PROJECT SUMMARY

1. NOVA Chemicals requests approval from the OEB pursuant to Section 90(1)(c) of the *OEB Act* for leave to construct approximately 4 km of hydrocarbon (natural gas liquids or NGLs) pipeline having a NPS of 12 inches, in order to establish a second, independent pipeline system to deliver NGLs to its Corunna Facility. The project to construct the Proposed Pipeline is also known as the "Kimball Pipeline Replacement Project" (the "Project").

2. Section 90 of the *OEB Act* requires an order of the OEB granting leave to construct a hydrocarbon line if, *inter alia*, the proposed hydrocarbon line: i) is projected to cost more than $2 million; or ii) uses pipe that has an NPS of 12 inches or more and has an operating pressure of 2,000 kilopascals or more. The current estimated cost to design and construct the Proposed Pipeline is approximately $13.8 million. The Proposed Pipeline will have an NPS of 12 inches and will operate at a pressure of 6,895 kilopascals gauge. As such, leave to construct is sought from the OEB under Section 90 of the *OEB Act*.

3. The Proposed Pipeline will connect to the Windsor-Sarnia Pipeline, which is owned and operated by Plains and regulated by the National Energy Board ("NEB"). The connection will be at Plains' existing NOVA valve site ("Existing Valve Site"). The Proposed Pipeline will start at the Existing Valve Site and terminate at a new valve site ("New Valve Site") that will be constructed on the Corunna Facility approximately 4 km to the west of the Existing Valve Site. The Proposed Pipeline will be installed in an existing pipeline RoW, which is comprised of a series of easements registered in favour of NOVA Chemicals. The Proposed Pipeline will replace a dormant NPS 4 pipeline, which will be removed from the RoW as part of the Project. This NPS 4 pipeline was most

recently used to transport ethylene to the Corunna Facility, but has been dormant since 2006. As part of the Project, NOVA Chemicals also plans to remove that portion of a dormant NPS 8 pipeline which is located in the RoW. The NPS 8 pipeline was previously used to transport brine arising from cavern storage of petrochemicals at the Corunna Facility for treatment in an off-site area, but this line too has been dormant since 1986.

4. The location of the Project is entirely within the Township of St Clair in Lambton County as shown in Exhibit 3, Tab H, Schedule 1.

Purpose and Justification

5. NOVA Chemicals and its affiliates manufacture and sell plastics and chemicals to customers worldwide who produce consumer, industrial and packaging products. In Canada, manufacturing sites of NOVA Chemicals and its affiliate are located in Alberta and near Sarnia, Ontario.

6. NOVA Chemicals and its affiliate own and operate three petrochemical facilities in the Sarnia region:

- The largest facility is the Corunna Facility. Acquired in 1988, the Corunna Facility is currently capable of producing approximately 2.5 billion pounds of petrochemicals, including 1.8 billion pounds of ethylene, which is its primary product. The Corunna Facility's ethylene is used to produce polyethylene at NOVA Chemicals' other Sarnia region facilities and is also sold to third parties in the Sarnia region. In addition to ethylene, the Corunna Facility produces large volumes of associated chemical products (or co-products), which are sold to third parties throughout North America. The Corunna Facility consumes up to 53,000 barrels per day (bpd) of NGLs as feedstock.

- NOVA Chemicals Corporation's St. Clair Plant, acquired in 1994, is capable of producing up to 400 million pounds per year of polyethylene, using ethylene from the Corunna Facility as feedstock.

- NOVA Chemicals' Moore Plant, acquired in 1987, also uses ethylene from the Corunna Facility as feedstock to manufacture up to 840 million pounds per year of polyethylene.

7. In 2012, NOVA Chemicals' ongoing efforts to improve the capability and economic viability of its Sarnia region facilities continued with the undertaking of a $250 million project to convert the Corunna Facility from a feedstock supply which included significant amounts of crude oil and crude oil derivatives to a feedstock supply of up to 100% NGLs. That project enabled the Corunna Facility to operate on an optimized 100% NGLs feedstock basis (a combination of ethane, propane and butane) and required a new pipeline system to provide ethane sourced from the Marcellus basin in western Pennsylvania.

8. The new Genesis pipeline connection of the Corunna Facility with the Sunoco Logistics Mariner West project was built after approval by the NEB in June 2012. The new Genesis pipeline connection became operational in the fall of 2013 and is currently NOVA Chemicals' sole means for receiving ethane at its Corunna Facility.

9. NOVA Chemicals is now investigating additional modifications to the Corunna Facility, including those required to enable its use of up to 100% ethane as feedstock. Implementation of these modifications would increase the Corunna Facility's requirement for ethane beyond the capacity of the existing Genesis pipeline system. In addition to increasing delivery capacity, a second pipeline system for NGLs would improve the operational reliability of the Corunna Facility by reducing the prospect of feedstock supply interruptions.

10. NOVA Chemicals has developed relationships with NGL producers in the Utica shale gas basin in Ohio. Ethane will be supplied to NOVA Chemicals from one or more fractionation plants in this area. It will then be shipped by Kinder Morgan Cochin LLC ("Kinder Morgan") via its new UTOPIA pipeline system to Metamora, Ohio, where the new system will tie into Kinder Morgan's existing Cochin pipeline. From there, the Cochin pipeline crosses the Detroit River where it ties into Plains' Windsor-Sarnia Pipeline at Windsor, Ontario. The Windsor-Sarnia Pipeline will bring the ethane up to the Existing Valve Site and on to the Proposed Pipeline to the Corunna Facility.

11. The Project will provide the most efficient, direct physical interconnection for the transportation of ethane from the Existing Valve Site to the Corunna Facility, increasing reliability and capacity of NGL supply to the Corunna Facility.

Benefits of the Project

12. The Corunna Facility, as a competitive and efficient operation, is a key element of NOVA Chemicals' ongoing business operations. Given its investments in the Corunna Facility and the cyclical and highly competitive global nature of NOVA Chemicals' business, reliable and diverse supplies of competitively priced feedstock are essential to its continued viability.

13. This economic imperative is affected by many factors that may change over time. These include internal and third party ethylene demand in the Sarnia region, the relative price of crude oil, the increased supply of NGLs in North America, and the ability to maintain or enhance economic operations through the use of lighter feedstocks such as ethane.

14. In light of the factors noted above, prudent planning of future feedstock supply for the Corunna Facility requires NOVA Chemicals to continue to develop economically viable feedstock sources. The Kimball Pipeline Replacement Project will enhance the diversity and security of feedstock supply available to NOVA Chemicals by establishing a second, independent pipeline delivery system for NGLs to the Corunna Facility.

15. Today, NOVA Chemicals' facilities in the Sarnia region collectively employ more than 900 people and contribute significant property taxes to the Township of St. Clair. Preservation of existing employment at NOVA Chemicals and throughout the Sarnia region is important. The Kimball Pipeline Replacement Project will contribute to this goal.

16. Implementation of the Project could also increase employment opportunities in the Sarnia region by enabling future growth of the Corunna Facility and those facilities which consume its ethylene. The potential for this growth is attributable to the additional supply of NGLs from the second pipeline delivery system. Thus, the Project could enable the continued evolution of the Corunna Facility to the common benefit of NOVA Chemicals and the Sarnia region.

Alternatives to the Project

17. NOVA Chemicals' primary alternative to the Project is to continue with its existing combination of NGLs as feedstock for the Corunna Facility. Historically, propane and butane have been less lucrative feedstocks than ethane and they are forecast to be less lucrative in the long term. Delivering them to the Corunna Facility typically involves railcars, which is a more logistically complex mode of transportation than pipeline. The Project will facilitate favourable long term

feedstock pricing. The Project will also simplify feedstock supply logistics for the Corunna Facility and reduce the number of railcars containing potentially hazardous goods in the Sarnia region.

18. Given the high vapour pressure ("HVP") characteristics of liquid ethane, and the large volumes typically transported, HVP pipelines are the most practical means for moving ethane, as commercially available railcars or trucks for ethane service do not exist.

19. The substantially continuous operations of the Corunna Facility require that the ongoing development of a feedstock supply portfolio reflect a number of relevant factors, including: commodity prices, quality, availability, supply security and reliability, transportation costs, operational safety and flexibility, product and co-product revenues, as well as underlying commercial terms. All of these factors are part of NOVA Chemicals' definition of economically viable options for feedstock supply and were considered in assessing the Project.

20. The overall pipeline delivery system contemplated by the Project (i.e. the continuous path provided by Kinder Morgan's UTOPIA project, Plains' Windsor-Sarnia Pipeline and the Kimball Pipeline Replacement Project) provides the most direct, technically acceptable and cost-effective means of delivering ethane from the Utica basin to the Sarnia region.

COMMUNITY CONSULTATION

1. NOVA Chemicals has a Responsible Care and Sustainability Policy endorsed by its senior management. That policy includes the following principle concerning community consultation:

> *"At NOVA Chemicals, we create dialogue with our communities and near neighbours to share information, seek input, respond to concerns, and to continuously improve our performance as a responsible neighbour."*

Interactions with Stakeholders

2. In November 2014, a letter concerning the Project was couriered, mailed or emailed to stakeholders comprised of the Aboriginal communities and government agencies listed below as well as owners of the lands subject to the easements comprising the RoW and other interested local landowners. In December 2014, the Notice of Project Commencement was published in local newspapers including the Sarnia Observer, Sarnia & Lambton County This Week, The Independent and the Wallaceburg Courier Press. In early January, 2015, a Notice of Information Session was posted in the same local newspapers and a formal invitation was sent to stakeholders. On January 22, 2015, the Information Session for the Project was held in the town of Corunna. Copies of the Notices published, and the materials distributed at the information session, are included in Appendix B of the Environmental Report of the construction and operation of the Proposed Pipeline prepared by Stantec Consulting Limited ("Stantec") and updated to reflect comments received following circulation in May, 2015 (the "ER"). The study area defined and investigated in the ER is described as the "Study Area" in this Application.

3. Public input from those who attended the Information Session has been documented in a comment-response summary table and copies of all written correspondence and responses can be found in Appendix B of the ER included in Exhibit 3, Tab H, Schedule 2, at page 103.

Interactions with Aboriginal Communities

4. The Aboriginal communities identified within 100 km of the Project are:

- Aamjiwnaang First Nation,
- Walpole Island First Nation,
- Caldwell First Nation,
- Chippewa of the Thames First Nation,
- Kettle & Stony Point First Nation,
- Moravian of the Thames (Delaware of the Thames) First Nation,
- Munsee-Delaware Nation,
- Oneida Nation of the Thames and
- Métis Nation of Ontario.

5. In November 2014, a formal letter was couriered to the Aboriginal communities. As outlined above, in December 2014, a Notice of Project Commencement was posted in local newspapers including the Sarnia Observer, Sarnia & Lambton County This Week, The Independent and the Wallaceburg Courier Press. In early January, 2015, a Notice of Information Session was posted in the same local newspapers and a formal invitation was sent to the Aboriginal communities. On January 22, 2015, the Information Session was held in the town of Corunna. Two

representatives of Aamjiwnaang First Nation attended. On April 8, 2015, NOVA Chemicals attended an Environment Committee meeting at Aamjiwnaang First Nation to provide more information about the Project. At this meeting, Aamjiwnaang representatives indicated no opposition to the Project. They expressed interest in participating in future field studies for the Project. NOVA Chemicals and the Aamjiwnaang First Nation have had initial discussions about the prospect of engaging Aboriginal monitors for archaeology and natural heritage studies.

6. NOVA Chemicals delivered a hard copy and compact disk version of the ER to the Aboriginal communities listed above.

7. The Chippewas of the Thames First Nation also expressed an interest in the Project after receipt of the Project commencement letter. Specifically, it requested a copy of the completed ER, which NOVA Chemicals delivered to it.

8. All Aboriginal communities will receive ongoing communications regarding the Project including:

- Construction activities schedule and notices; and
- Copies of field study reports, if requested.

9. Over the course of the Project construction period, NOVA Chemicals will have a construction manager available in the field as a primary contact for property owners and Aboriginal community representatives to discuss and review any issues that may arise during construction.

10. After the completion of Archaeological Assessments for the Project, NOVA Chemicals will notify Aboriginal communities and send a copy of the related report to any Aboriginal community which requests one.

Government Agencies

11. Correspondence regarding this Project was delivered to the following government ministries or agencies:

- Federal:
  - Canadian Environmental Assessment Agency
  - Environment Canada
  - Fisheries and Oceans Canada
  - Transport Canada – Ontario Region

- Provincial:
  - Infrastructure Ontario
  - Ministry of Aboriginal Affairs
  - Ministry of Agriculture, Food & Rural Affairs
  - Ministry of Energy
  - Ministry of Environment and Climate Change
  - Ministry of Natural Resources and Forestry
  - Ministry of Municipal Affairs & Housing
  - Ministry of Tourism, Culture and Sport

- Ministry of Transportation
- St. Clair Region Conservation Authority
- Ontario Energy Board
- Technical Standards and Safety Authority

- Local / Municipal:
  - St. Clair Township
  - Lambton County
  - Elected Officials
  - Other stakeholders include local interest groups, associations and other industry in the area, including but not limited to: Sarnia Lambton Environment Association, Lambton Federation of Agriculture, and Rural Lambton Stewardship Network/Ministry of Natural Resources

Communication Methods

12. The communications process for the Project has been open with opportunities for interested parties to provide comments. To facilitate this, a toll-free number, email address and Project information update section on NOVA Chemicals' website were established. Details are as follows:

- Toll-free Project number: 1-888-220-5880
- Project website – http://www.novachem.com/pages/sarnia-lambton/sarnia-news.aspx

13. Communications received through any of these forms will be documented in a database system to track, consider and respond to comments made throughout the consultation process.

14. All correspondence with Project stakeholders will be recorded and copies of all correspondence files will be maintained for inclusion in the Project communication database.

15. Summaries of consultations with the public and Aboriginal communities are found in Appendix B of the ER included in Exhibit 3, Tab H, Schedule 2.

ROUTE SELECTION

1. As part of its planning for the Project, NOVA Chemicals engaged Stantec to undertake the environmental study of the construction and operation of the Proposed Pipeline. Stantec has produced the ER, which is filed in support of this Application. The ER includes a route evaluation and selection process that was designed to identify the proposed route alternative with the least potential environmental impact.

2. The principle objectives of the ER were to identify a preferred route and to outline various environmental mitigation and protection measures for the construction and operation of the Proposed Pipeline, while meeting the intent of the OEB Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario, 6th Edition (2011) ("OEB Environmental Guidelines"). To meet these objectives, the ER was prepared by:

   - Undertaking a route evaluation process;
   - Confirming a preferred route that minimizes potential environmental impacts;
   - Completing a detailed review of environmental features along the preferred route and assessing the potential environmental impacts of the Project on these features;
   - Establishing mitigation and protective measures that may be used to minimize or eliminate potential environmental impacts of the Project;
   - Developing a consultation program to inform, and receive input from, interested and potentially affected parties; and
   - Identifying any necessary supplemental studies, monitoring and/or contingency plans.

3. The route evaluation process was divided into five steps:

- Step 1 - Determine Route Criteria
- Step II - Generate Route Options
- Step III - Route Evaluation
- Step IV - Input on Preliminary Preferred Route
- Step V - Confirmation of the Route

4. NOVA Chemicals prefers to utilize existing pipeline corridors to locate new or additional pipelines so as to minimize impact to undisturbed lands. NOVA Chemicals determined the preferred route was to construct the Proposed Pipeline within the RoW which runs between the Existing Valve Site and the Corunna Facility ("Alternate Route C"). As part of the Project, NOVA Chemicals will also remove two dormant pipelines from the RoW.

5. The process of developing alternative routes started with the identification of routing objectives for creating reasonable alternatives to Alternate Route C. These included routes that follow a reasonably direct path, routes that avoid environmentally sensitive and socio-economic features, utilization of existing linear infrastructure to reduce effects on previously undisturbed lands and use of existing lot or property lines.

6. In addition to Alternate Route C, two additional routes ("Alternate Route A" and "Alternate Route B") were identified to be environmentally acceptable and constructible options to transport NGLs between the Existing Valve Site and the Corunna Facility. All three route options follow existing linear infrastructure and avoid to the extent possible natural and built cultural heritage features. Alternate

Routes A, B and C are described in further detail below. The location of the preferred Alternate Route C as well as Alternate Routes A and B are shown on Appendix A, Figure 2 (page 100) of the ER (included in Exhibit 3, Tab H, Schedule 2).

7. Alternate Route A originates at the Existing Valve Site and travels east to Kimball Road. At Kimball Road, the route travels north along the west side of Kimball Road to Petrolia Line. At Petrolia Line, the route travels west along the south side of Petrolia Line crossing Tecumseh Road and continuing to Ladysmith Road. At Ladysmith Road, the route continues south along the east side of Ladysmith Road until it intercepts the RoW. The route then crosses Ladysmith Road and travels west and follows the RoW to the New Valve Site. Although the route is located within the road allowance, it is anticipated that construction activity will require the temporary use of private property beyond the road allowance. It is recognized that the final location for the pipeline in the road allowance would be determined in consultation with the Township of St. Clair.

8. Alternate Route B originates at the Existing Valve Site and travels east to Kimball Road. At Kimball Road, the route travels south along the west side of Kimball Road to Rokeby Line. At Rokeby Line, the route travels west along the north side of Rokeby Line crossing Tecumseh Road and continuing to Ladysmith Road. At Ladysmith Road, the route continues north along the east side of Ladysmith Road until it intercepts the RoW. The route then crosses Ladysmith Road and travels west and follows the existing pipeline corridor to the New Valve Site. Although the route is located within the road allowance, it is anticipated that construction activity will require the temporary use of private property beyond the road allowance. It is recognized that the final location for the pipeline in the road allowance would be determined in consultation with the Township of St. Clair.

9. Alternate Route C originates at the Existing Valve Site and travels west within the RoW, across Tecumseh Road and Ladysmith Road, to the New Valve Site at the Corunna Facility.

10. The three routes were subjected to a comparative evaluation based on the following features: agricultural, aquatic, community heritage, route length, socio-economic and terrestrial.

11. **Artificial Agricultural Drainage**: The soils along the three routes are either Caistor Clay or Brookston Clay. These are typically heavy textured and poorly drained resulting in random and systematic drainage being installed within the lands. Damage to agricultural drains as a result of construction can have significant impact to farming operations. The length of artificial drainage was assessed by determining the length of pipeline construction that could potentially intersect the artificial drainage.

	Length of Artificial Agricultural Drainage Crossed (m)
Route A	2393
Route B	4949
Route C	473

12. **Aquatic Characteristics**: The Study Area is serviced with municipal water and it is assumed that the houses in the Study Area are on municipal services. Under the presumption that some of the properties utilize existing wells, the number of wells within 100 m of each route was compared. Generally, minimizing the number of watercourse crossings along the preferred route helps to minimize the

impacts of pipeline construction. The number of watercourses, including municipal drains, was compared along the three route alternatives.

	Watercourses	Water Wells
Route A	4	22
Route B	2	7
Route C	2	2

13. **Community Heritage**: To assess the potential for built and cultural heritage features along the three alternate routes, an overview of those features was conducted for the Study Area. Field work was undertaken to identify potential cultural heritage resources. Seven potential heritage resources (five farmsteads, one residence and one church) were determined to be situated within the Study Area.

	Heritage Sites
Route A	2
Route B	5
Route C	0

14. **Route Length**: Comparing the total length of the alternate routes is appropriate as a broad scoping tool that yields an estimate of the total disturbed area. Typically, shorter routes impact fewer environmental features.

	Route Length
Route A	7624 m
Route B	7654 m
Route C	3712 m

15. **Socio-Economic**: To assess the alternate routes with respect to minimizing the socio-economic effects, the number of houses, farm operations and commercial business along each route were counted and compared.

	House/Farm Operations	Commercial Businesses
Route A	18	0
Route B	12	0
Route C	0	0

16. **Terrestrial**: In order to determine what terrestrial features might become identified as constraints to the Project, desktop and field investigations of published information were conducted on each of the three alternate routes to confirm information gathered during the desktop record review and to assess the potential for encountering protected species or habitats (see Section 8.0 of the ER for a list of the resources reviewed for the environmental study). It is understood that areas regulated by conservation authorities, evaluated / unevaluated wetlands and woodlots are the primary lands in which species at risk and their habitat may be found in the Study Area. Minimizing impact to these features would minimize potential impact to the habitat of any endangered species. The distance traveled for each route through the features is set out below.

	Regulated Areas	Wetlands	Woodlots
Route A	1871 m	0	1420 m
Route B	2788 m	0	1758 m
Route C	151 m	0	3345 m

17. The preceding analysis of the six features noted above indicates that Alternate Route C is the preferred route for the construction and installation of the Proposed Pipeline. Alternate Route C was identified as the first option for five of the six features and was ranked second under the Terrestrial feature.

18. Of the three routes assessed, Alternate Route C has the least projected impact to agricultural artificial drainage, watercourses and water wells and to houses, farm operations or commercial businesses. Alternate Route C is the shortest of the three alternate routes.

19. While Alternate Route C traverses more wooded area than Alternate Routes A and B, the use of the existing easement lands in the RoW to install the Proposed Pipeline would impact the wooded area the least. While running a shorter distance through the wooded areas, Alternate Routes A and B both would require the creation of a new right of way likely requiring the permanent removal of trees for the purposes of construction.

Input on the Preliminary Preferred Route

20. NOVA Chemicals hosted an Information Session on January 22, 2015, to provide details of the Project and receive feedback on the route evaluation and the preliminary preferred route. During the Information Session, various landowners indicated a preference for Alternate Route C because Alternate Routes A and B would run closer to their houses and farm operations than Alternate Route C, which is also located in an existing pipeline corridor in the RoW. NOVA Chemicals also met with representatives of the Township of St. Clair on February 5, 2015, to discuss the routing of the Proposed Pipeline across the two identified roads (Ladysmith Road and Tecumseh Road) as part of Alternate Route C and to

discuss the potential for abandoning in place portions of the dormant 4" and 8" pipelines in those road allowances. No objections were raised and NOVA Chemicals and the Township of St. Clair continue to develop the protocol for the required road crossings and abandonment in place.

21. Following the evaluation and based on input received, the preliminary preferred route, Alternate Route C, was confirmed as the preferred route for the Proposed Pipeline. It is also described in subsequent paragraphs of this Application as the "Proposed Pipeline Route".

22. The Proposed Pipeline Route is currently illustrated within a general location. Detailed design will be undertaken by NOVA Chemicals to determine the exact location of the Proposed Pipeline within the RoW. Detailed design will also be influenced by supplemental studies and site specific requests from landowners and agencies. NOVA Chemicals has also committed to refine the method of installation of the Proposed Pipeline through natural areas during detailed design to minimize the disturbance to the extent reasonably possible.

ENGINEERING

Proposed Pipeline

1. The Proposed Pipeline will run from the Existing Valve Site, East Half of Lot 17, Concession 9, to the New Valve Site at the Corunna Facility, East Half of Lot 23, Concession 9, in the Township of St. Clair (Geographic Township of Moore), County of Lambton.

2. The Proposed Pipeline is shown on the map filed as Exhibit 3, Tab H, Schedule 1. The Proposed Pipeline will be installed in the RoW, which is comprised of a series of easements granted to NOVA Chemicals that are all 10 m (33 ft) wide and have an additional 3 m (10 ft) of working space. Additional information about the RoW and the related easements is set out in the Land Matters section of this Application (Exhibit 3, Tab G).

3. As part of the Proposed Project, NOVA Chemicals will also be removing two dormant pipelines from the RoW, except where agreements are reached to abandon parts of those pipelines in place. The specifications for those two pipelines are set out in Table 10-1 below.

Table 10-1
Existing Pipeline Specifications

NOVA No.	Material	NPS x W.T.	Coating	Most Recent Service	Current State
Line #28	API 5L X42	4 x 0.188”	Yellow Jacket	Ethylene	Out of Service since 2006
Line #29	CSA Gr. 52	8 x 0.125”	Tape	Brine	Out of Service since 1986

Project Schedule

4. Exhibit 3, Tab H, Schedule 3 sets out the current schedule for Project activities, including construction of the Proposed Pipeline. It currently provides for construction of the Proposed Pipeline to begin late in the second quarter of 2017 and to be completed early in the fourth quarter of 2017. The proposed construction schedule takes advantage of the drier summer months, thereby minimizing the impact of construction on the lands and features such as watercourses.

Design

5. All design, installation and testing of the Proposed Pipeline will be in accordance with the requirements of the Canadian Standards Association ("CSA") Code Z662-11 for the Oil and Gas Pipeline Systems ("CSA Z662") and Ontario Regulation 210/01, Oil and Gas Pipeline Systems under the Technical Standards and Safety Act 2000, including code adoption documents. This regulation governs the installation of pipelines in Ontario.

6. The design of the Proposed Pipeline is based on the class location applicable to its proposed location. To determine class location, CSA Z662 includes a classification system that takes into account land use and population density. The class location boundaries are determined by a sliding boundary of 1.6 km long by 400 metres ("m") wide which is centered over the pipeline. The Proposed Pipeline is designated as a Class 2 Location and future development is not expected in this area. Refer to Exhibit 3, Tab H, Schedule 4 for the Class Study Assessment.

7. The design parameters of the Proposed Pipeline will be in accordance with Table 10-2 below.

Table 10-2

Proposed Pipeline Design Parameters

CSAZ662 Parameter	Description	Reference
Design Factor, F	0.8	CSA Z662-11, 4.3.6
Location Factor, L	0.8	HVP, Non Sour Service, Class 2 CSA Z662-11, 4.3.7
Joint Factor, J	1.0	ERW Pipe CSA Z662-11, 4.3.8
Temperature Factor, T	1.0	Up to 120°C CSA Z662-11, 4.3.9
Design Pressure, P	9,930 kPag (1,440 psig)	Design Pressure equals the Maxiumum Operating Pressure (MOP)
Design Temperature	38°C/-30°C (100F/-22F)	
Design Flowrate	464 m^3/h (70,000 bpd)	
Operating Pressure	6,895 kPag (1000 psig)	
Operating Temperature	10°C (50F)	
Operating Flowrate	185 m^3/h (28,000 bpd)	
Corrosion / Erosion Allowance	1.59 mm (1/16”)	
Mill Tolerance	12.5%	

8. The minimum depth of cover for the Proposed Pipeline is shown in Table 10.3 below. It reflects an HVP product pipeline that is designed for a Class 2 Location. For reference, the minimum CSA Z662 requirement is also provided. The depth of cover is measured to the top of the pipe. There are no railway crossings on the Proposed Pipeline Route.

Table 10-3

Proposed Pipeline Depth of Cover

Location	CSA Z662 Min. Requirement m (ft)	Actual Design m (ft)
General	1.2 (4)	1.5 (5)
Below a travelled surface (Road)	1.2 (4)	1.5 (5)
Below the base of a rail (Cased)	1.2 (4)	Not Applicable
Below the base of a rail (Uncased)	2.0 (6.5)	Not Applicable
Drainage or irrigation ditch invert	0.75 (2.5)	1.5 (5) (Based on ditch location relative to road allowance)
Underground structures and utilities (pipelines)	0.3 (1)	1 (3)
Drainage Tiles	0.05 (0.16)	1 (3)

Specifications

9. The Proposed Pipeline will be manufactured using an electric resistance weld process in accordance with the requirements of CSA Z245.1, 2014, Steel Pipe.

10. The Pipeline Design Standards shown in Table 10-4 below are applicable to the Proposed Pipeline's fittings, flanges, valves and coatings.

Table 10-4

Pipeline Design Standards

Product	Code	Year
Steel Fittings	CSA Z245.11	2013
Steel Flanges	CSA Z245.12	2013
Steel Valves	CSA Z245.15	2013
Plant Applied External Coatings for Steel Pipe	CSA Z245.20, Series 14	2014
Field Applied External Coatings for Steel Pipe	CSA Z245.30	2014

11. The pipe specifications of the Proposed Pipeline will be in accordance with Table 10-5 below. These specifications are based on the design parameters set out in Table 10-2.

Table 10-5

Pipe Specifications

	NPS 12
Outside Diameter	328.8 mm
Grade	359
Wall Thickness	10.31 mm (Sch. 40)
Category	II
Coating	Fusion Bond Epoxy, 14 mils
HDD Coating	Dual Layer Abrasion Resistant Fusion Bond Epoxy, 12 mils Base and 18 mils Top Coat
Hoop Stress as % of SMYS	60%

12. The design and proposed location of the Proposed Pipeline will be in accordance with the minimum set back conditions of the TSSA Guidelines for Locating New Oil and Gas Pipeline Facilities (PI Filed: 98/01) and TSSA Guidelines for Development in the Vicinity of Oil and Gas Pipeline Facilities (PI-98/02).

13. The design and planned operation of the Proposed Pipeline will meet the requirements of the Oil and Gas Pipeline Systems Code Adoption Amendment (FS-196-12, November 1, 2012) Section 2(5) concerning High Consequence Areas. It should be noted, however, that the Proposed Pipeline Route is not classified as a High Consequence Area, as the potential impact radius is less than 200 m and the area within the potential impact circle does not contain twenty or more buildings intended for human occupancy. Please refer to Exhibit 3, Tab H, Schedule 4 for the Class Study Assessment, which includes the potential impact radius.

14. The Proposed Pipeline will be included in NOVA Chemicals' Pipeline System Integrity Management Program and NOVA Chemicals' Emergency Response Plan to ensure that the ongoing operation of the Proposed Pipeline takes into account pipeline integrity and addresses any threats to the Proposed Pipeline. Part of this process will include regular in-line inspections of the Proposed Pipeline, including a baseline assessment in the first year of operation.

Pressure Testing

15. The Proposed Pipeline will be pressure tested based on the requirements of Section 8.7 of CSA Z662, which are set out in Table 10-6 below.

Table 10-6
Pressure Testing Criteria

Test Medium	water
Strength Test Pressure	14,895 kPa min. (2,160 psi)
Strength Test Duration	4 hrs
Leak Test Pressure	10,923 kPa min. (1,584 psi)
Leak Test Duration	4 hrs

Cathodic Protection

16. There is an existing impressed current cathodic protection system located at the Existing Valve Site that currently protects two of the pipelines in the RoW. The Proposed Pipeline will be incorporated into the existing cathodic protection system to ensure electrical continuity and avoid stray current interference. New test stations will be installed for the Proposed Pipeline.

Quality Assurance

17. A Quality Assurance program will be established outlining the actions required to ensure the materials purchased for use in the Project are appropriate for their intended service. A Quality Assurance and Quality Control program will also be in place for material procurement.

Valves and Scraper Trap Facilities

18. Scraper traps will be located at the Existing Valve Site and at the New Valve Site. This will allow pigging for maintenance purposes and inline inspection to assist with maintaining the integrity of the Proposed Pipeline.

Pigging Facilities Specifications

19. All below ground pipe in the Proposed Pipeline will be designed for inline inspection and be complete with pig traps, senders and long radius bends where required. The design of the pigging facilities for the Proposed Pipeline will be in accordance with Table 10-7 below.

Table 10-7

Pig Trap Design Summary

Description DN 300 Launch/Receive Traps	**Value**
CSA Location Class for Design	Class 2, CSA Z662-11
Design Temperature (°C)	38°C
Pipe & WT (mm) (above ground & risers)	323.8 mm OD x 10.31 mm WT (Sch. 40)
Barrel O.D. & WT (mm)	Nominal 323.8 mm OD x 10.31 mm WT, Oversize 406.4 mm OD x 12.75 mm WT
Material Types & Grades	ERW, CSA Z245.1-14, Gr. 359, Cat. II, to -30°C
MOP (kPa)	9,930 kPag
Closure Device	16” Flange
Flange Pressure Rating	ANSI 600

Leak Detection

20. The leak detection system for the Proposed Pipeline will be based on a dynamic model that calculates or predicts the pipeline conditions based on the input from the instrumentation installed on the pipeline. The predicted condition is then compared to the actual condition to determine if a leak exists.

21. The leak detection system will be installed and tested for functionality but not optimized at the start-up of the Proposed Pipeline. After start-up, the system will be tuned, optimized and tested to ensure it meets the requirements of CSA Z662.

Overpressure Protection

22. Overpressure protection will be provided by the connecting facilities at the Existing Valve Site. These facilities will meet the requirements of CSA Z662.

Metering

23. Custody transfer metering will be installed at the connection with Plains' Windsor Sarnia Pipeline at the Existing Valve Site. Additional metering and flow control will also be installed at the Corunna Facility in the New Valve Site for operational purposes such as leak detection, flow control and inventory management.

CONSTRUCTION

1. Exhibit 3, Tab H, Schedule 5 describes the general techniques and methods of construction that NOVA Chemicals will employ for the construction of the Proposed Pipeline. It includes activities such as clearing, grading, stringing of pipe, trenching, welding, backfill, tile repair and clean-up.

2. The current schedule calls for construction of the Proposed Pipeline to begin late in the second quarter of 2017 and to continue into the first part of the fourth quarter of 2017. Construction during the winter period was also considered in order to mitigate some environmental concerns; however, the benefits of winter installation were identified as too variable to offset the additional risks and complications of construction in cold weather. The summer period provides fewer environmental impacts than spring or fall without the issues inherent to winter months. The current schedule for construction of the Proposed Pipeline is included in Exhibit 3, Tab H, Schedule 3.

3. For horizontal directional drilling under roads and any other situation where traffic may reasonably be expected to be affected, Traffic management plans will be developed for review and approval by the applicable road authority prior to construction.

4. Bedrock in the area is generally found between 40 and 50 m below the surface; therefore bedrock is not expected to be encountered during construction of the Proposed Pipeline. A map of the local drift thickness in the area is provided in Appendix C, Figure 1 (at page 287), of the ER (see Exhibit 3, Tab H, Schedule 2).

5. The Proposed Pipeline will be pressure tested hydrostatically with water to prove its integrity. Testing will be in accordance with the requirements of Section 7 of CSA Z662. Refer to Table 10-6 in Exhibit 3, Tab D (page 7) for the criteria.

6. Water for the testing of the Proposed Pipeline will be sourced from, and returned to, the Corunna Facility.

7. NOVA Chemicals foresees no issues obtaining material for the Project within the proposed timelines. NOVA Chemicals has already acquired the services of a pipeline contractor to participate in constructability review meetings during the development of the Project.

8. NOVA Chemicals will construct the Proposed Pipeline in compliance with the Project's construction execution plan and Environmental Protection Plan ("EPP") (which are both currently under development), permit conditions and commitments to regulators and landowners. NOVA Chemicals will provide an environmental inspector in the field to monitor compliance with the mitigation measures for the construction of the Proposed Pipeline.

9. The Proposed Pipeline will be installed in the RoW. Consultation with both directly affected and adjacent landowners has taken place, as detailed in the Community Consultation section of this Application (Exhibit 3, Tab 2). Approximately 0.1 hectare of the RoW is agricultural land. NOVA Chemicals will implement a soil management program, which includes segregating top soil from sub soil in the construction area and returning soils in proper sequence after installation of the Proposed Pipeline, in order to mitigate any impact on agricultural productivity.

10. A reforestation program will be implemented as agreed with the St. Clair Region Conservation Authority and any directly affected land owners whose trees are affected.

11. All necessary permits, approvals and authorizations for the Proposed Pipeline will be obtained prior to construction. NOVA Chemicals will establish a Construction Management Team to ensure the obligations between NOVA Chemicals and the pipeline contractor are fulfilled.

ENVIRONMENTAL MATTERS

Planning Process for the Environmental Report

1. The ER for the Project was initiated by Stantec on behalf of NOVA Chemicals in September 2014 and followed the process outlined in the OEB Environmental Guidelines.

2. Following completion of the ER, copies were circulated on May 8, 2015 to federal and provincial agencies, elected officials, municipal offices, Aboriginal communities, land owners and members of the Ontario Pipeline Coordinating Committee ("OPCC") for review and comment. Aboriginal communities received hard copies and a compact disk ("CD"). A CD was delivered to all other recipients, together with an offer of a hard copy. On June 25, 2015, a memorandum (a copy of which is included in Exhibit 3, Tab H, Schedule 2) containing a number of detailed amendments to the ER and dated June 24, 2015 was sent to the OPCC.

3. As of June 24, 2015, no formal response to the ER has been received from the OPCC.

4. Only one comment was received during the ER review process facilitated by the OPCC. A summary of that comment and NOVA Chemicals' response, and the related correspondence, can be found in Exhibit 3, Tab H, Schedule 6. The final, updated version of the ER is filed as Exhibit 3, Tab H, Schedule 2.

5. Based on the feedback received during the public engagement process and the OPCC review, the preferred route for the Proposed Pipeline from the Existing Valve Site to the New Valve Site was confirmed.

6. The ER concludes that the recommended program of supplemental studies and standard mitigation, protective and contingency measures is appropriate to protect the features encountered along the preferred route for the Proposed Pipeline. Monitoring is expected to confirm mitigation and protective measures have been effective in both the short and long term. Therefore, through the implementation of the recommendations in the ER, on-going communication and consultation and adherence to permit, regulatory and legislative requirements, adverse residual environmental and socio-economic effects from this Project are not expected to occur.

Groundwater

7. Historically, private wells were installed at residences along Petrolia Line, Kimball Road and Rokeby Line. These residences are approximately 1 km from the Proposed Pipeline. A review of the Ministry of Environment and Climate Change ("MOECC") water well records ("WWR") indicates that these wells were installed in the 1950's to 1960's and completed within the bedrock aquifer. Based on the known groundwater quality issues, it is expected that most of these residences are now connected to the municipal surface water system and that the private wells are no longer in use. The WWR includes abandonment records for some of these wells. The WWR also indicates shallow test wells and monitoring wells on the Corunna Facility. These types of wells are not used for water supply.

8. There are no active private wells expected within 500 m of the Proposed Pipeline Route. The WWR identifies wells within 1 km of that location as seen in Appendix C, Figure 2 (page 288) of the ER (included in Exhibit 3, Tab H, Schedule 2). These wells were typically installed within the bedrock aquifer. Based on the distance to these wells, the depth of the wells and the reasonable expectation that they are likely no longer in use, trench dewatering is not expected to impact water well quality or quantity.

9. At this time, based on the distance of existing wells from the RoW and their depth, no further steps are anticipated to monitor water wells during construction of the Proposed Pipeline. As an additional precaution, NOVA Chemicals will use reasonable efforts to obtain confirmation from those landowners with wells within 1 km of the Proposed Pipeline Route that those wells are not used for drinking water. If any well is encountered during construction, mitigating measures will be taken to protect the wells as further outlined in Section 4.2.3 (page 33) of the ER.

Species at Risk

10. NOVA Chemicals has initiated field survey programs to determine the presence or absence of species at risk and their habitats along the Proposed Pipeline Route. NOVA Chemicals will work with the Ontario Ministry of Natural Resources and Forestry (“MNRF”) to develop appropriate mitigation procedures, should any species at risk or associated habitat be identified through the field survey programs. Based on a review of background information, species at risk are known to occur in the vicinity of the Study Area; however to date, no species at risk have been identified along the Proposed Pipeline Route. If a species at risk is discovered during construction, NOVA Chemicals will undertake further consultation with the MNRF. For additional information on terrestrial species at

risk, and the mitigative and protective measures identified in the ER and to be adopted by NOVA Chemicals, refer to Section 4.3.4 (page 48) of the ER. According to the MNRF's Natural Heritage Information Centre (MNRF, 2014), and the Federal Department of Fisheries and Oceans aquatic species at risk mapping (2014), there are no aquatic species at risk in the vicinity of the Proposed Pipeline Route. For further details, please see Section 4.3.2 (page 43) of the ER.

Watercourse Crossings

11. The Study Area is within the Sydenham Watershed; however, there are no natural watercourses in the Study Area. There are five drains identified in the Study Area that may be potentially affected along the Proposed Pipeline Route; however, the Proposed Pipeline Route will cross only the Jarvis Drain and the Allingham Drain. Any impact to the Jarvis Drain or the Allingham Drain will be mitigated through the use of directional drilling techniques, which will allow avoidance of the drain infrastructure. Any permits or approvals required from the St. Clair Region Conservation Authority will be obtained prior to construction of the Proposed Pipeline. For further details, please see Section 4.3.1 (page 41) of the ER.

Cultural Heritage Resources

12. A heritage overview has been undertaken for the Study Area through agency consultation, review of historic mapping and visual assessment to determine the presence of potential heritage resources and protected properties.

13. The Project has the potential to impact seven heritage resources (farmsteads, a residence and a church) during construction. The heritage resources identified

are situated approximately 1 km from the anticipated Project activity. A Heritage Assessment Report ("HAR") will be undertaken prior to construction. It will assess potential heritage resources, the relationship of each heritage resource to the Project, and the impacts of the proposed undertaking on each heritage resource analyzed. While describing the impacts of the Proposed Pipeline Route on heritage resources, the HAR will also provide recommendations pertaining to the mitigation of negative impacts to safeguard these resources during the construction and operation phases of the Project.

14. Prior to construction, the HAR will be submitted to the Ontario Ministry of Tourism, Culture and Sport ("MTCS") for its review and comment. With the implementation of mitigative and protective measures as described in the ER (for additional information, refer to Section 4.4.9 (page 66) of the ER), no significant residual impacts on the heritage resources or the cultural heritage landscapes are anticipated.

Socio-Economic Environment

15. Residential and business properties may experience noise, dust and equipment exhaust associated with construction activity for the Project. Construction activities will temporarily affect the aesthetic landscape of the construction area, and could impede property access. The need for consideration of safety exists at locations where properties, residents and vehicles come in proximity to construction activities.

16. To reduce the impacts on residents and businesses, NOVA Chemicals proposes to implement the following mitigation and protection measures:

- maintain open access to homes and businesses;

- replace trees in consultation with the affected landowner should it be necessary to remove trees along the Proposed Pipeline Route;
- restrict construction activities to daylight hours and adhere to local noise by-laws, equip motorized equipment with mufflers and silencers;
- maintain equipment in compliance with regulatory requirements;
- protect stockpiles of friable material with barriers or windscreens in the event of dry conditions and dust;
- suppress dust in source areas; and
- cover loads of friable materials during transport.

17. Additional consultation with residents and businesses adjacent to the Proposed Pipeline Route will be held before construction begins. NOVA Chemicals will also distribute a newsletter to surrounding landowners reminding those who may use the RoW for recreational use that it will be fenced off for safety during the construction. Contact information for a designated NOVA Chemicals' representative will be available before and during construction to address questions and concerns.

Traffic Management

18. A traffic management plan will be implemented for all roads affected by construction. At a minimum, the traffic management plan will outline measures to:

- control the movement of materials and personnel to and from the construction site;
- post signs to warn oncoming motorists of construction activity;
- control traffic at road crossings;

- reduce on-road disturbance and land closures;
- store equipment as far from the edge of the road as practical; and
- install construction barricades at road crossings.

LAND MATTERS

1. The Proposed Pipeline will be installed in the RoW, which is comprised of a series of easements granted to NOVA Chemicals for the purposes of installing, operating, maintaining and replacing pipelines. It will run from the east half of Lot 17, Concession 9, Township of St. Clair to the New Valve Site located at the Corunna Facility in the East half of Lot 23, Concession 9, Township of St. Clair.

2. The existing easement lands of the RoW are 10 m (33 feet) in width running in an east to west direction from the Existing Valve Site. The easement agreements also provide for an additional 3 m (10 feet) of working space located directly south of the easement lands. A list of the easement lands and the current registered landowners is set out in Exhibit 3, Tab H, Schedule 7. There are seven residential landowners (excluding joint tenancies), the Township of St. Clair and one industrial landowner.

3. NOVA Chemicals will be utilizing both the easement lands and the working space lands during the installation of the Proposed Pipeline. The Proposed Pipeline will be installed within the existing easement lands in previously disturbed soils. No new easement agreements are required for the installation of the Proposed Pipeline.

4. Each of the easement agreements for the RoW allows for a maximum of three pipelines to be installed in the easement lands at any time. NOVA Chemicals previously assigned a two foot strip of the easement lands to a subsidiary of Plains for the installation of a NPS10 pipeline. NOVA Chemicals also assigned a six foot strip of the easement lands in Lot 21, Concession 9 to Enbridge Gas Distribution Inc. for the installation of a NPS 3 pipeline and a 600 volt TEC cable.

These assignments were completed in accordance with the terms of the relevant easement agreements or with the written consent of the relevant landowner.

5. The Proposed Pipeline will be installed after the removal of the dormant NPS 4 and NPS 8 pipelines from the RoW. The Proposed Pipeline will be installed in the trench which is dug to remove the existing pipelines. The removal of the two dormant pipelines from the RoW will maintain compliance with the easement agreement condition of a maximum of three pipelines installed in the easements lands when the Proposed Pipeline is installed.

6. The existing easement agreements for the RoW cover the laying down, construction, operation, maintenance, inspection, alteration, removal, replacement, reconstruction and or repair of the subject pipelines together with all works of NOVA Chemicals necessary for these undertakings.

7. According to each easement, the landowner cannot, without the written permission of NOVA Chemicals, excavate, drill, install, erect or permit to be excavated, drilled, installed or erected on, over, under or through the easement lands any pit, well, foundation, pavement, tile, building or other structure or installation.

8. In addition to the existing easement agreements with residential and industrial landowners, NOVA Chemicals entered into a Road Crossing Agreement with the Township of St. Clair (previously Township of Moore) to install, operate and maintain a NPS 4 and an NPS 8 pipeline across Ladysmith Road and Tecumseh Road. The lands covered under this Road Crossing Agreement are part of the RoW, resulting in an uninterrupted pipeline corridor from the Existing Valve Site to the Corunna Facility.

As the existing Road Crossing Agreement with the Township of St. Clair is specific to the existing dormant pipelines in place, NOVA Chemicals has been in discussions with the Township of St Clair regarding a new Road Crossing Agreement to allow for the construction and installation of the Proposed Pipeline under the roads.

9. NOVA Chemicals has also discussed with the Township of St. Clair the prospect of abandoning in place those portions of the dormant NPS 4 and NPS 8 pipelines which are in the road allowances covered by the current Road Crossing Agreement. NOVA Chemicals is developing an Abandonment Plan for the Township's review and approval. NOVA Chemicals will also apply to the Township for a permit to install a culvert in the Jarvis Drain, in order to access the RoW from Tecumseh Road.

10. NOVA Chemicals has identified the landowners who are adjacent to the RoW and has provided these landowners with information regarding the Project and the Proposed Pipeline. These landowners were identified through Project route maps, land registry office records and field work.

11. The land activities for the Project began in September 2014 and are expected to be completed by the end of 2015.

12. Acquisition of third party consents is ongoing. The table below provides a brief summary of these activities.

Land Matters Schedule
September 2014 - Preliminary title searches and completed line lists prepared
January 2015 - Project information package mailed to all landowners and occupants
January 2015 - Public Open House
January 2015 to December 2015 - Road Crossing Bylaw Agreements, pipeline abandonment agreements and all third party consents received
January 2015 – through to end of construction – Information updates to landowners and occupants

13. NOVA Chemicals has identified several third party owned existing linear facilities that the Proposed Pipeline will cross. These facilities are owned and operated by Bell Canada Inc., Hydro One Networks Inc., Enbridge Inc. and Union Gas Limited. NOVA Chemicals has made initial contact with the owners of each facility and will obtain the necessary consents and approvals from each owner prior to the construction of the Proposed Pipeline.

14. The custody metering and main line valve at the Existing Valve Site are owned and operated by Plains on land leased by Plains. NOVA Chemicals has an arrangement with Plains to connect the Proposed Pipeline at the Existing Valve Site, and to share signals from Plains' custody meter to support NOVA Chemicals' leak detection program and to allow remote isolation of that valve by NOVA Chemicals. NOVA Chemicals will install and operate a manual isolation valve and pig trap for the Proposed Pipeline within the Existing Valve Site and has an arrangement with Plains to access and operate these facilities. It also has an arrangement with Plains to connect to the existing Plains cathodic protection system which covers the Existing Valve Site and the RoW.

15. The meter, main line valve and pig trap to be installed at the Corunna Facility in the New Valve Site will be owned and operated by NOVA Chemicals and will be located on land owned by NOVA Chemicals.

16. As part of the Project, NOVA Chemicals will ensure that, at the end of the installation of the Proposed Pipeline, all lands utilized during the construction and installation of the Proposed Pipeline will be returned to the same state that existed prior to any Project activities occurring on these lands or as close thereto as reasonably possible. NOVA Chemicals will ensure that all garbage, construction materials, equipment and anything else that is brought onto the lands is removed.

17. NOVA Chemicals will meet with all affected landowners to review their lands and to ensure that the landowners are satisfied with the state of the lands at the end of the construction activities.