE

-

SEDIMENT FENCELINE

-

BELL (CABLE)

-

COGECO (CABLE)

-

EXISTING HYDRO LINES

-

WATERMAIN

-

ROAD SIDE DRAINAGE

-

MUNICIPAL DRAINAGE

-

SANITARY

-

HYDRO TOWER

-

STREAM CROSSING

-

TEST BOX

-

BOREHOLE

-

BOREHOLE WITH WELL

CONSTRUCTION NOTES:

- 1) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES.
- 2) DEPTH OF MAIN TO BE 1.5m BELOW  $\phi$  OF ROAD OR DITCH, WHICHEVER IS LOWER.
- 3) MINIMUM DEPTH OF COVER 1.2m, 1.5m FOR ALL ROAD AND CREEK CROSSINGS AND 3.25m FOR RAILWAY CROSSINGS.
- 4) MAINTAIN MIN. 500mm CLEARANCE BETWEEN PROPOSED MAIN AND OTHER UTILITIES AND UNDERGROUND STRUCTURES THAT ARE CROSSED.
- 5) ALL CULVERTS, END WALL TREATMENT AND TILE DRAINS REMOVED DURING CONSTRUCTION ARE TO BE RESTORED TO MATCH EXISTING CONDITIONS.
- 6) RESTORATION INCLUDES TOPSOIL AND SEEDING.
- 7) RESTORE DRIVEWAYS TO MATCH EXISTING.
- 8) ALL ASPHALT AREAS TO BE RESTORED TO MATCH EXISTING.
- 9) RESTORE ALL OPEN DRAINS TO MATCH ORIGINAL GRADE AND CONTOUR CONDITIONS.
- 10) ALL WORK MUST BE IN ACCORDANCE WITH THE UNION GAS CONSTRUCTION AND MAINTENANCE MANUAL SPECIFICATIONS.
- 11) ALL WELDS TO BE NON-DESTRUCTIVELY EXAMINED, AS PER C&M 3.6.8.

DESIGN PARAMETERS  
(NEW PIPING ONLY)

- DESIGN
- 
- DESIGNED TO CSA Z662-15

-

DESIGN FACTOR - 0.8

-

LOCATION FACTOR - 0.9 (CLASS 2)

-

DESIGN TEMPERATURE - WSC

-

DESIGN PRESSURE - 6895 kPa

-

MOP - 6040 kPa

TEST PRESSURE

-

MINIMUM - 8460 kPa

- TEST DATE: \_\_\_\_\_

ENGINEER: DEREK LANDSCHOOT



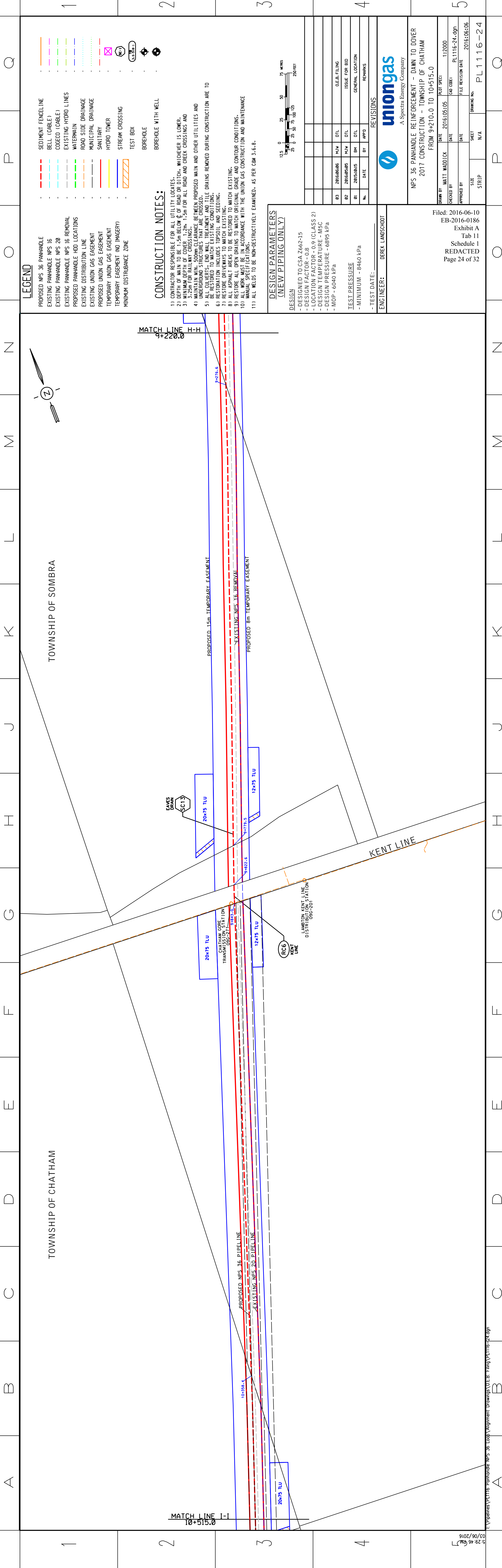
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NPS 36 PANHANDLE REINFORCEMENT - DAWN TO DOVER  
2017 CONSTRUCTION - TOWNSHIP OF CHATHAM  
FROM 10+515.0 TO 11+805.0

Filed: 2016-06-10  
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DRAWN BY	MATT WADDICK	DATE	2016:05:05	PLOT SPEC	1:2000
CHECKED BY		DATE		CAD CODE	PL1116-23.dgn
APPROVED BY		DATE		FILE REVISION DATE	2016:06:06
SIZE	STRIP	SHEET	N/A	DRAWING No.	PL1116-23





LEGEND

- PROPOSED NPS 36 PANHANDLE
- EXISTING PANHANDLE NPS 16
- EXISTING PANHANDLE NPS 20
- EXISTING PANHANDLE NPS 16 REMOVAL
- PROPOSED PANHANDLE HDD LOCATIONS
- EXISTING DISTRIBUTION LINE
- EXISTING UNION GAS EASEMENT
- PROPOSED UNION GAS EASEMENT
- TEMPORARY UNION GAS EASEMENT
- TEMPORARY EASEMENT (NO IMAGERY)
- MINIMUM DISTURBANCE ZONE
- SEDIMENT FENCELINE
- BELL (CABLE)
- CODECO (CABLE)
- EXISTING HYDRO LINES
- WATERMAIN
- ROAD SIDE DRAINAGE
- MUNICIPAL DRAINAGE
- SANITARY
- HYDRO TOWER
- STREAM CROSSING
- TEST BOX
- BOREHOLE
- BOREHOLE WITH WELL

CONSTRUCTION NOTES:

- 1) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES.
- 2) DEPTH OF MAIN TO BE 1.5m BELOW G OF ROAD OR DITCH, WHICHEVER IS LOWER.
- 3) MINIMUM DEPTH OF COVER 1.2m, 1.5m FOR ALL ROAD AND CREEK CROSSINGS AND 3.25m FOR RAILWAY CROSSINGS.
- 4) MAINTAIN MIN. 500mm CLEARANCE BETWEEN PROPOSED MAIN AND OTHER UTILITIES AND UNDERGROUND STRUCTURES THAT ARE CROSSED.
- 5) ALL CULVERTS, END WALL TREATMENT AND TILE DRAINS REMOVED DURING CONSTRUCTION ARE TO BE RESTORED TO MATCH EXISTING CONDITIONS.
- 6) RESTORATION INCLUDES TOPSOIL AND SEEDING.
- 7) RESTORE DRIVEWAYS TO MATCH EXISTING.
- 8) ALL ASPHALT AREAS TO BE RESTORED TO MATCH EXISTING.
- 9) RESTORE ALL OPEN DRAINS TO MATCH ORIGINAL GRADE AND CONTOUR CONDITIONS.
- 10) ALL WORK MUST BE IN ACCORDANCE WITH THE UNION GAS CONSTRUCTION AND MAINTENANCE MANUAL SPECIFICATIONS.
- 11) ALL WELDS TO BE NON-DESTRUCTIVELY EXAMINED, AS PER C&M 3.6-8.

DESIGN PARAMETERS  
(NEW PIPING ONLY)

- DESIGN
- DESIGNED TO CSA Z662-15
  - DESIGN FACTOR - 0.8
  - LOCATION FACTOR - 0.9 (CLASS 2)
  - DESIGN TEMPERATURE - WSC
  - DESIGN PRESSURE - 6895 kPa
  - MOP - 6040 kPa

TEST PRESSURE

- MINIMUM - 8460 kPa

- TEST DATE: \_\_\_\_\_

ENGINEER: DEREK LANDSCHOOT

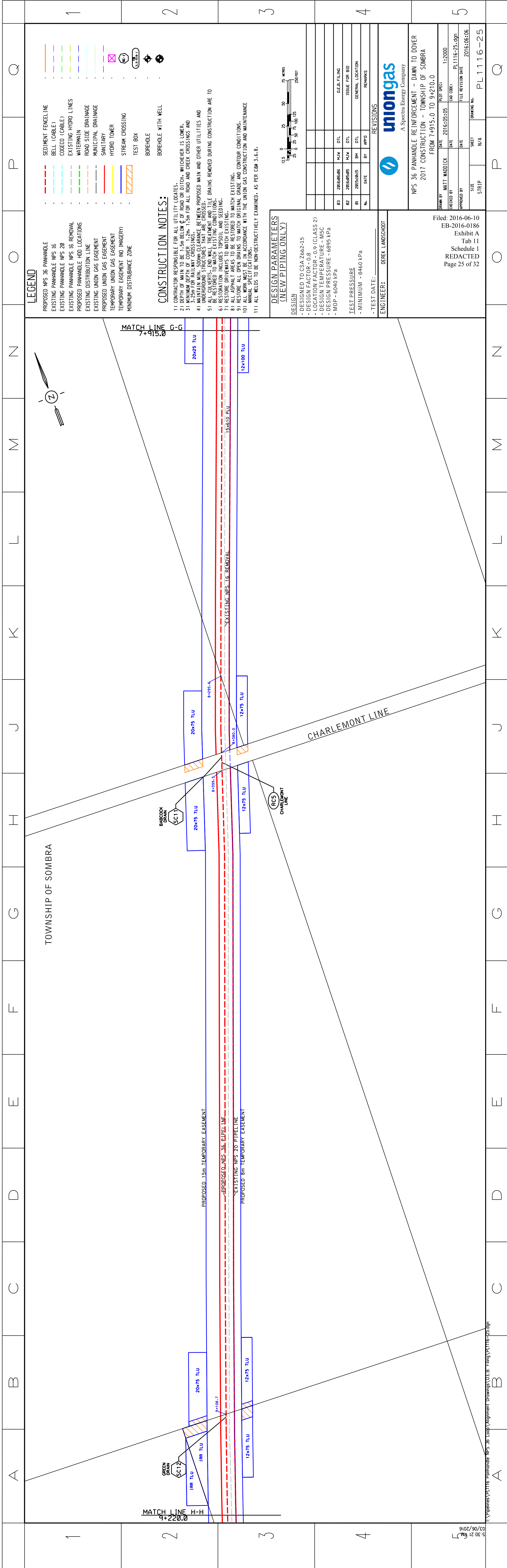


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NPS 36 PANHANDLE REINFORCEMENT - DAWN TO DOVER  
2017 CONSTRUCTION - TOWNSHIP OF CHATHAM  
FROM 9+210.0 TO 10+515.0

Filed: 2016-06-10  
EB-2016-0186  
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DRAWN BY	MATT WADDICK	DATE	2016:05:05	PLOT SPEC:	1:2000
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APPROVED BY		DATE		FILE REVISION DATE	2016:06:06
SIZE	STRIP	SHEET	N/A	DRAWING No.	PL1116-24



LEGEND

- PROPOSED NPS 36 PANHANDLE
- EXISTING PANHANDLE NPS 16
- EXISTING PANHANDLE NPS 20
- EXISTING PANHANDLE NPS 16 REMOVAL
- PROPOSED PANHANDLE HDD LOCATIONS
- EXISTING DISTRIBUTION LINE
- EXISTING UNION GAS EASEMENT
- PROPOSED UNION GAS EASEMENT
- TEMPORARY UNION GAS EASEMENT
- TEMPORARY EASEMENT (NO IMAGERY)
- MINIMUM DISTURBANCE ZONE
- SEDIMENT FENCELINE
- BELL (CABLE)
- CODECO (CABLE)
- EXISTING HYDRO LINES
- WATERMAIN
- ROAD SIDE DRAINAGE
- MUNICIPAL DRAINAGE
- SANITARY
- HYDRO TOWER
- STREAM CROSSING
- TEST BOX
- BOREHOLE
- BOREHOLE WITH WELL

CONSTRUCTION NOTES:

- 1) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES.
- 2) DEPTH OF MAIN TO BE 1.5m BELOW G OF ROAD OR DITCH, WHICHEVER IS LOWER.
- 3) MINIMUM DEPTH OF COVER 1.2m, 1.5m FOR ALL ROAD AND CREEK CROSSINGS AND 3.25m FOR RAILWAY CROSSINGS.
- 4) MAINTAIN MIN. 500mm CLEARANCE BETWEEN PROPOSED MAIN AND OTHER UTILITIES AND UNDERGROUND STRUCTURES THAT ARE CROSSED.
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- 6) RESTORATION INCLUDES TOPSOIL AND SEEDING.
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- 9) RESTORE ALL OPEN DRAINS TO MATCH ORIGINAL GRADE AND CONTOUR CONDITIONS.
- 10) ALL WORK MUST BE IN ACCORDANCE WITH THE UNION GAS CONSTRUCTION AND MAINTENANCE MANUAL SPECIFICATIONS.
- 11) ALL WELDS TO BE NON-DESTRUCTIVELY EXAMINED, AS PER CAM 3.6.8.

DESIGN PARAMETERS  
(NEW PIPING ONLY)

- DESIGN
- DESIGNED TO CSA Z662-15
  - DESIGN FACTOR - 0.8
  - LOCATION FACTOR - 0.9 (CLASS 2)
  - DESIGN TEMPERATURE - WSC
  - DESIGN PRESSURE - 6895 kPa
  - MOP - 6040 kPa
- TEST PRESSURE
- MINIMUM - 8460 kPa

- TEST DATE: \_\_\_\_\_

ENGINEER: DEREK LANDSCHOOT



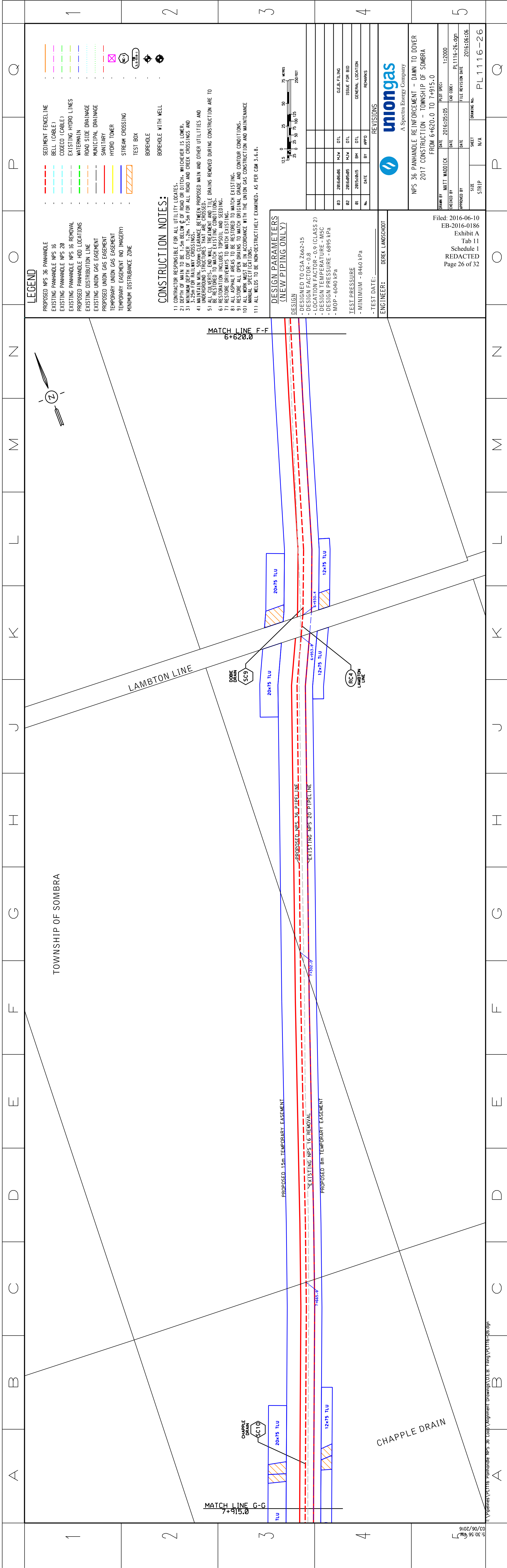
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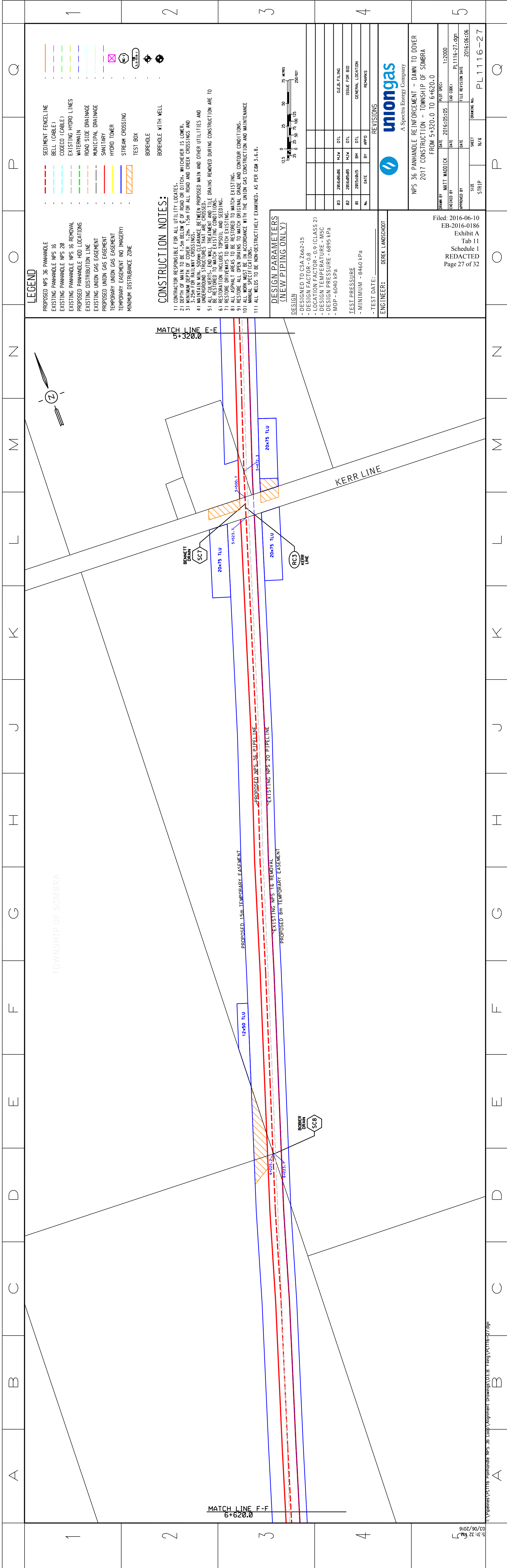
NPS 36 PANHANDLE REINFORCEMENT - DAWN TO DOVER  
2017 CONSTRUCTION - TOWNSHIP OF SOMBRA  
FROM 7+915.0 TO 9+210.0

Filed: 2016-06-10  
EB-2016-0186  
Exhibit A  
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Schedule 1  
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APPROVED BY		DATE		FILE REVISION DATE	2016:06:06
SIZE	STRIP	SHEET	N/A	DRAWING No.	PL1116-25







LEGEND

- PROPOSED NPS 36 PANHANDLE
- EXISTING PANHANDLE NPS 16
- EXISTING PANHANDLE NPS 20
- EXISTING PANHANDLE NPS 16 REMOVAL
- PROPOSED PANHANDLE HDD LOCATIONS
- EXISTING DISTRIBUTION LINE
- EXISTING UNION GAS EASEMENT
- PROPOSED UNION GAS EASEMENT
- TEMPORARY UNION GAS EASEMENT
- TEMPORARY EASEMENT (NO IMAGERY)
- MINIMUM DISTURBANCE ZONE
- SEDIMENT FENCELINE
- BELL (CABLE)
- CODECO (CABLE)
- EXISTING HYDRO LINES
- WATERMAIN
- ROAD SIDE DRAINAGE
- MUNICIPAL DRAINAGE
- SANITARY
- HYDRO TOWER
- STREAM CROSSING
- TEST BOX
- BOREHOLE
- BOREHOLE WITH WELL

CONSTRUCTION NOTES:

- 1) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES.
- 2) DEPTH OF MAIN TO BE 1.5m BELOW  $\phi$  OF ROAD OR DITCH, WHICHEVER IS LOWER.
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- 5) ALL CULVERTS, END WALL TREATMENT AND TILE DRAINS REMOVED DURING CONSTRUCTION ARE TO BE RESTORED TO MATCH EXISTING CONDITIONS.
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- 11) ALL WELDS TO BE NON-DESTRUCTIVELY EXAMINED, AS PER C&M 3.6-8.

DESIGN PARAMETERS  
(NEW PIPING ONLY)

- DESIGN
- DESIGNED TO CSA Z662-15
  - DESIGN FACTOR - 0.8
  - LOCATION FACTOR - 0.9 (CLASS 2)
  - DESIGN TEMPERATURE - WSC
  - DESIGN PRESSURE - 6895 kPa
  - MOP - 6040 kPa

TEST PRESSURE

- MINIMUM - 8460 kPa

- TEST DATE: \_\_\_\_\_

ENGINEER: DEREK LANDSCHOOT



A Spectra Energy Company

NPS 36 PANHANDLE REINFORCEMENT - DAWN TO DOVER  
2017 CONSTRUCTION - TOWNSHIP OF SOMBRA

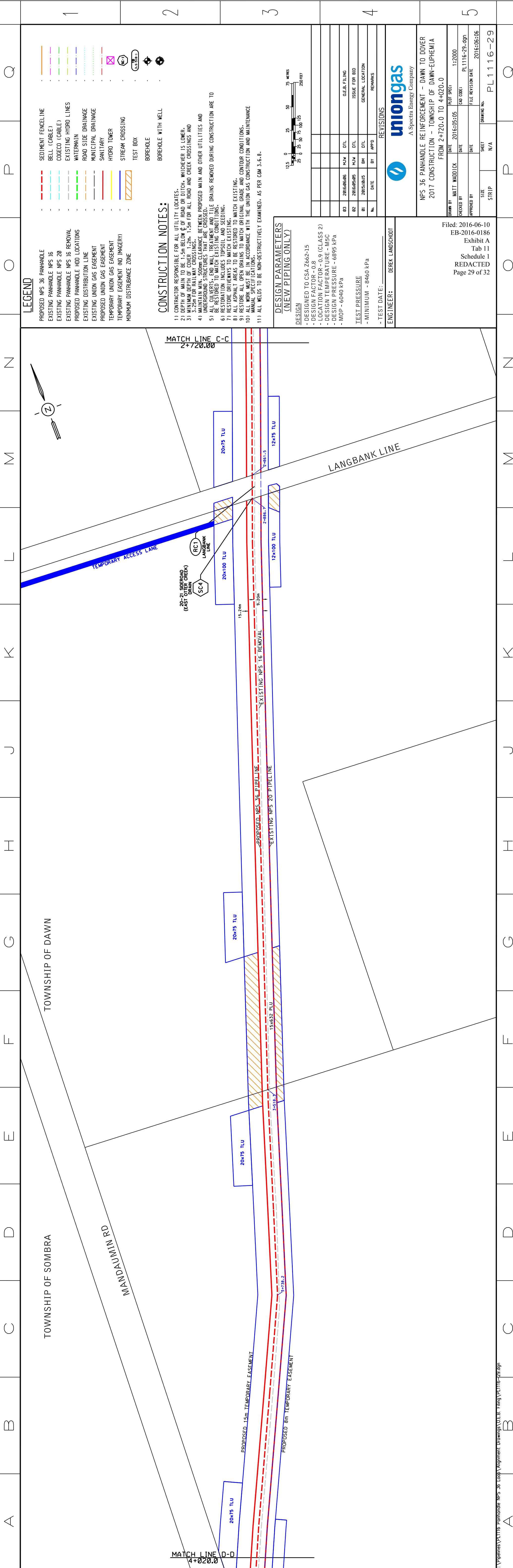
FROM 5+320.0 TO 6+620.0

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Filed: 2016-06-10  
EB-2016-0186  
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LEGEND

- PROPOSED NPS 36 PANHANDLE

- EXISTING PANHANDLE NPS 16

- EXISTING PANHANDLE NPS 20

- EXISTING PANHANDLE NPS 16 REMOVAL

- PROPOSED PANHANDLE HDD LOCATIONS

- EXISTING DISTRIBUTION LINE

- EXISTING UNION GAS EASEMENT

- PROPOSED UNION GAS EASEMENT

- TEMPORARY UNION GAS EASEMENT

- TEMPORARY EASEMENT (NO IMAGERY)

- MINIMUM DISTURBANCE ZONE
- SEDIMENT FENCELINE

- BELL (CABLE)

- CODECO (CABLE)

- EXISTING HYDRO LINES

- WATERMAIN

- ROAD SIDE DRAINAGE

- MUNICIPAL DRAINAGE

- SANITARY

- HYDRO TOWER

- STREAM CROSSING

- TEST BOX

- BOREHOLE

- BOREHOLE WITH WELL

CONSTRUCTION NOTES:

- 1) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES.
- 2) DEPTH OF MAIN TO BE 1.5m BELOW  $\phi$  OF ROAD OR DITCH, WHICHEVER IS LOWER.
- 3) MINIMUM DEPTH OF COVER 1.2m, 1.5m FOR ALL ROAD AND CREEK CROSSINGS AND 3.25m FOR RAILWAY CROSSINGS.
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- 11) ALL WELDS TO BE NON-DESTRUCTIVELY EXAMINED, AS PER C&M 3.6-8.

DESIGN PARAMETERS  
(NEW PIPING ONLY)

- DESIGN
- DESIGNED TO CSA Z662-15
- DESIGN FACTOR - 0.8
- LOCATION FACTOR - 0.9 (CLASS 2)
- DESIGN TEMPERATURE - WSC
- DESIGN PRESSURE - 6895 kPa
- MOP - 6040 kPa

TEST PRESSURE

- MINIMUM - 8460 kPa

- TEST DATE: \_\_\_\_\_

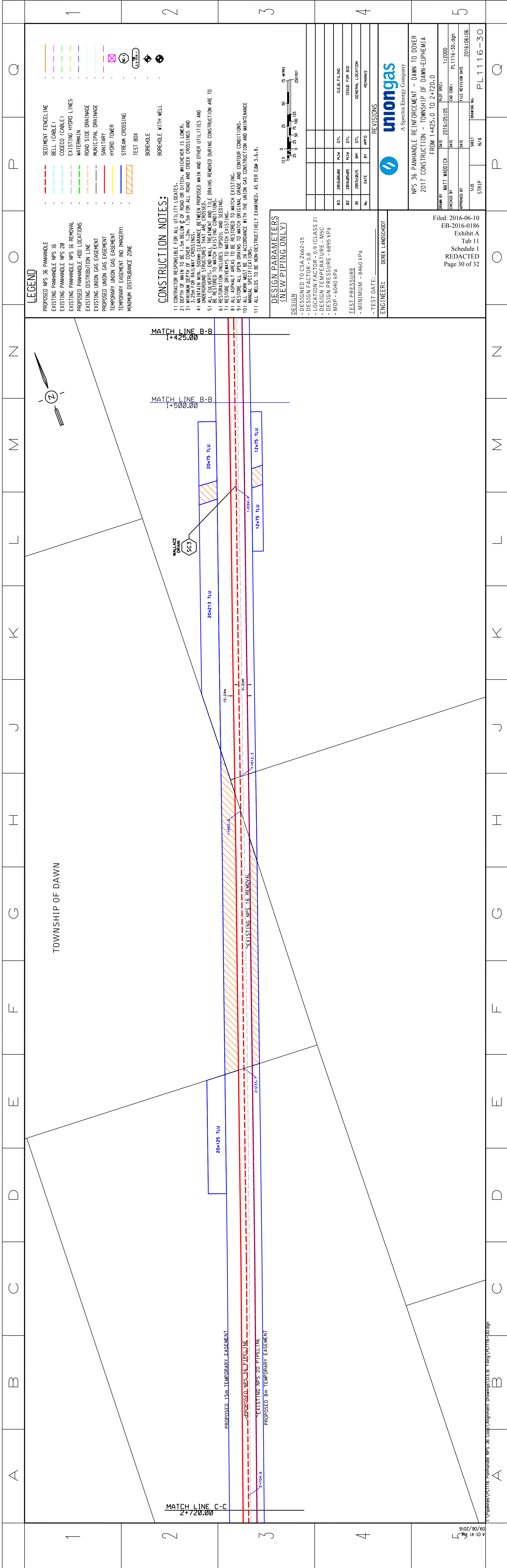
ENGINEER: DEREK LANDSCHOOT



NPS 36 PANHANDLE REINFORCEMENT - DAWN TO DOVER  
2017 CONSTRUCTION - TOWNSHIP OF DAWN-EUPHEMIA  
FROM 2+720.0 TO 4+020.0

Filed: 2016-06-10  
EB-2016-0186  
Exhibit A  
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DRAWN BY	MATT WADDICK	DATE	2016:05:05	PLOT SPECT	1:2000
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APPROVED BY		DATE		FILE REVISION DATE	
SIZE	STRIP	SHEET	N/A	DRAWING No.	PL1116-29



LEGEND

- PROPOSED NPS 36 PANHANDLE
- EXISTING PANHANDLE NPS 16
- EXISTING PANHANDLE NPS 20
- EXISTING PANHANDLE NPS 16 REMOVAL
- PROPOSED PANHANDLE HDD LOCATIONS
- EXISTING DISTRIBUTION LINE
- EXISTING UNION GAS EASEMENT
- PROPOSED UNION GAS EASEMENT
- TEMPORARY UNION GAS EASEMENT
- TEMPORARY EASEMENT (NO IMAGERY)
- MINIMUM DISTURBANCE ZONE
- SEDIMENT FENCELINE
- BELL (CABLE)
- CODECO (CABLE)
- EXISTING HYDRO LINES
- WATERMAIN
- ROAD SIDE DRAINAGE
- MUNICIPAL DRAINAGE
- SANITARY
- HYDRO TOWER
- STREAM CROSSING
- TEST BOX
- BOREHOLE
- BOREHOLE WITH WELL

CONSTRUCTION NOTES:

- 1) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES.
- 2) DEPTH OF MAIN TO BE 1.5m BELOW Q OF ROAD OR DITCH, WHICHEVER IS LOWER.
- 3) MINIMUM DEPTH OF COVER 1.2m, 1.5m FOR ALL ROAD AND CREEK CROSSINGS AND 3.25m FOR RAILWAY CROSSINGS.
- 4) MAINTAIN MIN. 500mm CLEARANCE BETWEEN PROPOSED MAIN AND OTHER UTILITIES AND UNDERGROUND STRUCTURES THAT ARE CROSSED.
- 5) ALL CULVERTS, END WALL TREATMENT AND TILE DRAINS REMOVED DURING CONSTRUCTION ARE TO BE RESTORED TO MATCH EXISTING CONDITIONS.
- 6) RESTORATION INCLUDES TOPSOIL AND SEEDING.
- 7) RESTORE DRIVEWAYS TO MATCH EXISTING.
- 8) ALL ASPHALT AREAS TO BE RESTORED TO MATCH EXISTING.
- 9) RESTORE ALL OPEN DRAINS TO MATCH ORIGINAL GRADE AND CONTOUR CONDITIONS.
- 10) ALL WORK MUST BE IN ACCORDANCE WITH THE UNION GAS CONSTRUCTION AND MAINTENANCE MANUAL SPECIFICATIONS.
- 11) ALL WELDS TO BE NON-DESTRUCTIVELY EXAMINED, AS PER C&M 3.6.8.

DESIGN PARAMETERS (NEW PIPING ONLY)

- DESIGN
- DESIGNED TO CSA Z662-15
  - DESIGN FACTOR - 0.8
  - LOCATION FACTOR - 0.9 (CLASS 2)
  - DESIGN TEMPERATURE - W5C
  - DESIGN PRESSURE - 6895 kPa
  - MOP - 6040 kPa

TEST PRESSURE

- MINIMUM - 8460 kPa

- TEST DATE: \_\_\_\_\_

ENGINEER: DEREK LANDSCHOOT

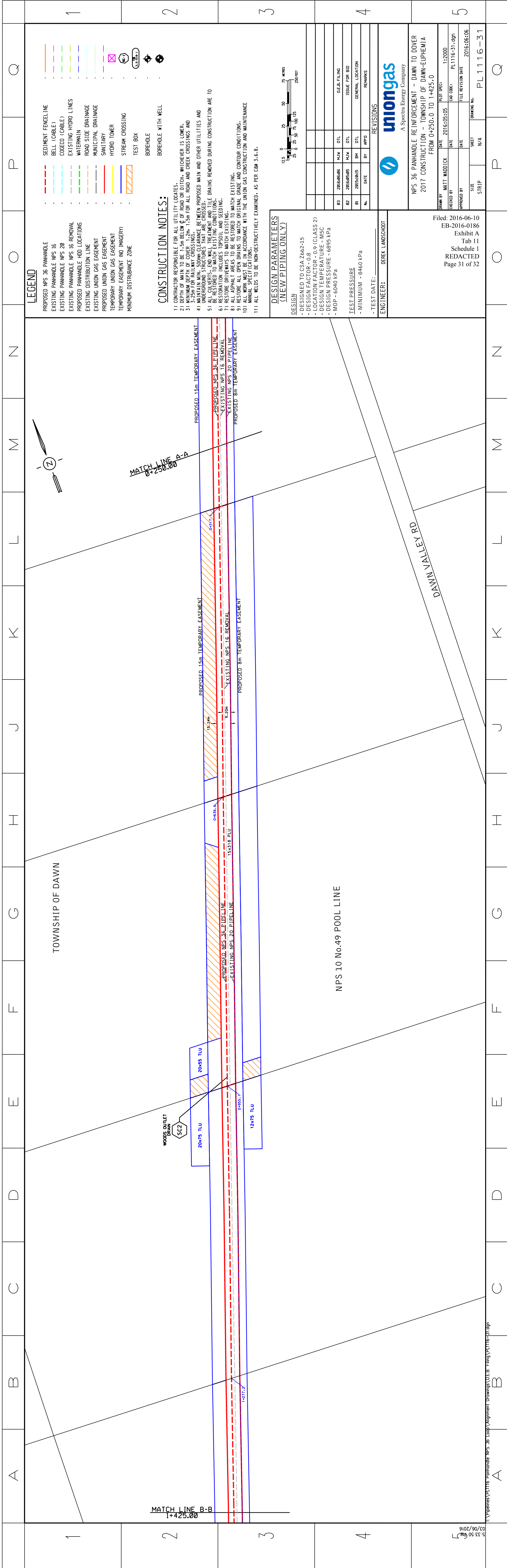
REVISIONS



NPS 36 PANHANDLE REINFORCEMENT - DAWN TO DOVER  
2017 CONSTRUCTION - TOWNSHIP OF DAWN-EUPHEMIA  
FROM 1+425.0 TO 2+720.0

Filed: 2016-06-10  
EB-2016-0186  
Exhibit A  
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Schedule 1  
REDACTED  
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DRAWN BY	MATT WADDICK	DATE	2016:05:05	PLOT SPEC	1:2000
CHECKED BY		DATE		CAD CODE	PL1116-30.dgn
APPROVED BY		DATE		FILE REVISION DATE	
SIZE	STRIP	SHEET	N/A	DRAWING No.	2016:06:06



LEGEND

- PROPOSED NPS 36 PANHANDLE

- EXISTING PANHANDLE NPS 16

- EXISTING PANHANDLE NPS 20

- EXISTING PANHANDLE NPS 16 REMOVAL

- PROPOSED PANHANDLE HDD LOCATIONS

- EXISTING DISTRIBUTION LINE

- EXISTING UNION GAS EASEMENT

- PROPOSED UNION GAS EASEMENT

- TEMPORARY UNION GAS EASEMENT

- TEMPORARY EASEMENT (NO IMAGERY)

- MINIMUM DISTURBANCE ZONE
- SEDIMENT FENCELINE

- BELL (CABLE)

- CODECO (CABLE)

- EXISTING HYDRO LINES

- WATERMAIN

- ROAD SIDE DRAINAGE

- MUNICIPAL DRAINAGE

- SANITARY

- HYDRO TOWER

- STREAM CROSSING

- TEST BOX

- BOREHOLE

- BOREHOLE WITH WELL

CONSTRUCTION NOTES:

- 1) CONTRACTOR RESPONSIBLE FOR ALL UTILITY LOCATES.
- 2) DEPTH OF MAIN TO BE 1.5m BELOW  $\phi$  OF ROAD OR DITCH, WHICHEVER IS LOWER.
- 3) MINIMUM DEPTH OF COVER 1.2m, 1.5m FOR ALL ROAD AND CREEK CROSSINGS AND 3.25m FOR RAILWAY CROSSINGS.
- 4) MAINTAIN MIN. 500mm CLEARANCE BETWEEN PROPOSED MAIN AND OTHER UTILITIES AND UNDERGROUND STRUCTURES THAT ARE CROSSED.
- 5) ALL CULVERTS, END WALL TREATMENT AND TILE DRAINS REMOVED DURING CONSTRUCTION ARE TO BE RESTORED TO MATCH EXISTING CONDITIONS.
- 6) RESTORATION INCLUDES TOPSOIL AND SEEDING.
- 7) RESTORE DRIVEWAYS TO MATCH EXISTING.
- 8) ALL ASPHALT AREAS TO BE RESTORED TO MATCH EXISTING.
- 9) RESTORE ALL OPEN DRAINS TO MATCH ORIGINAL GRADE AND CONTOUR CONDITIONS.
- 10) ALL WORK MUST BE IN ACCORDANCE WITH THE UNION GAS CONSTRUCTION AND MAINTENANCE MANUAL SPECIFICATIONS.
- 11) ALL WELDS TO BE NON-DESTRUCTIVELY EXAMINED, AS PER C&M 3.6.8.

DESIGN PARAMETERS  
(NEW PIPING ONLY)

- DESIGN
- DESIGNED TO CSA Z662-15
- DESIGN FACTOR - 0.8
- LOCATION FACTOR - 0.9 (CLASS 2)
- DESIGN TEMPERATURE - WSC
- DESIGN PRESSURE - 6895 kPa
- MOP - 6040 kPa

TEST PRESSURE

- MINIMUM - 8460 kPa

- TEST DATE: \_\_\_\_\_

ENGINEER: DEREK LANDSCHOOT



A Spectra Energy Company

NPS 36 PANHANDLE REINFORCEMENT - DAWN TO DOVER  
2017 CONSTRUCTION - TOWNSHIP OF DAWN-EUPHEMIA  
FROM 0+250.0 TO 1+425.0

Filed: 2016-06-10  
EB-2016-0186  
Exhibit A  
Tab 11  
Schedule 1  
REDACTED  
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DRAWN BY	MATT WADDICK	DATE	2016:05:05	PLOT SPEC:	1:2000
CHECKED BY		DATE		CAD CODE:	PL1116-31.dgn
APPROVED BY		DATE		FILE REVISION DATE	
SIZE	STRIP	SHEET	N/A	DRAWING No.	2016:06:06

PL1116-31





Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
	TOWNLINE ROAD										
P1 T1801-106		PIN: 007770068 LT PT LT 1 CON 6 DOVER AS IN R668352 S/T 604871 S/T DO28895 PARTIALLY RELEASED BY 242584 S/T DO28879 PARTIALLY RELEASED BY 242583; S/T 235269, 236410; CHATHAM-KENT				222 x 15 290 x 8 150 x 133		0.33 0.23 1.40	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK111836 (L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK111834 (L) Wind Lease  CK110136 (L) Plains Midstream Canada ULC 1400, 607 8 Avenue SW Calgary, AB T2P 0A7 262963, 662107, CK88008 (m) Canadian Imperial Bank of Commerce 99 King St. W. Chatham, ON N7M 1C7 CK 82706		



Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P2 T1801-106		PIN: 007770065 LT PART LOT 1 CON 6 DOVER AS IN 342448; EXCEPT PARTS 1, 2 & 3, 24R6767; S/T DO28895 PARTIALLY RELEASED BY 242584; S/T 265970; S/T 235269; CHATHAM-KENT				343 x 415 x	8 15	0.27 0.59	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK89863, CK89864, CK111834, CK111836 (L) Plains Midstream Canada ULC 1400, 607 8 Avenue SW Calgary, AB T2P 0A7 265970, 662107, CK77645, CK88008 (m) Canadian Imperial Bank of Commerce 99 King St. W. Chatham, ON N7M 1C7 CK82706		
P3 T1801-105		PIN: 007770036 LT PT LT 2 CON 6 DOVER AS IN R668353 (SECONDLY) S/T DO28937 PARTIALLY RELEASED BY 182415 & 309952; S/T 237942; CHATHAM- KENT				208 x 75 x 300 x 360 x	12 20 15 8	0.24 0.03 0.43 0.29	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK110136, CK111834, CK111836, (L) Plains Midstream Canada ULC 1400, 607 8 Avenue SW Calgary, AB T2P 0A7 263026, 662107, CK88008, (m) Canadian Imperial Bank of Commerce 99 King St. W. Chatham, ON N7M 1C7 CK82706		
P5 T1801-104		PIN: 007770059 LT PT LT 2-3 CON 6 DOVER AS IN 572879 S/T DO28804 AMENDED BY 242576; S/T 236684; CHATHAM-KENT				1049 x 1142 x 75 x 470 x	8 15 12 20	0.85 1.69 0.10 0.85	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK104290, CK104411, CK111834, CK111836 (L) Plains Midstream Canada ULC 1400, 607 8 Avenue SW Calgary, AB T2P 0A7 265968, 662107, CK88008,		

Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P6 T1801-103		PIN: 007770047 LT PT LT 4 CON 6 DOVER AS IN 655906 T/W 638008 S/T D028795 PARTIALLY RELEASED BY 242578; S/T 236303; CHATHAM-KENT	50	x 15	0.04	100	x 20	0.23	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK103936, CK104411, CK111834, CK111836 (m) Farm Credit Canada Suite 200 - 1133 St. George Blvd. Moncton, NB E1E 4E1 655907		
P6a		PIN: 007770048 LT PT LT 4 CON 6 DOVER AS IN 257313; S/T 638008; S/T INTEREST IN 257313; CHATHAM-KENT	130	x 10	0.13	50	x irreg	0.09	(L) North Kent Wind 1 GP Inc. & North Kent Wind 1 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK104292, CK104411, CK111834		
P6b		PIN: 007770135 LT PT LT 4 CON 6 DOVER DESIGNATED AS PARTS 1, 2 & 3, 24R10093 SUBJECT TO AN EASEMENT AS IN 638008 MUNICIPALITY CHATHAM-KENT	147	x 10	0.15				(L) North Kent Wind 1 GP Inc. & North Kent Wind 1 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK104293, CK104411, CK111834		
P6c		PIN: 007770056 LT PT LT 5 CON 6 DOVER AS IN 257313 EXCEPT 24R5050; S/T 243389 & 638008; CHATHAM-KENT	620	x 10	0.63				(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK104294, CK104411, CK111834, CK111836 (m) Jean Paul Pinsonneault Mary Pinsonneault 89 Gregory Dr E, Chatham, ON N7M 5J7 CK69856		

Panhandle Reinforcement NPS36 2017

FILE NO.:		NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
				Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
HERON LINE												
P7 T1801-102			PIN: 007720009 LT PT LT 3-4 CON 7 DOVER AS IN 558619; S/T DO28779 PARTIALLY SURRENDERED BY 242577; S/T 234151, 262964; CHATHAM-KENT	41	x	15	0.04	100	x	50	0.37	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK111836 (L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK111834 (L) Plains Midstream Canada ULC 1400, 607 8 Avenue SW Calgary, AB T2P 0A7 262964, 471217, 657353, 662107, CK65428, CK88008
P8 T1801-101			PIN: 007720131 LT PART OF LOTS 4 & 5 CONCESSION 7 DOVER AS IN 475176; SAVE & EXCEPT PARTS 6, 7 & 8, D1156 & PARTS 1, 2 & 8, 24R-10005; S/T DO28932 PARTIALLY SURRENDERED BY 242585; S/T 236560, 262965 SUBJECT TO AN EASEMENT OVER PARTS 3, 4, 5, 6 & 7, 24R-10005 IN FAVOUR OF PART LOT 5 CON 7 DOVER DESIGNATED AS PART 8, 24R-10005 AS IN CK112749 MUNICIPALITY CHATHAM-KENT					100	x	20	0.21	(L) Plains Midstream Canada ULC 1400, 607 8 Avenue SW Calgary, AB T2P 0A7 262965, 662107, CK88008, (m) Bank of Montreal 200 Ouellette Ave., Windsor, ON N9A 1A5 CK88557
	JACOB LINE											Filed: EE

FILE NO.:		NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
				Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P8a			PIN: 007730120 LT PT LT 6 CON 7 DOVER AS IN 560677; CHATHAM-KENT				20	x	15	0.03	(m) Farm Credit Canada 200 - 1133 St. George Blvd, Moncton, NB E1E 4E1 610336	
P9	T1801-100		PIN: 007730082 LT PT LT 6 CON 7 DOVER AS IN 651173 S/T DO28806 PARTIALLY RELEASED BY 242586; S/T 238214; CHATHAM-KENT				350	x	15	0.50	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK104288, CK104411, CK111834, CK111836 (option for easement) Agris Solar Co- operation 835 Park Ave. Chatham, ON N7M 5J6 CK68690 (L) Paragon Petroleum Corp. 555 Southdale Rd. E London, ON N6E 1A2 586906 (m) Farm Credit Canada 417 Exeter Rd. London, ON N6E 2Z3 CK68705 (m) Canadian Imperial Bank of Commerce 802 Dufferin Ave. Wallaceburg, ON N8A 4L5 651361	
P11	T1801-099		PIN: 007730081 LT PT LT 6 CON 7 DOVER AS IN 630338 S/T DO28844 PARTIALLY RELEASED BY 242588; S/T 234150; CHATHAM-KENT				308	x	8	0.28	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 657355, CK65428, CK111834, CK111836	
Filed: 2016-06-10 EB-2016-0186 Exhibit A Tab 11 Schedule 2 REDACTED Page 5 of 38												
June-10-16												

Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P12 T1801-098		PIN: 007730085 LT PT LT 7 CON 7 DOVER AS IN 659043 S/T DO28826 PARTIALLY RELEASED BY 242587; S/T 236883; S/T EXECUTION 93-0000958, IF ENFORCEABLE; CHATHAM-KENT				345 x 345 x	8 15	0.28 0.53	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK110071, CK111834, CK111836,		
P13 T1801-097		PIN: 007730083 LT PT LT 6-7 CON 7 DOVER AS IN 405246 & 366676 LYING N OF D1172 S/T DO28805 PARTIALLY RELEASED BY 243430 S/T DO28826 PARTIALLY RELEASED BY 242587; S/T 238213; S/T EXECUTION 93-0000958, IF ENFORCEABLE; CHATHAM-KENT				340 x 342 x	8 15	0.27 0.51			
P14 T1801-096		PIN: 007730307 LT PART OF LOT 8, CONCESSION 7, GEOGRAPHIC TOWNSHIP OF DOVER AS IN 456182 EXCEPT PART 1, 24R9687 ; SUBJECT TO AN EASEMENT IN GROSS AS IN DO28846 PARTIALLY RELEASED BY 174260 SUBJECT TO AN EASEMENT IN GROSS OVER PART 1, 24R348 AS IN 236302 MUNICIPALITY CHATHAM-KENT				174 x 174 x	15 8	0.26 0.14	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK756678, CK76555, CK76561, CK111834, CK111836		
P15 T1801-096		PIN: 007730087 LT PT LT 8 CON 7 DOVER AS IN 457366 S/T DO28846 PARTIALLY RELEASED BY 174260; S/T 236882; CHATHAM-KENT				125 x 175 x 175 x	20 8 15	0.29 0.14 0.26	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK75677, CK76555, CK76572, CK111834, CK111836		

Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P16 T1801-096		PIN: 007730088 LT PT LT 8 CON 7 DOVER AS IN 644333 S/T DO28846 PARTIALLY RELEASED BY 174260; S/T 238212; CHATHAM-KENT				15 x 90 x	15 8	0.03 0.06	(L) Corp. of Chatham/Kent Box 640, 315 King St. W. Chatham, ON N7M5K8 648095, 665591 (m) Royal Bank of Canada 226 Main St. Exeter, ON N0M 1S7 644334		
	RIVARD LINE										
P17		PIN: 007730020 R PT LT 8 CON 8 DOVER PT 1, 24R3815 S/T DO28828 PARTIALLY RELEASED BY 242598; CHATHAM-KENT									
P18 T1801-095		PIN: 007730150 R PT LT 8 CON 8 DOVER AS IN 405246 EXCEPT PT 1, 24R3815 & PT 1 & 2, 24R7990 S/T DO28828 PARTIALLY RELEASED BY 242598; CHATHAM- KENT				125 x 237 x 310 x	20 8 15	0.28 0.19 0.47	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 670820, 670863, 670864, (m) Royal Bank of Canada 180 Wellington St., 10th Floor Toronto, ON M5J 1J1 665654		
P19 T1801-094		PIN: 007730023 LT PT LT 9 CON 8 DOVER AS IN DO28677 S/T DO28863 PARTIALLY RELEASED BY 242589; S/T 236881; CHATHAM-KENT				350 x 350 x	8 15	0.28 0.56	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK663333, CK654285, CK65448, CK111333, CK111836		

Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P20 T1801-093		PIN: 007730024 LT PT LT 9 CON 8 DOVER AS IN 655438 S/T DO28797 PARTIALLY RELEASED BY 242592 S/T INTEREST IN 655438; S/T 234341; CHATHAM-KENT				357 x 357 x	15 8	0.54 0.28	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK106500, CK111834, CK111836, (m) Couture, Dora Marie RR #1 Grande Pointe, ON N0P 1S0 655439		
P21 T1801-092		PIN: 007730028 LT PT LT 10 CON 8 DOVER AS IN 324457 S/T DO28925 PARTIALLY RELEASED BY 242590; S/T 238889; CHATHAM-KENT				20 x 75 x 358 x 358 x	12 12 8 15	0.02 0.10 0.29 0.51	(m) Farm Credit Canada Suite 200 - 1133 St. George Blvd. Moncton, NB E1E 4E1 CK112525		
P22 T1801-091		PIN: 007730029 LT PT LT 10 CON 8 DOVER AS IN 568246 W OF GIVEN RD S/T DO28778 PARTIALLY RELEASED BY 158322 & 353484 S/T 568246; S/T 236880; CHATHAM-KENT				52 x 80 x	8 12	0.03 0.08	(option for easement) Agri Solar Co- Operative Inc. 835 Park Ave. West Chatham, ON N7M 5J6 CK68691 (m) Farm Credit Canada 417 Exeter Rd. London, ON N6E 2Z3 CK68705 (m) Canadian Imperial Bank of Commerce 802 Dufferin Ave. Wallaceburg, ON N8A 4L5 651361 (m) Canadian Imperial Bank of Commerce 802 Dufferin Ave. Wallaceburg, ON N8A 4L5 571125		
P22a T1801-090		PIN: 007730026 LT PT LT 10 CON 8 DOVER AS IN 540866 (FIRSTLY); CHATHAM-KENT				irr 60 x	15 12	0.03 0.06			

Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P23 T1801-090		PIN: 007730050 LT PT LT 10 CON 8 DOVER AS IN 540866 (SECONDLY) S/T DO28928 PARTIALLY RELEASED BY 167051; S/T 238210; CHATHAM-KENT				310	x	8	0.24	(m) Sylvain, Dorey Joseph & Sylvain, Therese Marie RR #1 Grande Pointe, ON NOP 150 540867	
P24 T1801-089		PIN: 007730031 LT PT LT 11 CON 8 DOVER AS IN 648130 E OF GIVEN RD S/T DO28798 PARTIALLY RELEASED BY 242579; S/T 238209; CHATHAM-KENT				x				(L) Invenergy Canada Wind 2 Ltd. 120 Front St. East, Suite 201 Toronto, ON M5A 4L9 CK79312 (L) Invenergy Wind Canada LLC. 45 Toronto St. Guelph, ON N1E 3E3 657352	
P25 T1801-088		PIN: 007730032 LT PT LT 11 CON 8 DOVER AS IN 549990 S/T DO28865 PARTIALLY RELEASED BY 229777; S/T 241192; CHATHAM-KENT				73	x	20	0.13	(m) The Corporation of Chatham-Kent 315 King St. West, Box 640 Chatham, ON N7M 5K8 CK65945 (m) Royal Bank of Canada 180 Wellington St., 10th Floor Toronto, ON M5J 1J1 669381	
P26 T1801-087		PIN: 007730034 LT PT LT 11 CON 8 DOVER AS IN R666676 S/T DO28929 PARTIALLY RELEASED BY 242591; S/T 234340; CHATHAM-KENT				179	x	15	0.27		
						179	x	8	0.14		



Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P27 T1801-085		PIN: 007730145 LT PT LT 12 CON 8 DOVER AS IN 622821 S/T DO28930 PARTIALLY RELEASED BY 227152 S/T DO28953 PARTIALLY RELEASED BY 227153; S/T 236682, 236683; CHATHAM-KENT				127 x 86 x irr x 104 x 104 x 60 x 86 x	8 15 26 15 8 20 20	0.10 0.10 0.06 0.16 0.08 0.11 0.19	(m) Farm Credit Canada Suite 200 - 1133 St. George Blvd. Moncton, NB E1E 4E1 614779		
P28 T1801-086		PIN: 007730038 LT PT LT 12 CON 8 DOVER PT 5, 6 & 7, 24R1607 S/T DO28953 PARTIALLY RELEASED BY 227153; S/T 238208; CHATHAM-KENT				40 x 40 x	8 15	0.03 0.06	(m) CIBC Mortgage Corp. Box 115 Commerce Court Postal Station Toronto, ON M5L 1E5 559864		
P29 T1801-085		PIN: 007730146 LT PT LT 12 CON 8 DOVER PT 1, 2, 3 & 4, 24R6955 S/T DO28930 PARTIALLY RELEASED BY 227152 S/T DO28953 PARTIALLY RELEASED BY 227153; S/T 236084, 236682; CHATHAM-KENT				irr x	8	0.01	(m) Bank of Montreal 865 Harrington Court Burlington, ON L7N 3P 607445		
	SAINT PHILIPPE LINE										
P30 T1801-084		PIN: 007690077 LT PT LT 12 CON 9 DOVER AS IN 656381; S/T DO28927 PARTIALLY SURRENDERED BY 242593; S/T 234149; CHATHAM-KENT				81 x 45 x irr x 39 x	15 20 6 20	0.10 0.05 0.01 0.08	(L) Agreement Re: Drains  CK91717		

Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P31 T1801-083		PIN: 007690229 LT PART OF LOT 1, PLAN 588 AS IN 558169 EXCEPT PARTS 1 & 2, 24R9977; SUBJECT TO AN EASEMENT AS IN DO28800 PARTIALLY SURRENDERED BY 160760 SUBJECT TO AN EASEMENT AS IN D1352 MUNICIPALITY CHATHAM-KENT				25 x 75 x 85 x 345 x 366 x 60 x	20 20 10 8 15 20	0.05 0.15 0.09 0.28 0.53 0.12	(L) Notice CK91717		
	WINTERLINE ROAD										
P33 T1801-082		PIN: 007700190 LT LT 6 PL 588 SAVE & EXCEPT PTS 1 & 2 PL 24R9961; S/T DO28807 PARTIALLY RELEASED BY 242597; S/T 236879 MUNICIPALITY CHATHAM- KENT				518 x 518 x 91 x 86 x	15 8 10 20	0.78 0.41 0.09 0.16	(m) Canadian Imperial Bank of Commerce 802 Dufferin Ave. Wallaceburg, ON N8A 4L5 658535		
P34 T1801-081		PIN: 007700039 LT PT LT 13 CON 9 DOVER AS IN 604393 S/T DEBTS IN 604393 S/T DO28796 PARTIALLY RELEASED BY 243431; S/T 236301, 353516; CHATHAM-KENT				180 x 180 x	8 15	0.14 0.27			

Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P35 T1801-080		PIN: 007700046 LT PT LT 14 CON 9 DOVER AS IN 391293; S/T 238207, 353523; SUBJECT TO AN EASEMENT IN GROSS UNTIL JULY 26, 2051 AS IN CK64380 MUNICIPALITY CHATHAM-KENT				75 x 75 x 290 x 232 x	12 12 8 15	0.08 0.08 0.22 0.32	(L) East Lake St. Clair Wind GP Inc. 105 Commerce Valley Drive West, Suite 410 Markham, ON L3T 7W3 CK64380, CK77812, , (Notice) International Power Canada Inc. 105 Commerce Valley Drive West, Suite 410 Markham, ON L3T 7W3 R668334 (Option Easement) AIM Powergen Corporation 200 Consumers Rd., Suite 604 North York, ON M2J R4R 659332 (A Charge of Easement) The Manufacturers Life Insurance Co. 200 Bloor St. East, Suite 400 Toronto, ON M4W 1E5 CK78982		
P36 T1801-079		PIN: 007700044 LT PT LT 14 CON 9 DOVER AS IN 663556 S/T DO28842 PARTIALLY RELEASED BY 147444; S/T 236878; CHATHAM-KENT				34 x 73 x 146 x 79 x	12 8 15 12	0.02 0.05 0.20 0.08			
P37 T1801-078		PIN: 007700045 LT PT LT 14 CON 9 DOVER AS IN 659978 S/T DO28841 PARTIALLY RELEASED BY 148047; S/T 236877; CHATHAM-KENT				70 x 75 x 76 x 350 x 350 x	12 12 12 8 15	0.08 0.09 0.09 0.28 0.52			

Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P38 T1801-076		PIN: 007700074 LT PT LT 15 CON 9 DOVER AS IN 543895 & 599849 S/T DO28839 PARTIALLY RELEASED BY 174267 S/T DO28847 PARTIALLY RELEASED BY 186396; S/T 239585, 239586; CHATHAM-KENT				680 x 680 x 75 x 75 x	8 15 12 12	0.14 1.02 0.09 0.09	(m) Canadian Imperial Bank of Commerce 100 University Ave., 3rd Floor Toronto, ON M5J 2X4 CK105464  (m) Canadian Imperial Bank of Commerce 802 Dufferin Ave. Wallaceburg, ON N8A 4L5 599850		
P39 T1801-075		PIN: 007700054 LT PT LT 16 CON 9 DOVER AS IN 212690 S/T DO28802 PARTIALLY RELEASED BY 214494; S/T 233882; SUBJECT TO AN EASEMENT IN GROSS UNTIL JULY 26, 2051 AS IN CK64385 MUNICIPALITY CHATHAM-KENT				102 x 75 x 330 x 274 x	20 12 8 15	0.17 0.09 0.26 0.38	(L) East Lake St. Clair Wind GP Inc. 105 Commerce Valley Drive West, Suite 410 Markham, ON L3T 7W3 CK64385, CK77812, , (L) Option Easement  667145  (A Charge of Easement) The Manufacturers Life Insurance Co. 200 Bloor St. East, Suite 400 Toronto, ON M4W 1E5 CK78982		
	MALLARD LINE										
P39a		PIN: 007700017 LT PT LT 16 CON 10 DOVER AS IN 558170 EXCEPT PT 6, D1186 S/T DO28969 PARTIALLY RELEASED BY 225072; S/T 232002; CHATHAM-KENT				65 x 112 x	15 20	0.07 0.17	(e) Aim Powergen Corporation 410 - 105 Commerce Valley Dr W, Markham, ON L3T 7W3 662274		

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FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P40 T1801-073		PIN: 007700084 LT PT LT 16 CON 10 DOVER AS IN 662342 S/T DO28840 PARTIALLY RELEASED BY 242596; S/T 236300; CHATHAM-KENT				695 x 10 x 75 x 317 x 344 x	8 20 12 8 15	0.56 0.01 0.01 0.26 0.51	(m) Canadian Imperial Bank of Commerce 802 Dufferin Ave. Wallaceburg, ON N8A 4L5 CK82596		
P41 T1801-072		PIN: 007700085 LT PT LT 17 CON 10 DOVER AS IN 662343 S/T DO28801 PARTIALLY RELEASED BY 242595; S/T 236299; CHATHAM-KENT				75 x 690 x 348 x 348 x	15 8 8 15	0.11 0.55 0.28 0.51	(m) The Bank of Nova Scotia 213 King Street West, PO Box 518 Chatham, ON N7M 1E6 CK108352		
P42 t1801-071		PIN: 007700184 LT PART OF LOT 17, CONCESSION 10, GEOGRAPHIC TOWNSHIP OF DOVER, AS IN 409918 EXCEPT PART 2, 24R9009 ; SUBJECT TO INTEREST IN 463657 SUBJECT TO AN EASEMENT IN GROSS OVER PART OF LOT 17, CON 10, DOVER, DESIGNATED AS PART 1, 24R405 AS IN DO28799 SUBJECT TO AN EASEMENT IN GROSS OVER PART OF LOT 17, CON 10, DOVER, DESIGNATED AS PART 1, 24R380 AS IN 238206 MUNICIPALITY CHATHAM-KENT				350 x 350 x	8 15	0.28 0.53	(L) AIM Powergen Corporation 200 Consumers Road, Suite 604 North York, ON M2J 4R4 658403		
P43 T1801-070		PIN: 007700026 LT PT LT 18 CON 10 DOVER AS IN 640078 S/T INTEREST IN 558019 S/T DO28942 PARTIALLY RELEASED BY 242581; S/T 234153; CHATHAM- KENT				350 x 335 x	8 15	0.28 0.48			

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FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P44 T1801-069		PIN: 007700079 LT PT LT 18 CON 10 DOVER AS IN 531814 EXCEPT PT 13, D1186 & PT 1, 24R7553 S/T DO28776 PARTIALLY RELEASED BY 242582; S/T 231844; CHATHAM-KENT				44	x	8			(L) International Power Canada Inc. 105 Commerce Valley Drive West, Suite 410 Markham, ON L3T 7W3 659335, R668319 (m) The Bank of Nova Scotia 213 King Street West, PO Box 518 Chatham, ON N7M 1E6 R669731
P44a		PIN: 007700024 LT PT LT 18 CON 10 DOVER AS IN 162256; S/T EXECUTION 09-0000124, IF ENFORCEABLE; CHATHAM-KENT				49	x	15			
P45 T1801-068		PIN: 007700025 LT PT LT 18 CON 10 DOVER AS IN 558018 S/T INTEREST IN 558018 S/T DO28931 PARTIALLY RELEASED BY 242580; S/T 234152; S/T EXECUTION 09-0000124, IF ENFORCEABLE; CHATHAM-KENT				75 75 75 75 318 342	x x x x x x	12 12 12 12 8 15			
P46 T1801-067		PIN: 007700028 LT PT LT 19 CON 10 DOVER PT 1, 24R2743 S/T DO28777; S/T 194264; CHATHAM-KENT				347 347	x x	8 15			(m) Dodick, Kive I., in trust c/o: 711 Canada Trust Bldg., Windsor, ON N9A 1G5 494882
P47 T1801-067		PIN: 007700029 LT PT LT 19 CON 10 DOVER AS IN 663982 S/T DO28777; S/T 194264; CHATHAM-KENT				75 75 338 338	x x x x	12 20 8 15			

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			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
	BEARLINE ROAD										
P47A F11-028		PIN: 007680007 LT PT LT 20 CON 11 DOVER PT 1, D1235; S/T DO28924 PARTIALLY SURRENDERED BY 205561; CHATHAM-KENT									
P48 T1801-066		PIN: 007680006 LT PT LT 20 CON 11 DOVER AS IN 473959, S/T DO28924 PARTIALLY SURRENDERED BY 205561; S/T 195266; CHATHAM-KENT	330 x 350 x 75 x 101 x	8 15 20 47	0.28 0.53 0.14 0.41						
P49 T1801-064		PIN: 007680009 LT PT LT 20 CON 11 DOVER AS IN 632913; S/T 194263, DO28827, DO28951; CHATHAM-KENT	120 x 190 x 130 x	12 8 15	0.14 0.14 0.17						
P50 T1801-064		PIN: 007680061 LT PT LT 20 CON 11 DOVER AS IN 571859, S/T DO28827 PARTIALLY SURRENDERED BY 148324; S/T 194262, DO28915; CHATHAM-KENT	176 x 248 x 120 x	8 15 12	0.13 0.35 0.14				(L) Township of Dover 515 Grand Ave West Chatham ON N7L 1C5 571860, 574064		
P51 T1801-063		PIN: 007680019 LT LT 26 WEST BALDOON ROAD DOVER S/T DO28833 PARTIALLY SURRENDERED BY 498341; S/T 195162; CHATHAM-KENT	300 x 243 x	8 15	0.23 0.34				(L) Mooncor Oil & Gas Corp. 2050, 717-7th Avenue S.W. Calgary, AB T2P 0Z3 650903, 656467, R669521 (m) Canadian Imperial Bank of Commerce 103 Main St. Dresden, ON N0P 1M0 668130		

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			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P52 T1801-063		PIN: 007680017 LT LT 27 WEST BALDOON ROAD DOVER S/T DEBTS IN 574548; S/T DO28833 PARTIALLY SURRENDERED BY 498341; S/T 194768; CHATHAM-KENT				75 x 75 x 744 x 819 x	20 12 8 15	0.16 0.09 0.59 1.20			
	BALDOON ROAD										
P53 T1801-063		PIN: 007680082 LT PT LT 27 EAST BALDOON ROAD DOVER AS IN 627592, S/T DO28823 PARTIALLY SURRENDERED BY 205560; S/T 194261; CHATHAM-KENT				75 x 269 x 210 x 75 x 122 x	12 8 15 12 20	0.09 0.21 0.29 0.10 0.29	(m) St. Willibrord Community Credit Union Limited 167 Central Avenue, 2nd Floor London, ON N6A 1M6 627595		
	GREENVALLEY LINE										



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FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P54 T1801-061		PIN: 007680067 LT LT 28 EAST BALDOON ROAD DOVER EXCEPT PT 1, 24R5467, S/T DO29642 PARTIALLY SURRENDERED BY 205559, S/T INTEREST IN 552565; S/T 194259; CHATHAM-KENT				75	x	12	0.09	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP	
						75	x	12	0.09	2050 Derry Rd. West, Mississauga, ON L5N 0B9	
						75	x	20	0.19		
						75	x	12	0.10	CK103000, CK104165, CK111834	
						75	x	20	0.14	(m) Bank of Montreal	
						734	x	8	0.57	10 Fifth Street South Chatham, ON N7M 4V4	
						745	x	15	1.11	CK67657	
						75	x	20	0.14	(m) Bank of Montreal	
										10 Fifth Street South Chatham, ON N7M 4V4 642379	
										(m) Bank of Montreal	
										801 St. Clair St. Ext., Chatham, ON N7M 5J7 589089	
P55 T1801-060		PIN: 007680054 LT PT LT 24 CON 12 DOVER DESIGNATED AS PTS 7, 8 & 9, 24R7748, S/T DO28843 PARTIALLY RELEASED BY 205558; S/T 194767 MUNICIPALITY CHATHAM-KENT	60	x	15	258	x	8	0.21	(L) Agri Solar Co-Operative Inc.	
						250	x	15	0.38	835 Park Ave. West Chatham, ON N7M 5J6 CK60684	
						245	x	20	0.48	(m) Farm Credit Canada	
										417 Exeter Rd. London, ON N6E 2Z3 CK60732	
										(m) Bank of Nova Scotia	
										213 King Street West, PO Box 518 Chatham, ON N7M 1E6	
										CK74426	

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FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT				TEMPORARY EASEMENT				MORTGAGE, LIEN/LEASE, EASEMENT			
			Length	Width	Area (Hectares)		Length	Width	Area (Hectares)		(m)	(l)	(e)	
P56 T1801-060		PIN: 007680055 LT PT LT 24 CON 12 DOVER DESIGNATED AS PARTS 1 TO 6, 24R7748, S/T DO28843 PARTIALLY RELEASED BY 205558, S/T 194767, DO27460 SUBJECT TO AN EASEMENT IN GROSS OVER PARTS 1, 2, 3 & 4, 24R9955 AS IN CK103592 MUNICIPALITY CHATHAM-KENT	70	x	15	0.01	422	x	8	0.34	(L) Agri Solar Co-Operative Inc. 835 Park Ave. West Chatham, ON N7M 5J6 CK79447 (m) Bank of Nova Scotia 213 King Street West, PO Box 518 Chatham, ON N7M 1E6 CK74425			
P56a		PIN: 007680162 LT PART OF LOT 24, CONCESSION 12, GEOGRAPHIC TOWNSHIP OF DOVER, DESIGNATED AS PARTS 1 & 2, 24R9434 SUBJECT TO AN EASEMENT IN GROSS OVER PART 1, 24R9434 AS IN DO27477 SUBJECT TO AN EASEMENT OVER PARTS 1 & 2, 9434 IN FAVOUR OF PART OF LOT 24, CON. 12, DOVER, DESIGNATED AS PARTS 3 & 4, 24R9434 AS IN CK81302 TOGETHER WITH AN EASEMENT OVER PART OF LOT 24, CON. 12, DOVER, DESIGNATED AS PARTS 3 & 4, 24R9434 AS IN CK81302 MUNICIPALITY CHATHAM-KENT	89	x	20	0.13	42	x	15	0.04	(L) North Kent Wind 1 GP Inc. North Kent Wind 1 LP 2050 Derry Rd W, Mississauga ON L5N 0B9 CK106509, CK111834 (m) The Toronto-Dominion Bank 1907 Oxford St E, London ON N5V 4L9 651579 (m) The Toronto-Dominion Bank 75 King St W, PO Box 190, Chatham ON N7N 5K3 567585			
	ST CLAIR ROAD													
P57 T1801-059		PIN: 007530021 LT PT LT 1 CON 12 CHATHAM AS IN 558612; S/T 194260; CHATHAM-KENT	10	x	15	0.02	15	x	8	0.01	(m) Toronto-Dominion Bank 651580 (m) Toronto-Dominion Bank 255 King St. West, Chatham, ON N7M 1E6 629765			

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			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P58 T1801-059		PIN: 007530023 LT PT LT 1-2 CON 12 CHATHAM AS IN 473263 S/T CH42329 PARTIALLY RELEASED BY 205557; S/T 196426 SUBJECT TO AN EASEMENT IN GROSS OVER PART OF LOT 1, CON 12, CHATHAM; DESIGNATED AS PARTS 1 & 2, 24R9951 AS IN CK103582 MUNICIPALITY CHATHAM-KENT	190	x	15	0.29	96	x	20	0.18	(m) Toronto-Dominion Bank
						60	x	12	0.11	651580	
						794	x	8	0.64	(m) Toronto-Dominion Bank	
						766	x	15	1.12	75 King St. West, Chatham, ON N7M 5K3 606062	
										(m) Toronto-Dominion Bank 75 King St. West, Chatham, ON N7M 5K3 473264	
P59 T1801-058		PIN: 007530024 LT PART OF LOTS 1 & 2, CONCESSION 12, GEOGRAPHIC TOWNSHIP OF CHATHAM AS IN 648138; S/T 194307, CH43090 MUNICIPALITY CHATHAM-KENT				411	x	8	0.32	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP	
						482	x	15	0.70	2050 Derry Rd. West, Mississauga, ON L5N 0B9	
										CK102907, CK104165, CK111834	
										(m) Bank of Montreal 10 Fifth Street South Chatham, ON N7M 4V4 CK67657	
P60 T1801-057		PIN: 007530054 LT PT LT 2-3 CON 12 CHATHAM AS IN 590756 S/T CH42460 S/T CH43577 PARTIALLY RELEASED BY 205556; S/T 194258; CHATHAM-KENT				75	x	12	0.10		
						75	x	20	0.19		
						295	x	8	0.23		
						240	x	15	0.33		
	BUSH LINE										

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			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P60a		PIN: 007560006 LT E1/2 LT 2 CON 13 CHATHAM; CHATHAM-KENT				16	x	10	0.02	(L) North Kent Wind 1 GP Inc. North Kent Wind 1 LP 2050 Derry Rd W, Mississauga ON L5N 0B9 CK104031, CK104165, CK111834 (m) Canadian Imperial Bank of Commerce 99 King St W, PO Box 820, Chatham ON N7N 5L1 550496	
P61		PIN: 007560007 LT PT LT 3 CON 13 CHATHAM AS IN 598204 (PARCEL 2); S/T CH42148 PARTIALLY SURRENDERED BY 127806, S/T CH42209 PARTIALLY SURRENDERED BY 206496; S/T D1232; S/T EXECUTION 09-0000493, IF ENFORCEABLE; CHATHAM-KENT				10	x	23	0.01		
	T1801-055					364	x	8	0.29		
						430	x	15	0.63		
						75	x	12	0.10		
						75	x	20	0.19		
P62		PIN: 007560067 LT PT LT 3 CON 13 CHATHAM AS IN 640932; T/W 640932; S/T CH42209 PARTIALLY RELEASED BY 206496, 503782; S/T 194257, CH42112; CHATHAM-KENT				235	x	8	0.19	(m) Van De Velde, Rosemary Evelyn RR #3 Tupperville, ON 640933	
	T1801-054					235	x	15	0.35		
P63		PIN: 007560009 LT PT LT 4 CON 13 CHATHAM AS IN 598204 (PARCEL 1); S/T 194256, CH42110 MUNICIPALITY CHATHAM-KENT				355	x	8	0.28	(m) Bank of Montreal 10 Fifth Street South Chatham, ON N7M 4V4 CK55740	
	T1801-052					355	x	15	0.53		

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			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P64 T1801-051		PIN: 007560010 LT PT LT 4 CON 13 CHATHAM PT 1 24R2450; S/T INTEREST IN 344248; S/T CH42111 PARTIALLY SURRENDERED BY 205555; S/T 194255 MUNICIPALITY CHATHAM-KENT				190 x 190 x	8 15	0.15 0.29	(L) Amoco Canada Petroleum Co. Ltd. 444-7th Avenue S.W., Calgary, AB T2P 0Y2 329378 (m) Bank of Montreal 10 Fifth Street South Chatham, ON N7M 4V4 CK55740		
P65 T1801-051		PIN: 007560058 LT PT LT 4 CON 13 CHATHAM PT 2 24R2450 EXCEPT PT 1, 2 24R6748; S/T CH42111 PARTIALLY SURRENDERED BY 205555; S/T 194255; CHATHAM-KENT				165 x 165 x	8 15	0.13 0.25	(L) Paladin Petroleum Corporation 150 Kent Street London, ON N6A 1L3 329378, 417454		
P66 T1801-050		PIN: 007560048 LT SW 1/4 LT 5 CON 13 CHATHAM ; S/T CH42151 PARTIALLY SURRENDERED BY 205554; S/T 194769, CH38302; CHATHAM-KENT				148 x 92 x	8 15	0.11 0.11	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK104066, CK104165, CK111834 (m) Van Segbrook, Elze and Frank RR #3 Tupperville, ON N0P 2M0 539315		
P67 T1801-049		PIN: 007560053 LT SW 1/2 OF NW1/2 LT 5 CON 13 CHATHAM EXCEPT PT 1, 2, 3 24R5193 AND PT 1 24R5357; S/T CH42208 PARTIALLY SURRENDERED BY 205554; S/T 194769, CH38287; CHATHAM-KENT				50 x 50 x 222 x 295 x	12 12 8 15	0.07 0.07 0.17 0.41	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK104066, CK104165, CK111834 (m) Van Segbrook, Elze and Frank RR #3 Tupperville, ON N0P 2M0 539319		

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			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P69 T1801-048		PIN: 007560050 LT NE 1/2 OF N1/2 LT 5 CON 13 CHATHAM; S/T CH42147 PARTIALLY SURRENDERED BY 205553; S/T 195163; CHATHAM-KENT				356 x 356 x	8 15	0.28 0.54	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK104066, CK104165, CK111834 (m) Van Segbrook, Elze and Frank RR #3 Tupperville, ON NOP 2M0 539317		
P71 T1801-047		PIN: 007560060 LT NW 1/4 LT 6 CON 13 CHATHAM EXCEPT PT 1 24R7012; S/T CH42108 PARTIALLY SURRENDERED BY 205552; S/T 194254; CHATHAM-KENT				357 x 357 x	8 15	0.29 0.54	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK104067, CK104165, CK111834 (m) McFadden, Marjorie Madeling 3-5 Henry Street Wallaceburg, ON N8A 1C2 615121		
P72 T1801-046		PIN: 007560020 LT PT LT 6 CON 13 CHATHAM AS IN 215709; S/T CH42150 PARTIALLY SURRENDERED BY 205551; S/T 194253; CHATHAM-KENT				75 x 23 x 300 x 344 x 344 x	12 20 30 8 15	0.09 0.06 0.90 0.28 0.51	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK108469, CK111834		
	PRINCE ALBERT ROAD										

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			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P73 T1801-045		PIN: 007570007 LT NW 1/4 LT 7 CON 13 CHATHAM S/T CH42220 PARTIALLY SURRENDERED BY 205550; S/T 194252; CHATHAM-KENT				63 x 115 x 51 x 180 x 23 x 184 x 128 x	29 12 12 12 20 8 15	0.08 0.13 0.05 0.22 0.05 0.14 0.17	(L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK108465, CK111834 (L) Lagasco Inc. 309 Commissioners Road West London, ON N6J 1Y4 609255, 609256 (m) De Cooman, Francis 121 Camp Street Wallaceburg, ON 288847		
	OLD FIELD LINE										
P74 T1801-044		PIN: 007570036 LT PT LT 7 CON 14 CHATHAM AS IN 600716; S/T 194251; S/T EXECUTION 04-0000352, IF ENFORCEABLE; CHATHAM-KENT				62 x 75 x 155 x 261 x 225 x	10 12 8 30 15	0.06 0.10 0.12 0.96 0.32	(m) Charge of Lease Canada Permanent Trust Company 220818		
P75 T1801-043		PIN: 007570039 LT SE 1/4 LT 7 CON 14 CHATHAM EXCEPT PT 1, D1212, 195404; S/T 194248; CHATHAM-KENT				75 x 30 x 307 x 306 x 38 x 75 x	30 20 8 15 20 12	0.23 0.06 0.24 0.46 0.07 0.08	(m) Lambton Financial Credit Union Limited 4348 St. Clair Pkwy Port Lambton, ON N0P 2B0 656452		

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			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P76		PIN: 007570040 LT PT LT 7 CON 14 CHATHAM AS IN 189025, 195404, PT 1, D1212; S/T 194248, 211668; CHATHAM-KENT	40	x	15	0.06	40	x	30	0.12	
							40	x	12	0.05	
P77		PIN: 007570042 LT SW 1/4 LT 8 CON 14 CHATHAM; S/T 194250; CHATHAM-KENT					75	x	20	0.14	
							41	x	12	0.05	
							350	x	8	0.28	
							350	x	15	0.53	
P78		PIN: 007570043 LT NE 1/2 OF SE1/2 LT 8 CON 14 CHATHAM S/T LIFE INTEREST IN 341872; S/T CH42546 PARTIALLY SURRENDERED BY 205547; S/T 194249; CHATHAM-KENT					350	x	8	0.29	
							350	x	15	0.53	
P79		PIN: 007570046 LT SW 1/4 LT 9 CON 14 CHATHAM S/T INTEREST IN 605782; S/T CH42267 PARTIALLY SURRENDERED BY 205546; S/T 198333; CHATHAM-KENT					326	x	8	0.25	
							270	x	15	0.38	
P81		PIN: 007570044 LT NE 1/4 LT 8 CON 14 CHATHAM; NW1/4 LT 9 CON 14 CHATHAM EXCEPT CH45690; S/T 194247; CHATHAM-KENT					36	x	8	0.02	
							110	x	15	0.14	



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			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P82 T1801-038		PIN: 007570048 LT NE 1/4 LT 9 CON 14 CHATHAM S/T CH42370 PARTIALLY SURRENDERED BY 205544; CHATHAM-KENT				75 x 75 x 202 x 154 x 167 x 200 x 75 x 75 x	12 12 8 8 15 15 20 20	0.10 0.10 0.16 0.12 0.23 0.28 0.16 0.16			
P83 T1801-037		PIN: 007570050 LT PT LT 10 CON 14 CHATHAM AS IN 463097; S/T CH42200 PARTIALLY SURRENDERED BY 205543; S/T 194246; CHATHAM-KENT				700 x 700 x	8 15	0.56 1.05			
P84 T1801-036		PIN: 007570055 LT PT LT 11 CON 14 CHATHAM AS IN 182459, 265650; S/T CH42207 PARTIALLY SURRENDERED BY 186395; S/T 194245, 577107; CHATHAM-KENT				60 x 136 x 350 x 350 x	12 64 8 15	0.07 0.38 0.28 0.53	(L) Francisco Petroleum Enterprises Inc. 715 St. Clair St. Ext., P.O. Box 172 Chatham, ON N7M 5K3 418695 (Lodgement) Beneficial Finance Co. of Canada 371371		
P85 T1801-035		PIN: 007570056 LT PT LT 11 CON 14 CHATHAM PT 1-3, 24R8484; S/T 194244; CHATHAM-KENT				5 x 50 x 40 x	5 12 8	0.01 0.12 0.03	(L) Agri Solar Co-Operative Inc. 835 Park Ave. West Chatham, ON N7M 5J6 CK79451 (m) Farm Credit Canada 417 Exeter Rd. London, ON N6E 2Z3 CK79465 (Lodgement) Beneficial Finance Co. of Canada 371371		

Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
	BASE LINE (HWY 45)										
P86 1804-034		PIN: 005920021 LT SE 1/4 LT 24 CON 1 CHATHAM GORE; SW 1/4 LT 25 CON 1 CHATHAM GORE S/T CH42153 PARTIALLY RELEASED BY 205542; S/T 194243; S/T CH39608; CHATHAM-KENT				267 x 372 x 75 x 75 x	8 15 12 20	0.20 0.52 0.09 0.16	(m)	(l)	(e)
P87 T1801-033		PIN: 005920024 LT SE 1/4 LT 25 CON 1 CHATHAM GORE S/T CH42146 PARTIALLY RELEASED BY 205541; S/T 194242; S/T CH39609; CHATHAM-KENT				75 x 75 x 542 x 456 x	20 20 8 15	0.15 0.16 0.42 0.65			
P88 T1801-032		PIN: 005920081 LT PT LT 25 CON 1 CHATHAM GORE AS IN 652041; S/T CH42334 PARTIALLY RELEASED BY 205857; S/T 194241 SUBJECT TO AN EASEMENT IN GROSS OVER PART 1, 24R67 AND PART 1, 24R68 AS IN CK83880 MUNICIPALITY CHATHAM-KENT				75 x 65 x 258 x 410 x 466 x	20 3 20 8 15	0.16 0.12 0.46 0.33 0.70			
	SIMPSON ROAD										

Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P89 T1801-031		PIN: 005940018 LT PART OF LOT 26, CONCESSION 1, GORE OF THE GEOGRAPHIC TOWNSHIP OF CHATHAM, DESIGNATED AS PARTS 1, 2, 3 & 4, 24R9154 SUBJECT TO AN EASEMENT IN GROSS OVER PART LOT 26, CON 1, CHATHAM GORE, DESIGNATED AS PARTS 1 & 2, 24R9231 AS IN CK60967 SUBJECT TO AN EASEMENT IN GROSS OVER PART LOT 26, CON 1, CHATHAM GORE, DESIGNATED AS PARTS 2 & 3, 24R9231 AS IN CK60970 TOGETHER WITH AN EASEMENT OVER PART LOT 26, CON 1, CHATHAM GORE, DESIGNATED AS PART 4, 24R9154 AS IN CK60973 MUNICIPALITY CHATHAM-KENT	179	x	58	0.50					
			303	x	8	0.23					
			228	x	15	0.31					
			170	x	30	0.51					
			100	x	12	0.12					
			75	x	12	0.11					
	JOHN PARK LINE										
P90		PIN: 00594-0014 LT PART OF LOTS 26 & 27, CONCESSION 2, GORE OF THE GEOGRAPHIC TOWNSHIP OF CHATHAM, DESINGATED AS PARTS 1, 2 & 3, 24R9630 SUBJECT TO AN EASEMENT IN GROSS AS IN CK98192 MUNICIPALITY CHATHAM-KENT	15	x	15	0.03					
P91 T1801-030		PIN: 005940104 LT PT LT 26 CON 2 CHATHAM GORE PT 5, 6, 7, 8 & 9, 24R8941; S/T CH42114 PARTIALLY SURRENDERED BY 205540; S/T 194648; CHATHAM-KENT	75	x	20	0.15			(m) Farm Credit Canada Suite 200 - 1133 St. George Blvd. Moncton, NB E1E 4E1 669266		
			600	x	8	0.48					
			600	x	15	0.90					
			200	x	20	0.40					
			50	x	50	0.29					
	STARKWEATHER LINE										

Panhandle Reinforcement NPS36 2017

FILE NO.:		NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
				Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P92	T1801-030		PIN: 005940103 LT PT LT 26 CON 2 CHATHAM GORE PT 1, 2, 3 & 4, 24R8941; S/T CH42114 PARTIALLY SURRENDERED BY 205540; S/T 194648; CHATHAM-KENT				18 111 173	x x x	6 15 20	0.01 0.13 0.28	(m) Farm Credit Canada Suite 200 - 1133 St. George Blvd. Moncton, NB E1E 4E1 669266	
P94	T1801-029		PIN: 005940106 LT PT LT 26 CON 2 CHATHAM GORE AS IN 457897 N OF RIVER RD; S/T CH42215 PARTIALLY SURRENDERED BY 205539; S/T 194239; S/T 597618; CHATHAM-KENT	157	x	15	0.23	485 366 364 100	x x x x	8 15 20 12	0.39 0.60 0.67 0.12	(m) The Bank of Nova Scotia 1584 Main Street, P.O. Box 10 Brigden, ON N0N 1B0 457896
P95	T1801-028		PIN: 005940102 R PT LT 26-27 CON 2 CHATHAM GORE; CHATHAM- KENT	47 130 220 224	x x x x	13 15 8 12	0.03 0.20 0.19 0.27	(L) Mooncor Oil & Gas Corp. 2050, 717-7th Avenue S.W. Calgary, AB T2P 0Z3 652986, 656467, 669521, (m) Farm Credit Canada Suite 200 - 1133 St. George Blvd. Moncton, NB E1E 4E1 648034 (m) Hueni, Rudolf & Hueni, Waltraud RR #4 Wallaceburg, ON N8A 4L1 612696				
		McCREARY LINE										

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FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P96 T1801-029		PIN: 005950008 LT PT LT 26 CON 3 CHATHAM GORE AS IN 612697; S/T CH42115 PARTIALLY RELEASED BY 205538; S/T 194238; CHATHAM-KENT				75 x 154 x 156 x 268 x	12 8 20 15	0.09 0.11 0.31 0.30	(L) Otter Creek Wind Farm GP Inc. 772 Sherbrooke Street West Montreal, QC N3A 1G1 CK97488, CK109603,, (L) Mooncor Oil & Gas Corp. 2050, 717-7th Avenue S.W. Calgary, AB T2P 0Z3 652986, 656467, 669521, (m) Farm Credit Canada Suite 200 - 1133 St. George Blvd. Moncton, NB E1E 4E1 648034		
P97 T1801-027		PIN: 005950009 LT PT LT 27 CON 3 CHATHAM GORE AS IN 651299 EXCEPT D225; S/T CH42327 PARTIALLY RELEASED BY 205537; S/T 194237 MUNICIPALITY CHATHAM-KENT				20 x 1044 x 1038 x	20 8 15	0.03 0.83 1.56	(m) Farm Credit Canada Suite 200 - 1133 St. George Blvd. Moncton, NB E1E 4E1 CK48934		
P98 T1801-026		PIN: 005950043 LT PT LT 27 CON 3 CHATHAM GORE PT 2-4, 24R7984; S/T CH42117 PARTIALLY RELEASED BY 205536; S/T 194236; CHATHAM-KENT				241 x 158 x 75 x 75 x	8 15 20 12	0.18 0.20 0.13 0.09			
	LANGSTAFF LINE										

Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P99 T1801-025		PIN: 005950027 LT SE 1/4 LT 27 CON 4 CHATHAM GORE S/T CH42107 PARTIALLY RELEASED BY 128734; S/T 195206; CHATHAM-KENT				75 x 75 x 701 x 710 x 75 x 75 x	12 20 8 15 12 20	0.09 0.15 0.57 1.07 0.08 0.13	(m) Farm Credit Canada Suite 200 - 1133 St. George Blvd. Moncton, NB E1E 4E1 649352		
P100 T1801-024		PIN: 005950025 LT N 1/2 LT 27 CON 4 CHATHAM GORE; S/T 195432, CH42109; CHATHAM-KENT				75 x 146 x 265 x	20 8 15	0.13 0.11 0.36			
P101 T1801-023		PIN: 005950028 LT N 1/2 LT 28 CON 4 CHATHAM GORE S/T CH42116 PARTIALLY RELEASED BY 205535; S/T 194235; CHATHAM-KENT				75 x 75 x 580 x 492 x	12 20 8 15	0.09 0.15 0.45 0.70	(m) Farm Credit Canada Suite 200 - 1133 St. George Blvd. Moncton, NB E1E 4E1 CK57723		
		KENT LINE									
P102		PIN: 433870110 LT PT LT 28 CON 5 SOMBRA PT 1, 25R1752; S/T PP1053; ST. CLAIR				45 x 40 x	8 15	0.04 0.06	(L) Shawnee Petroleums Limited Tenth Floor, 366 Bay Street Toronto 1, Ontario L263120, L265878, , (m) Bank of Montreal 865 Harrington Court Burlington, ON L7N 3P LA158107		

Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P103		PIN: 433870109 LT SW 1/4 LT 28 CON 5 SOMBRA EXCEPT PT 1, 25R1752; S/T PP1053; ST. CLAIR				75 x 75 x 74 x 469 x 580 x	20 12 23 8 15	0.16 0.09 0.09 0.37 0.83	(m) Farm Credit Canada Suite 200 - 1133 St. George Blvd. Moncton, NB E1E 4E1 LA139531		
P104 T1801-022		PIN: 433870111 LT SE 1/4 LT 28 CON 5 SOMBRA S/T SO29848; S/T L254638; ST. CLAIR				146 x 228 x 75 x 81 x	15 8 12 25	0.18 0.17 0.08 0.10	(L) Shawnee Petroleum Limited Tenth Floor, 366 Bay Street Toronto 1, Ontario L263124		
P105 T1801-021		PIN: 433870108 LT N 1/2 LT 28 CON 5 SOMBRA S/T SO29865 PARTIALLY RELEASED BY L268236; S/T L253729; ST. CLAIR				75 x 75 x 705 x 705 x 75 x 75 x	12 20 8 15 12 20	0.08 0.15 0.56 1.06 0.09 0.16			
	CHARLEMONT LINE										
P106 T1801-020		PIN: 433870123 LT PT LT 28 CON 6 SOMBRA DESIGNATED PTS 1,2,3 PLAN 25R9835; S/T SO29866, L201809, PP1052; ST. CLAIR				25 x 54 x 75 x 140 x	5 8 20 15	0.01 0.03 0.16 0.20			

Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P107 T1801-019		PIN: 433870080 LT SW 1/4 LT 29 CON 6 SOMBRA S/T SO29867 PARTIALLY RELEASED BY L268237; S/T L253728; ST. CLAIR				75 x 75 x 100 x 75 x 687 x 609 x 65 x	12 20 12 20 8 15 12	0.09 0.13 0.11 0.13 0.56 0.88 0.08			
P108 T1801-018		PIN: 433870078 LT NW 1/4 LT 29 CON 6 SOMBRA S/T SO30032 PARTIALLY RELEASED BY L268234; S/T L253727; ST. CLAIR				331 x 436 x	8 15	0.25 0.62	(m) Toronto-Dominion Bank 4720 Tahoe Boulevard, 4th Floor, Building 1 Mississauga, ON L4W 5P2 LA118097		
P109 T1801-017		PIN: 433870079 LT NE 1/4 LT 29 CON 6 SOMBRA S/T SO29860 PARTIALLY RELEASED BY L268233; S/T L254085; ST. CLAIR				75 x 75 x 407 x 327 x	12 20 8 15	0.09 0.16 0.32 0.45	(L) Dundee Oil and Gas Limited 28th Floor, Dundee Place, 1 Adelaide Street East Toronto, ON M5C 2V9 LA45575, LA113907, , (L) Kinetic Energy Inc. Suite 514, 200 Queen's Avenue London, ON N6A 1J3 L423605, L578801, L783951, L815626, L863979 (m) Farm Credit Canada Suite 200 - 1133 St. George Blvd. Moncton, NB E1E 4E1 LA138071		
	LAMBTON LINE										



Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P110 T1801-016		PIN: 433880095 LT PT LT 29 CON 7 SOMBRA AS IN L896549; S/T SO29880 PARTIALLY SURRENDERED BY L268235; S/T L253726; ST. CLAIR				75 x 75 x 672 x 680 x	12 20 8 15	0.07 0.12 0.53 1.03			
P110a		PIN: 433880096 LT N1/2 LT 29 CON 7 SOMBRA; ST. CLAIR	irr	x	irr	irr	x	irr			
P111 T1801-015		PIN: 433880097 LT PT LT 30 CON 7 SOMBRA AS IN L672686; S/T SO29847 PARTIALLY SURRENDERED BY L268232; S/T L253725; ST. CLAIR				60 x 75 x 75 x 763 x 620 x	12 20 20 8 15	0.09 0.16 0.16 0.60 0.97	(L) Mooncor Oil & Gas corp. 2050, 717-7th Avenue S.W. Calgary, AB T2P 0Z3 L959113, L962838, LA92538, (m) Bank of Montreal 10 Fifth Street South Chatham, ON N7M 4V4 LA935528		
	KERR LINE										
P112 T1801-014		PIN: 433880071 LT PT LT 30 CON 8 SOMBRA PT 1 - 3, 25R6042; S/T L713165; S/T SO29849 PARTIALLY SURRENDERED BY L268239; S/T L253722; ST. CLAIR				30 x	15	0.05	()		
P113 T1801-014		PIN: 433880069 LT PT LT 30 CON 8 SOMBRA AS IN L407803 EXCEPT PT 1 - 3, 25R6042; S/T SO29849 PARTIALLY SURRENDERED BY L268239; S/T L253722; ST. CLAIR				330 x 336 x 75 x	8 15 20	0.26 0.53 0.13	(m) Farm Credit Corporation 105 Silvercreek Parkway N. Guelph, ON N1H 7G7 L573644		

Filed: 2016-06-10  
EB-2016-0186  
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FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT		TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P114 T1801-013		PIN: 433880068 LT PT LT 30 CON 8 SOMBRA AS IN L938943; S/T SO29850 PARTIALLY SURRENDERED BY L268230; S/T L254449; ST. CLAIR			75 x 294 x 315 x	12 8 15	0.08 0.23 0.43			
P115 T1801-012		PIN: 433880066 LT PT LT 30 CON 8 SOMBRA AS IN L609758 EXCEPT PT 1 & 2, 25R7276 & PT 1, 25R1570; S/T DEBTS IN L609758; S/T SO29924 PARTIALLY SURRENDERED BY L268231; S/T L254448; ST. CLAIR			75 x 355 x 355 x	12 8 15	0.08 0.28 0.53			
P116		PIN: 433880067 LT PT LT 30 CON 8 SOMBRA PT 1, 25R1570; S/T INTEREST IN L960500; S/T L254448; ST. CLAIR			25 x	8	0.01			
P117 T1801-011		PIN: 433880065 LT PT LT 30 CON 8 SOMBRA AS IN L906683; S/T SO30087 PARTIALLY SURRENDERED BY L268228; S/T INTEREST IN L962454; S/T L253719; ST. CLAIR			231 x 317 x 75 x 100 x	8 15 12 20	0.45 0.18 0.11 0.20			
	MANDAUMIN ROAD									
P119		PIN: 433850093 LT W 1/2 LT 19 CON 1 DAWN; DAWN-EUPHEMIA						(L) See Lease L540769		

Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P120 T1801-009		PIN: 433850089 LT PT LT 20 CON 1 DAWN AS IN L946350; S/T INTEREST IN L946350; S/T L278268, DN24727 PARTIALLY RELEASED BY L268226, L560630 AMENDED BY L672332; S/T PP1050; DAWN- EUPHEMIA				75 x 100 x 100 x 483 x 483 x	20 20 12 8 15	0.14 0.18 0.10 0.38 0.73	(m) Farm Credit Canada Suite 200 - 1133 St. George Blvd. Moncton, NB E1E 4E1 LA75704 (m) Farm Credit Canada Suite 200 - 1133 St. George Blvd. Moncton, NB E1E 4E1 L946351		
	LANGBANK LINE										
P121 T1801-008		PIN: 433850070 LT PT LT 21 CON 1 DAWN AS IN L530535; S/T DN24630 PARTIALLY RELEASED BY L268227; S/T PP1054; DAWN-EUPHEMIA				125 x 628 x 628 x 75 x 75 x	20 8 15 12 20	0.26 0.49 0.94 0.09 0.16	(L) Charles G. Stevenson Drilling Ltd. 12 Montgomery Dr, 106a, Wallaceburg, ON N8A 5B5 L476984		
P122 T1801-007		PIN: 433850066 LT W 1/2 LT 22 CON 1 DAWN; S/T DN24647, L254447; DAWN-EUPHEMIA				230 x 330 x	8 15	0.18 0.50	(m) Bank of Montreal 865 Harrington Court Burlington, ON L7N 3P LA131919		
P123 T1801-006		PIN: 433850068 LT NE 1/4 LT 21 CON 1 DAWN; SE 1/4 LT 22 CON 1 DAWN S/T DN24632 PARTIALLY RELEASED BY L268225; S/T PP1048; DAWN-EUPHEMIA				90 x	8	0.07	(Lease) Charles G. Stevenson Drilling Ltd. 12 Montgomery Dr, 106a, Wallaceburg, ON N8A 5B5 476984		

Panhandle Reinforcement NPS36 2017

FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P124 T1801-005		PIN: 433850065 LT NE 1/4 LT 22 CON 1 DAWN; SE 1/4 LT 23 CON 1 DAWN S/T INTEREST IN L607354; S/T DN24634 PARTIALLY RELEASED BY L268224; S/T PP1055; DAWN-EUPHEMIA				75 x 75 x 634 x 594 x 75 x 213 x	12 20 8 15 12 20	0.09 0.14 0.51 0.93 0.07 0.50	(L) Brookwood Oils Inc. 442 Jarvis Street London, ON N6K 1X1 L608334 (m) Polysar Lambton Credit Union Limited 2394 Jane St. Brigden, ON N0N 1B0 L800153		
P125 T1801-004		PIN: 433850064 LT NE 1/4 LT 23 CON 1 DAWN S/T DN24672 PARTIALLY RELEASED BY L268223; S/T L253720, PP1055; DAWN-EUPHEMIA				75 x 75 x 320 x 320 x	20 20 8 15	0.15 0.15 0.26 0.48	(L) Forbes Resources Inc.  L456543, L474466, , (Assignment, Lease, Assignment) Forbes Petroleum Limited P.O. Box 67, Aylmer, ON N5H 2R8 L453060, 456543, 474466		
P126 T1801-003		PIN: 433850060 LT SE 1/4 LT 24 CON 1 DAWN S/T DN24631 PARTIALLY RELEASED BY L268222; S/T L253721; DAWN-EUPHEMIA				298 x 55 x 44 x 320 x 55 x	20 20 15 8 15	0.60 0.11 0.07 0.26 0.08			
P127		PIN: 433850059 LT NE 1/4 LT 24 CON 1 DAWN S/T INTEREST IN L861988; S/T L192384; S/T L253718; DAWN- EUPHEMIA				315 x 320 x 24 x	20 8 15	0.64 0.26 0.04	(L) Elliott's Land Services Ltd., In Trust P.O. 969, 72 Ontario Street, South Grand Bend, ON N0M 1M0 L825853		
P128 F12-026	DAWN PLANT	E 1/2 LT 25 CON 1 DAWN EXCEPT PT 6 25R506; S/T L749192, PP1046, PP1047; DAWN-EUPHEMIA									

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FILE NO.:	NAME and ADDRESS	PROPERTY DESCRIPTION	PERMANENT EASEMENT			TEMPORARY EASEMENT			MORTGAGE, LIEN/LEASE, EASEMENT		
			Length	Width	Area (Hectares)	Length	Width	Area (Hectares)	(m)	(l)	(e)
P1 T1801-106		PIN: 007770068 LT PT LT 1 CON 6 DOVER AS IN R668352 S/T 604871 S/T DO28895 PARTIALLY RELEASED BY 242584 S/T DO28879 PARTIALLY RELEASED BY 242583; S/T 235269, 236410; CHATHAM-KENT	55	x	25	0.19			(m) Canadian Imperial Bank of Commerce 99 King St. W. Chatham, ON N7M 1C7 CK 82706 (L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK111836 (L) North Kent Wind 2 GP Inc. & North Kent Wind 2 LP 2050 Derry Rd. West, Mississauga, ON L5N 0B9 CK111834 (L) Plains Midstream Canada ULC 1400, 607 8 Avenue SW Calgary, AB T2P 0A7 262963, 662107, CK88008 (L) Wind Lease  CK110136		
P48 T1801-066		PIN: 007680006 LT PT LT 20 CON 11 DOVER AS IN 473959, S/T DO28924 PARTIALLY SURRENDERED BY 205561; S/T 195266; CHATHAM-KENT	30	x	25	0.08					



## PIPELINE EASEMENT

(Hereinafter called the "Easement")

Between

(hereinafter called the "Transferor")

and

**UNION GAS LIMITED**

(hereinafter called the "Transferee")

This is an Easement in Gross.

WHEREAS the Transferor is the owner in fee simple of those lands and premises more particularly described as:

**PIN:**

**Legal Description:**

(hereinafter called the "Transferor's Lands").

The Transferor does hereby GRANT, CONVEY, TRANSFER AND CONFIRM unto the Transferee, its successors and assigns, to be used and enjoyed as appurtenant to all or any part of the lands, the right, liberty, privilege and easement on, over, in, under and/or through a strip of the Transferor's Lands more particularly described as:

**BEING THE PIN/PART OF THE PIN:**

**Legal Description:**

(hereinafter called the "Lands") to survey, lay, construct, maintain, brush, clear trees and vegetation, inspect, patrol, alter, remove, replace, reconstruct, repair, move, keep, use and/or operate one pipeline for the transmission of Pipeline quality natural gas as defined in The Ontario Energy Board Act S.O. 1998 (hereinafter called the "Pipeline") including therewith all such buried attachments, equipment and appliances for cathodic protection which the Transferee may deem necessary or convenient thereto, together with the right of ingress and egress at any and all times over and upon the Lands for its servants, agents, employees, those engaged in its business, contractors and subcontractors on foot and/or with vehicles, supplies, machinery and equipment for all purposes necessary or incidental to the exercise and enjoyment of the rights, liberty, privileges and easement hereby granted. The Parties hereto mutually covenant and agree each with the other as follows:

1. In Consideration of the sum of XX/100 Dollars (\$) (hereinafter called the "Consideration"), which sum is payment in full for the rights and interest hereby granted and for the rights and interest, if any, acquired by the Transferee by expropriation, including in either or both cases payment in full for all such matters as injurious affection to remaining lands and the effect, if any, of registration on title of this document and where applicable, of the expropriation documents, subject to Clause 12 hereof to be paid by the Transferee to the Transferor within 90 days from the date of these presents or prior to the exercise by the Transferee of any of its rights hereunder other than the right to survey (whichever may be the earlier date), the rights, privileges and easement hereby granted shall continue in perpetuity or until the Transferee, with the express written consent of the Transferor, shall execute and deliver a surrender thereof. Prior to such surrender, the Transferee shall remove all debris as may have resulted from the Transferee's use of the Lands from the Lands and in all respects restore the Lands to its previous productivity and fertility so far as is reasonably possible, save and except for items in respect of which compensation is due under Clause 2, hereof. As part of the Transferee's obligation to restore the Lands upon surrender of its easement, the Transferee agrees at the option of the Transferor to remove the Pipeline from the Lands. The Transferee and the Transferor shall surrender the Easement and the Transferee shall remove the Pipeline at the Transferor's option where the Pipeline has been abandoned. The Pipeline shall be deemed to be abandoned where: (a) corrosion protection is no longer applied to the Pipeline, or, (b) the Pipeline becomes unfit for service in accordance with Ontario standards. The Transferee shall, within 60 days of either of these events occurring, provide the Transferor with notice of the event. Upon removal of the Pipeline and restoration of the Lands as required by this agreement, the Transferor shall release the Transferee from further obligations in respect of restoration.
2. The Transferee shall make to the Transferor (or the person or persons entitled thereto) due compensation for any damages to the Lands resulting from the exercise of any of the rights herein granted, and if the compensation is not agreed upon by the Transferee and the Transferor, it shall be determined by arbitration in the manner prescribed by the Expropriations Act, R.S.O. 1990,

Chapter E-26 or any Act passed in amendment thereof or substitution therefore. Any gates, fences and tile drains curbs, gutters, asphalt paving, lockstone, patio tiles interfered with by the Transferee shall be restored by the Transferee at its expense as closely as reasonably possible to the condition and function in which they existed immediately prior to such interference by the Transferee and in the case of tile drains, such restoration shall be performed in accordance with good drainage practice and applicable government regulations.

3. The Pipeline (including attachments, equipment and appliances for cathodic protection but excluding valves, take-offs and fencing installed under Clause 9 hereof) shall be laid to such a depth that upon completion of installation it will not obstruct the natural surface run-off from the Lands nor ordinary cultivation of the Lands nor any tile drainage system existing in the Lands at the time of installation of the Pipeline nor any planned tile drainage system to be laid in the Lands in accordance with standard drainage practice, if the Transferee is given at least thirty (30) days notice of such planned system prior to the installation of the Pipeline. The Transferee agrees to make reasonable efforts to accommodate the planning and installation of future tile drainage systems following installation of the Pipeline so as not to obstruct or interfere with such tile installation. In the event there is a change in the use of all, or a portion of the Transferor Lands adjacent to the Lands which results in the pipeline no longer being in compliance with the pipeline design class location requirements, then the Transferee shall be responsible for any costs associated with any changes to the Pipeline required to ensure compliance with the class location requirements.
4. As soon as reasonably possible after the construction of the Pipeline, the Transferee shall level the Lands and unless otherwise agreed to by the Transferor, shall remove all debris as may have resulted from the Transferee's use of the Lands therefrom and in all respects restore the Lands to its previous productivity and fertility so far as is reasonably possible, save and except for items in respect of which compensation is due under Clause 2 hereof.
5. It is further agreed that the Transferee shall assume all liability and obligations for any and all loss, damage or injury, (including death) to persons or property that would not have happened but for this Easement or anything done or maintained by the Transferee hereunder or intended so to be and the Transferee shall at all times indemnify and save harmless the Transferor from and against all such loss, damage or injury and all actions, suits, proceedings, costs, charges, damages, expenses, claims or demands arising therefrom or connected therewith provided that the Transferee shall not be liable under the clause to the extent to which such loss, damage or injury is caused or contributed to by the gross negligence or wilful misconduct of the Transferor.
6. In the event that the Transferee fails to comply with any of the requirements set out in Clauses 2, 3, or 4 hereof within a reasonable time of the receipt of notice in writing from the Transferor setting forth the failure complained of, the Transferee shall compensate the Transferor (or the person or persons entitled thereto) for any damage, if any, necessarily resulting from such failure and the reasonable costs if any, incurred in the recovery of those damages.
7. Except in case of emergency, the Transferee shall not enter upon any of the Transferor's Lands, other than the Lands, without the consent of the Transferor. In case of emergency the right of entry upon the Transferor's Lands for ingress and egress to and from the Lands is hereby granted. The determination of what circumstances constitute an emergency, for purposes of this paragraph is within the absolute discretion of the Transferee, but is a situation in which the Transferee has a need to access the Pipeline in the public interest without notice to the Transferor, subject to the provisions of Clause 2 herein. The Transferee will, within 72 hours of entry upon such lands, advise the Transferor of the said emergency circumstances and thereafter provide a written report to Transferor with respect to the resolution of the emergency situation The Transferee shall restore the lands of the Transferor at its expense as closely as reasonably practicable to the condition in which they existed immediately prior to such interference by the Transferee and in the case of tile drains, such restoration shall be performed in accordance with good drainage practice.
8. The Transferor shall have the right to fully use and enjoy the Lands except for planting trees over the lesser of the Lands or a six (6) meter strip centered over the Pipeline, and except as may be necessary for any of the purposes hereby granted to the Transferee, provided that the Transferor shall not excavate, drill, install, erect or permit to be excavated, drilled, installed or erected in, on, over or through the Lands any pit, well, foundation, building, mobile homes or other structure or installation and the Transferor shall not deposit or store any flammable material, solid or liquid spoil, refuse, waste or effluent on the Lands. Notwithstanding the foregoing the Transferee upon request shall consent to the Transferor erecting or repairing fences, hedges, pavement, lockstone constructing or repairing tile drains and domestic sewer pipes, water pipes, and utility pipes and constructing or repairing lanes, roads, driveways, pathways, and walks across, on and in the Lands

or any portion or portions thereof, provided that before commencing any of the work referred to in this sentence the Transferor shall (a) give the Transferee at least (30) clear days notice in writing describing the work desired so as to enable the Transferee to evaluate and comment on the work proposed and to have a representative inspect the site and/or be present at any time or times during the performance of the work, (b) shall follow the instructions of such representative as to the performance of such work without damage to the Pipeline, (c) shall exercise a high degree of care in carrying out any such work and, (d) shall perform any such work in such a manner as not to endanger or damage the Pipeline as may be required by the Transferee.

9. The rights, privileges and easement herein granted shall include the right to install, keep, use, operate, service, maintain, repair, remove and/or replace in, on and above the Lands any valves and/or take-offs subject to additional agreements and to fence in such valves and/or take-offs and to keep same fenced in, but for this right the Transferee shall pay to the Transferor (or the person or persons entitled thereto) such additional compensation as may be agreed upon and in default of agreement as may be settled by arbitration under the provisions of The Ontario Energy Board Act, S.O. 1998, or any Act passed in amendment thereof or substitution therefore. The Transferee shall keep down weeds on any lands removed from cultivation by reason of locating any valves and/or take-offs in the Lands.
10. Notwithstanding any rule of law or equity and even though the Pipeline and its appurtenances may become annexed or affixed to the realty, title thereto shall nevertheless remain in the Transferee.
11. Neither this Agreement nor anything herein contained nor anything done hereunder shall affect or prejudice the Transferee's rights to acquire the Lands or any other portion or portions of the Transferor's lands under the provisions of The Ontario Energy Board Act, S.O. 1998, or any other laws, which rights the Transferee may exercise at its discretion in the event of the Transferor being unable or unwilling for any reason to perform this Agreement or give to the Transferee a clear and unencumbered title to the easement herein granted.
12. The Transferor covenants that he has the right to convey this Easement notwithstanding any act on his part, that he will execute such further assurances of this Easement as may be requisite and which the Transferee may at its expense prepare and that the Transferee, performing and observing the covenants and conditions on its part to be performed, shall have quiet possession and enjoyment of the rights, privileges and easement hereby granted. If it shall appear that at the date hereof the Transferor is not the sole owner of the Lands, this Easement shall nevertheless bind the Transferor to the full extent of his interest therein and shall also extend to any after-acquired interest, but all moneys payable hereunder shall be paid to the Transferor only in the proportion that his interest in the Lands bears to the entire interest therein.
13. In the event that the Transferee fails to pay the Consideration as hereinbefore provided, the Transferor shall have the right to declare this Easement cancelled after the expiration of 15 days from personal service upon the Manager, Land Services of the Transferee at its Executive Head Office in Chatham, Ontario, (or at such other point in Ontario as the Transferee may from time to time specify by notice in writing to the Transferor) of notice in writing of such default, unless during such 15 day period the Transferee shall pay the Consideration; upon failing to pay as aforesaid, the Transferee shall forthwith after the expiration of 15 days from the service of such notice execute and deliver to the Transferor at the expense of the Transferee, a valid and registrable release and discharge of this Easement.
14. All payments under these presents may be made either in cash or by cheque of the Transferee and may be made to the Transferor (or person or persons entitled thereto) either personally or by mail. All notices and mail sent pursuant to these presents shall be addressed to:

the Transferor at:

and to the Transferee at:                    Union Gas Limited  
P.O. Box 2001  
50 Keil Drive North  
Chatham, Ontario N7M 5M1  
Attention: Manager, Land Services

or to such other address in either case as the Transferor or the Transferee respectively may from time to time appoint in writing.

15. The rights, privileges and easement hereby granted are and shall be of the same force and effect as a covenant running with the Transferor's Land and this Easement, including all the covenants



and conditions herein contained, shall extend to, be binding upon and inure to the benefit of the heirs, executors, administrators, successors and assigns of the Parties hereto respectively; and, wherever the singular or masculine is used it shall, where necessary, be construed as if the plural, or feminine or neuter had been used, as the case may be.

16. (a) The Transferee represents that it is registered for the purposes of the Harmonized Goods and Services Tax (hereinafter called “HST”) in accordance with the applicable provisions in that regard and pursuant to the Excise Tax Act, (R.S.C., 1985, c. E-15), (hereinafter called “Excise Tax Act”), as amended.
- (b) The Transferee covenants to deliver a Statutory Declaration, Undertaking and Indemnity confirming its HST registration number, which shall be conclusive evidence of such HST registration, and shall preclude the Transferor from collection of HST from the Transferee.
- (c) The Transferee shall undertake to self-assess the HST payable in respect of this transaction pursuant to subparagraphs 221(2) and 228(4) of the Excise Tax Act, and to remit and file a return in respect of HST owing as required under the said Act for the reporting period in which the HST in this transaction became payable.
- (d) The Transferee shall indemnify and save harmless the Transferor from and against any and all claims, liabilities, penalties, interest, costs and other legal expenses incurred, directly or indirectly, in connection with the assessment of HST payable in respect of the transaction contemplated by this Easement. The Transferee’s obligations under this Clause shall survive this Easement.

17. The Transferor hereby acknowledges that this Easement will be registered electronically.

Dated this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_.

[Insert name of Individuals or Corporation]

Signature (Transferor)
Print Name(s) (and position held if applicable)
Address (Transferor)

Signature (Transferor)
Print Name(s) (and position held if applicable)
Address (Transferor)

UNION GAS LIMITED

Name & Title (Union Gas Limited)
I have authority to bind the Corporation.
519-436-4673
Telephone Number (Union Gas Limited)

Additional Information: (if applicable):

Property Address:

HST Registration Number:

DECLARATION REQUIRED UNDER  
SECTION 50 (3) OF THE PLANNING  
ACT, R.S.O. 1990, as amended

I, \_\_\_\_\_, of the Choose an item., in the Province of Ontario;

DO SOLEMNLY DECLARE THAT:

1. I am a **Choose an item.**, Lands Department of Union Gas Limited, the Transferee in the attached Grant of Easement and as such have knowledge of the matters herein deposed to.
2. The use of or right in the land described in the said Grant of Easement being:

**PIN/Part of the PIN:**

### Legal Description:

acquired by Union Gas Limited for the purpose of a hydrocarbon line within the meaning of Part VI of the Ontario Energy Board Act, 1998.

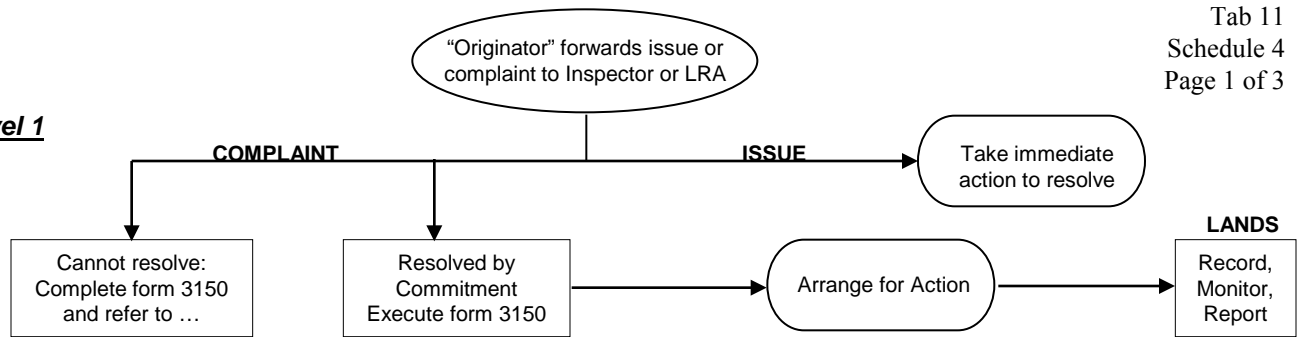
AND I make this solemn declaration conscientiously believing it to be true and knowing that it is of the same force and effect as if made under oath, and by virtue of The Canada Evidence Act.

DECLARED before me at the \_\_\_\_\_ )  
 \_\_\_\_\_ )  
 \_\_\_\_\_ )  
 in the Province of Ontario )  
 \_\_\_\_\_ )  
 this \_\_\_\_\_ day of \_\_\_\_\_ 20\_\_\_\_ )

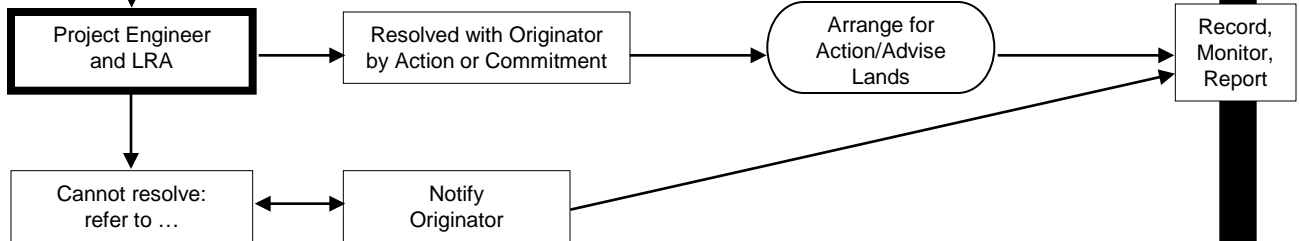
A Commissioner, etc.

# Process Chart: Landowner Complaint Resolution System

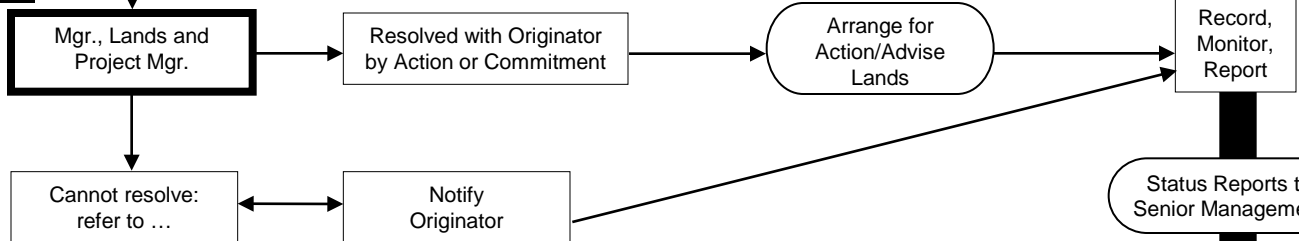
## Level 1



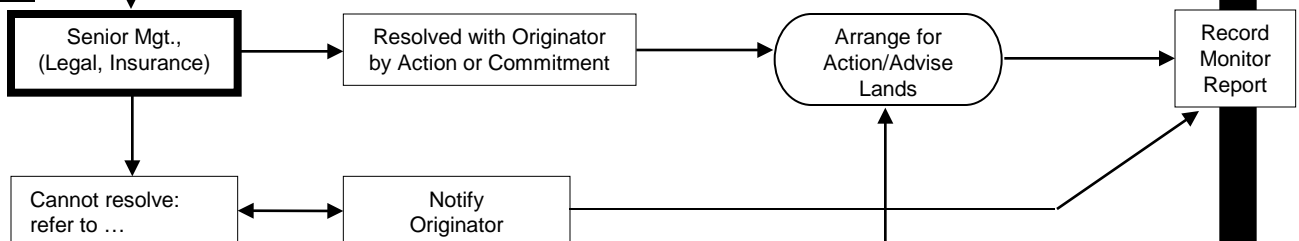
## Level 2



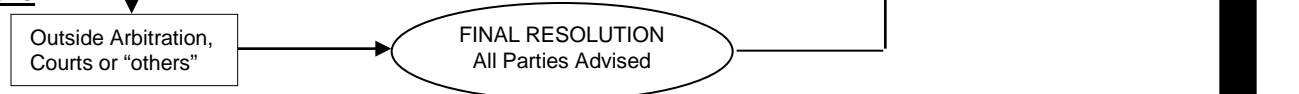
## Level 3



## Level 4



## Level 5



## Notes:

1. "Originator" of complaint or issue may be landowner or company representative.
2. Parties indicated in heavy outlined boxes shall assume responsibility for actions subsequently required in the resolution process. Parties identified in brackets may only be required for resolution or specific technical concerns.
3. "L.R.A." refers to Landowner Relations Agent.
4. "Outside Arbitration" includes the Board of Negotiation, O.M.B. and O.E.B. "Others" refers to other regulatory bodies and tribunals.

FINAL REPORTS TO O.E.B.

## **LANDOWNER COMPLAINT RESOLUTION SYSTEM EXPLANATION OF PROCESS CHART**

### **Key Definitions**

**Originator** – The originator of a complaint or issue is the landowner or Union Gas personnel who initiates a complaint or issue by making it known to the Landowner Relations Agent or a company inspector.

**Landowner Relations Agent (LRA)** – A person assigned on a full time or part time basis to record, monitor, and ensure follow-up on any complaint or issue received by Union related to construction, to address questions and concerns of the landowners, and to act as a liaison between landowners and the contractor and engineering personnel.

**Issue** – A concern of a landowner which can be resolved within three ( 3 ) working days. Immediate action is taken to resolve such matters.

**Complaint** – A concern of a landowner which cannot be resolved within three ( 3 ) working days.

**Commitment** – If an issue or complaint is resolved at any level of the Complaint Resolution system through the efforts and liaison activities of the Landowner Relations Agent or other personnel, the resolution is recorded to ensure proper future follow-up.

**Outside Arbitration** – includes the Board of Negotiation, O.M.B., and O.E.B.

**Others** – refers to other regulatory bodies and tribunals

### **Levels of the Complaint Resolution System**

**Level 1:** The LRA or company inspector receives issues or complaints, and the following can happen:

- a) Immediate action could be arranged by the LRA or inspector to resolve the issue or complaint; or
- b) A complaint can be resolved by a commitment in which case the LRA is responsible for arranging for the committed action and having the commitment recorded in the Complaint Resolution system; or
- c) If a complaint cannot be resolved through the efforts of the LRA or inspector, the applicable form ( Form 3150 ) is completed and then recorded, and the complaint is referred to **Level 2**.

**Level 2:** The LRA and the Construction Supervisor work together to develop a resolution for the complaint, and the following can happen:

- a) the complaint may be resolved with the originator by action or commitment and the action or commitment is recorded in the Complaint Resolution System; or
- b) if the complaint cannot be resolved, the originator is notified, the non-resolution is recorded, and the complaint is referred to **Level 3**.

**Level 3:** The Manager, Lands and the Project Manager work together to develop a resolution for the complaint, and the following can happen:

- a) complaint may be resolved with the originator by action or commitment and the action or commitment is recorded in the Complaint Resolution System; or
- b) if the complaint cannot be resolved, the originator is notified, the non-resolution is recorded, and the complaint is referred to **Level 4**;

When complaints reach this level, status reports are generated through the Complaint Resolution System and are forwarded to Senior Management.

**Level 4:** Senior Management (with possible input from the Legal and Risk and Claims Departments) attempts to develop a resolution to the complaint, and the following can happen:

- a) the complaint may be resolved with the originator by action or commitment and the action or commitment is recorded in the Complaint Resolution System; or
- b) if the complaint cannot be resolved, the originator is notified, the non-resolution is recorded, and the complaint is referred to **Level 5**;

**Level 5:** Involves the resolution of a complaint by outside arbitration or others, and the following will happen:

A final resolution will occur, all parties will be advised, and any action required will be arranged by the LRA or other Lands Department personnel.

**Note:** the Complaint Resolution System is used to generate final reports to the Ontario Energy Board

**FIRST NATIONS AND MÉTIS NATIONS CONSULTATIONS**

Union has a long standing practice of consulting with First Nations and Métis organizations, and has programs in place to ensure they are aware of Union's projects and have the opportunity to participate in both the planning and construction phases of these projects.

Union has an extensive data base and knowledge of First Nations and Métis organizations in Ontario and consults with the Tribal organizations and the data bases with the Ministry of Natural Resources, with the Ministry of Aboriginal Affairs and the Aboriginal Affairs and Northern Development Canada to ensure consultation is carried out with the most appropriate groups.

Union has signed a General Relationship Agreement with the Métis Nation of Ontario which describes Union's commitments to the Métis when planning and constructing pipeline projects.

The following First Nations and Métis organizations were notified by letter regarding the Project as identified in Figure 12-1:

Figure 12-1

<b>TITLE</b>	<b>First Name</b>	<b>Last Name</b>	<b>First Nation or Métis Nation</b>
Director Lands Resource and Consultation	Aly	Alibhai	Métis Nation of Ontario
Chief	Sherri	Doxtator	Oneida First Nation
Chief	Roger	Thomas	Munsee-Delaware First Nation
Chief	Leslee	Whiteye	Chippewa of the Thames First Nation

<b>TITLE</b>	<b>First Name</b>	<b>Last Name</b>	<b>First Nation or Métis Nation</b>
Consultation Manager	Kelly	Riley	Chippewa of the Thames First Nation
Chief	Thomas	Bressette	Kettle and Stony Point First Nations
Consultation Manager	Lorraine	George	Kettle and Stony Point First Nations
Chief	Chris	Plain	Aamjiwnaang First Nation
Environmental Coordinator	Sharilyn	Johnston	Aamjiwnaang First Nation
Chief	Dan	Miskokomon	Walpole Island First Nation
Consultation Manager	Dean	Jacobs	Walpole Island First Nation
Chief	Greg	Peters	Delaware Nation
Consultation Manager	Robin	King	Delaware Nation
Chief	Louise	Hillier	Caldwell First Nation

The following First Nations requested that Union conduct formal consultations and/or engagement meetings with them:

- 1) Walpole Island First Nation (first session March 18, 2016)
- 2) Caldwell First Nation (first session March 11, 2016)
- 3) Aamjiwnaang First Nation (consultation with Union's Senior Environmental Planner and Manager of First Nations and Métis Affairs May 2, 2016)
- 4) Kettle and Stony Point First Nation (consultation with Union's Senior Environmental Planner and Manager of First Nations and Métis Affairs early June)
- 5) Chippewas of the Thames First Nation (consultation with Union's Senior Environmental Planner and Manager of First Nations and Métis Affairs June 6, 2016)

Copies of the correspondence sent to the First Nations and Métis organizations can be found in Exhibit A, Tab 12, Schedule 1.

The following issues were raised as part of the ongoing consultation process:

- 1) Walpole Island First Nation requested that monitors be on sight for the Archeology and Field surveys. They also requested a meeting with the Stantec Archeologists to exchange information that Walpole Island has in its archives, requested follow up on the pipe being removed to ensure proper recycling of the material, and requested follow-up meeting to discuss ongoing matters as they arise.
- 2) Caldwell First Nation requested monitors be on site for the Archeology and Field surveys. Chief Hillier requested that the Chief and Council be notified along with the monitors regarding any change in the stages of the Archeology study.

Union proposed to address these concerns in the following manner:

- 1) A meeting was held March 31, 2016 between Archeologists from Stantec and Walpole Island Project Coordinators to exchange information regarding areas of importance to the Walpole First Nation. Stantec provided the details of the pipe disposal/recycling to the Walpole Island consultation team. Further discussions to be held as the Project develops.
- 2) The Caldwell Chief and Council will be notified directly of any changes to the monitors work or the stages of the Archeology survey.



1           3)    All affected First Nations and Métis organizations have been contacted by Stantec for  
2                   the opportunity to provide monitors for the Archeology and Field surveys to be  
3                   conducted.

4                   As of April 22, Aamjiwnaang First Nation, Walpole Island First Nation, Chippewa of  
5                   the Thames First Nation and the Caldwell First Nation are participating in the stage  
6                   two Archeology surveys with monitors.

7           4)    Consultations with Aamjiwnaang First Nation, Kettle Point & Stony Point First  
8                   Nation and Chippewas of the Thames are being coordinated.

9  
10    Upon completion of the necessary archaeological assessments for the Project, Union will make  
11    available the assessment to any First Nations or Métis organizations that request a copy and will  
12    undertake any construction in accordance with any mitigation measures recommended in the  
13    assessments.

14  
15    During construction, Union has inspectors in the field who are available to First Nations and  
16    Métis organizations as a primary contact to discuss and review any issues that may arise.

17  
18    Union will continue with its commitment to enhance its relationship with First Nations and Métis  
19    organizations.

January 11, 2016  
File: 160961079

**Attention: Aly Alibhai, Director, Lands Resource and Consultation**  
Métis Nation of Ontario  
75 Sherbourne Street  
Toronto, ON M5A 2P9

Dear Aly Alibhai,

**Reference: Union Gas Pipeline Project – Notice of Information Session  
Panhandle Reinforcement Project**

To secure the continued reliable delivery of natural gas and to serve a growing demand for affordable natural gas, Union Gas is proposing to increase the capacity of the Panhandle Transmission System which serves residential, commercial and industrial natural gas customers in Windsor-Essex, Chatham-Kent and surrounding areas, including the fast growing greenhouse market in the Leamington and Kingsville area. The proposed project involves removing an existing 16-inch diameter pipeline and replacing it in the same location with a new 36-inch diameter pipeline. The proposed project will occur between the existing Union Gas Dawn Compressor Station located at Bentpath Line and Dawn Valley Road in the Township of Dawn-Euphemia, and the existing Dover Transmission Station located at Town Line Road and Belle Rose Line in the Municipality of Chatham-Kent. The location of the pipeline being replaced is shown on the attached map. If approved by the Ontario Energy Board, project construction is targeted to begin in the spring, 2017.

Union Gas will continue to consult and engage with landowners, municipalities, government agencies, First Nations, the Métis Nation of Ontario and other interested parties throughout the project. **Information Sessions regarding the Panhandle Reinforcement Project will be held on February 3 and February 4, 2016.** Please see the attached Notice for more details. We hope you are able to attend an Information Session.

If you are unable to attend an Information Session, please do not hesitate to forward any questions or comments you may have regarding the project to the undersigned.

Sincerely,

*Ken McCorkle*

**Ken McCorkle**  
Manager, First Nations and Métis Affairs  
Union Gas Limited  
50 Keil Drive North  
Chatham, ON N7M 5M1  
Phone: 519-436-4600 ext. 5002243  
Email: kmccorkle@uniongas.com

Attachments: Notice of Information Session  
Map – Pipeline to be Replaced

c. John Bonin, Union Gas  
Ryan Park, Union Gas  
Tony Vadjla, Union Gas  
Mark Iamarino, Stantec Consulting Ltd.

January 11, 2016  
File: 160961079

**Attention: Chief Sherri Doxtator**  
Oneida First Nation  
2212 Elm Street  
Southwold, ON N0L 2G0

Dear Chief Sherri Doxtator,

**Reference: Union Gas Pipeline Project – Notice of Information Session  
Panhandle Reinforcement Project**

To secure the continued reliable delivery of natural gas and to serve a growing demand for affordable natural gas, Union Gas is proposing to increase the capacity of the Panhandle Transmission System which serves residential, commercial and industrial natural gas customers in Windsor-Essex, Chatham-Kent and surrounding areas, including the fast growing greenhouse market in the Leamington and Kingsville area. The proposed project involves removing an existing 16-inch diameter pipeline and replacing it in the same location with a new 36-inch diameter pipeline. The proposed project will occur between the existing Union Gas Dawn Compressor Station located at Bentpath Line and Dawn Valley Road in the Township of Dawn-Euphemia, and the existing Dover Transmission Station located at Town Line Road and Belle Rose Line in the Municipality of Chatham-Kent. The location of the pipeline being replaced is shown on the attached map. If approved by the Ontario Energy Board, project construction is targeted to begin in the spring, 2017.

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Sincerely,

*Ken McCorkle*

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Manager, First Nations and Métis Affairs  
Union Gas Limited  
50 Keil Drive North  
Chatham, ON N7M 5M1  
Phone: 519-436-4600 ext. 5002243  
Email: kmccorkle@uniongas.com

Attachments: Notice of Information Session  
Map – Pipeline to be Replaced

c. John Bonin, Union Gas  
Ryan Park, Union Gas  
Tony Vadlja, Union Gas  
Mark Iamarino, Stantec Consulting Ltd.

January 11, 2016  
File: 160961079

**Attention: Chief Roger Thomas**  
Munsee-Delaware First Nation  
289 Jubilee Road, RR1  
Muncey, ON N0L 1Y0

Dear Chief Roger Thomas,

**Reference: Union Gas Pipeline Project – Notice of Information Session  
Panhandle Reinforcement Project**

To secure the continued reliable delivery of natural gas and to serve a growing demand for affordable natural gas, Union Gas is proposing to increase the capacity of the Panhandle Transmission System which serves residential, commercial and industrial natural gas customers in Windsor-Essex, Chatham-Kent and surrounding areas, including the fast growing greenhouse market in the Leamington and Kingsville area. The proposed project involves removing an existing 16-inch diameter pipeline and replacing it in the same location with a new 36-inch diameter pipeline. The proposed project will occur between the existing Union Gas Dawn Compressor Station located at Bentpath Line and Dawn Valley Road in the Township of Dawn-Euphemia, and the existing Dover Transmission Station located at Town Line Road and Belle Rose Line in the Municipality of Chatham-Kent. The location of the pipeline being replaced is shown on the attached map. If approved by the Ontario Energy Board, project construction is targeted to begin in the spring, 2017.

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Sincerely,

*Ken McCorkle*

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Manager, First Nations and Métis Affairs  
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Phone: 519-436-4600 ext. 5002243  
Email: kmccorkle@uniongas.com

Attachments: Notice of Information Session  
Map – Pipeline to be Replaced

c. John Bonin, Union Gas  
Ryan Park, Union Gas  
Tony Vadlja, Union Gas  
Mark Iamarino, Stantec Consulting Ltd.

January 11, 2016  
File: 160961079

**Attention: Chief Leslee Whiteye**  
Chippewa of the Thames First Nation  
320 Chippewa Rd  
Muncey, ON N0L 1Y0

Dear Chief Leslee Whiteye,

**Reference: Union Gas Pipeline Project – Notice of Information Session  
Panhandle Reinforcement Project**

To secure the continued reliable delivery of natural gas and to serve a growing demand for affordable natural gas, Union Gas is proposing to increase the capacity of the Panhandle Transmission System which serves residential, commercial and industrial natural gas customers in Windsor-Essex, Chatham-Kent and surrounding areas, including the fast growing greenhouse market in the Leamington and Kingsville area. The proposed project involves removing an existing 16-inch diameter pipeline and replacing it in the same location with a new 36-inch diameter pipeline. The proposed project will occur between the existing Union Gas Dawn Compressor Station located at Bentpath Line and Dawn Valley Road in the Township of Dawn-Euphemia, and the existing Dover Transmission Station located at Town Line Road and Belle Rose Line in the Municipality of Chatham-Kent. The location of the pipeline being replaced is shown on the attached map. If approved by the Ontario Energy Board, project construction is targeted to begin in the spring, 2017.

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If you are unable to attend an Information Session, please do not hesitate to forward any questions or comments you may have regarding the project to the undersigned.

Sincerely,

*Ken McCorkle*

**Ken McCorkle**  
Manager, First Nations and Métis Affairs  
Union Gas Limited  
50 Keil Drive North  
Chatham, ON N7M 5M1  
Phone: 519-436-4600 ext. 5002243  
Email: kmccorkle@uniongas.com

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Map – Pipeline to be Replaced

c. John Bonin, Union Gas  
Ryan Park, Union Gas  
Tony Vadlja, Union Gas  
Mark Iamarino, Stantec Consulting Ltd.

January 11, 2016  
File: 160961079

**Attention: Kelly Riley, Consultation Manager**  
Chippewa of the Thames First Nation  
320 Chippewa Rd  
Muncey, ON N0L 1Y0

Dear Kelly Riley,

**Reference: Union Gas Pipeline Project – Notice of Information Session  
Panhandle Reinforcement Project**

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Chatham, ON N7M 5M1  
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Email: kmccorkle@uniongas.com

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Map – Pipeline to be Replaced

c. John Bonin, Union Gas  
Ryan Park, Union Gas  
Tony Vadjla, Union Gas  
Mark Iamarino, Stantec Consulting Ltd.

January 11, 2016  
File: 160961079

**Attention: Chief Thomas Bressette**  
Kettle and Stony Point First Nations  
6247 Indian Lane, RR2  
Forest, ON N0N 1J0

Dear Chief Thomas Bressette,

**Reference: Union Gas Pipeline Project – Notice of Information Session  
Panhandle Reinforcement Project**

To secure the continued reliable delivery of natural gas and to serve a growing demand for affordable natural gas, Union Gas is proposing to increase the capacity of the Panhandle Transmission System which serves residential, commercial and industrial natural gas customers in Windsor-Essex, Chatham-Kent and surrounding areas, including the fast growing greenhouse market in the Leamington and Kingsville area. The proposed project involves removing an existing 16-inch diameter pipeline and replacing it in the same location with a new 36-inch diameter pipeline. The proposed project will occur between the existing Union Gas Dawn Compressor Station located at Bentpath Line and Dawn Valley Road in the Township of Dawn-Euphemia, and the existing Dover Transmission Station located at Town Line Road and Belle Rose Line in the Municipality of Chatham-Kent. The location of the pipeline being replaced is shown on the attached map. If approved by the Ontario Energy Board, project construction is targeted to begin in the spring, 2017.

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Manager, First Nations and Métis Affairs  
Union Gas Limited  
50 Keil Drive North  
Chatham, ON N7M 5M1  
Phone: 519-436-4600 ext. 5002243  
Email: kmccorkle@uniongas.com

Attachments: Notice of Information Session  
Map – Pipeline to be Replaced

c. John Bonin, Union Gas  
Ryan Park, Union Gas  
Tony Vadjla, Union Gas  
Mark Iamarino, Stantec Consulting Ltd.

January 11, 2016  
File: 160961079

**Attention: Lorraine George, Consultation Manager**  
Kettle and Stony Point First Nations  
6247 Indian Lane, RR2  
Forest, ON N0N 1J0

Dear Lorraine George,

**Reference: Union Gas Pipeline Project – Notice of Information Session  
Panhandle Reinforcement Project**

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Manager, First Nations and Métis Affairs  
Union Gas Limited  
50 Keil Drive North  
Chatham, ON N7M 5M1  
Phone: 519-436-4600 ext. 5002243  
Email: kmccorkle@uniongas.com

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Map – Pipeline to be Replaced

c. John Bonin, Union Gas  
Ryan Park, Union Gas  
Tony Vadlja, Union Gas  
Mark Iamarino, Stantec Consulting Ltd.



January 11, 2016  
File: 160961079

**Attention: Chief Chris Plain**  
Aamjiwnaang First Nation  
978 Tashmoo Avenue  
Sarnia, ON N7T 7H5

Dear Chief Chris Plain,

**Reference: Union Gas Pipeline Project – Notice of Information Session  
Panhandle Reinforcement Project**

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Manager, First Nations and Métis Affairs  
Union Gas Limited  
50 Keil Drive North  
Chatham, ON N7M 5M1  
Phone: 519-436-4600 ext. 5002243  
Email: kmccorkle@uniongas.com

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Map – Pipeline to be Replaced

c. John Bonin, Union Gas  
Ryan Park, Union Gas  
Tony Vadjla, Union Gas  
Mark Iamarino, Stantec Consulting Ltd.

January 11, 2016  
File: 160961079

**Attention: Sharilyn Johnston, Environmental Coordinator**  
Aamjiwnaang First Nation  
979 Tashmoo Avenue  
Sarnia, ON N7T 7H6

Dear Sharilyn Johnston,

**Reference: Union Gas Pipeline Project – Notice of Information Session  
Panhandle Reinforcement Project**

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50 Keil Drive North  
Chatham, ON N7M 5M1  
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c. John Bonin, Union Gas  
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January 11, 2016  
File: 160961079

**Attention: Chief Dan Miskokomon**  
Walpole Island First Nation  
RR3 Stn Main  
Wallaceburg, ON N8A 4K9

Dear Chief Dan Miskokomon,

**Reference: Union Gas Pipeline Project – Notice of Information Session  
Panhandle Reinforcement Project**

To secure the continued reliable delivery of natural gas and to serve a growing demand for affordable natural gas, Union Gas is proposing to increase the capacity of the Panhandle Transmission System which serves residential, commercial and industrial natural gas customers in Windsor-Essex, Chatham-Kent and surrounding areas, including the fast growing greenhouse market in the Leamington and Kingsville area. The proposed project involves removing an existing 16-inch diameter pipeline and replacing it in the same location with a new 36-inch diameter pipeline. The proposed project will occur between the existing Union Gas Dawn Compressor Station located at Bentpath Line and Dawn Valley Road in the Township of Dawn-Euphemia, and the existing Dover Transmission Station located at Town Line Road and Belle Rose Line in the Municipality of Chatham-Kent. The location of the pipeline being replaced is shown on the attached map. If approved by the Ontario Energy Board, project construction is targeted to begin in the spring, 2017.

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50 Keil Drive North  
Chatham, ON N7M 5M1  
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Email: kmccorkle@uniongas.com

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c. John Bonin, Union Gas  
Ryan Park, Union Gas  
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January 11, 2016  
File: 160961079

**Attention: Dean Jacobs, Consultation Manager**  
Walpole Island First Nation  
RR3 Stn Main  
Wallaceburg, ON N8A 4K1

Dear Dean Jacobs,

**Reference: Union Gas Pipeline Project – Notice of Information Session  
Panhandle Reinforcement Project**

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50 Keil Drive North  
Chatham, ON N7M 5M1  
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Email: kmccorkle@uniongas.com

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Map – Pipeline to be Replaced

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Ryan Park, Union Gas  
Tony Vadjla, Union Gas  
Mark Iamarino, Stantec Consulting Ltd.

January 11, 2016  
File: 160961079

**Attention: Chief Greg Peters**  
Delaware Nation  
14760 School House Line, RR3  
Thamesville, ON N0P 2K0

Dear Chief Greg Peters,

**Reference: Union Gas Pipeline Project – Notice of Information Session  
Panhandle Reinforcement Project**

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Manager, First Nations and Métis Affairs  
Union Gas Limited  
50 Keil Drive North  
Chatham, ON N7M 5M1  
Phone: 519-436-4600 ext. 5002243  
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Attachments: Notice of Information Session  
Map – Pipeline to be Replaced

- c. John Bonin, Union Gas  
Ryan Park, Union Gas  
Tony Vadjla, Union Gas  
Mark Iamarino, Stantec Consulting Ltd.

January 11, 2016  
File: 160961079

**Attention: Robin King, Consultation Manager**  
Delaware Nation  
14760 School House Line, RR3  
Thamesville, ON N0P 2K0

Dear Robin King,

**Reference: Union Gas Pipeline Project – Notice of Information Session  
Panhandle Reinforcement Project**

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- c. John Bonin, Union Gas  
Ryan Park, Union Gas  
Tony Vadjla, Union Gas  
Mark Iamarino, Stantec Consulting Ltd.

January 11, 2016  
File: 160961079

**Attention: Chief Louise Hillier**  
Caldwell First Nation  
14 Orange Street  
Leamington, ON N8H 1P5

Dear Chief Louise Hillier,

**Reference: Union Gas Pipeline Project – Notice of Information Session  
Panhandle Reinforcement Project**

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Chatham, ON N7M 5M1  
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Attachments: Notice of Information Session  
Map – Pipeline to be Replaced

c. John Bonin, Union Gas  
Ryan Park, Union Gas  
Tony Vadjla, Union Gas  
Mark Iamarino, Stantec Consulting Ltd.



**From:** [Dickson, Parker](#)  
**To:** [alya@metisnation.org](mailto:alya@metisnation.org)  
**Cc:** [McCorkle, Ken](#); [Iamarino, Mark](#); [Dickson, Parker](#)  
**Subject:** Site Monitors for Natural Heritage Surveys and Archaeological Assessments – Union Gas Panhandle Transmission System, Dawn to Dover Pipeline Replacement  
**Date:** March-17-16 4:59:57 PM

---

Good Afternoon Aly,

Further to Stantec's previous communication on March 11, 2016, it is anticipated that the archaeological surveys for the Panhandle Reinforcement Project will begin on Monday, March 28<sup>th</sup>, 2016.

We welcome the opportunity to include members of your community on the archaeological survey team. If any member wishes to participate, please let us know at your earliest convenience so that we can arrange a meeting time and location. As I will be leading the archaeological surveys for the project, please feel free to contact me moving forward for further archaeological assessment details.

Natural heritage surveys are to commence at a later date and additional notification regarding the anticipated start date will be sent to you accordingly.

On behalf of Union Gas and Stantec, I thank you for your time and look forward to working with you on this project.

**Parker Dickson, MA**

Project Archaeologist  
Stantec  
600-171 Queens Avenue London ON N6A 5J7  
Phone: 519-645-2007 ext 6640  
Cell: 226-268-7196  
Fax: 519-645-6575  
[Parker.Dickson@stantec.com](mailto:Parker.Dickson@stantec.com)

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**From:** [Dickson, Parker](#)  
**To:** [lwhite-eye@cottfn.com](mailto:lwhite-eye@cottfn.com); [kriley@cottfn.com](mailto:kriley@cottfn.com)  
**Cc:** [McCorkle, Ken](#); [Iamarino, Mark](#); [Dickson, Parker](#)  
**Subject:** Site Monitors for Natural Heritage Surveys and Archaeological Assessments – Union Gas Panhandle Transmission System, Dawn to Dover Pipeline Replacement  
**Date:** March-17-16 5:04:30 PM

---

Good Afternoon Leslee and Kelly,

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Stantec  
600-171 Queens Avenue London ON N6A 5J7  
Phone: 519-645-2007 ext 6640  
Cell: 226-268-7196  
Fax: 519-645-6575  
[Parker.Dickson@stantec.com](mailto:Parker.Dickson@stantec.com)

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**From:** [Dickson, Parker](#)  
**To:** [sheri.doxtator@oneida.on.ca](mailto:sheri.doxtator@oneida.on.ca)  
**Cc:** [McCorkle, Ken](#); [Iamarino, Mark](#); [Dickson, Parker](#)  
**Subject:** Site Monitors for Natural Heritage Surveys and Archaeological Assessments – Union Gas Panhandle Transmission System, Dawn to Dover Pipeline Replacement  
**Date:** March-17-16 5:01:42 PM

---

Good Afternoon Sheri,

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Stantec  
600-171 Queens Avenue London ON N6A 5J7  
Phone: 519-645-2007 ext 6640  
Cell: 226-268-7196  
Fax: 519-645-6575  
[Parker.Dickson@stantec.com](mailto:Parker.Dickson@stantec.com)

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**From:** [Dickson, Parker](#)  
**To:** [chief.thomas@munsee-delaware.org](mailto:chief.thomas@munsee-delaware.org)  
**Cc:** [McCorkle, Ken](#); [Iamarino, Mark](#); [Dickson, Parker](#)  
**Subject:** Site Monitors for Natural Heritage Surveys and Archaeological Assessments – Union Gas Panhandle Transmission System, Dawn to Dover Pipeline Replacement  
**Date:** March-17-16 5:04:01 PM

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Fax: 519-645-6575  
[Parker.Dickson@stantec.com](mailto:Parker.Dickson@stantec.com)

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**From:** [Dickson, Parker](#)  
**To:** [Thomas.bressette@kettlepoint.org](mailto:Thomas.bressette@kettlepoint.org); [lorraine.george@kettlepoint.org](mailto:lorraine.george@kettlepoint.org)  
**Cc:** [McCorkle, Ken](#); [Iamarino, Mark](#); [Dickson, Parker](#)  
**Subject:** Site Monitors for Natural Heritage Surveys and Archaeological Assessments – Union Gas Panhandle Transmission System, Dawn to Dover Pipeline Replacement  
**Date:** March-17-16 5:08:57 PM

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Good Afternoon Thomas and Lorraine,

Further to Stantec's previous communication on March 11, 2016, it is anticipated that the archaeological surveys for the Panhandle Reinforcement Project will begin on Monday, March 28<sup>th</sup>, 2016.

We welcome the opportunity to include members of your community on the archaeological survey team. If any member wishes to participate, please let us know at your earliest convenience so that we can arrange a meeting time and location. As I will be leading the archaeological surveys for the project, please feel free to contact me moving forward for further archaeological assessment details.

Natural heritage surveys are to commence at a later date and additional notification regarding the anticipated start date will be sent to you accordingly.

On behalf of Union Gas and Stantec, I thank you for your time and look forward to working with you on this project.

**Parker Dickson, MA**

Project Archaeologist  
Stantec  
600-171 Queens Avenue London ON N6A 5J7  
Phone: 519-645-2007 ext 6640  
Cell: 226-268-7196  
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**From:** [Dickson, Parker](#)  
**To:** [wmaness@outlook.com](mailto:wmaness@outlook.com)  
**Cc:** [CPlain@aamjiwnaang.ca](mailto:CPlain@aamjiwnaang.ca); [SJohnston@aamjiwnaang.ca](mailto:SJohnston@aamjiwnaang.ca); [McCorkle, Ken](#); [Iamarino, Mark](#); [Dickson, Parker](#)  
**Subject:** Site Monitors for Natural Heritage Surveys and Archaeological Assessments – Union Gas Panhandle Transmission System, Dawn to Dover Pipeline Replacement  
**Date:** March-17-16 5:10:14 PM

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Good Afternoon Wanda,

Further to Stantec's previous communication on March 11, 2016, it is anticipated that the archaeological surveys for the Panhandle Reinforcement Project will begin on Monday, March 28<sup>th</sup>, 2016.

We welcome the opportunity to include members of your community on the archaeological survey team. If any member wishes to participate, please let us know at your earliest convenience so that we can arrange a meeting time and location. As I will be leading the archaeological surveys for the project, please feel free to contact me moving forward for further archaeological assessment details.

Natural heritage surveys are to commence at a later date and additional notification regarding the anticipated start date will be sent to you accordingly.

On behalf of Union Gas and Stantec, I thank you for your time and look forward to working with you on this project.

**Parker Dickson, MA**

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**From:** [Dickson, Parker](#)  
**To:** [dean.jacobs@wfn.org](mailto:dean.jacobs@wfn.org)  
**Cc:** [dan.miskokomon@wfn.org](mailto:dan.miskokomon@wfn.org); [McCorkle, Ken](#); [Iamarino, Mark](#); [Dickson, Parker](#)  
**Subject:** Site Monitors for Natural Heritage Surveys and Archaeological Assessments – Union Gas Panhandle Transmission System, Dawn to Dover Pipeline Replacement  
**Date:** March-17-16 5:11:29 PM

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Good Afternoon Dean,

Further to Stantec's previous communication on March 11, 2016, it is anticipated that the archaeological surveys for the Panhandle Reinforcement Project will begin on Monday, March 28<sup>th</sup>, 2016.

We welcome the opportunity to include members of your community on the archaeological survey team. If any member wishes to participate, please let us know at your earliest convenience so that we can arrange a meeting time and location. As I will be leading the archaeological surveys for the project, please feel free to contact me moving forward for further archaeological assessment details.

Natural heritage surveys are to commence at a later date and additional notification regarding the anticipated start date will be sent to you accordingly.

On behalf of Union Gas and Stantec, I thank you for your time and look forward to working with you on this project.

**Parker Dickson, MA**

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**From:** [Dickson, Parker](#)  
**To:** [Robin.King@delawarenation.on.ca](mailto:Robin.King@delawarenation.on.ca)  
**Cc:** [gcpeters@mnsi.net](mailto:gcpeters@mnsi.net); [McCorkle, Ken](#); [Iamarino, Mark](#); [Dickson, Parker](#)  
**Subject:** Site Monitors for Natural Heritage Surveys and Archaeological Assessments – Union Gas Panhandle Transmission System, Dawn to Dover Pipeline Replacement  
**Date:** March-17-16 5:12:22 PM

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Good Afternoon Robin,

Further to our previous communication on March 11, 2016, it is anticipated that the archaeological surveys for the Panhandle Reinforcement Project will begin on Monday, March 28<sup>th</sup>, 2016.

We welcome the opportunity to include members of your community on the archaeological survey team. If any member wishes to participate, please let us know at your earliest convenience so that we can arrange a meeting time and location. As I will be leading the archaeological surveys for the project, please feel free to contact me moving forward for further archaeological assessment details.

Natural heritage surveys are to commence at a later date and additional notification regarding the anticipated start date will be sent to you accordingly.

On behalf of Union Gas and Stantec, I thank you for your time and look forward to working with you on this project.

**Parker Dickson, MA**

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**From:** [Dickson, Parker](#)  
**To:** [cfnchief@live.com](mailto:cfnchief@live.com)  
**Cc:** [McCorkle, Ken](#); [Iamarino, Mark](#); [Dickson, Parker](#)  
**Subject:** Site Monitors for Natural Heritage Surveys and Archaeological Assessments – Union Gas Panhandle Transmission System, Dawn to Dover Pipeline Replacement  
**Date:** March-17-16 5:13:20 PM

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Good Afternoon Louise,

Further to Stantec's previous communication on March 11, 2016, it is anticipated that the archaeological surveys for the Panhandle Reinforcement Project will begin on Monday, March 28<sup>th</sup>, 2016.

We welcome the opportunity to include members of your community on the archaeological survey team. If any member wishes to participate, please let us know at your earliest convenience so that we can arrange a meeting time and location. As I will be leading the archaeological surveys for the project, please feel free to contact me moving forward for further archaeological assessment details.

Natural heritage surveys are to commence at a later date and additional notification regarding the anticipated start date will be sent to you accordingly.

On behalf of Union Gas and Stantec, I thank you for your time and look forward to working with you on this project.

**Parker Dickson, MA**

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<u>Cash Inflow</u>							
Revenue	2,833	2,833	2,833	2,833	2,833	2,833	2,833
Expenses:							
O & M Expense	(15)	(15)	(15)	(15)	(15)	(15)	(15)
Municipal Tax	(1,533)	(1,533)	(1,533)	(1,533)	(1,533)	(1,533)	(1,533)
Income Tax	598	520	449	384	324	270	133
Net Cash Inflow	<u>1,882</u>	<u>1,804</u>	<u>1,733</u>	<u>1,668</u>	<u>1,609</u>	<u>1,555</u>	<u>1,418</u>
							<u>1,379</u>
<u>Cash Outflow</u>							
Incremental Capital	-	-	-	-	-	-	-
Change in Working Capital	-	-	-	-	-	-	-
Cash Outflow	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
<u>Cumulative Net Present Value</u>							
Cash Inflow	51,756	52,374	52,940	53,458	53,933	54,370	55,805
Cash Outflow	<u>263,459</u>	<u>263,459</u>	<u>263,459</u>	<u>263,459</u>	<u>263,459</u>	<u>263,459</u>	<u>263,459</u>
NPV By Year	<u>(211,703)</u>	<u>(211,084)</u>	<u>(210,519)</u>	<u>(210,001)</u>	<u>(209,526)</u>	<u>(209,089)</u>	<u>(208,654)</u>
<u>Project NPV</u>							
DCF term 40 years							
<u>Profitability Index</u>							
By Year PI	0.20	0.20	0.20	0.20	0.20	0.21	0.21
Project PI							0.21

[illegible]

UNION GAS LIMITED  
Panhandle Reinforcement Project Revenue Requirement  
Based on Board-Approved Depreciation Rates

Line No.	Particulars (\$000's)	2017 (a)	2018 (b)
	<u>Rate Base Investment</u>		
1	Capital Expenditures	243,651	20,818
2	Average Investment	28,751	249,046
	<u>Revenue Requirement Calculation:</u>		
	<u>Operating Expenses:</u>		
3	Operating and Maintenance Expenses (1)	3	15
4	Depreciation Expense (2)	2,486	5,185
5	Property Taxes	261	1,569
6	Total Operating Expenses	<u>2,750</u>	<u>6,769</u>
7	Required Return (5.775% x line 2) (3)	1,660	14,382
	<u>Income Taxes:</u>		
8	Income Taxes - Equity Return (4)	333	2,882
9	Income Taxes - Utility Timing Differences (5)	(4,393)	(6,356)
10	Total Income Taxes	<u>(4,060)</u>	<u>(3,474)</u>
11	Total Revenue Requirement (line 6 + line 7 + line 10)	<u>350</u>	<u>17,677</u>
12	Incremental Project Revenue	<u>250</u>	<u>1,572</u>
13	Net Revenue Requirement (line 11 - line 12)	<u>100</u>	<u>16,105</u>

Notes:

- (1) Expenses include incremental O&M for stations and pipe.
- (2) Depreciation expense at 2013 Board-approved depreciation rates.
- (3) The required return of 5.775% assumes a capital structure of 64% long-term debt at 4.00% and 36% common equity at the 2013 Board-approved return of 8.93% ( $0.64 \times 0.0400 + 0.36 \times 0.0893$ ).  
The 2018 required return calculation is as follows:  
\$249.046 million  $\times$  64%  $\times$  4.00% = \$6.376 million plus  
\$249.046 million  $\times$  36%  $\times$  8.93% = \$8.006 million for a total of \$14.382 million.
- (4) Taxes related to the equity component of the return at a tax rate of 26.5%.
- (5) Taxes related to utility timing differences are negative as the capital cost allowance deduction in arriving at taxable income exceeds the provision of book depreciation in the year.

**UNION GAS LIMITED**  
**Detailed Allocation Factors Derivation**

Line No.	Particulars (10 <sup>3</sup> m <sup>3</sup> /d)	Capacity (a)	M1 (b)	M2 (c)	M4 (d)	M5 (e)	M7 (f)	T1 (g)	T2 (h)	In-Franchise (i) = (sum b-h)	C1 (j)	M16 (k)	Ex-Franchise (l) = (j+k)	Total (m) = (i+l)
2013 Board-Approved Allocation Methodology														
1	Ojibway/St. Clair Design Maximum Capacity	15,188												
2	Less: C1 Transportation - Ojibway/St. Clair Firm Demand	(2,264)												
3	Less: M16 Firm Demand (West of Dawn)	(473)												
4	Remaining Pipe Capacity to be Allocated to In-Franchise	12,452												
5	2013 Panhandle Firm Design Day Demands		5,567	1,870	929	30	131	524	3,051	12,102	-	-	-	12,102
6	2013 Sarnia Industrial Line Firm Design Day Demands		764	257	12	-	-	1,047	9,541	11,620	-	-	-	11,620
7	Total Firm Design Day Demands		6,331	2,127	941	30	131	1,570	12,592	23,722	-	-	-	23,722
8	2013 Board-Approved Allocation Methodology		3,323	1,116	494	16	69	824	6,610	12,452	2,264	473	2,737	15,188 (1)
2013 Board-Approved Allocation Methodology Updated for Project														
9	2013 Approved Ojibway/St. Clair Demand Allocator	15,188												
10	Less: C1 Transportation - Ojibway/St. Clair Firm Demand	(2,264)												
11	Less: M16 Firm Demand (West of Dawn)	(473)												
12	Add: Incremental Capacity related to the Project	2,739 (2)												
13	Remaining Pipe Capacity to be Allocated to In-Franchise	15,191												
14	2013 Panhandle Firm Design Day Demands		5,567	1,870	929	30	131	524	3,051	12,102	-	-	-	12,102
15	2013 Sarnia Industrial Line Firm Design Day Demands		764	257	12	-	-	1,047	9,541	11,620	-	-	-	11,620
16	2018 Incremental Firm Design Day Demands for the Project		56	45	1,039	-	439	154	151	1,884	-	-	-	1,884
17	Total Firm Design Day Demands		6,387	2,172	1,980	30	570	1,725	12,743	25,606	-	-	-	25,606
18	2013 Board-Approved Allocation Methodology Updated for Project		3,789	1,289	1,174	18	338	1,023	7,560	15,191	2,264	473	2,737	17,927 (3)
Proposed 2017 Project Allocation Factor														
19	2013 Panhandle Firm Design Day Demands		5,567	1,870	929	30	131	524	3,051	12,102	-	-	-	12,102
20	2017 Incremental Firm Design Day Demands for the Project		28	24	696	-	439	154	151	1,492	-	-	-	1,492
21	Proposed 2017 Project Allocation Factor		5,595	1,894	1,625	30	570	678	3,202	13,594	-	-	-	13,594
Proposed 2018 Project Allocation Factor														
22	2013 Panhandle Firm Design Day Demands		5,567	1,870	929	30	131	524	3,051	12,102	-	-	-	12,102
23	2017 Incremental Firm Design Day Demands for the Project		28	24	696	-	439	154	151	1,492	-	-	-	1,492
24	2018 Incremental Firm Design Day Demands for the Project		28	21	343	-	-	-	-	392	-	-	-	392
25	Proposed 2018 Project Allocation Factor		5,623	1,915	1,968	30	570	678	3,202	13,986	-	-	-	13,986
Proposed 2019 Project Allocation Factor														
26	2013 Panhandle Firm Design Day Demands		5,567	1,870	929	30	131	524	3,051	12,102	-	-	-	12,102
27	2017 Incremental Firm Design Day Demands for the Project		28	24	696	-	439	154	151	1,492	-	-	-	1,492
28	2018 Incremental Firm Design Day Demands for the Project		28	21	343	-	-	-	-	392	-	-	-	392
29	Proposed 2019 Project Allocation Factor		5,623	1,915	1,968	30	570	678	3,202	13,986	-	-	-	13,986
Proposed 2020 Project Allocation Factor														
30	2013 Panhandle Firm Design Day Demands		5,567	1,870	929	30	131	524	3,051	12,102	-	-	-	12,102
31	2017 Incremental Firm Design Day Demands for the Project		28	24	696	-	439	154	151	1,492	-	-	-	1,492
32	2018 Incremental Firm Design Day Demands for the Project		28	21	343	-	-	-	-	392	-	-	-	392
33	Proposed 2020 Project Allocation Factor		5,623	1,915	1,968	30	570	678	3,202	13,986	-	-	-	13,986

Notes:

(1) In-franchise capacity (Line 4) allocated using total Panhandle and St. Clair Design Day Demands (Line 7) to in-franchise rate classes. Rate C1 demand (Line 2) and Rate M16 demand (Line 3) added to total in-franchise allocation.

(2) Incremental capacity of  $2,739 \text{ } 10^3 \text{ m}^3/\text{d}$  equal to  $106 \text{ TJ/d}$  based on a heat value of  $38.55 \text{ GJ}/10^3 \text{ m}^3$ .

(3) In-franchise capacity (Line 13) allocated using total Panhandle, St. Clair, and 2018 Incremental Project Design Day Demands (Line 17) to in-franchise rate classes. Rate C1 demand (Line 10) plus Rate M16 demand (Line 11) added to total in-franchise allocation.

UNION GAS LIMITED  
2018 Cost Allocation Impacts of the Panhandle Reinforcement Project - Board-Approved Cost Allocation  
Based on Board-Approved Depreciation Rates

Line No.	Particulars	Total Cost Allocation Impacts (\$000's) (a) = (b + e + i)	Cost Allocation Change in Demands (1) (\$000's) (b)	Project-related Ojibway/St. Clair Demand Costs (2)			Other Functional Classifications (4)		
				Project Costs (\$000's) (c)	Indirect Costs (\$000's) (d)	Total (\$000's) (e) = (c + d)	Project Costs (\$000's) (g)	Indirect Costs (\$000's) (h)	Total (\$000's) (i) = (g + h)
1	Rate M1	2,561	(53)	4,281	355	4,636	(858)	(1,165)	(2,023)
2	Rate M2	1,314	(12)	1,456	121	1,577	(151)	(101)	(252)
3	Rate M4	1,585	234	1,327	110	1,437	(77)	(9)	(86)
4	Rate M5	(40)	(0)	20	2	22	(17)	(44)	(61)
5	Rate M7	489	102	382	32	414	(24)	(2)	(27)
6	Rate M9	(2)	-	-	-	-	(2)	0	(2)
7	Rate M10	(0)	-	-	-	-	(0)	(0)	(0)
8	Rate T1	1,209	20	1,156	96	1,252	(62)	(1)	(63)
9	Rate T2	8,837	(96)	8,543	708	9,251	(427)	109	(319)
10	Rate T3	(7)	-	-	-	-	(9)	2	(7)
11	Subtotal - Union South	15,946	195	17,166	1,423	18,589	(1,627)	(1,212)	(2,839)
12	Excess Utility Space	(35)	-	-	-	-	(16)	(19)	(35)
13	Rate C1	2,706	(161)	2,558	212	2,770	(115)	212	97
14	Rate M12	(191)	-	-	-	-	(348)	158	(191)
15	Rate M13	0	-	-	-	-	(0)	0	0
16	Rate M16	528	(34)	534	44	579	(24)	7	(16)
17	Subtotal - Ex-franchise	3,009	(195)	3,092	256	3,349	(503)	358	(145)
18	Rate 01	(942)	-	-	-	-	(332)	(609)	(942)
19	Rate 10	(131)	-	-	-	-	(50)	(82)	(131)
20	Rate 20	(99)	-	-	-	-	(35)	(64)	(99)
21	Rate 100	(77)	-	-	-	-	(25)	(52)	(77)
22	Rate 25	(29)	-	-	-	-	(9)	(19)	(29)
23	Subtotal - Union North	(1,277)	-	-	-	-	(451)	(826)	(1,277)
24	In-franchise (line 11 + line 23)	14,668	195	17,166	1,423	18,589	(2,078)	(2,038)	(4,116)
25	Ex-franchise (line 17)	3,009	(195)	3,092	256	3,349	(503)	358	(145)
26	Total	17,677	-	20,258	1,680	21,938	(2,581)	(1,680)	(4,261)

Notes:

- (1) Allocation of the 2013 Board-approved Ojibway/St. Clair Demand costs updated to include the incremental Panhandle Project design capacity of 2,739 10<sup>3</sup>m<sup>3</sup>/d.
- (2) The Project costs of \$20.258 million and Indirect costs of \$1.680 million are allocated in proportion to Exhibit A, Appendix B, Schedule 2, line 18.
- (3) The total 2018 Project costs of \$17.677 million include \$20.258 million directly allocated to the Ojibway/St. Clair functional classification and (\$2.581) million of property, income taxes and working capital allocated to distribution, storage and other transmission-related functional classifications.
- (4) Includes distribution, storage and other transmission including Ojibway/St. Clair Demand costs that are not Project-related.

UNION GAS LIMITED  
2018 Cost Allocation Impacts of the Panhandle Reinforcement Project - Proposed Cost Allocation  
Based on Board-Approved Depreciation Rates

Line No.	Particulars	Total Cost Allocation Impacts (\$000's) (a) = (d + h)	Project-related Ojibway/St. Clair Demand Costs (1)			Other Functional Classifications (3)		
			Project Costs (2) (\$000's) (b)	Indirect Costs (\$000's) (c)	Total (\$000's) (d) = (b + c) (e)	Project Costs (2) (\$000's) (f)	Indirect Costs (\$000's) (g)	Total (\$000's) (h) = (f + g)
1	Rate M1	6,792	8,144	675	8,820	(864)	(1,164)	(2,028)
2	Rate M2	2,751	2,774	230	3,005	(153)	(100)	(253)
3	Rate M4	3,021	2,850	236	3,087	(47)	(18)	(65)
4	Rate M5	(14)	44	4	47	(17)	(44)	(61)
5	Rate M7	876	825	68	894	(11)	(6)	(18)
6	Rate M9	(2)	-	-	-	(2)	0	(2)
7	Rate M10	(0)	-	-	-	(0)	(0)	(0)
8	Rate T1	1,002	982	81	1,063	(59)	(2)	(61)
9	Rate T2	4,695	4,639	385	5,023	(440)	111	(328)
10	Rate T3	(7)	-	-	-	(9)	2	(7)
11	Subtotal - Union South	19,114	20,258	1,680	21,938	(1,602)	(1,223)	(2,824)
12	Excess Utility Space	(35)	-	-	-	(16)	(19)	(35)
13	Rate C1	82	-	-	-	(135)	218	82
14	Rate M12	(191)	-	-	-	(348)	158	(191)
15	Rate M13	0	-	-	-	(0)	0	0
16	Rate M16	(16)	-	-	-	(28)	12	(16)
17	Subtotal - Ex-franchise	(159)	-	-	-	(528)	369	(159)
18	Rate 01	(942)	-	-	-	(332)	(609)	(942)
19	Rate 10	(131)	-	-	-	(50)	(82)	(131)
20	Rate 20	(99)	-	-	-	(35)	(64)	(99)
21	Rate 100	(77)	-	-	-	(25)	(52)	(77)
22	Rate 25	(29)	-	-	-	(9)	(19)	(29)
23	Subtotal - Union North	(1,277)	-	-	-	(451)	(826)	(1,277)
24	In-franchise (line 11 + line 23)	17,836	20,258	1,680	21,938	(2,053)	(2,048)	(4,102)
25	Ex-franchise (line 17)	(159)	-	-	-	(528)	369	(159)
26	Total	17,677	20,258	1,680	21,938	(2,581)	(1,680)	(4,261)

Notes:

- (1) The Project costs of \$20.258 million and the indirect costs of \$1.680 million are allocated in proportion to Exhibit A, Appendix B, Schedule 2, line 25.
- (2) The total 2018 Project costs of \$17.677 million include \$20.258 million directly allocated to the Ojibway/St. Clair Demand functional classification and (\$2.581) million of property, income taxes and working capital allocated to distribution, storage and other transmission-related functional classifications.
- (3) Includes distribution, storage and other transmission including Ojibway/St. Clair Demand costs that are not Project-related.



UNION GAS LIMITED  
Comparison of the Board-Approved and Proposed Cost Allocation of the 2018 Panhandle Reinforcement Project Costs  
Based on Board-Approved Depreciation Rates

Line No.	Particulars	Board-Approved		Project Revenue		Total Rate Impact based on Board-Approved Cost Allocation		Proposed		Project Revenue		Total Rate Impact based on Proposed Cost Allocation		Difference		
		Cost Allocation (1) (\$000's)	(b)	Adjustment (2) (\$000's)	(c)	Board-Approved Cost Allocation (\$000's)	(d) = (a + c)	(e)	Cost Allocation (3) (\$000's)	(f)	Adjustment (2) (\$000's)	(h)	(i) = (f + h)	(j)	(\$000's) (k) = (i - d)	(l) = (j / d)
1	Rate M1	2,561	14%	(37)		2,524	16%	6,792	38%	(37)		6,754	42%	4,231	165%	
2	Rate M2	1,314	7%	(37)		1,276	8%	2,751	16%	(37)		2,714	17%	1,438	109%	
3	Rate M4	1,585	9%	(906)		679	4%	3,021	17%	(906)		2,115	13%	1,436	91%	
4	Rate M5	(40)	0%	-		(40)	0%	(14)	0%	-		(14)	0%	26	-65%	
5	Rate M7	489	3%	(380)		109	1%	876	5%	(380)		497	3%	388	79%	
6	Rate M9	(2)	0%	-		(2)	0%	(2)	0%	-		(2)	0%	-	0%	
7	Rate M10	(0)	0%	-		(0)	0%	(0)	0%	-		(0)	0%	-	0%	
8	Rate T1	1,209	7%	(116)		1,093	7%	1,002	6%	(116)		886	6%	(207)	-17%	
9	Rate T2	8,837	50%	(96)		8,741	54%	4,695	27%	(96)		4,599	29%	(4,142)	-47%	
10	Rate T3	(7)	0%	-		(7)	0%	(7)	0%	-		(7)	0%	-	0%	
11	Subtotal - Union South	15,946	90%	(1,572)		14,374	89%	19,114	108%	(1,572)		17,542	109%	3,168	20%	
12	Excess Utility Space	(35)	0%	-		(35)	0%	(35)	0%	-		(35)	0%	-	0%	
13	Rate C1	2,706	15%	-		2,706	17%	82	0%	-		82	1%	(2,624)	-97%	
14	Rate M12	(191)	-1%	-		(191)	-1%	(191)	-1%	-		(191)	-1%	-	0%	
15	Rate M13	0	0%	-		0	0%	0	0%	-		0	0%	-	0%	
16	Rate M16	528	3%	-		528	3%	(16)	0%	-		(16)	0%	(545)	-103%	
17	Subtotal - Ex-franchise	3,009	17%	-		3,009	19%	(159)	-1%	-		(159)	-1%	(3,168)	-105%	
18	Rate 01	(942)	-5%	-		(942)	-6%	(942)	-5%	-		(942)	-6%	-	0%	
19	Rate 10	(131)	-1%	-		(131)	-1%	(131)	-1%	-		(131)	-1%	-	0%	
20	Rate 20	(99)	-1%	-		(99)	-1%	(99)	-1%	-		(99)	-1%	-	0%	
21	Rate 100	(77)	0%	-		(77)	0%	(77)	0%	-		(77)	0%	-	0%	
22	Rate 25	(29)	0%	-		(29)	0%	(29)	0%	-		(29)	0%	(0)	0%	
23	Subtotal - Union North	(1,277)	-7%	-		(1,277)	-8%	(1,277)	-7%	-		(1,277)	-8%	(0)	0%	
24	In-franchise (line 11 + line 23)	14,668	83%	(1,572)		13,096	81%	17,836	101%	(1,572)		16,264	101%	3,168	22%	
25	Ex-franchise (line 17)	3,009	17%	-		3,009	19%	(159)	-1%	-		(159)	-1%	(3,168)	-105%	
26	Total	17,677	100%	(1,572)		16,105	100%	17,677	100%	(1,572)		16,105	100%	(0)	0%	

Notes:

- (1) See Exhibit A, Appendix B, Schedule 3.  
(2) Total Project revenue, per Exhibit A, Appendix B, Schedule 1, line 12, column (b).  
(3) See Exhibit A, Appendix B, Schedule 4.

UNION GAS LIMITED  
Calculation of Sales Service and Direct Purchase Impacts for Typical Small and Large Customers - Union North  
Based on Board-Approved Depreciation Rates

Line No.	Particulars	EB-2016-0040 Approved 01-Apr-16 (1)		EB-2016-0186 Proposed 01-Jan-18		Impact		
		Annual Bill	Unit Rate	Annual Bill	Unit Rate	Unit Rate Change	Annual Bill Change	
		(\$)	(cents/m <sup>3</sup> )	(\$)	(cents/m <sup>3</sup> )	(cents/m <sup>3</sup> )	(\$)	(%)
		(a)	(b)	(c)	(d)	(e) = (d-b)	(f) = (c-a)	(g) = (f/a)
	<u>Small Rate 01</u>							
1	Delivery Charges	435	19.7552	433	19.6632	(0.0921)	(2.03)	-0.5%
2	Gas Supply Charges	481	21.8483	480	21.8395	(0.0088)	(0.19)	0.0%
3	Total Bill	915	41.6035	913	41.5027	(0.1008)	(2.22)	-0.2%
4	Sales Service Impact						(2.22)	-0.2%
5	Bundled-T (Direct Purchase) Impact						(2.22)	-0.3%
	<u>Small Rate 10</u>							
6	Delivery Charges	4,232	7.0530	4,205	7.0076	(0.0454)	(27.23)	-0.6%
7	Gas Supply Charges	13,109	21.8483	13,104	21.8395	(0.0088)	(5.27)	0.0%
8	Total Bill	17,341	28.9013	17,308	28.8471	(0.0542)	(32.50)	-0.2%
9	Sales Service Impact						(32.50)	-0.2%
10	Bundled-T (Direct Purchase) Impact						(32.50)	-0.3%
	<u>Large Rate 10</u>							
11	Delivery Charges	13,579	5.4315	13,504	5.4017	(0.0298)	(74.43)	-0.5%
12	Gas Supply Charges	54,621	21.8483	54,599	21.8395	(0.0088)	(21.95)	0.0%
13	Total Bill	68,199	27.2798	68,103	27.2412	(0.0386)	(96.38)	-0.1%
14	Sales Service Impact						(96.38)	-0.1%
15	Bundled-T (Direct Purchase) Impact						(96.38)	-0.2%
	<u>Small Rate 20</u>							
16	Delivery Charges	73,272	2.4424	72,659	2.4220	(0.0204)	(612.86)	-0.8%
17	Gas Supply Charges	573,432	19.1144	573,198	19.1066	(0.0078)	(234.36)	0.0%
18	Total Bill	646,704	21.5568	645,857	21.5286	(0.0282)	(847.23)	-0.1%
19	Sales Service Impact						(847.23)	-0.1%
20	Bundled-T (Direct Purchase) Impact						(847.23)	-0.2%
	<u>Large Rate 20</u>							
21	Delivery Charges	281,495	1.8766	279,512	1.8634	(0.0132)	(1,983.10)	-0.7%
22	Gas Supply Charges	2,659,156	17.7277	2,658,152	17.7210	(0.0067)	(1,004.41)	0.0%
23	Total Bill	2,940,651	19.6043	2,937,663	19.5844	(0.0199)	(2,987.50)	-0.1%
24	Sales Service Impact						(2,987.50)	-0.1%
25	Bundled-T (Direct Purchase) Impact						(2,987.50)	-0.2%
	<u>Average Rate 25</u>							
26	Delivery Charges	62,814	2.7611	62,409	2.7432	(0.0178)	(405.28)	-0.6%
27	Gas Supply Charges	303,844	13.3558	303,844	13.3558	-	-	0.0%
28	Total Bill	366,658	16.1168	366,253	16.0990	(0.0178)	(405.28)	-0.1%
29	Sales Service Impact						(405.28)	-0.1%
30	T-Service (Direct Purchase) Impact						(405.28)	-0.6%
	<u>Small Rate 100</u>							
31	Delivery Charges	260,184	0.9636	258,790	0.9585	(0.0052)	(1,394.52)	-0.5%
32	Gas Supply Charges	5,353,074	19.8262	5,353,074	19.8262	-	-	0.0%
33	Total Bill	5,613,258	20.7898	5,611,863	20.7847	(0.0052)	(1,394.52)	0.0%
34	Sales Service Impact						(1,394.52)	0.0%
35	T-Service (Direct Purchase) Impact						(1,394.52)	-0.5%
	<u>Large Rate 100</u>							
36	Delivery Charges	2,106,720	0.8778	2,096,428	0.8735	(0.0043)	(10,292.52)	-0.5%
37	Gas Supply Charges	46,488,914	19.3704	46,488,914	19.3704	-	-	0.0%
38	Total Bill	48,595,635	20.2482	48,585,342	20.2439	(0.0043)	(10,292.52)	0.0%
39	Sales Service Impact						(10,292.52)	0.0%
40	T-Service (Direct Purchase) Impact						(10,292.52)	-0.5%

Notes:

(1) Reflects Board-approved rates per Appendix A in Union's October 2015 QRAM filing (EB-2015-0255).

UNION GAS LIMITED  
Calculation of Sales Service and Direct Purchase Impacts for Typical Small and Large Customers - Union South  
Based on Board-Approved Depreciation Rates

Line No.	Particulars	EB-2016-0040 Approved 01-Apr-16 (1)		EB-2016-0186 Proposed 01-Jan-18		Impact		
		Annual Bill	Unit Rate	Annual Bill	Unit Rate	Unit Rate Change	Annual Bill Change	
		(\$)	(cents/m <sup>3</sup> )	(\$)	(cents/m <sup>3</sup> )	(cents/m <sup>3</sup> )	(\$)	(%)
		(a)	(b)	(c)	(d)	(e) = (d-b)	(f) = (c-a)	(g) = (f/a)
	<u>Small Rate M1</u>							
1	Delivery Charges	346	15.7046	351	15.9386	0.2340	5.15	1.5%
2	Gas Supply Charges	299	13.5856	299	13.5856	-	-	0.0%
3	Total Bill	644	29.2902	650	29.5242	0.2340	5.15	0.8%
4	Sales Service Impact						5.15	0.8%
5	Direct Purchase Impact						5.15	1.5%
	<u>Small Rate M2</u>							
6	Delivery Charges	3,297	5.4947	3,441	5.7347	0.2400	144.01	4.4%
7	Gas Supply Charges	8,151	13.5856	8,151	13.5856	-	-	0.0%
8	Total Bill	11,448	19.0803	11,592	19.3203	0.2400	144.01	1.3%
9	Sales Service Impact						144.01	1.3%
10	Direct Purchase Impact						144.01	4.4%
	<u>Large Rate M2</u>							
11	Delivery Charges	10,642	4.2566	11,224	4.4896	0.2330	582.48	5.5%
12	Gas Supply Charges	33,964	13.5856	33,964	13.5856	-	-	0.0%
13	Total Bill	44,606	17.8422	45,188	18.0752	0.2330	582.48	1.3%
14	Sales Service Impact						582.48	1.3%
15	Direct Purchase Impact						582.48	5.5%
	<u>Small Rate M4</u>							
16	Delivery Charges	37,374	4.2713	43,475	4.9685	0.6972	6,100.85	16.3%
17	Gas Supply Charges	118,874	13.5856	118,874	13.5856	-	-	0.0%
18	Total Bill	156,248	17.8569	162,349	18.5541	0.6972	6,100.85	3.9%
19	Sales Service Impact						6,100.85	3.9%
20	Direct Purchase Impact						6,100.85	16.3%
	<u>Large Rate M4</u>							
21	Delivery Charges	277,378	2.3115	327,180	2.7265	0.4150	49,801.44	18.0%
22	Gas Supply Charges	1,630,272	13.5856	1,630,272	13.5856	-	-	0.0%
23	Total Bill	1,907,650	15.8971	1,957,452	16.3121	0.4150	49,801.44	2.6%
24	Sales Service Impact						49,801.44	2.6%
25	Direct Purchase Impact						49,801.44	18.0%
	<u>Small Rate M5</u>							
26	Delivery Charges	30,596	3.7086	30,440	3.6897	(0.0189)	(155.83)	-0.5%
27	Gas Supply Charges	112,081	13.5856	112,081	13.5856	-	-	0.0%
28	Total Bill	142,677	17.2942	142,521	17.2753	(0.0189)	(155.83)	-0.1%
29	Sales Service Impact						(155.83)	-0.1%
30	Direct Purchase Impact						(155.83)	-0.5%
	<u>Large Rate M5</u>							
31	Delivery Charges	169,794	2.6122	169,031	2.6005	(0.0117)	(763.06)	-0.4%
32	Gas Supply Charges	883,064	13.5856	883,064	13.5856	-	-	0.0%
33	Total Bill	1,052,858	16.1978	1,052,095	16.1861	(0.0117)	(763.06)	-0.1%
34	Sales Service Impact						(763.06)	-0.1%
35	Direct Purchase Impact						(763.06)	-0.4%
	<u>Small Rate M7</u>							
36	Delivery Charges	656,550	1.8237	725,798	2.0161	0.1924	69,248.52	10.5%
37	Gas Supply Charges	4,890,816	13.5856	4,890,816	13.5856	-	-	0.0%
38	Total Bill	5,547,366	15.4093	5,616,614	15.6017	0.1924	69,248.52	1.2%
39	Sales Service Impact						69,248.52	1.2%
40	Direct Purchase Impact						69,248.52	10.5%
	<u>Large Rate M7</u>							
41	Delivery Charges	2,513,626	4.8339	2,815,801	5.4150	0.5811	302,175.36	12.0%
42	Gas Supply Charges	7,064,512	13.5856	7,064,512	13.5856	-	-	0.0%
43	Total Bill	9,578,138	18.4195	9,880,313	19.0006	0.5811	302,175.36	3.2%
44	Sales Service Impact						302,175.36	3.2%
45	Direct Purchase Impact						302,175.36	12.0%

Notes:

(1) Reflects Board-approved rates per Appendix A in Union's October 2015 QRAM filing (EB-2015-0255).

UNION GAS LIMITED  
Calculation of Sales Service and Direct Purchase Impacts for Typical Small and Large Customers - Union South  
Based on Board-Approved Depreciation Rates

Line No.	Particulars	EB-2016-0040 Approved 01-Apr-16 (1)		EB-2016-0186 Proposed 01-Jan-18		Impact		
		Annual Bill	Unit Rate	Annual Bill	Unit Rate	Unit Rate Change	Annual Bill Change	
		(\$)	(cents/m <sup>3</sup> )	(\$)	(cents/m <sup>3</sup> )	(cents/m <sup>3</sup> )	(\$)	(%)
		(a)	(b)	(c)	(d)	(e) = (d-b)	(f) = (c-a)	(g) = (f/a)
	<u>Large Rate M9</u>							
1	Delivery Charges	384,526	1.9057	383,685	1.9015	(0.0042)	(841.18)	-0.2%
2	Gas Supply Charges	2,741,302	13.5856	2,741,302	13.5856	-	-	0.0%
3	Total Bill	3,125,829	15.4913	3,124,988	15.4871	(0.0042)	(841.18)	0.0%
4	Sales Service Impact						(841.18)	0.0%
5	Direct Purchase Impact						(841.18)	-0.2%
	<u>Average Rate M10</u>							
6	Delivery Charges	5,570	5.8937	5,490	5.8098	(0.0839)	(79.29)	-1.4%
7	Gas Supply Charges	12,838	13.5856	12,838	13.5856	-	-	0.0%
8	Total Bill	18,408	19.4793	18,329	19.3954	(0.0839)	(79.29)	-0.4%
9	Sales Service Impact						(79.29)	-0.4%
10	Direct Purchase Impact						(79.29)	-1.4%
	<u>Small Rate T1</u>							
11	Delivery Charges	132,068	1.7523	144,975	1.9235	0.1712	12,907.02	9.8%
12	Gas Supply Charges	1,023,947	13.5856	1,023,947	13.5856	-	-	0.0%
13	Total Bill	1,156,015	15.3379	1,168,922	15.5091	0.1712	12,907.02	1.1%
14	Sales Service Impact						12,907.02	1.1%
15	Direct Purchase Impact						12,907.02	9.8%
	<u>Average Rate T1</u>							
16	Delivery Charges	201,822	1.7450	223,132	1.9292	0.1843	21,310.75	10.6%
17	Gas Supply Charges	1,571,302	13.5856	1,571,302	13.5856	-	-	0.0%
18	Total Bill	1,773,124	15.3306	1,794,434	15.5148	0.1843	21,310.75	1.2%
19	Sales Service Impact						21,310.75	1.2%
20	Direct Purchase Impact						21,310.75	10.6%
	<u>Large Rate T1</u>							
21	Delivery Charges	445,903	1.7402	496,624	1.9381	0.1979	50,720.74	11.4%
22	Gas Supply Charges	3,481,185	13.5856	3,481,185	13.5856	-	-	0.0%
23	Total Bill	3,927,088	15.3258	3,977,809	15.5237	0.1979	50,720.74	1.3%
24	Sales Service Impact						50,720.74	1.3%
25	Direct Purchase Impact						50,720.74	11.4%
	<u>Small Rate T2</u>							
26	Delivery Charges	511,030	0.8624	577,949	0.9753	0.1129	66,918.71	13.1%
27	Gas Supply Charges	8,050,283	13.5856	8,050,283	13.5856	-	-	0.0%
28	Total Bill	8,561,313	14.4480	8,628,232	14.5609	0.1129	66,918.71	0.8%
29	Sales Service Impact						66,918.71	0.8%
30	Direct Purchase Impact						66,918.71	13.1%
	<u>Average Rate T2</u>							
31	Delivery Charges	1,186,197	0.5997	1,356,166	0.6857	0.0859	169,968.86	14.3%
32	Gas Supply Charges	26,870,938	13.5856	26,870,938	13.5856	-	-	0.0%
33	Total Bill	28,057,135	14.1853	28,227,104	14.2713	0.0859	169,968.86	0.6%
34	Sales Service Impact						169,968.86	0.6%
35	Direct Purchase Impact						169,968.86	14.3%
	<u>Large Rate T2</u>							
36	Delivery Charges	1,936,196	0.5232	2,220,402	0.6000	0.0768	284,206.07	14.7%
37	Gas Supply Charges	50,278,811	13.5856	50,278,811	13.5856	-	-	0.0%
38	Total Bill	52,215,008	14.1088	52,499,214	14.1856	0.0768	284,206.07	0.5%
39	Sales Service Impact						284,206.07	0.5%
40	Direct Purchase Impact						284,206.07	14.7%
	<u>Large Rate T3</u>							
41	Delivery Charges	3,552,739	1.3027	3,555,805	1.3039	0.0011	3,066.36	0.1%
42	Gas Supply Charges	37,049,561	13.5856	37,049,561	13.5856	-	-	0.0%
43	Total Bill	40,602,300	14.8883	40,605,367	14.8895	0.0011	3,066.36	0.0%
44	Sales Service Impact						3,066.36	0.0%
45	Direct Purchase Impact						3,066.36	0.1%

Notes:

(1) Reflects Board-approved rates per Appendix A in Union's October 2015 QRAM filing (EB-2015-0255).

UNION GAS LIMITED  
Panhandle Reinforcement Project Revenue Requirement by Rate Class  
Based on Board-Approved Depreciation Rates

Line No.	Particulars (\$000's)	2017			2018		
		Total Revenue Requirement (a)	Incremental Project Revenue (b)	Net Revenue Requirement (c) = (a+b)	Total Revenue Requirement (e)	Incremental Project Revenue (f)	Net Revenue Requirement (g) = (e+f)
1	Rate M1	271	(5)	266	6,792	(37)	6,754
2	Rate M2	405	(4)	401	2,751	(37)	2,714
3	Rate M4	506	(122)	384	3,021	(906)	2,115
4	Rate M5	(41)	-	(41)	(14)	-	(14)
5	Rate M7	181	(77)	105	876	(380)	497
6	Rate M9	(4)	-	(4)	(2)	-	(2)
7	Rate M10	(0)	-	(0)	(0)	-	(0)
8	Rate T1	175	(23)	151	1,002	(116)	886
9	Rate T2	752	(19)	732	4,695	(96)	4,599
10	Rate T3	(21)	-	(21)	(7)	-	(7)
11	Subtotal - Union South	2,223	(250)	1,972	19,114	(1,572)	17,542
12	Excess Utility Space	(25)	-	(25)	(35)	-	(35)
13	Rate C1	(62)	-	(62)	82	-	82
14	Rate M12	(742)	-	(742)	(191)	-	(191)
15	Rate M13	(0)	-	(0)	0	-	0
16	Rate M16	(15)	-	(15)	(16)	-	(16)
17	Subtotal - Ex-franchise	(844)	-	(844)	(159)	-	(159)
18	Rate 01	(749)	-	(749)	(942)	-	(942)
19	Rate 10	(114)	-	(114)	(131)	-	(131)
20	Rate 20	(81)	-	(81)	(99)	-	(99)
21	Rate 100	(63)	-	(63)	(77)	-	(77)
22	Rate 25	(22)	-	(22)	(29)	-	(29)
23	Subtotal - Union North	(1,029)	-	(1,029)	(1,277)	-	(1,277)
24	In-franchise	1,194	(250)	944	17,836	(1,572)	16,264
25	Ex-franchise	(844)	-	(844)	(159)	-	(159)
26	Total	350	(250)	100	17,677	(1,572)	16,105

Notes:

(1) Exhibit A, Appendix B, Schedule 5, column (i).