



450 – 1 Street SW
Calgary, Alberta T2P 5H1

Tel: (403) 920-5052
Fax: (403) 920-2347
Email: robert_tarvydas@transcanada.com

September 2, 2015

Filed Electronically

National Energy Board
517 Tenth Avenue SW
Calgary, Alberta T2R 0A8

Attention: Ms. Sheri Young, Secretary of the Board

Dear Ms. Young:

**Re: NOVA Gas Transmission Ltd. (NGTL)
Towerbirch Expansion Project Application
Board File OF-Fac-Gas-NO81-2015-16 02**

Enclosed for filing with the Board is an Application for approvals to construct and operate the Towerbirch Expansion Project (the Project).

The Project consists of approximately 87 km of pipeline, three meter stations and associated facilities in the Tower Lake Area along the Alberta and British Columbia provincial border. The Project facilities are required to meet incremental and existing firm service contracts for the receipt of sweet natural gas on the NGTL System and forecast supply requirements.

NGTL requests that the Board issue a report recommending approval of the Application by the end of Q4 2016. This timing would enable Project construction to be completed in time to achieve an in-service date of November 1, 2017.

Should the Board require additional information with respect to this Application, please contact the NGTL representatives listed in the Application.

Yours truly,
NOVA Gas Transmission Ltd.

Original signed by

Robert Tarvydas
Vice-President
Regulatory Affairs

Enclosures

cc: Jim Delaney, Major Projects Management Office

NATIONAL ENERGY BOARD

IN THE MATTER OF the *National Energy Board Act*, R.S.C. 1985, c. N-7, as amended, and the regulations made thereunder;

IN THE MATTER OF the *Canadian Environmental Assessment Act*, 2012, S.C. 2012, c. 37, as amended, and the regulations made thereunder;

IN THE MATTER OF an application by NOVA Gas Transmission Ltd. for a Certificate of Public Convenience and Necessity and other related approvals pursuant to Part III and Part IV of the *National Energy Board Act*.

NOVA GAS TRANSMISSION LTD.

TOWERBIRCH EXPANSION PROJECT APPLICATION

September 2015

To: The Secretary
National Energy Board
517 Tenth Avenue SW
Calgary, Alberta
T2R 0A8

TOWERBIRCH EXPANSION PROJECT APPLICATION

NOVA Gas Transmission Ltd. (NGTL) applies to the National Energy Board (Board or NEB), pursuant to sections 52 and 58 of Part III, and Part IV of the *National Energy Board Act* (NEB Act), for a Certificate of Public Convenience and Necessity (CPCN) and related approvals for the Towerbirch Expansion Project (Project).

Applicant

1. NGTL is a “company” as the term is defined in the NEB Act.
2. The NGTL System is an integrated natural gas pipeline system comprising approximately 24,500 km of pipeline, associated compression and other facilities located in Alberta (AB) and British Columbia (BC) (NGTL System). The NGTL System gathers and transports natural gas produced in the Western Canadian Sedimentary Basin (WCSB) for delivery to intra-basin and export markets.
3. The NGTL System is subject to federal jurisdiction and regulation by the Board.
4. NGTL is a wholly owned subsidiary of TransCanada PipeLines Limited (TransCanada).
5. TransCanada operates the NGTL System pursuant to an operating agreement between TransCanada and NGTL. TransCanada applies corporate policies in its operation of the NGTL System that are common to TransCanada’s operation of its other federally regulated pipelines, including the TransCanada Mainline and the Foothills System.

Towerbirch Expansion Project

6. NGTL seeks approval in this Application to construct and operate the Project. The Project consists of the Groundbirch Mainline Loop, an approximately 55 km 914 mm (NPS 36) OD pipeline loop of the existing Groundbirch Mainline, and the Tower Lake Section, an approximately 32 km 762 mm (NPS 30) outside diameter (OD) pipeline extension off the Groundbirch Mainline, three meter stations (Dawson Creek North Receipt Meter Station, Dawson Creek North No. 2 Receipt Meter Station and the Tower Lake receipt Meter Station) and related components, including valve sites and launcher and receiver facilities.
7. The Project will provide gas producers in the Tower Lake area with direct access to the NGTL System. The Project components are located in northeastern British Columbia and northwestern Alberta, and collectively form an expansion necessary to meet existing and incremental firm service contracts for the receipt of sweet natural gas on the NGTL System as well as supply forecast requirements.

8. Detailed maps of the Project are provided in Section 15: Foldout Maps.
9. The Project requires an environmental assessment under the NEB Act and is subject to the *Canadian Environmental Assessment Act, 2012* (CEAA 2012). As the proposed pipelines, in aggregate, exceed 40 km in length and will be regulated by the Board, the Project is a “designated project” under the *Regulations Designating Physical Activities* (October 2013).
10. Temporary infrastructure, such as access roads, borrows pits/dugouts, stockpile sites and contractor yards will be required during construction.
11. NGTL seeks approval of the Project in time to meet a proposed in-service date of November 1, 2017 for the pipeline components and the Tower Lake Receipt Meter Station. The Dawson Creek North No. 2 and Dawson Creek North Receipt Meter Stations have proposed in-service dates of April 1, 2018 and September 1, 2018, respectively. To meet these dates, Project construction is scheduled to begin in late Q2 2017, subject to receipt of regulatory approvals.
12. To achieve the proposed construction schedule and desired in-service dates, NGTL requires temporary access to select areas along the proposed route to prepare temporary right-of-way access and establish temporary stockpile sites and contractor yards prior to the commencement of pipeline construction. Work on this temporary infrastructure is scheduled to begin in late Q1 2017, subject to receipt of regulatory approval and landowner consent. An exemption under section 58 of the NEB Act from the detailed route process is sought as part of this Application for routing associated with temporary infrastructure. An exemption is also sought to enable NGTL to begin right-of-way (ROW) preparation activities (including clearing, stripping and grading) in certain locations. In aggregate, this preparatory work will not exceed 40 km in ROW length.
13. The estimated cost of the Project is \$470 million.

Purpose and Justification

14. The Towerbirch Expansion Project was triggered by existing and incremental firm service contracts for the receipt of sweet natural gas on the NGTL System. The facilities are sized to meet design flows, which include existing and incremental firm service contract flows and forecast supply for the Tower Lake Area.
15. The Project is supported by NGTL’s forecasts of gas supply and demand for the NGTL System. The forecasted supply and demand growth, combined with aggregate contractual underpinnings, demonstrate that the applied-for facilities will be used and useful over their economic life.

Transportation Services and Tolls

16. NGTL will provide receipt services to the incremental shippers in the Tower Lake Area under the terms and conditions established in the Tariff, as amended from time to time. These services will utilize the Project facilities and the existing NGTL System.
17. NGTL proposes to treat the costs for the Project on a rolled-in basis, and to determine the tolls for services in accordance with the NGTL toll design methodology in effect, and as approved, at any given time.

Application Content

18. NGTL provides in this Application information required for consideration of a CPCN and other approvals, as reflected in sections 52 and 58 of Part III, and Part IV of the NEB Act and as outlined in the Board's *Filing Manual*. It also provides information required under section 19(1) of CEAA 2012.

Supporting Material

19. In support of this Application, NGTL provides and relies on the information attached to this Application and any additional information that it might file, as directed or permitted by the Board.

Relief Requested

20. NGTL requests that the Board:
 - issue a report recommending the issuance of a CPCN, pursuant to section 52 of the NEB Act, authorizing construction and operation of the Project
 - issue an order, pursuant to section 58 of the NEB Act, exempting NGTL from the requirements of subsections 31(c), 31(d) and 33 of the NEB Act in relation to:
 - temporary infrastructure required for construction of the pipeline
 - ROW preparation activities (including clearing, grading, and stripping) in select areas along the proposed route (in aggregate not exceeding 40 km in length)
 - issue an order pursuant to Part IV of the NEB Act affirming that:
 - prudently incurred costs required to provide service on the applied-for facilities will be included in the determination of the NGTL System revenue requirement

- the tolls for services on the applied-for facilities will be calculated using the same methodology used to calculate tolls for services on the NGTL System, as determined through Board order from time to time
- grant such further and other relief as NGTL might request or the Board might consider appropriate

Respectfully submitted,

Calgary, Alberta
September 2, 2015

NOVA Gas Transmission Ltd.

Original Signed by

Robert Tarvydas
Vice-President, Regulatory Affairs

Please direct all communications related to this Application to:

Daniel RK Wyman
Regulatory Project Manager
Regulatory Services
NOVA Gas Transmission Ltd.
450 – 1 Street SW
Calgary, AB T2P 5H1
Tel: (403) 920-6296
Fax: (403) 920-2347
Email: dan_wyman@transcanada.com

Matthew Ducharme
Legal Counsel
Law, Canadian Pipelines
NOVA Gas Transmission Ltd.
450 – 1 Street SW
Calgary, AB T2P 5H1
Tel: (403) 920-2563
Fax: (403) 920-2310
Email: matthew_ducharme@transcanada.com

Shawn H.T. Denstedt, QC
Osler, Hoskin & Harcourt LLP
Suite 2500, TransCanada Tower
450 – 1 Street SW
Calgary, AB T2P 5H1
Tel: (403) 260-7088
Fax: (403) 260-7024
Email: sdenstedt@osler.com

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Appendix 7-9	Design Confirmation Letter

Section 8 – Pipeline Construction

Appendix 8-1	Typical Construction ROW NPS 30 – NPS 48
Appendix 8-2	Groundbirch Mainline Loop – Pouce Coupe HDD Feasibility Report
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Section 9 – Meter Stations

Appendix 9-1	Towerbirch Receipt Meter Station Process and Instrumentation Diagram
Appendix 9-2	Towerbirch Receipt Meter Station Plot Plan

Section 11 – Land Matters

Appendix 11-1	Typical ROW Configuration Drawing
Appendix 11-2	Sample Section 87(1) Notice
Appendix 11-3	Sample Grant ROW Agreement – Alberta and British Columbia
Appendix 11-4	Sample NGTL TWS Agreement – Alberta and British Columbia
Appendix 11-5	Summary of Landowner Concerns

Section 12 – Stakeholder Engagement

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Appendix 12-2	Towerbirch Project Fact Sheet
Appendix 12-3	NEB Brochure: <i>Information for Proposed Pipeline or Power Line Projects that Involve a Hearing</i>
Appendix 12-4	TransCanada Brochure: <i>Your Safety, Our Integrity</i>
Appendix 12-5	TransCanada Aboriginal Relations and Stakeholder Engagement Brochures
Appendix 12-6	TransCanada Corporate Profile Brochure
Appendix 12-7	Towerbirch Open House Invitation
Appendix 12-8	Towerbirch Expansion Open House Newspaper Advertisement
Appendix 12-9	TransCanada Community Investment Brochure
Appendix 12-10	Towerbirch Expansion Project Public Notice
Appendix 12-11	Stakeholder Engagement Logs

Section 13 – Aboriginal Engagement

Appendix 13-1	Aboriginal Engagement Logs – May 1, 2014 to August 1, 2015
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Section 14 – Environmental and Socio-Economic Matters

Appendix 14-1 Environmental Regulatory Consultation Engagement Log

Project Foldout Maps

Appendix 15-1 Project Overview Map

Appendix 15-2 Detailed Pipe Routing

Appendix 15-3 Dawson Creek North and North No. 2 Receipt Meter Station

Appendix 15-4 Tower Lake Receipt Meter Station

Chapter 3 – Common Information Requirements

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
3.1 Action Sought by Applicant			
1.	Requirements of s. 15 of the Rules.	Application	
3.2 Application or Project Purpose			
1.	Purpose of the proposed project.	Application, Section 2	
3.4 Consultation			
3.4.1 Principles and Goals of Consultation			
1.	The corporate policy or vision.	Application, Section 12 Appendix 12-6	
2.	The principles and goals of consultation for the project.	Sections 11.9.1, 12.1, 13.1	
3.	A copy of the Aboriginal protocol and copies of policies and principles for collecting traditional use information, if available.	Appendix 12-5	
3.4.2 Design of Consultation Program			
1.	The design of the consultation program and the factors that influenced the design.	Sections 1.9, 1.10, 11.9.2, 12.2, 13.2	
3.4.3 Implementing a Consultation Program			
1.	The outcomes of the consultation program for the project.	Sections 11.9, 12.5, 13.6	
3.4.4 Justification for Not Undertaking a Consultation Program			
1.	The application provides justification for why the applicant has determined that a consultation program is not required for the project.		N/A
3.5 Notification of Commercial Third Parties			
1.	Confirm that third parties were notified.	Section 3.6	
2.	Details regarding the concerns of third parties.	Section 3.6	
3.	List the self-identified interested third parties and confirm they have been notified.		N/A
4.	If notification of third parties is considered unnecessary, an explanation to this effect.		N/A

Chapter 4 – Sections 4.1 and 4.2: Common Requirements for Physical Projects

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
4.1 Description of the Project			
1.	The project components, activities and related undertakings.	Sections 1.0, 1.2, 1.3, 1.5, 7, 9, 14	
2.	The project location and criteria used to determine the route or site.	Sections 7.1, 9.2.1	
3.	How and when the project will be carried out.	Sections 1.6, 8.2, 9.4.6	
4.	Description of any facilities, to be constructed by others, required to accommodate the proposed facilities.		N/A
5.	An estimate of the total capital costs and incremental operating costs, and changes to abandonment cost estimates.	Sections 1.7, 6.3.1, 6.4	
6.	The expected in-service date.	Application, Sections 1.6, 8.2, 9.4.6	
4.2 Economic Feasibility, Alternatives and Justification			
4.2.1 Economic Feasibility			
1.	Description of the economic feasibility of the project.	Sections 2, 3	
4.2.2 Alternatives			
1.	Describe the need for the project, other economically-feasible alternatives to the project examined, along with the rationale for selecting the applied for project over these other possible options.	Sections 2, 5.2.3, 5.3.4	
2.	Describe and justify the selection of the proposed route and site including a comparison of the options evaluated using appropriate selection criteria.	Sections 5.2, 7.1, Appendix 7-1, Appendix 7-2	
3.	Describe the rationale for the chosen design and construction methods. Where appropriate, describe any alternative designs and methods evaluated and explain why these other options were eliminated.	Sections 4.2, 4.3, 7, 8	
4.2.3 Justification			
1.	Provide a justification for the proposed project.	Sections 2, 3, 5	

Guide A – A.2 Environmental and Socio-Economic Assessment

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
A.2.5 Description of the Environmental and Socio-Economic Setting			
1.	Identify and describe the current biophysical and socio-economic setting of each element (i.e., baseline information) in the area where the project is to be carried out.	Sections 14.3, 14.5, 14.6, 14.7 ESA Section 5	
2.	Describe which biophysical or socio-economic elements in the study area are of ecological, economic or human importance and require more detailed analysis taking into account the results of consultation (see Table A-1 for examples). Where circumstances require more detailed information in an ESA, see: <ul style="list-style-type: none"> Table A-2 – Filing Requirements for Biophysical Elements; or Table A-3 – Filing Requirements for Socio-Economic Elements. 	Section 14.7 ESA Sections 4.2, 5 and 6	
3.	Provide supporting evidence (e.g., references to scientific literature, field studies, local and traditional knowledge, previous environmental assessment and monitoring reports) for: <ul style="list-style-type: none"> information and data collected; analysis completed; conclusions reached; and the extent of professional judgment or experience relied upon in meeting these information requirements, and the rationale for that extent of reliance. 	ESA Sections 4 and 5, ESA Appendices B through H and J	
4.	Describe and substantiate the methods used for any surveys, such as those pertaining to wildlife, fisheries, plants, species at risk or species of special status, soils, heritage resources or traditional land use, and for establishing the baseline setting for the atmospheric and acoustic environment.	ESA Section 5	
5.	Applicants must consult with other expert federal, provincial or territorial departments and other relevant authorities on requirements for baseline information and methods.	Appendix 14-1, ESA Section 3, 5 and ESA Appendix C	

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
A.2.6 Effects Assessment			
Identification and Analysis of Effects			
1.	Describe the methods used to predict the effects of the project on the biophysical and socio-economic elements, and the effects of the environment on the project.	ESA Section 4	
2.	Predict the effects associated with the proposed project, including those that could be caused by construction, operations, decommissioning or abandonment, as well as accidents and malfunctions. Also include effects the environment could have on the project. For those biophysical and socio-economic elements or their valued components that require further analysis (see Table A-1), provide the detailed information outlined in Tables A-2 and A-3.	ESA Section 6	
Mitigation Measures			
1.	Describe the standard and project specific mitigation measures and their adequacy for addressing the project effects, or clearly reference specific sections of company manuals that provide mitigation measures. Ensure that referenced manuals are current and filed with the NEB.	ESA Sections 6 and 8 ESA Appendices A and B	
2.	Ensure that commitments about mitigative measures will be communicated to field staff for implementation through and Environmental Protection Plan (EP Plan).	ESA Section 8 ESA Appendices A and B	
3.	Describe plans and measures to address potential effects of accidents and malfunctions during construction and operation of the project.	ESA Section 6.21, 7.2.18 ESA Appendices A and B	
Evaluation of Significance			
1.	After taking into account any appropriate mitigation measures, identify any remaining residual effects from the project.	ESA Section 6	
2.	Describe the methods and criteria used to determine the significance of adverse effects, including defining the point at which any particular effect on a valued component is considered "significant".	ESA Section 4.5	

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
3.	Evaluate the significance of residual adverse environmental and socio-economic effects against the defined criteria.	ESA Section 6	
4.	Evaluate the likelihood of significant residual adverse environmental and socio-economic effects occurring and substantiate the conclusions made.	ESA Section 6	
A.2.7 Cumulative Effects Assessment			
Scoping and Analysis of Cumulative Effects			
1.	Identify the valued components for which residual effects are predicted, and describe and justify the methods used to predict any residual effects.	ESA Sections 6 and 7	
2.	For each valued component where residual effects have been identified, describe and justify the spatial and temporal boundaries used to assess the potential cumulative effects.	ESA Section 7	
3.	Identify other physical facilities or activities that have been or will be carried out within the identified spatial and temporal boundaries for the cumulative effects assessment.	ESA Section 7, ESA Appendix K	
4.	Identify whether the effects of those physical facilities or activities that have been or will be carried out would be likely to produce effects on the valued components within the identified spatial and temporal boundaries.	ESA Section 7	
5.	Where other physical facilities or activities may affect the valued components for which residual effects from the applicant's proposed project are predicted, continue the cumulative effects assessment, as follows: <ul style="list-style-type: none"> Consider the various components, phases and activities associated with the applicant's project that could interact with other physical facilities or activities. Provide a description of the extent of the cumulative effects on valued components. Where professional knowledge or experience is cited, explain the extent to which professional knowledge or experience was relied upon and justify how the resulting conclusions or decisions were reached. 	ESA Section 7	

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
Mitigation Measures for Cumulative Effects			
1.	Describe the general and specific mitigation measures, beyond project-specific mitigation already considered, that are technically and economically feasible to address any cumulative effects.	ESA Section 7	
The Applicant's Evaluation of Significance			
1.	After taking into account any appropriate mitigation measures for cumulative effects, identify any remaining residual cumulative effects.	ESA Section 7	
2.	Describe the methods and criteria used to determine the significance of remaining adverse cumulative effects, including defining the point at which each identified cumulative effect on a valued component is considered "significant".	ESA Sections 4 and 7	
3.	Evaluate the significance of adverse residual cumulative effects against the defined criteria.	ESA Section 7	
4.	Evaluate the likelihood of significant, residual adverse cumulative environmental and socio-economic effects occurring and substantiate the conclusions made.	ESA Section 7	
A.2.8 Inspection, Monitoring, Follow-up and Operation			
1.	Describe inspections plans to ensure compliance with biophysical and socio-economic commitments, consistent with sections 48, 53, and 54 of the OPR.	ESA Section 8 ESA Appendix A	
2.	Describe the surveillance and monitoring program for the protection of the pipeline, the public and the environment, as required by Section 39 of the OPR.	ESA Sections 2,6, 8 ESA Appendices A and B	
3.	Consider any particular elements in the Application that are of greater concern and evaluate the need for a more in-depth monitoring program for those elements.	ESA Section 8	
4.	For CEAA designated projects, identify which elements and monitoring procedures would constitute follow-up under the CEAA 2012.	ESA Section 8	

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
Table A-1 Circumstances and Interactions Requiring Detailed Biophysical and Socio-Economic Information			
	Physical & meteorological environment	ESA Section 5	
	Soil and soil productivity	ESA Sections 5, 6 and 7, and ESA Appendix E	
	Vegetation	ESA Sections 5, 6 and 7	
	Water quality and quantity	ESA Sections 5, 6 and 7	
	Fish and fish habitat, including any fish habitat compensation required	ESA Sections 5, 6 and 7	
	Wetlands	ESA Sections 5, 6 and 7	
	Wildlife and wildlife habitat	ESA Sections 5, 6 and 7, and ESA Appendix H	
	Species at Risk or Species of Special Status and related habitat	ESA Sections 5, 6 and 7	
	Air emissions	ESA Sections 5, 6 and 7	
	Greenhouse gas (GHG) emissions	ESA Sections 5, 6 and 7	
	Acoustic environment	ESA Sections 5, 6 and 7	
	Human occupancy and resource use	ESA Sections 5, 6 and 7	
	Heritage resources	ESA Sections 5, 6 and 7	
	Navigation and navigation safety	ESA Sections 5, 6 and 7	
	Traditional land and resource use	ESA Sections 3, 6 and 7, and ESA Appendix C	
	Social and cultural well-being	ESA Sections 5, 6 and 7	
	Human health and aesthetics	ESA Sections 5, 6 and 7	
	Infrastructure and services	ESA Sections 5, 6 and 7	
	Employment and economy	ESA Sections 5, 6 and 7, and ESA Appendix J	

GUIDE A – A.3 ECONOMICS

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
A.3.1 Supply			
1.	A description of each commodity.	Application	
2.	A discussion of all potential supply sources.	Sections 2.3, 4.1, 4.2, 4.3	
3.	Forecast of productive capacity over the economic life of the facility.	Sections 4.5, 5.2.1, 5.3.1, 5.3.2, 5.3.3	
4.	For pipelines with contracted capacity, a discussion of the contractual arrangements underpinning supply.	Section 3.3	
A.3.2 Transportation Matters			
Pipeline Capacity			
1.	In the case of expansion provide: <ul style="list-style-type: none"> • Pipeline capacity before and after and size of increment • Justification that size of expansion is appropriate 	Section 5.3	
2.	In case of new pipeline, justification that size of expansion is appropriate given available supply.	Section 5.2	
Throughput			
1.	For pipelines with contracted capacity, information on contractual arrangements.	Section 3.3, Appendix 3-2	
2.	For non-contract carrier pipelines, forecast of annual throughput volumes by commodity type, receipt location and delivery destination over facility life.		N/A
3.	If project results in an increase in throughput: <ul style="list-style-type: none"> • theoretical and sustainable capabilities of the existing and proposed facilities versus the forecasted requirements • flow formulae and flow calculations used to determine the capabilities of the proposed facilities and the underlying assumptions and parameters 	Section 5	
4.	If more than one type of commodity transported, a discussion pertaining to segregation of commodities including potential contamination issues or cost impacts.		N/A

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
A.3.3 Markets			
1.	Provide an analysis of the market in which each commodity is expected to be used or consumed.	Sections 2.1, 2.4, 4.6	
2.	Provide a discussion of the physical capability of downstream facilities to accept the incremental volumes that would be delivered.	Section 5	
A.3.4 Financing			
1.	Evidence that the applicant has the ability to finance the proposed facilities.	Section 6.5	
2.	Estimated toll impact for the first full year that facilities are expected to be in service.	Section 6.3.3	
3.	Confirmation that shippers have been apprised of the project and toll impact, their concerns and plans to address them.	Section 3.6	
4.	Additional toll details for applications with significant toll impacts.		N/A
A.3.5 Non-NEB Regulatory Approvals			
1.	Confirm that all non-NEB regulatory approvals, required to allow the applicant to meet the construction schedule and planned in-service date and to allow the facilities to be used and useful, are or will be in place.	Section 1.12	
2.	If any of the approvals referred to in 1. may be delayed, describe the status of those approval(s) and provide an estimation of when the approval is anticipated.		N/A

GUIDE A – A.4 LANDS INFORMATION

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
A.4.1 Land Areas			
1.	<ul style="list-style-type: none"> Width of right-of-way and locations of any changes to width Locations and dimensions of known temporary work space and drawings of typical dimensions Locations and dimensions of any new lands for facilities 	Section 11.1, 11.2, 11.3, 11.4 Appendix 11-1	
A.4.2 Land Rights			
1.	The type of lands rights proposed to be acquired for the project.	Section 11.2	
2.	The relative proportions of land ownership along the route of the project.	Section 11.2	
3.	Any existing land rights that will be required for the project.	Section 11.2	
A.4.3 Lands Acquisition Process			
1.	The process for acquiring lands.	Section 11.5	
2.	The timing of acquisition and current status.	Section 11.6	
3.	The status of service of section 87(1) notices.	Section 11.6	
A.4.4 Land Acquisition Agreements			
1.	A sample copy of each form of agreement proposed to be used pursuant to section 86(2) of the NEB Act.	Appendix 11-03	
2.	A sample copy of any proposed fee simple, work space, access or other land agreement.	Appendix 11-4	
A.4.5 Section 87 Notices			
1.	A sample copy of the notice proposed to be served on all landowners pursuant to section 87(1) of the NEB Act.	Appendix 11-2	
2.	Confirmation that all notices include a copy of <i>Pipeline Regulation in Canada: A Guide for Landowners and the Public</i> .	Section 11.5	
A.4.6 Section 58 Application to Address a Complaint			
1.	The details of the complaint and describe how the proposed work will address the complaint.		N/A

AB	Alberta
AC	alternating current
ACA	Annual Contribution Amount
ACE	Abandonment Cost Estimate
ACIMS	Alberta Conservation Information Management System
ACO	Aboriginal Consultation Office
ACT	Alberta Culture and Tourism
AEP	Alberta Environment and Parks
AER	Alberta Energy Regulator
AFS	Application for Service
AFUDC	Allowance for Funds Used During Construction
AIA	Archaeological Information Assessment
ALR	Agricultural Land Reserve
API	American Petroleum Institute
ARD	acid rock drainage
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AT	Alpine Tundra
BAFA	Boreal Altai Fescue Alpine
BC	British Columbia
BC CDC	British Columbia Conservation Data Centre
BC MEMPR	British Columbia Ministry of Energy, Mines and Petroleum Resources
BC MFLNRO	British Columbia Ministry of Forest, Lands and Natural Resource Operations
BC MOE	British Columbia Ministry of Environment
BC OGC	British Columbia Oil and Gas Commission

BCMF	British Columbia Métis Federation
BC OGC	British Columbia Oil and Gas Commission
BEAHR	Building Environmental Aboriginal Human Resources
BGC	biogeoclimatic
BRFN	Blueberry River First Nations
BWBS	Black and White Boreal Spruce
CAC	criteria air contaminant
CBRP	Cutbank Ridge Partnership
CDC	Conservation Data Centre
CEAA 2012	<i>Canadian Environmental Assessment Act, 2012</i>
CGA	Canadian Gas Association
CGSB	Canadian General Best Standards Board
COS	cost of service
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CP	cathodic protection
CPCN	Certificate of Public Convenience and Necessity
CPVCOS	Cumulative Present Value Cost of Service
CRM	Central Rocky Mountain
CSA	Canadian Standards Association
DBRS	DBRS Limited
DCMF	Dawson Creek Métis Federation
DFN	Duncan's First Nation
DFO	Fisheries and Oceans Canada
DRFN	Doig River First Nation
DTFN	Dene Tha' First Nation
EOC	Emergency Operations Centre

EPP	Environmental Protection Plan
ESA	Environmental and Socio-Economic Assessment
ESSF	Engelmann Spruce-Subalpine Fir
EUR	estimated ultimate recovery
FBE	fusion-bonded epoxy
FDMD	Facilities Design Methodology Document
FNFN	Fort Nelson First Nation
FSJMS	Fort St. John Métis Society
FTE	full-time equivalence
FT-R	Firm Transportation – Receipt
GHG	greenhouse gas emissions
GIP	gas-in-place
HCA	<i>Heritage Conservation Act</i>
HDD	horizontal directional drilling
HLFN	Horse Lake First Nation
HRA	<i>Historical Resources Act</i>
HRFN	Halfway River First Nation
HRIA	Historical Resource Impact Assessment
HRMB	Heritage Resource Management Branch
HSE	health, safety and environment
ICS	Incident Command System
ILI	in-line inspection
ILMB	Integrated Land Management Bureau
ILRR	Integrated Land and Resource Registry
IMP	Integrity Management Program
IOS	International Organization for Standardization

ISD	in-service date
ISO	International Organization for Standardization
ITP	Inspection and Test Plan
ITP	Inspection and Test Plan
KLCN	Kelly Lake Cree Nation
KLFN	Kelly Lake First Nation
KLMSS	Kelly Lake Métis Settlement Society
km	kilometre
KP	kilometre post
LNG	liquefied natural gas
LSA	local study area
LSAS	Land Status Automated System
LSD	legal subdivision
MFL	magnetic flux leakage
MFMS	Moccasin Flats Métis Society
MLIB	McLeod Lake Indian Band
MNA	Métis Nation of Alberta
MNBC	Métis Nation of British Columbia
MOF	Ministry of Forests
MOP	maximum operating pressure
MOU	Memorandum of Understanding
MPa	megapascals
MPB	mountain pine beetle
MPMO	Major Projects Management Office
MSS	Manufacturers Standardization Society
NACE	National Association of Corrosion Engineers

NDE	non-destructive examination
NEB	National Energy Board
NEB Act	<i>National Energy Board Act</i>
NEMA	Northeast Métis Association
NGL	natural gas liquids
NGTL	NOVA Gas Transmission Ltd.
NIT	NOVA Inventory Transfer
NPS	nominal pipe size
NWWG	National Wetlands Working Group
OCC	Operations Control Centre
OD	outside diameter
OGMA	Old-Growth Management Area
OM&A	Operations, Maintenance and Administrative
OPP	Overpressure Protection
OPR	Onshore Pipeline Regulations
PA	public awareness
PCMP	post-construction monitoring program
PEA	Project Expenditure Authorization
PFP	Participant Funding Program
pig	pipeline inspection gauge
PRFN	Prophet River First Nation
PRGT	Prince Rupert Gas Transmission
Project	Towerbirch Expansion Project
PRRD	Peace River Regional District
RAP	Restricted Activity Period
ROW	right-of-way

RRMS	Red River Métis Society
RSA	regional study area
RTD	resistance temperature devices
SARA	<i>Species at Risk Act</i>
SBS	Sub-Boreal Spruce
SCADA	supervisory control and data acquisition
SFN	Saulteau First Nations
SMP	Safety Management Plan
SRM	South Rocky Mountain
SSA	socio-economic study area
SSPC	Steel Structures Painting Council
SSSP	site-specific safety plan
TCPL	TransCanada PipeLines Limited
TEG	thermoelectric generator
TEK	traditional ecological knowledge
TK	traditional knowledge
TLE	treaty land entitlement
TLRU	traditional land and resource use
TLU	traditional land use
TOP	TransCanada's Operating Procedure
TransCanada	TransCanada PipeLines Limited
TTFP	Tolls, Tariff, Facilities and Procedures Committee
TWS	temporary workspace
UNESCO	United Nations Educational, Scientific and Cultural Organization
UPS	uninterruptible power supply
US	United States

UTM	Universal Transverse Mercator
UWR	Ungulate Winter Range
VC	valued component
VOC	volatile organic compound
WCSB	Western Canadian Sedimentary Basin
WCTC	Western Cree Tribal Council
WHA	Wildlife Habitat Area
WHMIS	Workplace Hazardous Materials Information System
WHSRN	Western Hemisphere Shorebird Reserve Network
WMFN	West Moberly First Nations

1.0 EXECUTIVE SUMMARY

The Towerbirch Expansion Project (Project) is an expansion of the NGTL System necessary to meet existing and incremental firm service contracts for the receipt of sweet natural gas on the NGTL System as well as supply forecast requirements. The Project consists of the following proposed facilities:

- Tower Lake Section
- Groundbirch Mainline Loop
- Tower Lake Receipt Meter Station
- Dawson Creek North Receipt Meter Station
- Dawson Creek North No. 2 Receipt Meter Station
- related pipeline components, including valve sites and launcher/receiver facilities

For locations of the Project pipeline components and meter stations, see Figure 1-1. For Project overview maps, see Appendix 15-1, for detailed pipeline route maps, see Appendix 15-2, and for meter station location maps, see Appendix 15-3 and Appendix 15-4.

NGTL provides in this section an overview of the Project, the justification for it, and a description of how the Application is organized.

1.1 REQUIREMENT FOR NEW FACILITIES

The Towerbirch Expansion Project was triggered by existing and incremental contracts for the receipt of sweet natural gas on the NGTL System. The facilities are sized to meet design flows, which include existing and incremental firm service contract flows and forecast supply for the Tower Lake Area.

The Project represents specific facilities that NGTL has determined are necessary to meet design flows resulting from incremental firm service contracts for the receipt of sweet natural gas in the Tower Lake Area. The Project will provide gas producers in the Tower Lake area with access to the NGTL System and consequently to gas markets across North America.

1.2 PROJECT COMPONENT ROUTES AND LOCATIONS

Routing for the Project is based on established route-selection criteria, preliminary constructability assessments, and feedback obtained through engagement with Aboriginal communities, stakeholders and government agencies. At this time, the route corridor has been determined, with minor routing modifications expected throughout detailed design.

The proposed pipeline sections will parallel existing NGTL right-of-way (ROW) and existing or proposed linear disturbances for approximately 79% of the total route.

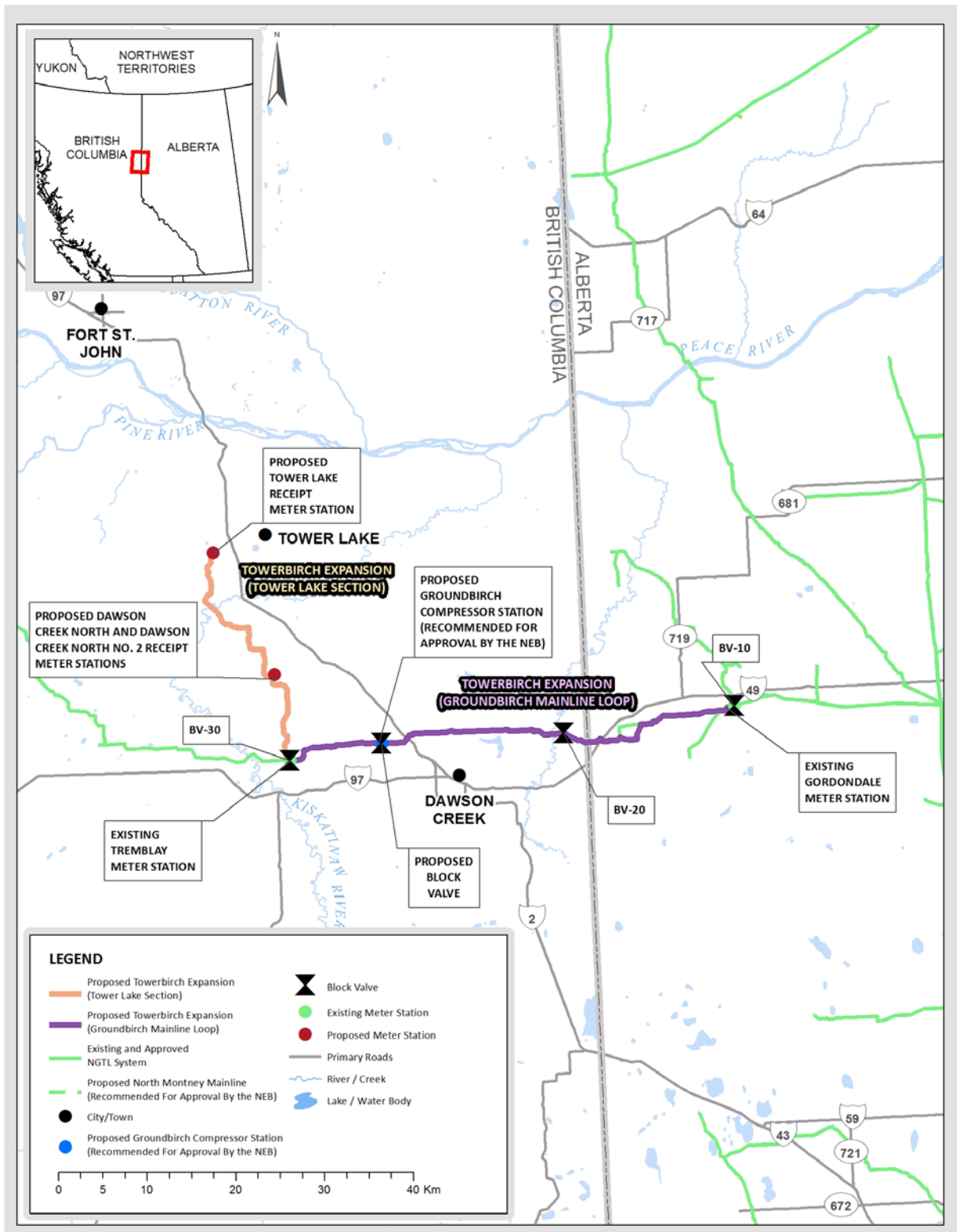


Figure 1-1: Project Overview

1.3 PROJECT SCOPE

1.3.1 Pipeline

The proposed pipeline sections include the following physical components:

- Groundbirch Mainline Loop, an approximately 55 km 914 mm (NPS 36) pipeline loop of the existing Groundbirch Mainline
- Tower Lake Section, an approximately 32 km 762 mm (NPS 30) pipeline extension off the Groundbirch Mainline
- interconnections along the pipeline, including tie-ins and crossovers
- pipeline block valves and crossover valves
- launcher and receiver facilities for cleaning and in-line inspection (ILI)
- a cathodic protection (CP) system for the pipeline
- an alternating current (AC) mitigation system, as required, where the pipeline is routed in proximity to power lines
- miscellaneous works, such as pipeline warning signs, fencing and aerial markers

1.3.2 Measurement

To measure the quality and volumes of gas transported by the Project, three new meter stations are proposed:

- Tower Lake Receipt Meter Station
- Dawson Creek North Receipt Meter Station
- Dawson Creek North No. 2 Receipt Meter Station

For a discussion of the location of these facilities, see Section 9, Appendix 15-3 and Appendix 15-4.

The Tower Lake Receipt Meter Station site will have a footprint of approximately 60 m x 60 m (3600 m²), which will include a permanent receiver/launcher to accommodate ILI and cleaning tools. The Dawson Creek North and Dawson Creek North No. 2 Meter Stations will be co-located on a site approximately 60 m x 120 m (7200 m²).

Each meter station will be constructed on a site that will be fenced. Each site is expected to include two skid-mounted meter run buildings, an instrument building, and a skid-mounted separator. The skids typically have a footprint of approximately 4 m x 10 m (40 m²) and are 3.5 m high. The meter station and valve sites will use existing access routes as much as possible.

Power required for the proposed meter stations will be supplied by a nearby producer facility, a site-installed natural gas thermoelectric generator (TEG) or utility power

from a third-party source. If new electrical power lines and facilities are required to operate the metering facility, then it is expected that they will be constructed, owned and operated by third-party power providers.

The site locations may be subject to minor changes based on detailed design, proximity to access, pipeline ROW, customer facilities and power supply.

1.4 ENGINEERING DESIGN

The Project will be designed, constructed, and operated in accordance with the requirements of the *Onshore Pipeline Regulations* (OPR) and *Canadian Standards Association* (CSA) Z662-15. If there are any inconsistencies between the OPR and CSA Z662-15, the OPR will govern. For more information on engineering design standards, see Section 7.2.

1.5 SECTION 58 ACTIVITIES

In order to meet the scheduled in-service date (ISD), NGTL proposes to commence construction of temporary infrastructure required for Project construction, and to undertake up to 40 km of ROW preparation activities at certain locations, under section 58 of the NEB Act.

Temporary infrastructure includes:

- temporary access
- stockpile sites
- contractor yards

ROW preparation activities (not to exceed 40 km in aggregate) include:

- clearing
- stripping/grading

To maintain the scheduled ISD, NGTL requires that these activities start by late Q1 2017, subject to regulatory and landowner approval. Therefore, NGTL has requested approval for these activities under section 58 of the NEB Act.

A stand-alone environmental protection plan (EPP) will be prepared to support the activities proposed under section 58 of the NEB Act. These activities will only be undertaken after the Certificate of Public Convenience and Necessity (CPCN) has been issued for the entire Project and after any applicable section 58 order conditions are satisfied. For more information on Project construction schedules, see Section 8.2 and Section 9.4.6.

1.6 PROJECT SCHEDULE

For the Project overview schedule, see Figure 1-2. For further details on Project construction schedules, see Section 8.2 and Section 9.4.6.

1.6.1 Pipeline Schedule

The pipeline components are targeted for an ISD of November 1, 2017. To meet the scheduled ISD, NGTL proposes to start construction of temporary infrastructure and ROW preparation activities for the Project in late Q1 2017, subject to receipt of regulatory approval. Overall construction is scheduled to start in late Q2 2017.

As the Project is predominantly on agricultural land, the proposed schedule is for construction to occur primarily during summer. Summer construction is preferred on agricultural land as the frost-free conditions allow proper backfill and compaction of soil in the same construction season, leaving the land in a state ready for agricultural activities in the following season.

1.6.2 Meter Station Schedule

The meter stations will be placed in service on the following dates:

- Tower Lake Receipt Meter Station – November 1, 2017
- Dawson Creek North No. 2 Receipt Meter Station – April 1, 2018
- Dawson Creek North Receipt Meter Station – September 1, 2018.

The meter stations are scheduled for construction as follows (dates could change if it is determined to be more efficient to bundle construction work):

- Tower Lake Receipt Meter Station in September – October 2017
- Dawson Creek North and Dawson Creek No. 2 Receipt Meter Stations – Q1 2018

1.7 ESTIMATED CAPITAL COST

An estimate of the Project capital cost, in 2017 dollars, is provided in Table 1-1.

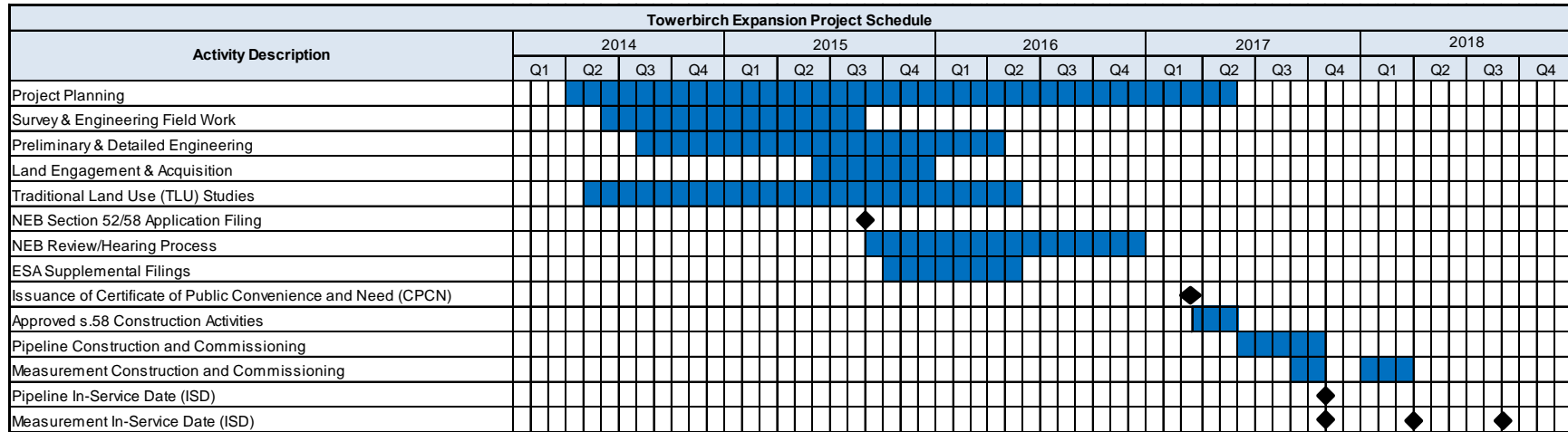


Figure 1-2: Project Overview Schedule

Table 1-1: Estimated Capital Cost (2017\$)

Component	Capital Cost (\$ million)
Pipeline	\$452
Metering	\$18
Total	\$470
Note: Estimated AFUDC is included in these costs.	

1.8 ECONOMIC BENEFITS

An economic effects analysis was prepared by Golder Associates Ltd. (Golder), using the Statistics Canada Input–Output Model, to understand the potential economic effects of the Project. The analysis estimated the economic effects of Project expenditures on construction activities in Canada from 2015 through to commissioning in 2017 (see Section 6.20 of the Environmental and Socio-Economic Assessment [ESA]).

During construction, the Project is expected to generate an estimated \$285 million in labour income and an estimated \$439 million in gross domestic product in Canada. Employment associated with Project construction is estimated to be approximately 3409 person-years on a full-time equivalence (FTE) basis across Canada. The Project is also estimated to generate \$75 million in federal and provincial tax revenue during construction (see Appendix J of the ESA).

During operations, the Project is estimated to contribute \$1.29 million per year in property taxes to the Peace River Regional District of British Columbia, and \$210,000 per year to Saddle Hills County, Alberta.

1.9 STAKEHOLDER ENGAGEMENT

TransCanada's stakeholder engagement program is being used for the Project. A description of the Program is provided in Section 12. Stakeholder engagement activities to date have included:

- early and ongoing public notification of the Project
- identifying stakeholders, initiating dialogue, attending community meetings and hosting open houses
- maintaining ongoing stakeholder engagement and dialogue
- distributing project updates and communication materials (including information on the process for providing the Board with comments)
- responding to inquiries and emerging issues and working with identified stakeholders to resolve issues and concerns

NGTL has contacted the following stakeholders as part of its public engagement efforts for the Project:

- landowners and users
- key officials at all three levels of government (municipal, provincial and federal)
- community leaders
- business development officers in rural municipalities
- emergency response service organizations
- other interested parties

Feedback raised during Stakeholder engagement is summarized in Section 12.5: Stakeholder Concerns. See also the Stakeholder engagement logs in Appendix 12-9.

Engagement activities will continue through the regulatory and construction phases of the Project, after this Application is filed. The primary focus will be on responding to specific questions or issues and following up with previously engaged stakeholders.

During operations, ongoing engagement activities for the Project will be conducted in accordance with the provisions of TransCanada's Public Awareness (PA) Program. For a description of the PA Program, see Section 10.5.

1.10 ABORIGINAL ENGAGEMENT

The Aboriginal engagement program for the Project is guided by TransCanada's Aboriginal Relations Policy and is designed to assist NGTL in planning the Project, including strategies to:

- determine potential effects on the current use of lands for traditional purposes
- identify sites of cultural and historical importance in the Project area
- obtain local and traditional knowledge (TK) about the Project area
- develop appropriate mitigation to reduce potential effects
- identify potential socio-economic effects and suitable opportunities to enhance Project benefits

The program includes Aboriginal communities and organizations that, through NGTL's Aboriginal engagement process, have expressed an interest in the Project.

For an outline of the Aboriginal Engagement Program and list of communities engaged by NGTL for the Project, see Section 13.

1.11 ENVIRONMENTAL AND SOCIO-ECONOMIC MATTERS

The ESA for the Project was prepared under the guidance provided by the NEB Filing Manual and the requirements of the *Canadian Environmental Assessment Act* (CEAA) 2012.

The ESA is supported by environmental field studies and includes an EPP for the Project. The EPP will be updated as additional mitigation measures are identified during detailed design, and through the engagement process.

Based on the findings in the ESA, the Project is not expected to have a significant adverse effect on any biophysical or socio-economic element, provided the mitigation measures identified in the ESA are effectively implemented.

NGTL accepts the findings of the ESA and will adhere to the recommendations and mitigation measures identified in the ESA. The ESA can be found as a separate attachment to this Application.

1.12 NON-NEB REGULATORY PERMITS AND AUTHORIZATIONS

All non-NEB regulatory permits and authorizations are planned to be in place, as required, to meet the construction schedule and in-service dates for the Project.

For a preliminary list of federal non-NEB regulatory permits and authorizations, including anticipated submission dates and approval timing, see Table 1-2. For a list of British Columbia (BC) regulatory authorizations, see Table 1-3, and for a list of Alberta regulatory authorizations, see Table 1-4.

The information in these tables may be updated as design and planning for the Project progresses and to reflect the outcome of ongoing discussions with regulators.

Table 1-2: Preliminary List of Possible Federal Regulatory Authorizations and Departments

Permit/Licence/Authorization	Issuing Agency	Timing	
		Filing Target	Approval Required
Section 35(s) of <i>Fisheries Act</i>	Fisheries and Oceans Canada	As Required	Q2 2017
<i>Radiocommunication Act</i>	Industry Canada	Q2 2017	Q2 2017

Table 1-3: Preliminary List of Possible BC Regulatory Authorizations and Departments

Permit/Licence/Authorization	Issuing Agency	Timing	
		Filing Target	Approval Required
<i>Land Act</i>	BC Oil and Gas Commission	Q1 2016	Q1 2017
<i>Water Act</i>		Q1 2016	Q1 2017
<i>Forest Act</i>		Q1 2016	Q1 2017
<i>Heritage Conservation Act</i>	Ministry of Forests, Lands and Natural Resource Operations	Q1 2016	Q1 2017
<i>Forest Practices Code of British Columbia Act and Forest Fire Prevention and Suppression Regulations</i>		Q3 2016	Q1 2017
<i>Wildlife Act</i>		Q4 2016	Q1 2017
<i>Highway Act</i>	Ministry of Transportation and Infrastructure	Q2 2016	Q1 2017
<i>Commercial Transport Act</i>		Q2 2016	Q1 2017
<i>Commercial Transport Regulations</i>		Q2 2016	Q1 2017
<i>Transportation Act</i>		Q2 2016	Q1 2017

Table 1-4: Preliminary List of Possible Alberta Regulatory Authorizations and Departments

Permit/Licence/Authorization	Issuing Agency	Timing	
		Filing Target	Approval Required
<i>Water Act</i> Code of Practice for Pipelines and Telecommunication Lines Crossing A Water Body	Alberta Environment and Parks (AEP)	Q4 2016	N/A
<i>Water Act</i> Code of Practice for Pipeline Hydrostatic Testing <i>Water Act</i> Code of Practice for the Release of Hydrostatic Test Water from Hydrostatic Testing of Petroleum Liquid and Gas Pipelines		Q3 2017	N/A
<i>Public Lands Act</i>		Q3 2016	Q1 2017
<i>Forest and Prairie Protection Act</i>		Q4 2016	Q1 2017
Fish Collection Permit		Q2 2017	Q2 2017
Temporary Diversion License		Q2 2017	Q2 2017
Burning Permits	Alberta Environment and Parks (AEP), County and Municipal District	Q1 2017	Q1 2017
Road Crossing Permit	Alberta Transportation/Municipal District	Q1 2017	Q1 2017
<i>Historical Resources Act</i>	Alberta Culture and Tourism (ACT)	Q1 2016	Q1 2017

1.13 DECOMMISSIONING AND ABANDONMENT

Approval from the Board and other applicable authorities will be required before any future decommissioning and abandonment activities are initiated. The decision to decommission or abandon will be influenced by future service requirements.

As the Project is a designated project under CEAA 2012, this Application includes a preliminary abandonment plan for the Project. An assessment of future decommissioning and abandonment activities, including determination of significant effects following mitigation and significance of cumulative effects, is provided in the ESA.

1.14 APPLICATION STRUCTURE AND CONTENTS

The Application contains 15 sections, as follows:

Section 1: Executive Summary

Section 1 provides a description of the Project, including its location, scope, preliminary schedule, costs, stakeholder and Aboriginal engagement programs, ESA, non-NEB regulatory authorizations, as well as decommissioning and abandonment.

Section 2: Need and Necessity

Section 2 describes the need for the Project and demonstrates the economic feasibility of the Project, based on supply, markets and transportation contracts.

Section 3: Transportation

Section 3 provides an overview of the transportation contracts supporting the Project and the transportation access and contracting process used for the Project. The commercial third-party notification process is also described and presentation materials provided.

Section 4: Supply and Markets

Section 4 provides an overview of the gas supply available to the Project and an outlook for the North American gas markets that can be accessed through the NGTL System, NOVA Inventory Transfer (NIT) hub and connecting downstream pipelines.

Section 5: System Design

Section 5 provides an overview of the system design planning process used to determine the optimum facility set for the Project. Facility alternatives that were considered but not selected are identified and the rationale for selection is explained.

Section 6: Tolls and Financing

Section 6 provides an analysis of the expected cost of service (COS) and toll impact of the Project on NGTL System rates. It includes a discussion of the appropriateness of the proposed rolled-in toll treatment, cost estimates for future decommissioning and abandonment of the Project, and financing information with current credit rating reports on TransCanada.

Section 7: Pipeline Design

Section 7 provides the engineering design details, specifications and typical drawings for the pipeline portion of the Project. Information is provided on routing alternatives, gas composition, valve locations, procurement, geotechnical data and watercourse crossings. This Section also outlines NGTL's approach to establishing pipeline integrity during design.

Section 8: Pipeline Construction

Section 8 provides pipeline construction information, including strategy, procedures, timing and sequencing. Information on worker safety and housing is also provided. Preliminary plans for early construction of temporary infrastructure and ROW preparation activities are also outlined in this section.

Section 9: Meter Stations

Section 9 provides the engineering design details, specifications, schematics and plot plans for the meter stations included in the Project.

Section 10: Operations

Section 10 describes the processes and procedures that will be employed to ensure the safe, reliable and efficient operation of the Project. In particular, management systems and programs required under the OPR are outlined.

Section 11: Land Matters

Section 11 describes the permanent and temporary land requirements for the Project facilities and outlines the procedures and schedules for obtaining the land rights and temporary workspace (TWS) requirements. Consultation with landowners is also summarized.

Section 12: Stakeholder Engagement

Section 12 provides an overview of TransCanada's approach to stakeholder engagement and describes the engagement process. Logs of stakeholder engagement activities, including outstanding issues and follow-up actions, are included to

August 6, 2015 in Appendix 12-11. Sample copies of letters, information brochures and open house materials are also provided.

Section 13: Aboriginal Engagement

Section 13 describes the Aboriginal engagement process for the Project. It includes principles and goals of the process, methodology for engagement, process for integrating appropriate mitigation measures in Project plans, and future planned engagement activities. The approach to obtaining and incorporating TK in the Project is described, and community engagement is summarized. Appendix 13-2 includes engagement logs to August 1, 2015.

Section 14: Environmental and Socio-Economic Matters

Section 14 provides a summary of the need for and scope of the ESA, along with the approach, findings and conclusions of the ESA.

Section 15: Foldout Maps

Foldout maps are provided as Section 15, including Project overview maps, detailed route maps for the Project pipeline sections and aerial location maps for the meter stations.

2.0 NEED AND NECESSITY

The Project is required to meet design flows resulting from existing and incremental firm service contracts for the receipt of sweet natural gas and forecast for gas supply in the Tower Lake area. The Project will provide customers in the Tower Lake area in BC with direct access to the NGTL System and consequently to gas markets throughout North America. The total incremental contracted receipt volume driving the Project is 16,713 10^3m^3 per day (590 MMcf/d). The need for the Project is also supported by NGTL's forecasts of gas supply and demand that can be accessed through the NGTL System. The forecast supply and market demand growth, combined with aggregate contractual underpinning, demonstrate that the applied-for facilities will be used and useful over their economic life.

The Cutbank Ridge Partnership (CBRP), a partnership between Encana Corporation and Cutbank Dawson Gas Resources Ltd. (a wholly owned subsidiary of Mitsubishi Corporation), has executed contracts with NGTL for incremental firm receipt transportation at three new meter station locations in the Tower Lake area and one existing meter station that is connected to the existing Groundbirch Mainline. CBRP was created to develop natural gas Montney lands in northeastern BC. NGTL understands that CBRP seeks to connect its Montney supply in the Tower Lake area to the NGTL System and to deliver gas to the NIT hub.

The proposed Tower Lake Section off the Groundbirch Mainline into the Tower Lake area is required to connect supply received at three new meter stations along the Section to the Groundbirch Mainline. The proposed Groundbirch Mainline Loop is required to accommodate the incremental and existing firm receipt contracts and forecast supply in the area. The three new meter stations consist of the Tower Lake Receipt Meter Station at the northern terminus of the proposed Tower Lake Section, and two co-located meter stations, Dawson Creek North Receipt Meter Station and Dawson Creek North No. 2 Receipt Meter Station, at approximately the midpoint of the Tower Lake Section. The one existing meter station located on the Groundbirch Mainline is Tremblay No. 2, where CBRP has existing receipt service on the NGTL System.

2.1 INTEGRATION WITH NGTL SYSTEM

The Project will form an integral part of the existing NGTL System and as such has been designed using the same methods used to design any other expansion of the NGTL System. Like any other part of the NGTL System, shippers contract separately for receipt and delivery service. NGTL then meets those requests for service based on the aggregate supply and demand balance across the entire NGTL System.

One benefit of the NGTL System is access to the NIT hub (see Figure 2-1); a unique and high-value commercial feature. The NIT hub is a result of a commercial

contracting structure that separates receipt and delivery contracts. The NIT market effectively aggregates all natural gas supplies, storage, intra-basin markets and interconnected pipelines to the NGTL System at a single, integrated transaction hub.

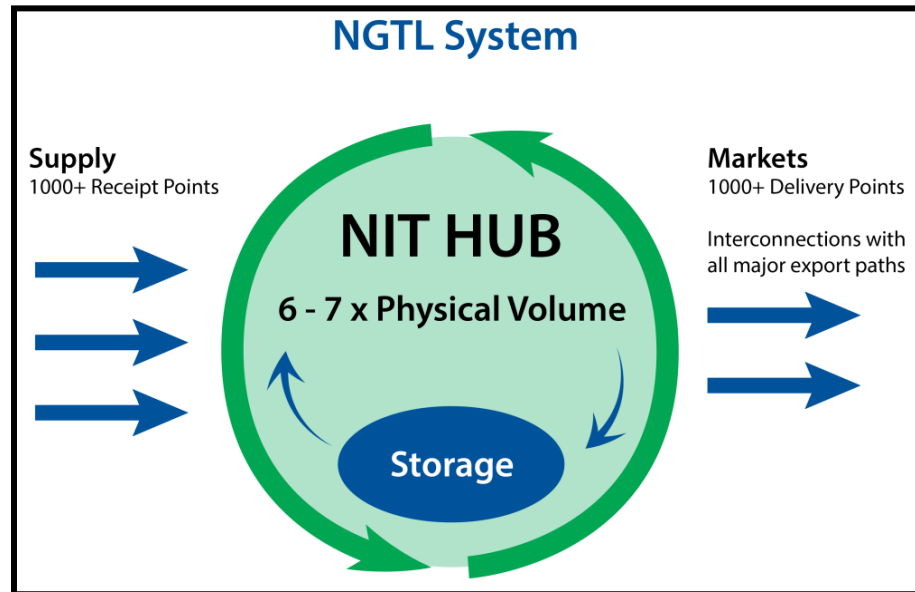


Figure 2-1: NIT Market on the NGTL System

All gas received on the NGTL System at a receipt point is commercially, and to a significant extent physically, comingled with gas from all other receipt points. That total amount of gas received is used to fulfill aggregate system delivery requirements. Commercially, gas that is received on the NGTL System is immediately available in the NIT market for holders of delivery service and other market participants. As a result, delivery shippers might commercially source gas through NIT that is physically received from any receipt point on the NGTL System.

In addition, as a result of the commercial separation between receipt and delivery services on the NGTL System, the NIT market facilitates gas trades that might not involve the original receipt shippers or the ultimate delivery shippers. Gas in the commercial marketplace is traded many more times than what physically flows on the NGTL System, exemplifying the separation between physical receipts and physical deliveries. By providing flexibility, reliability and liquidity to the market, NIT is the engine behind one of the largest natural gas trading hubs on the continent.

Whether gas physically flows from one point on the NGTL System to another is based on the overall balance of receipts and deliveries on the NGTL System. NGTL designs the physical facilities to ensure that the overall flows on the system balance; aggregate receipts are used to meet aggregate deliveries.

A description of the facilities design methodology that NGTL applies is provided in Appendix 5-1. The following excerpt summarizes the methodology provided below:

The physical characteristics of the NGTL System and the changing flow patterns on the system present significant design challenges. The NGTL System transports gas from many geographically diverse receipt points and moves it through pipelines that generally increase in size as they approach the major delivery points. The NGTL System is designed to meet the peak day design flow requirements of its customers. NGTL's obligation under its firm transportation service agreements with each customer is to:

- receive gas from the customer at the customer's receipt points, including transportation of gas
- deliver gas to the customer at the customer's delivery points, including transportation of gas

NGTL's facility design must ensure prudently sized facilities to meet flow requirements. The system design methodology developed to achieve this objective is described in the remainder of this document.

The Project facilities, including pipe size, were designed using this methodology, and will transport the expected peak design flow from the receipt stations on the Project, taking into account that the area has significant resource potential, as described in Section 4. The facilities are also designed to be an integral part of the NGTL System by enabling transportation of the additional supply received on the Project to other delivery points throughout the NGTL System.

No deliveries are proposed directly off the Project, and therefore the Project will result in an increase in physical flow to the existing NGTL System. The integrated nature of the Project with the NGTL System as a whole will mean that the Project will be jointly used by all NGTL System shippers.

2.2 TRANSPORTATION

The Project is underpinned by eight-year contracts with CBRP for Firm Transportation – Receipt (FT–R) service. For additional information on the contractual underpinnings of the Project, see Section 3.

CBRP has authorized NGTL to incur costs or expenses related to the design, regulatory approval and construction of the Project under a receipt Project Expenditure Authorization (PEA). The PEA remains in effect throughout the Project development and construction phases.

Once the facilities are completed and put into service, the PEA terminates and transportation service begins under FT–R service contracts. PEAs ensure that the cost risk of a project being cancelled before being placed in service is borne by the customers on that project and not the existing customers on the NGTL System.

Over the term of the CBRP contracts alone, total revenue generated by these contracts will exceed the cost of the Project (\$470 million). These contractual commitments demonstrate the supply demand for the Project, as well as its robust financial underpinnings. For additional information on revenue coverage for the Project, see Section 6.

2.3 TOWER LAKE AREA GAS SUPPLY

The Tower Lake area is part of the BC Montney play trend. It encompasses an area of approximately 414 km² (160 mi²) and has a resource estimate of approximately 0.27 10⁹m³ (9.5 Tcf). The Tower Lake area has sufficient economic gas resources to support the Project over the forecast period (gas years 2014/2015 to 2024/2025).

For additional gas supply information, see Section 4.1 through Section 4.5.

2.4 GAS MARKETS

The large and well-developed, existing and growing, intra-basin and North American gas markets supplied through NIT are capable of absorbing the additional gas volumes associated with the Project. Access to these markets will be facilitated through the NGTL System. For more details on market growth, see Section 4.6.

2.5 CONCLUSION

Based on the resource potential of the Tower Lake area, market demands, contractual underpinnings of the Project and financial stability of the anchor shipper (CBRP), NGTL expects the applied-for facilities will be used at reasonable levels throughout the economic life of the Project.

3.0 TRANSPORTATION

This section describes the transportation agreements underpinning the Project. Details are provided regarding the PEA agreement that establishes commitments before the Project in-service date and the transportation service contracts that are effective once the Project goes into service. Information is also provided regarding the process by which NGTL informed prospective customers and commercial parties of the Project.

3.1 OVERVIEW AND BACKGROUND

CBRP approached NGTL in 2012 with an interest in connecting production from its land base in the Tower Lake area to the NGTL System. Discussions proceeded while CBRP better defined its reserve base and development plans. The PEA and transportation agreements were executed in January 2015.

The Project is underpinned by contracts with CBRP for 16,713 $10^3\text{m}^3/\text{d}$ (590 MMcf/d) of FT-R service. For details of the PEA between CBRP and NGTL, see Section 3.4.

3.2 TRANSPORTATION ACCESS

Transportation access processes and contracting for the Project are consistent with NGTL's historic practice for responding to new service requests and delineating the need for, and appropriate configuration of, new facilities on its System. NGTL accepts requests for service from customers on an ongoing basis and works with those customers to meet their requirements and reflect them through transportation contracts. As part of this process, customers submit an application for service (AFS) either by using the AFS form available on the NGTL website¹ or by sending an email request to NGTL for capacity (specifying customer, volume and location). See Appendix 3-1 for the standard AFS form.

NGTL generally processes requests for service in an area until the existing capacity of that area has been reached. If service requests exceed the available capacity of an area, the requests are held by NGTL in a queue while it assesses and determines what expansion facilities are required to accommodate the requests. When the available capacity associated with expansion facilities is confirmed, contracts are offered to customers based on their priority date in the queue. NGTL processes the requests in the queue in this way until either the capacity has been fully allocated or there are no remaining service requests.

¹ http://www.transcanada.com/customerexpress/docs/ab_request_for_service/ab_afs_receipt.pdf

The transportation access process provides customers and parties with equal, sufficient and timely access to information and gives them a fair and reasonable opportunity to contract for service.

CBRP submitted an AFS at the proposed Dawson Creek North Receipt Meter Station and the existing Tremblay No. 2 Meter Station on October 31, 2013, the proposed Tower Lake Receipt Meter Station on December 30, 2013 and the proposed Dawson Creek North No. 2 Receipt Meter Station on March 13, 2015. NGTL determined that these requests for service exceeded the existing facilities capacity of the area and that new facilities were required to meet NGTL's aggregate contractual requirements.

NGTL continues to hold discussions with other potential customers that have approached NGTL expressing interest in a direct connection to the NIT hub and potential receipt service that would utilize the Project facilities.

3.3 FIRM TRANSPORTATION COMMITMENTS

3.3.1 Receipt – Contract Details and Volumes

The service attributes in the FT-R contracts with CBRP are consistent with the terms of FT-R service described in the NGTL Tariff. Also, the duration and structure of the FT-R transportation agreements with CBRP are consistent with NGTL System requirements for this area (Peace River Project area), as described below. NGTL has used this general structure for all recent FT-R transportation agreements with other receipt customers in this area. NGTL understands that CBRP plans to stage its production growth and NGTL will facilitate this production growth in two ways:

- meter stations will be put in service at times that align with FT-R service needs from a particular area
- FT-R volumes at a specific meter station will be staged to align with production growth in that area

This approach generally aligns with the anticipated timing for the completion of new or expanded gas processing facilities in the area and development of new gas production upstream of those processing facilities. This staged approach results in FT-R service agreements for CBRP that reflect an orderly, structured buildup of production commitments.

The Project is underpinned by eight-year contracts with CBRP for FT-R service. The volume is divided into two parts. The first part consists of 75% of the total volume, which is contracted for a five-year Primary Term plus a three-year Secondary Term. The remaining 25% of the FT-R contracted volume has an eight-year Secondary Term.

Primary and Secondary terms determine the ability for an FT–R contract to be transferred from one receipt point to another in accordance with Section 8 of NGTL’s Tariff, Rate Schedule FT–R.² Customers may not transfer their contracts from one receipt meter station to another during the Primary Term. During the Secondary Term, contracts may be transferred only to other receipt meter stations with existing uncontracted capacity elsewhere on the NGTL System.

For an illustration of the contract structure, see Figure 3-1. For the receipt contract profile for aggregate FT–R service, see Figure 3-2. For details of individual FT–R contracts, see Table 3-1.

3.4 PROJECT EXPENDITURE AUTHORIZATION

A PEA is an agreement between NGTL and a customer that prescribes the terms and conditions under which new facilities are constructed on the NGTL System to meet the customer’s transportation service request. A PEA remains in effect throughout the project development and construction phases. Once the facilities are completed and put into service, the PEA terminates and transportation service begins under FT–R service contracts. PEA agreements ensure that the risk of a project being cancelled before being placed in service is borne by the customers driving that project, and not by the existing customers on the NGTL System.

CBRP executed a PEA associated with the provision of receipt service at the three proposed Project receipt stations (Tower Lake, Dawson Creek North and Dawson Creek North No. 2) and one existing receipt station (Tremblay No. 2). For the CBRP PEA and corresponding amending agreements, see Appendix 3-2. The PEA authorizes NGTL to incur costs or expenses up to a maximum of \$468 million, plus applicable taxes. This amount represents the total cost of the Project, as initially calculated by NGTL using a Class 5 estimate. If the PEA is terminated, CBRP is obligated to pay all the direct Project-related costs (defined in Schedule C of the PEA).

Before the Project is placed into service, CBRP may request to reallocate the location of their FT–R service between Tower Lake, Dawson Creek North and Dawson Creek North No. 2 meter stations to better align with their production³, provided that:

- sufficient capacity exists at the relevant facilities
- operating conditions and design permit such change
- CBRP executes and delivers to NGTL revised agreements if necessary, and on terms and conditions satisfactory to NGTL

² http://www.transcanada.com/customerexpress/docs/ab_regulatory_tariff/Rate-Schedule-FT-R-2015.pdf

³ Tremblay No. 2 Receipt Meter Station is fully contracted and therefore cannot accept additional CBRP volumes.

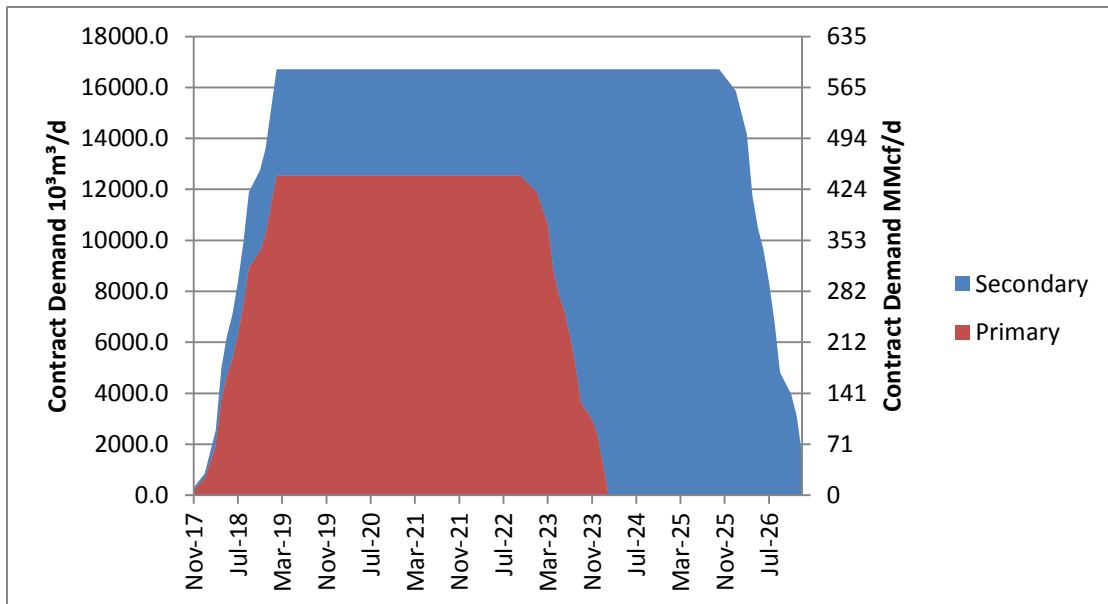


Figure 3-1: Contract Structure for Towerbirch Expansion

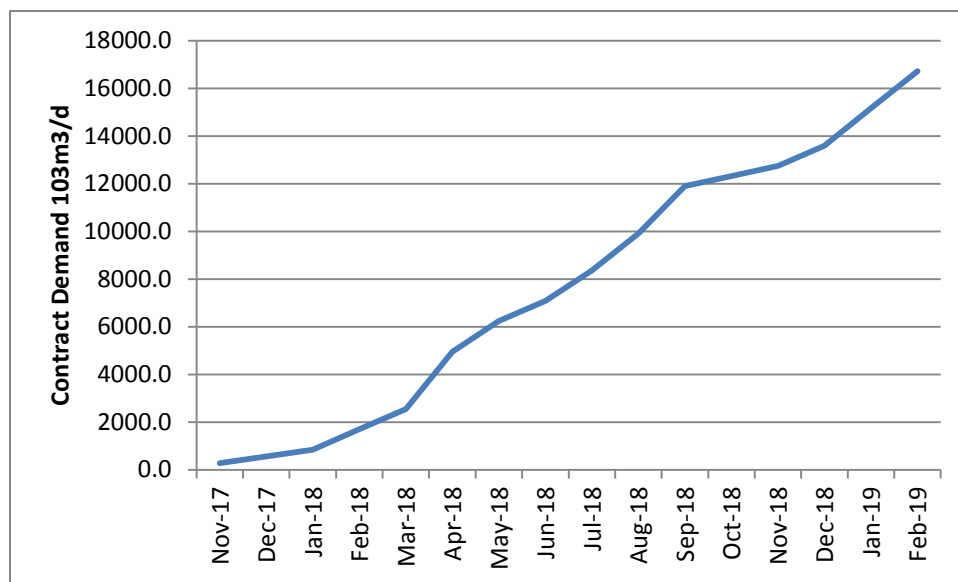


Figure 3-2: Receipt Contract Profile for Towerbirch Expansion

Table 3-1: Primary and Secondary Term Contract Summary at Receipt Meter Stations

Meter Station	Quantity Start Date	Primary Term (Years)	Secondary Term (Years)	Contract Demand Volume (10³m³/d)	Contract Demand Volume (MMcf/d)
Tower Lake	2017-Nov-01	5	3	212.5	7.5
		0	8	70.8	2.5
	2017-Dec-01	0	8	70.8	2.5
		5	3	212.5	7.5
	2018-Jan-01	0	8	70.8	2.5
		5	3	212.5	7.5
	2018-Feb-01	5	3	637.0	22.5
		0	8	213.0	7.5
	2018-Mar-01	5	3	637.0	22.5
		0	8	213.0	7.5
Dawson Creek North No. 2	2018-Apr-01	0	8	106.2	3.7
		5	3	319.0	11.3
Tower Lake	2018-Apr-01	5	3	637.0	22.5
		0	8	213.0	7.5
Tremblay No 2	2018-Apr-01	5	3	850.0	30.0
		0	8	283.0	10.0
Dawson Creek North No. 2	2018-May-01	0	8	106.2	3.7
		5	3	319.0	11.3
Tower Lake	2018-May-01	5	3	637.0	22.5
		0	8	213.0	7.5
Dawson Creek North No. 2	2018-Jun-01	0	8	106.2	3.7
		5	3	319.0	11.3
Tower Lake	2018-Jun-01	5	3	319.0	11.3
		0	8	106.1	3.7
Dawson Creek North No. 2	2018-Jul-01	0	8	212.4	7.5
		5	3	637.5	22.5
Tower Lake	2018-Jul-01	5	3	319.0	11.3
		0	8	106.0	3.7
Dawson Creek North No. 2	2018-Aug-01	0	8	390.0	13.8
		5	3	1168.0	41.2
Dawson Creek North	2018-Sep-01	0	8	106.2	3.7
		5	3	319.0	11.3
Dawson Creek North No. 2	2018-Sep-01	0	8	389.5	13.7
		5	3	1167.0	41.2

Table 3-1: Primary and Secondary Term Contract Summary at Receipt Meter Stations (cont'd)

Meter Station	Quantity Start Date	Primary Term (Years)	Secondary Term (Years)	Contract Demand Volume (10³m³/d)	Contract Demand Volume (MMcf/d)
Dawson Creek North	2018-Oct-01	5	3	319.0	11.3
		0	8	106.2	3.7
	2018-Nov-01	0	8	106.2	3.7
		5	3	319.0	11.3
	2018-Dec-01	0	8	212.4	7.5
		5	3	637.5	22.5
	2019-Jan-01	0	8	390.0	13.8
		5	3	1168.0	41.2
	2019-Feb-01	0	8	389.5	13.7
		5	3	1167.0	41.2
Total				16713.0	590.0

3.5 CREDIT AND FINANCIAL ASSURANCES

NGTL assesses the creditworthiness of all customers to determine if financial assurances are required to support their contractual obligations.

To determine the creditworthiness of CBRP for the Project, NGTL followed its standard creditworthiness assessment process. This process involves review of several sources of information, including but not limited to:

- financial statements, audited quarterly and at year-end
- geographic and operational diversity of company assets and cash flow
- corporate family structure
- credit rating agency opinions

As standard practice, NGTL continuously assesses creditworthiness of customers. In addition, NGTL assesses the adequacy of financial assurances, which can change over time as a result of changes in the creditworthiness of a customer and/or a change in its financial assurance provider.

The Project is underpinned by CBRP, an Alberta General Partnership, with Encana Corporation holding a 60% interest and acting as managing partner and operator of the Partnership. The remaining 40% interest is held by Cutbank Dawson Gas Resources Ltd., a wholly owned subsidiary of Mitsubishi Corporation. Encana Corporation has a credit rating of BBB and Mitsubishi Corporation has a credit rating of A+. Currently, NGTL has determined CBRP to be creditworthy.

Before the commencement of FT-R service, NGTL's financial assurance requirements are prescribed in the PEA. NGTL may require a CBRP to provide

financial assurances in a type and form acceptable to NGTL to support the total project costs as outlined in the PEA.

After FT-R service commencement, NGTL's financial assurance requirements are prescribed by the Tariff. NGTL may require a customer to provide financial assurances for up to 70 days' worth of all rates, tolls, charges and other amounts payable to NGTL for receipt service.

3.6 COMMERCIAL THIRD-PARTY NOTIFICATION

3.6.1 Tolls, Tariff, Facilities and Procedures Committee

The Tolls, Tariff, Facilities and Procedures Committee (TTFP) is a group of over 100 NGTL System customers and stakeholders that work collaboratively with NGTL to address NGTL System matters. Specifically, the TTFP facilitates the effective, efficient and timely exchange of information among the involved parties, and proactively addresses and attempts to resolve issues related to NGTL System tolls, Tariff, facilities and operating procedures.

NGTL regularly provides notifications to the TTFP about System activities and events. NGTL provides advance notice of capacity capital projects to the TTFP, and described the Project at the June 9 and August 18, 2015 TTFP meetings. During these presentations, NGTL requested that parties advise NGTL should they have any concerns with the Project. At this time, NGTL has not been made aware of any specific concerns related to the Project.

For the TTFP presentations for the Project see:

- Appendix 3-3: TTFP commercial presentation on June 9, 2015
- Appendix 3-4: TTFP facility presentation on August 18, 2015

3.6.2 Other Parties

NGTL has provided notification about the Project through the filing of the Project Description, TTFP communication, news release postings on the TransCanada website⁴, invitations to the Project open house, which was communicated through local area newspaper and radio advertising, and digital media posts. To date, NGTL is not aware of any specific objections to the Project from any party.

⁴ <http://www.transcanada.com/towerbirch.html>

4.0 SUPPLY AND MARKETS

This section provides an overview of the gas supply that can connect to the Project, as well as an outlook of the gas markets that producers connecting to the Project can access through the NGTL System.

4.1 SUPPLY

NGTL's supply analysis includes a production forecast of the average annual volumes expected in the Tower Lake drainage area, as shown in Figure 4-1. The forecast described in this section was based on estimates of resource potential, well production profile, pace of development and producer economics. For an overview of Tower Lake Area Supply Forecast and Methodology, see Appendix 4-1.

4.1.1 Commodity Description

Gas to be transported on the Project will be sweet natural gas, meeting NGTL System Tariff requirements. For a description of the expected gas composition, see Section 7.3.

4.2 SUPPLY SOURCES

The supply source for the Project is the Tower Lake area, which is part of the Montney play that extends from Dawson Creek in the south to the Kahta area of northeastern BC, along a northwest to southeast-trending fairway (see Figure 4-1).

The Montney play, which was formerly characterized as tight and uneconomic, has been successfully commercialized with the application of horizontal drilling and multi-stage hydraulic fracturing. The Montney Formation holds one of the largest unconventional gas resources in North America and is one of the most economic formations in the Western Canada Sedimentary Basin, with production reaching approximately $85 \times 10^6 \text{ m}^3/\text{d}$ (3 Bcf/d) in just a few years.

4.3 TOWER LAKE DRAINAGE AREA

As the first step in its gas supply assessment, NGTL establishes a project drainage area based on customer data, physical constraints (e.g., rivers, parks and mountains) and other major transportation systems. Determination of the drainage area is necessary to estimate resource potential, the number of potential drilling locations and the potential supply from the area that can reasonably be connected to the NGTL System.

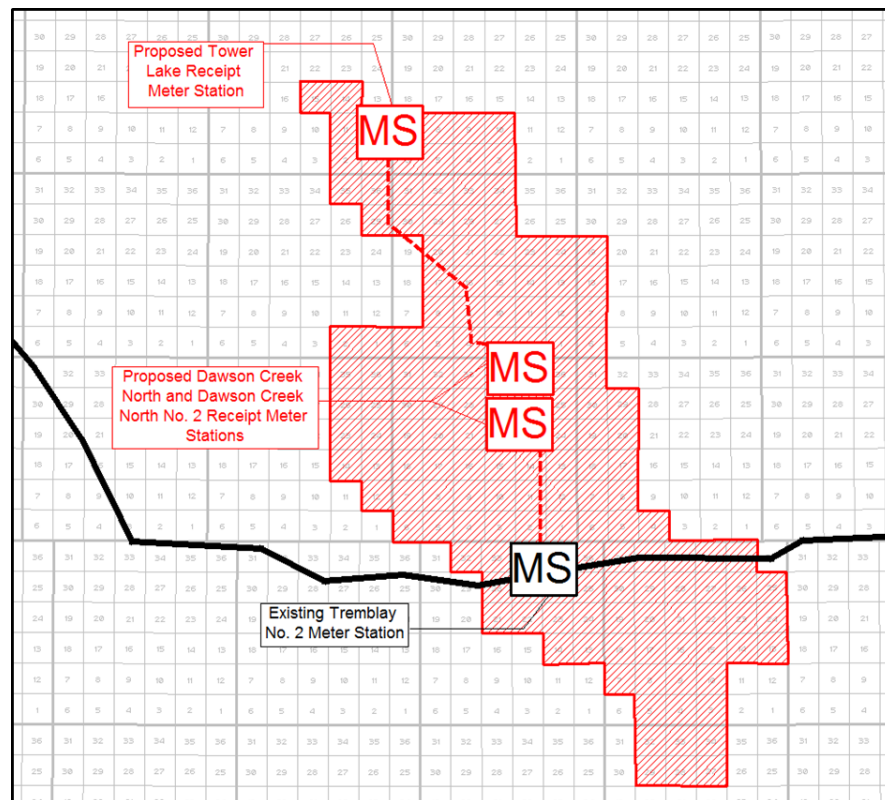
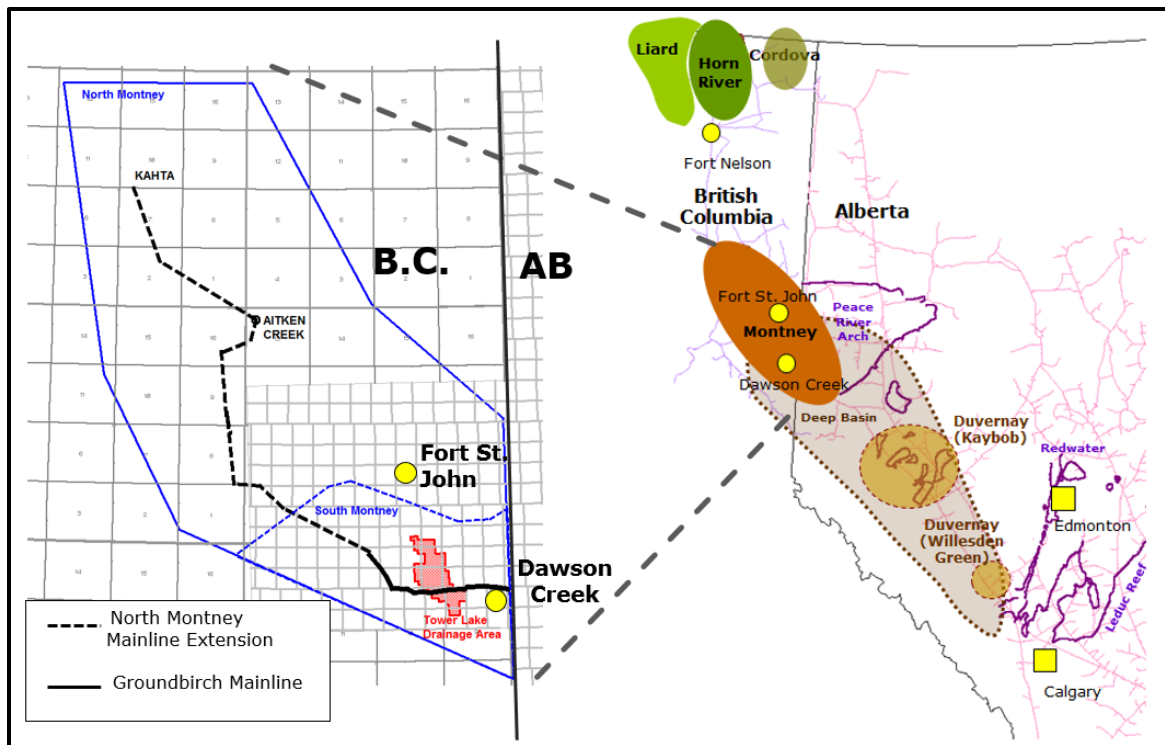


Figure 4-1: Drainage Area for the Tower Lake Supply Assessment

The Tower Lake drainage area encompasses approximately 160 sections, and is situated in the southern part of the BC Montney play trend. The development of the South Montney area is considerably more advanced than the North Montney area due to a better infrastructure grid consisting of roads, processing plants and pipeline transportation options for the gas and associated natural gas liquids (NGL). The production of South Montney has increased significantly over the last 10 years, to almost $56.7 \times 10^6 \text{ m}^3/\text{d}$ (2 Bcf/d) from 1,000 producing wells. It is currently averaging about 200 wells drilled annually. The advanced infrastructure grid and the current extensive resource development of the South Montney area are expected to be a benefit to the development of the Tower Lake area.

4.4 RESOURCE POTENTIAL

NGTL has estimated the gas-in-place (GIP) resource, recovery factors and marketable gas resource estimates based on studies by the NEB¹ and producer information. Resource potential in the Upper, Middle and Lower Montney Formations was considered. The Tower Lake drainage area marketable gas resource is estimated to be $0.27 \times 10^9 \text{ m}^3$ (9.5 Tcf), which is approximately 3.5% of the total BC Montney resource estimate.

4.4.1 Recovery Factor

Recovery factors associated with the entire Montney Formation can vary widely due to the regional heterogeneity of the reservoir as well as variation in completion practices such as the length of the horizontal lateral and the number of staged hydraulically fractured completion intervals.

The recovery factor for the Tower Lake drainage area is higher than the overall larger Montney area, as the drainage area is located in what is considered to be a geological “sweet spot” that is expected to be drilled at a higher well density than the larger Montney area. For an estimate of the Tower Lake Drainage Area resource potential compared with the larger Montney Area, see Table 4-1.

Table 4-1: Estimated Natural Gas Resource Potential

Area	GIP		Recovery Factor	Marketable Gas	
	10^9 m^3	Tcf	%	10^9 m^3	Tcf
BC Montney Area	55,664	1,965	14	7,677	271
Tower Lake Drainage Area	1,071	38	25	268	9.5

¹ National Energy Board. 2013. *The Ultimate Potential for Unconventional Petroleum from the Montney Formation of British Columbia and Alberta*.

4.5 TOWER LAKE SUPPLY FORECAST

NGTL developed a forecast of gas supply for the Tower Lake area, which is shown in Table 4-2. This forecast was developed after considering resource estimates, the well production profile, the pace of development and producer economics.

Currently, the Tower Lake area is producing around $8.5 \times 10^6 \text{ m}^3/\text{d}$ (300 MMcf/d), and is expected to increase to $35.0 \times 10^6 \text{ m}^3/\text{d}$ (1235 MMcf/d) by 2025.

Table 4-2: Production in Tower Lake Area

Gas Year	Total Tower Lake Area Supply	
	$10^6 \text{ m}^3/\text{d}$	MMcf/d
2014/15	9	328
2015/16	11	391
2016/17	12	418
2017/18	19	674
2018/19	29	1015
2019/20	34	1184
2020/21	35	1239
2021/22	36	1258
2022/23	36	1261
2023/24	35	1252
2024/25	35	1235

4.6 MARKETS

The Project will provide supply from the Tower Lake Area to both the intra-basin and export markets that the NGTL System serves. It will link growing customer receipt volumes in the Project area, as defined in Figure 5-2, with growing customer demand for delivery volumes, via the NIT hub, to these intra-basin and North American markets.

Natural gas received on the NGTL System will be available for purchase and sale in the NIT hub. In 2014, an average of approximately $302 \times 10^6 \text{ m}^3/\text{d}$ (10.7 Bcf/d) of gas was physically received on the NGTL System, although the commercial gas trading activity can exceed $1.5 \times 10^9 \text{ m}^3/\text{d}$ (54 Bcf/d). NIT provides a significant commercial market for volumes from the Tower Lake Area.

Once received on the NGTL System, gas can be physically delivered to either the intra-basin market or transported to export markets through further transportation on interconnecting pipelines. Markets accessible by interconnecting pipelines are located in other Canadian provinces and the United States (US), including the Pacific Northwest, California, the US Northeast and the Midwest. The NGTL System

is also expected to serve future liquefied natural gas (LNG) markets through proposed pipelines to the North American Pacific coast.

4.6.1 North American Markets

The primary export points on the NGTL System, where gas can be transported to downstream North American markets, are:

- Empress, where the NGTL System interconnects with the Canadian Mainline, which supplies gas to Canadian markets east of AB and to the US Midwest and Northeast markets.
- McNeill, where the NGTL System interconnects with the Foothills Pipe Lines (Sask.) Ltd. System, which supplies gas to the US Midwest via Northern Border Pipeline as well as Saskatchewan markets via TransGas Limited System.
- AB/BC, where the NGTL System interconnects with Foothills Pipe Lines (South BC), which supplies gas to southern BC markets and the US Pacific Northwest, California and Nevada via Gas Transmission Northwest.
- LNG–BC Pacific Coast, potential future markets where NGTL is expected to interconnect with proposed pipelines to the Pacific Coast and further to markets accessible by ocean transport.

Connecting pipelines enable natural gas at NIT to access North American (Canada/US) natural gas markets which, in 2014, had a daily aggregate demand of approximately $2.3 \times 10^9 \text{ m}^3/\text{d}$ (82 Bcf/d). NGTL expects demand for natural gas in North America to increase to approximately $3.3 \times 10^9 \text{ m}^3/\text{d}$ (116 Bcf/d) by 2025, including projected LNG exports.

The North American market is both large and well-developed, and will be capable of absorbing the additional gas volumes associated with the Project. For a simplified map of the NGTL System and export markets it serves, see Figure 4-2.

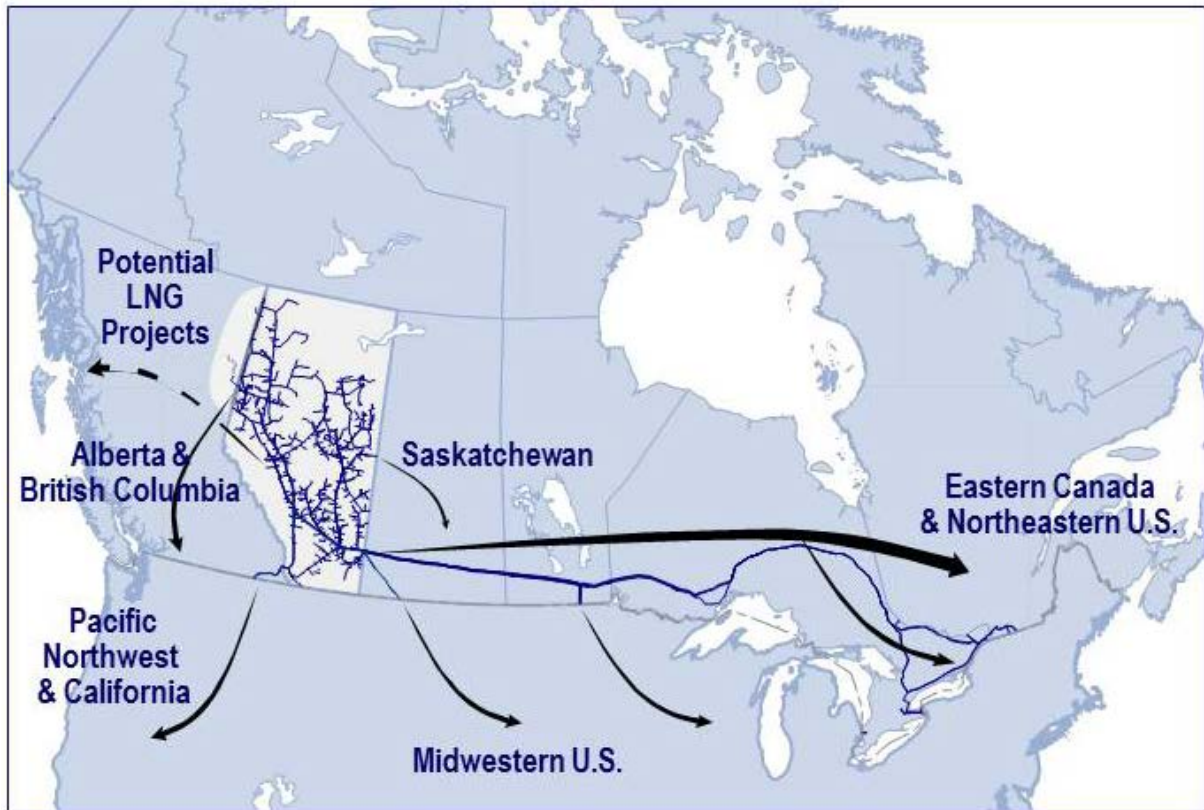


Figure 4-2: NGTL System Market Connections

4.6.2 Intra-Basin Markets

In addition to the North American export markets discussed above, other deliveries service the intra-basin market demand. This market primarily consists of deliveries made directly within the NGTL System (i.e., not via any major interconnecting transmission pipelines) and includes Firm Transportation Delivery (FT-D) Group 2 and Group 3 markets. For historical and forecast values for both the export and intra-basin markets, see Figure 4-3.

Growth in the intra-basin demand is primarily associated with increased industrial demand in the oil sands and electric generation sectors. Oil sands (mineable, in situ, upgrading) demand and its associated gas requirements are expected to increase by approximately 1.7 Bcf/d over the forecast period. Growth is also expected in other industrial areas as well as residential /commercial, but not to the same extent as oil sands growth. Forecast values for the intra-basin demand by sectors on the NGTL System show that oil sands demand continues to be a strong market, as illustrated in Figure 4-4 and Table 4-3.

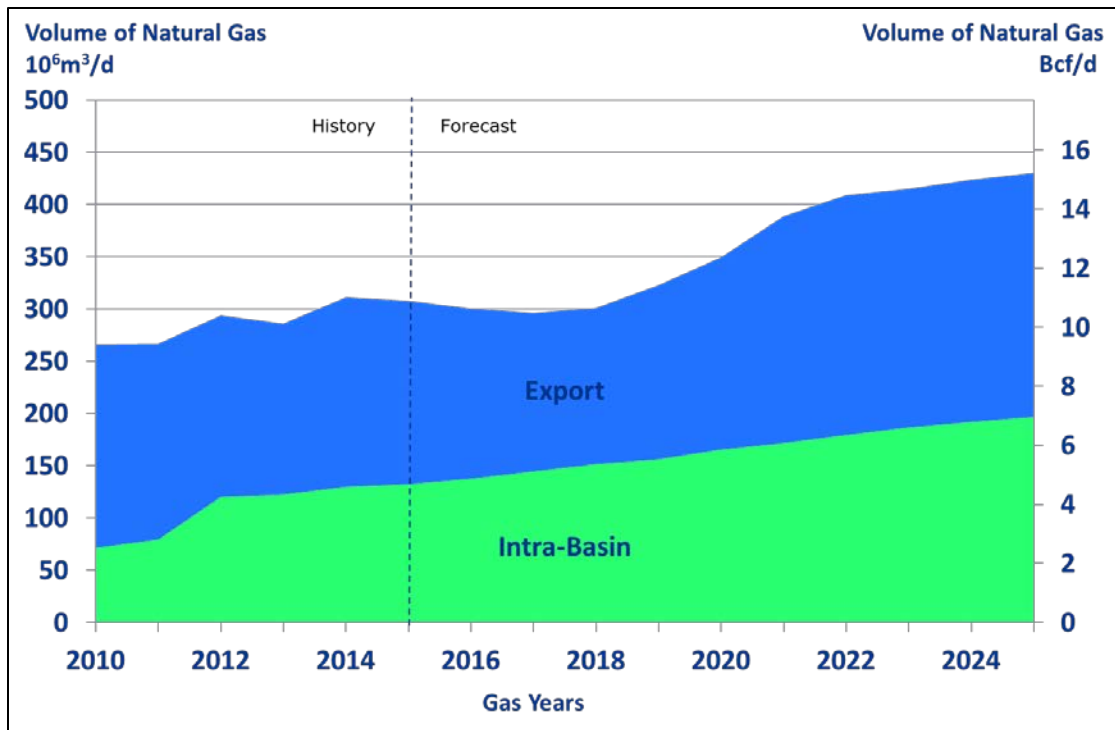


Figure 4-3: NGTL System Demand Forecast

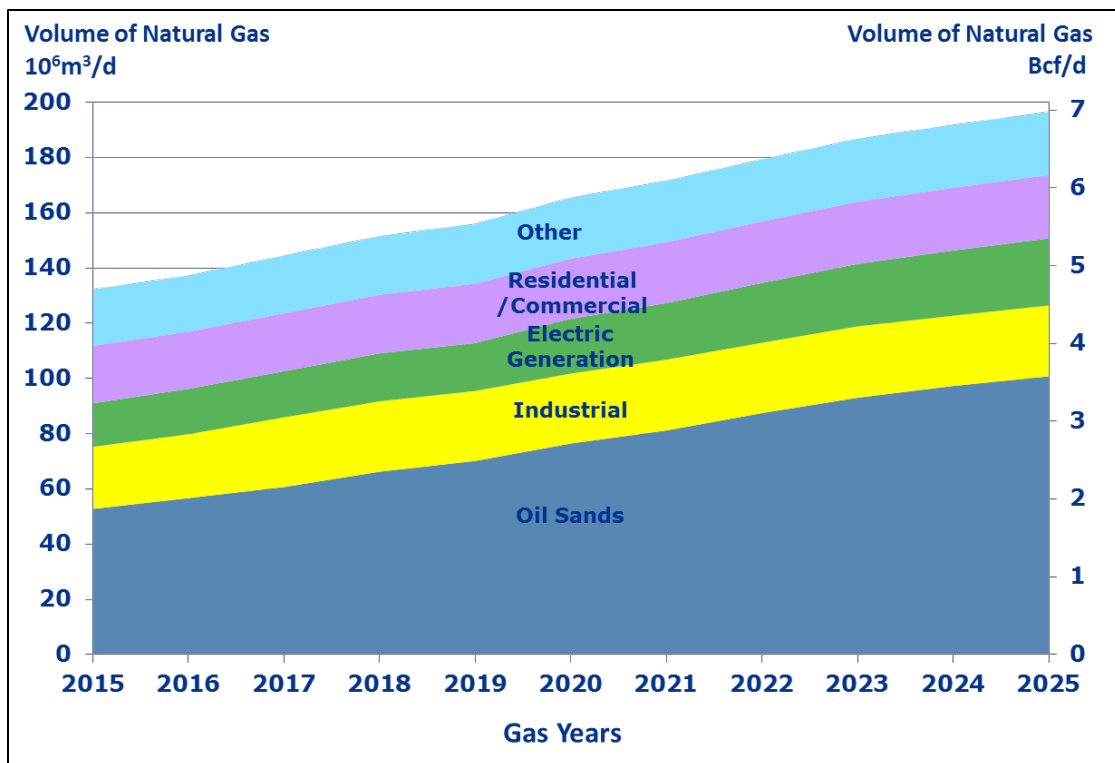


Figure 4-4: NGTL System Intra-Basin Demand

Table 4-3: NGTL System Intra-Basin Demand (2015 to 2025)

Gas Year	Oil Sands		Industrial		Electrical Generation		Residential/ Commercial		Other		Total	
	10 ⁶ m ³ /d	Bcf/d	10 ⁶ m ³ /d	Bcf/d	10 ⁶ m ³ /d	Bcf/d	10 ⁶ m ³ /d	Bcf/d	10 ⁶ m ³ /d	Bcf/d	10 ⁶ m ³ /d	Bcf/d
2015	52.75	1.86	22.50	0.79	15.76	0.56	20.82	0.73	20.46	0.72	132.28	4.67
2016	56.67	2.00	23.12	0.82	16.45	0.58	20.70	0.73	20.34	0.72	137.28	4.85
2017	60.69	2.14	25.22	0.89	16.70	0.59	20.97	0.74	20.93	0.74	144.52	5.10
2018	66.24	2.34	25.47	0.90	17.40	0.61	21.24	0.75	21.22	0.75	151.56	5.35
2019	70.14	2.48	25.34	0.89	17.34	0.61	21.51	0.76	21.72	0.77	156.05	5.51
2020	76.44	2.70	25.36	0.90	19.83	0.70	21.78	0.77	22.10	0.78	165.51	5.84
2021	81.18	2.87	25.65	0.91	20.46	0.72	22.06	0.78	22.30	0.79	171.65	6.06
2022	87.47	3.09	25.45	0.90	21.70	0.77	22.28	0.79	22.46	0.79	179.35	6.33
2023	93.03	3.28	25.85	0.91	22.62	0.80	22.50	0.79	22.83	0.81	186.83	6.60
2024	97.28	3.43	25.47	0.90	23.60	0.83	22.73	0.80	22.83	0.81	191.90	6.77
2025	100.79	3.56	25.66	0.91	24.27	0.86	22.96	0.81	22.90	0.81	196.57	6.94

5.0 SYSTEM DESIGN

This section provides an overview of system design matters for the Project, including:

- a summary of the facilities selected to meet flow requirements
- the design basis for the facility selection
- the rationale for selecting the applied-for facilities
- an evaluation of economically feasible alternatives that were examined

5.1 PROJECT DESCRIPTION

NGTL followed its established facility planning process in the design of the Project, which resulted in the following facilities requirements:

- Tower Lake Section, consisting of approximately 32 km of NPS 30 OD pipeline
- Groundbirch Mainline Loop, consisting of approximately 55 km of NPS 36 OD pipeline

The two components of the Project were evaluated separately because of separate design requirements. The Tower Lake Section, as an extension, was evaluated based on the design methodologies for extension facilities. The Groundbirch Mainline Loop was evaluated based on the Mainline Design methodologies as it is a mainline expansion to meet aggregate system requirements. The evaluation inputs, analysis and results are described in Section 5.2 for the Tower Lake Section and Section 5.3 for the Groundbirch Mainline Loop.

5.2 TOWER LAKE SECTION DESIGN

NGTL designed the Tower Lake Section to meet the customer's requested firm transportation requirements, with consideration given to the forecast production capability in the Tower Lake drainage area. The analysis was completed in accordance with the Guidelines for New Facilities described in Section 3 of the Facilities Design Methodology Document (FDMD), which is provided in Appendix 5-1.

The Guidelines for New Facilities provide criteria under which NGTL may consider constructing new facilities to meet service requests. The Tower Lake Section meets all four of these criteria:

- expected to meet the aggregate forecast of two or more facilities (gas plants/industrials)
- facilities greater than or equal to 305 mm (12 inches) in diameter
- facilities greater than 20 kilometers (12.4 miles) in length
- volumes greater than $2.8 \times 10^6 \text{ m}^3/\text{d}$ (100 MMcf/d)

The location of this section is also based on the expected locations of the customer's gas plants and the optimal tie-in points to those plants. These factors are also considered as part of the Guidelines for New Facilities process.

The Guidelines for New Facilities process involves identifying the receipt volumes and location of each new supply. Area reserves and field deliverability are reviewed to determine the peak expected receipt forecast. Hydraulic simulation and economic analysis is then used to establish the most appropriate pipe size.

5.2.1 Tower Lake Section Design Forecast

The receipt forecast for the Tower Lake Section is based on the Tower Lake area gas supply forecast provided in Section 4 (see Table 4-2). This includes volumes flowing to the Tower Lake Section facilities and other facilities in the Tower Lake drainage area. For the resulting peak receipt forecast used in the Tower Lake Section design, see Table 5-1. As shown, the peak forecast volume is projected to increase to approximately $16,829 \text{ } 10^3 \text{ m}^3/\text{d}$ (594 MMcf/d) by 2022/23.

Table 5-1: Tower Lake Section Forecast

Gas Year	Receipt Design Flow	
	MMcf/d	$10^3 \text{ m}^3/\text{d}$
2016/17	0	0
2017/18	217	6,134
2018/19	463	13,104
2019/20	586	16,596
2020/21	577	16,358
2021/22	577	16,359
2022/23	594	16,829
2023/24	579	16,402
2024/25	573	16,241
2025/26	558	15,821
2026/27	564	15,971
2027/28	539	15,267
2028/29	525	14,884

5.2.2 Tower Lake Section Facility Design Results

The Tower Lake Section will form part of the integrated NGTL System and provide service based on the receipt contracts and the peak expected receipt forecast.

NGTL considered both an NPS 24 and NPS 30 pipe size for the Tower Lake Section. Figure 5-1 shows the capacity of both these sizes compared to the contract volumes and peak design forecast for the period of 2016/2017 through to 2028/29.

As shown in Figure 5-1, contracted capacity exceeds the design capacity of an NPS 24 pipe. The peak forecast for the Tower Lake Section increases above the 15,500 $10^3\text{m}^3/\text{d}$ design capacity of an NPS 24 pipe with 16,596 $10^3\text{m}^3/\text{d}$ in 2019/20 and rises to a peak of 16,829 $10^3\text{m}^3/\text{d}$ in 2022/23.

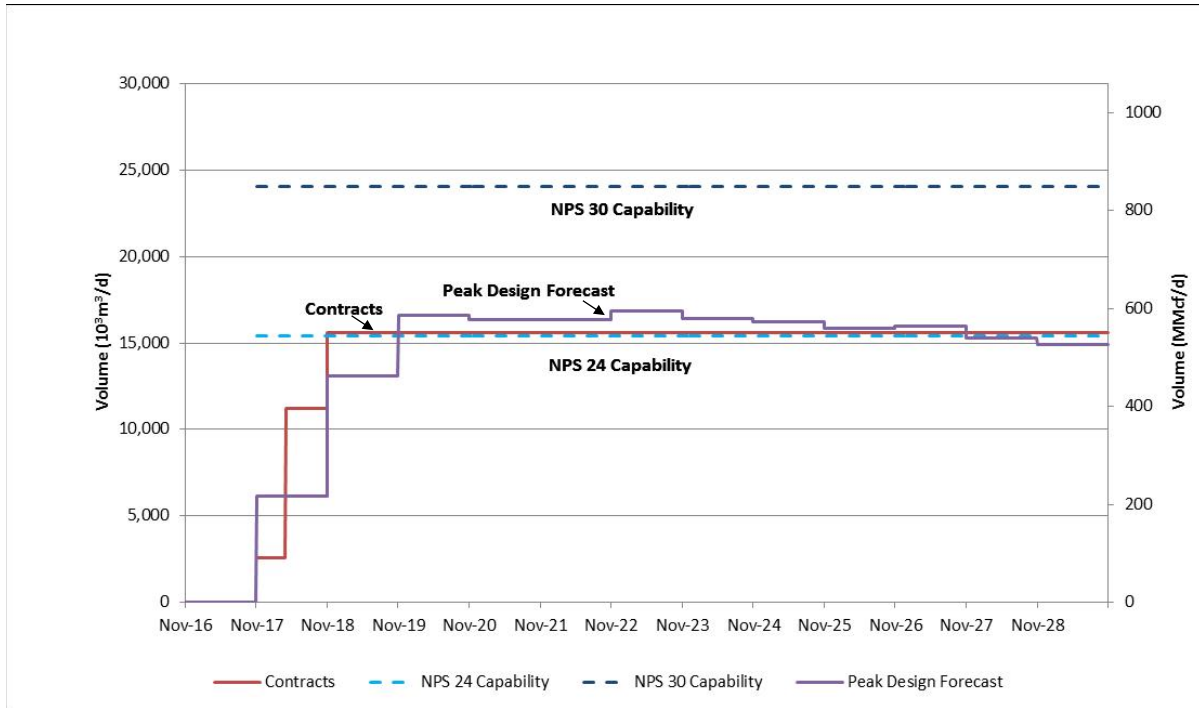


Figure 5-1: Tower Lake Section Peak Forecast and Pipe Capabilities

5.2.3 Tower Lake Section Facility Alternatives

The NGTL facility planning process includes evaluating facility alternatives to meet design requirements. Table 5-2 compares the first year capital cost, total long-term capital cost and cumulative present value cost of service (CPVCOS) for the alternative Tower Lake Section facilities that would meet both peak forecast and contractual requirements. The alternative to an NPS 30 pipe size is to initially build an NPS 24 pipeline and subsequently loop a 12 km section from Dawson Creek North to the Groundbirch Mainline with an NPS 24 pipe when the forecast flows exceed the existing NPS 24 capability in 2019/2020.

Due to the lower CPVCOS, NGTL has determined the NPS 30 pipe size is the appropriate design to meet contracts and forecasted flows.

Table 5-2: Cost Comparison of the Tower Lake Section Alternatives

Facility Alternatives	First Year Capital (\$M)	Long-Term Capital (\$M)	CPVCOS (\$M)
NPS 30	\$155	\$155	\$117
NPS 24 + 12 km NPS 24 Loop in 2019	\$136	\$185	\$134

5.3 GROUNDBIRCH MAINLINE LOOP DESIGN

NGTL designed the Groundbirch Mainline Loop to meet the aggregate system Design Flow requirements, based on system contracts, which include CBRP's requested firm transportation contracts. The analysis was completed in accordance with the Mainline Design methodologies described in the FDMD in Appendix 5-1.

5.3.1 Project Design Area

When NGTL considers an expansion to the existing NGTL System, it identifies a Project Design Area comprising the portion of the NGTL System where detailed analysis is conducted to determine possible facility alternative. To define the Project Design Area, NGTL first determined the design criteria that were relevant to the expansion. The NGTL System west of Saddle Hills compressor station is a receipt dominated area of the System; therefore NGTL applied the Flow-Through design condition to simulate the entire NGTL System for the purpose of determining the Project Design Area. The Flow-Through design condition is described in more detail in Section 5.3.2. Based on the simulations, the sections of the NGTL System that did not require incremental facilities to transport the design flows were removed to allow more efficient hydraulic simulation of the Project. Figure 5-2 details the Project Design Area where facilities require expansion to transport the design flows. Downstream of the Project Design Area the System will be capable of transporting the design flows.

5.3.2 Flow-Through Design

The Flow-Through design condition occurs when total area supply (sum of all receipts) exceeds the total area demand (sum of deliveries). The Flow-Through condition prevails west of Saddle Hills compressor station. Gas is transported out of the area to meet demand elsewhere on the NGTL System. When applying the Flow-Through design condition, design flows are based on maximum day receipt. This approach represents the most constraining design condition expected to occur and is therefore used to determine facility requirements.

Design flows for the Project Design Area were generated using a series of steps. First a maximum day receipt forecast was calculated by applying a peaking factor to the annual average receipt forecast. This peaking factor is based on NGTL's experience with flows on the NGTL System and reflects the historically observed amount by which daily peak values exceed the annual average flow.

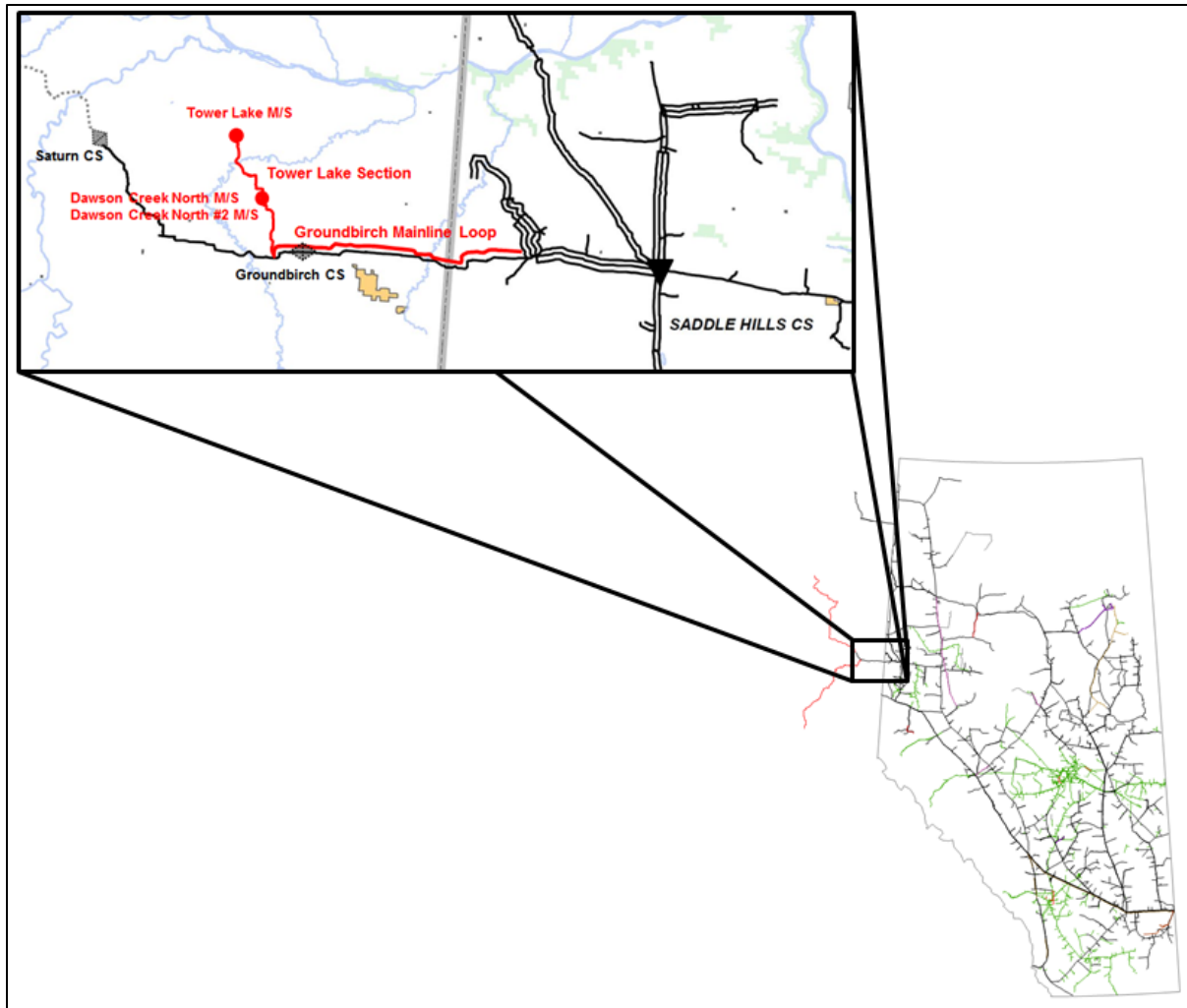


Figure 5-2: Project Area Map

Next, the maximum day receipt forecast was compared to receipt contracts. As receipt contracts exceed the maximum day receipt forecast, contracts were selected as the basis for design flows.

Lastly, receipt contracts were compared to expected downstream deliveries. As receipt contracts exceed expected downstream deliveries, a supply-demand balancing assumption was applied to avoid overbuilding the System. Balancing factors were calculated that matched supply to the forecasted downstream demand (i.e., what NGTL actually expects to flow). Design flows were generated by adjusting contracts with a balancing factor of 85%.

Design Flows in April 2017, before the Project commences, are forecasted to be $84.9 \times 10^6 \text{ m}^3/\text{d}$ (3.0 Bcf/d). By November 2018, design flows are forecasted to increase to $109.3 \times 10^6 \text{ m}^3/\text{d}$ (4.0 Bcf/d).

5.3.3 Design Flow Analysis

This section describes the existing capabilities and future capabilities compared to design flows for the Groundbirch Mainline Loop.

Figure 5-3 details the contracts and design flows west of Saddle Hills compressor station for the period April 2017 to March 2019. The design capability reflects planned system capability for April 2017. The NPS 36 Loop capability reflects system capability with the Project for April 2018.

As shown in Figure 5-3, by November 2017 the design flow increases to $87.7 \times 10^6 \text{ m}^3/\text{day}$ (3.1 Bcf/d), exceeding the planned system capability without the Project of $85.0 \times 10^6 \text{ m}^3/\text{day}$ (3.0 Bcf/d) by approximately $2.7 \times 10^6 \text{ m}^3/\text{day}$ (100 MMcf/d). With the addition of the Project facilities, the capability west of Saddle Hills compressor station increases to $117.8 \times 10^6 \text{ m}^3/\text{day}$ (4.1 Bcf/d), meeting the design flow requirements for November 2017 through to March 2019.

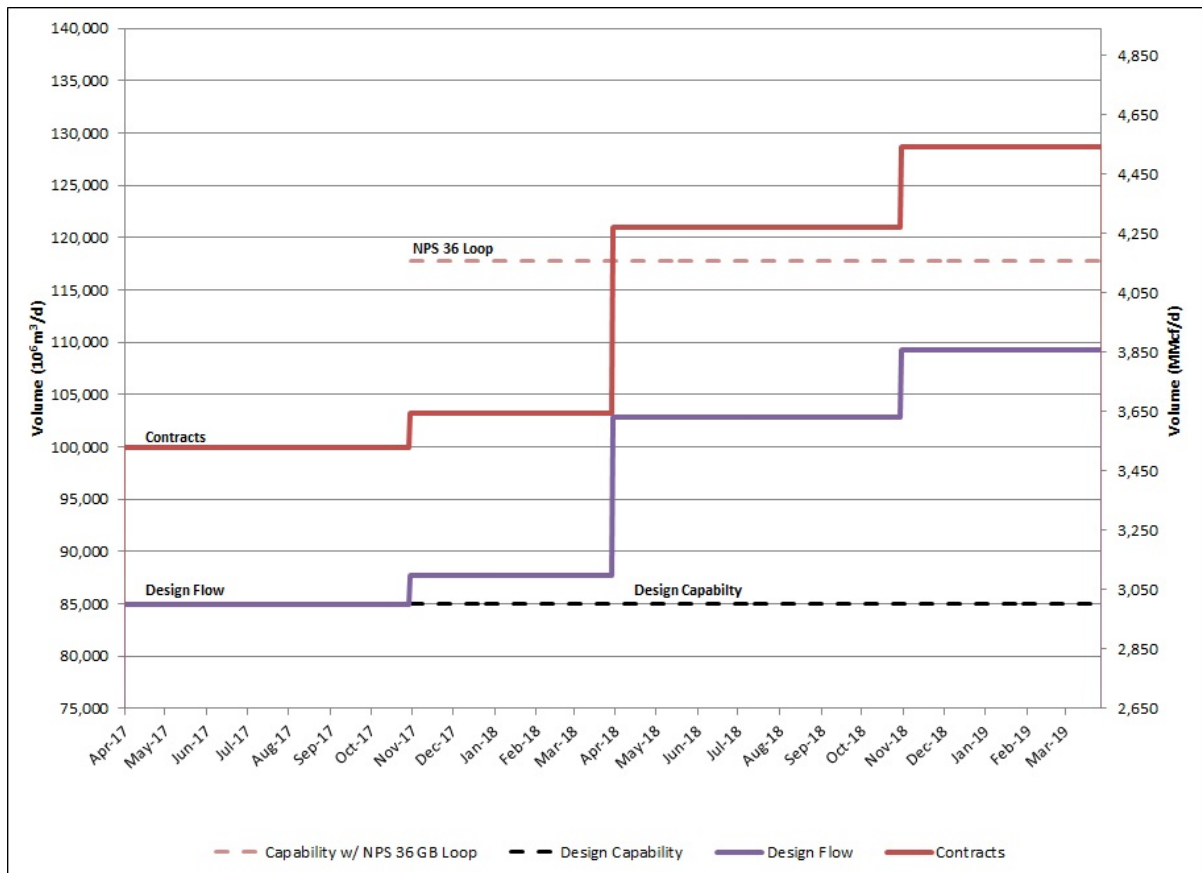


Figure 5-3: Flow-Through Capability and Design Flow

5.3.4 Groundbirch Mainline Loop Facility Alternatives

The NGTL facility planning process includes the evaluation of facility alternatives. NGTL's final selection of facilities must accommodate the design flow requirements that account for contractual commitments and forecasted flows to be transported through the Groundbirch Mainline and proposed Groundbirch Mainline Loop.

NGTL determined through hydraulic analysis of the design flows that the Groundbirch Mainline was unable to transport the required design flow due to significant pressure losses along its length. In order to overcome these pressure losses, a loop of the Groundbirch Mainline was selected to increase the capability. As per Appendix 5-1, when comparing installation of compression versus pipeline loop, pipeline loop is more economic than adding compression if the flow condition in the existing pipelines is resulting in excessive pressure drops and friction losses as in this instance.

The capabilities of the loop alternatives compared to design flows are illustrated in Figure 5-4.

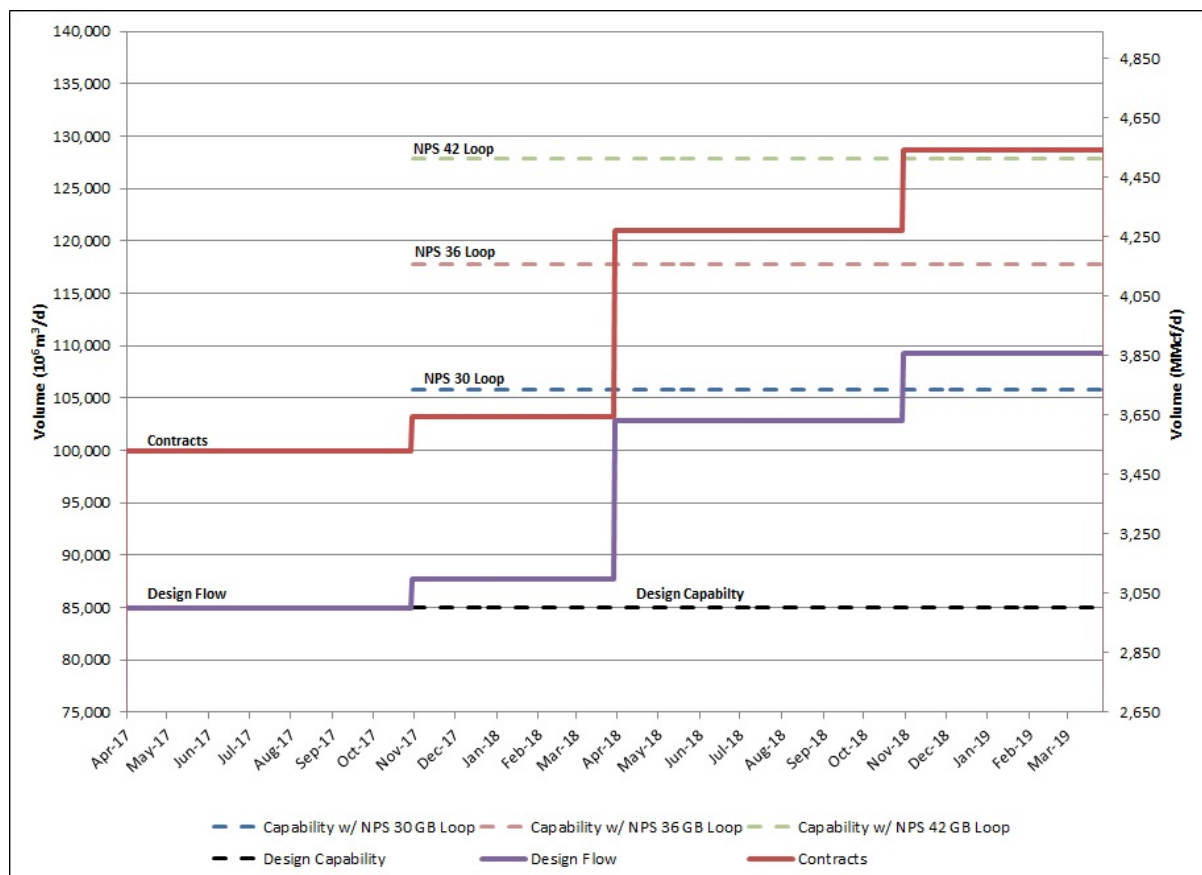


Figure 5-4: Loop Alternative Capabilities and Design Flows

As shown in Figure 5-4, both the NPS 36 and NPS 42 loop alternatives meet the design flow requirements. The NPS 30 loop alternative would not meet expected requirements.

Table 5-4 compares the first year capital cost, long-term capital cost, and the CPVCOS for the Groundbirch Mainline Loop alternatives that meet the design flow requirements.

NGTL has determined the NPS 36 loop, with the lower CPVCOS, is the appropriate design to meet the design flow requirements.

Table 5-3: Cost Comparison of the Groundbirch Mainline Loop Alternatives

Facility Alternatives	First Year Capital (\$M)	Long-term Capital (\$M)	CPVCOS (\$M)
NPS 36 Loop	296	296	275
NPS 42 Loop	330	330	301

5.3.5 Schematics

Summaries of the hydraulic analysis for the Project for April 2018 are represented schematically in Figure 5-5 (contract flow requirements) and Figure 5-6 (maximum flow capability). Although facilities are required for November 2017, design flows most exceed planned system capability in April 2018.

Figure 5-5 summarizes the contract flow requirement on the Tower Lake Section as well as the incremental contractual requirement at Tremblay No. 2 and associated pressures at key points related to the Project for April 2018 based on Flow-Through design conditions for the Project Design Area. Refer to Section 5.3.2 for a description of the Flow-Through design condition.

Figure 5-6 summarizes the maximum flow capability of the Project and associated pressures at key points related to the Project for April 2018 based on contract flow requirements on the Tower Lake Section.

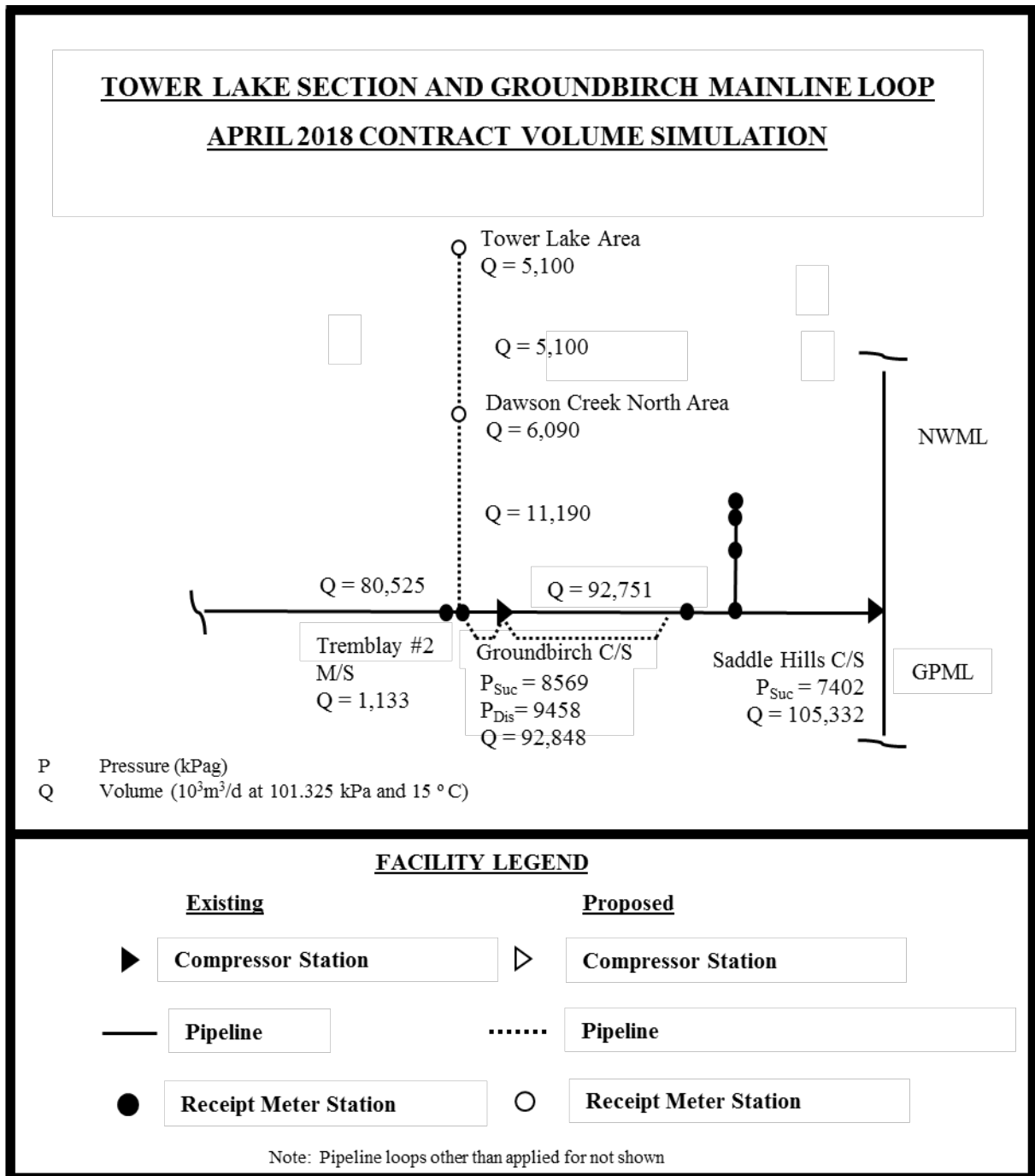


Figure 5-5: Schematic of Contract Flow Requirement

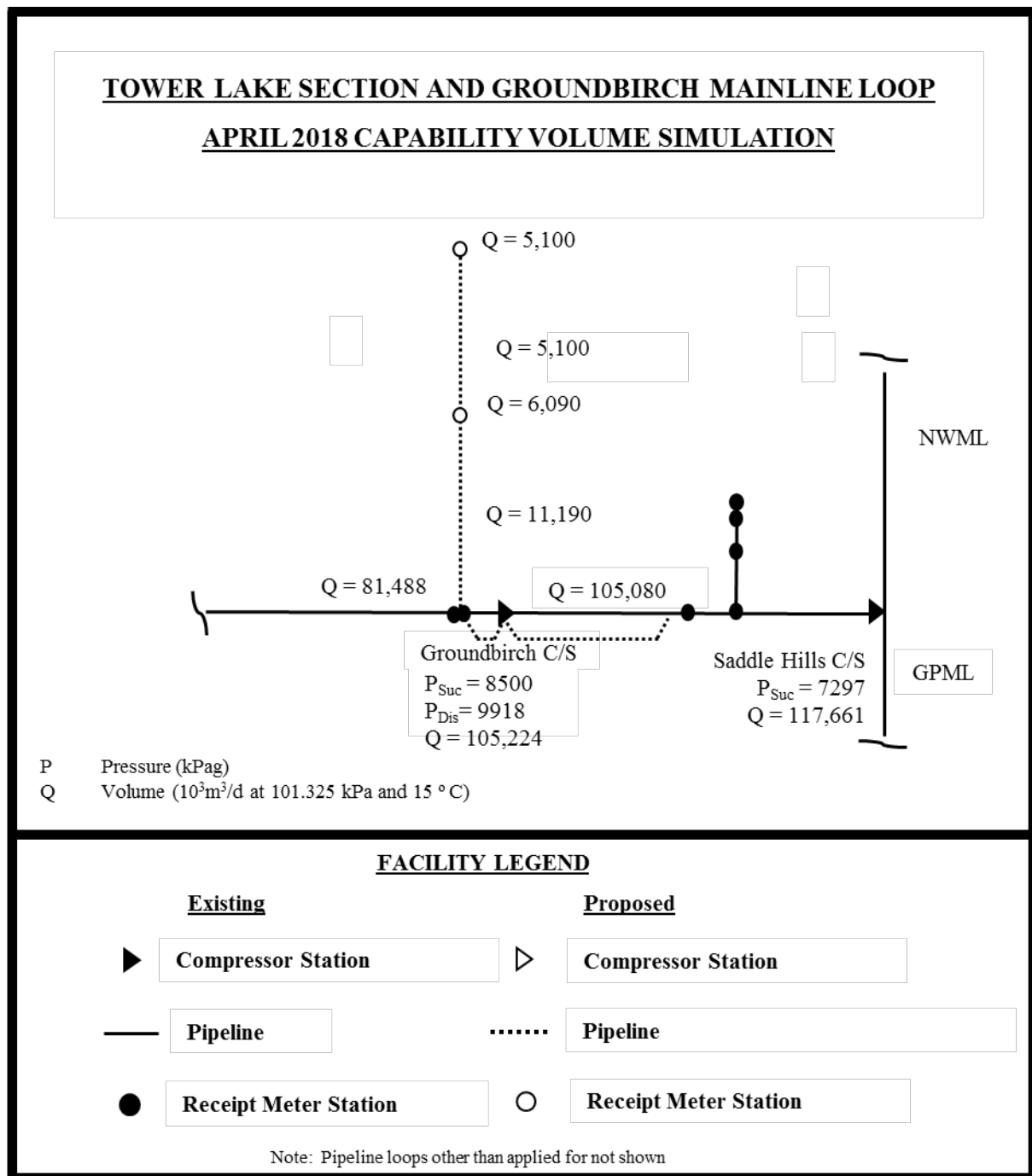


Figure 5-6: Schematic of Maximum Flow Capability

6.0 TOLLS AND FINANCING

This section addresses tolling and financial matters associated with the Project, including the proposed tolling treatment of the Project as part of the NGTL System, the estimated COS and rates impact of the Project on NGTL System tolls, abandonment cost estimates for the Project and financing.

6.1 TOLL METHODOLOGY

NGTL proposes to roll the cost of the Project facilities into the rate base of the NGTL System and to apply the existing toll methodology. The toll methodology may change over time to adapt to changing system requirements.

The Project is required to meet existing incremental FT–R contracts at existing and new receipt points located within the vicinity of the existing NGTL System. It consists of a loop of the existing Groundbirch Mainline and an extension off the Groundbirch Mainline connecting to the Tower Lake Area. The Project is analogous to previous projects that have been integrated into the NGTL System in this area and elsewhere on the System.

The Project facilities will be fully integrated with the rest of the NGTL System and the service provided will be standard FT–R service and other services pursuant to the terms of the Tariff. All gas received under the new FT–R contracts supporting the Project will physically flow through the existing NGTL System and will be commercially available to all gas buyers in the NIT hub. This gas will ultimately be delivered at diverse delivery points across the NGTL System to serve both the intra-basin and ex-basin market. The Project facilities will be used together with all other facilities on the NGTL System to meet the aggregate receipt and delivery requirements of NGTL’s customers.

The NGTL System tolling methodology is a cost-based toll methodology that reflects the integrated nature of the NGTL System where all system facilities are collectively used to provide service. As such, the capital costs associated with the Project will be added to the rate base of the NGTL System, and that rate base in its entirety and the prevailing toll design will be used as the basis for setting the revenue requirement and tolls over the entire NGTL System.

The NGTL System existing toll methodology was considered by the Board in the RHW-1-2010 proceeding and approved through Order-TG-04-2010. This tolling methodology begins with the calculation of the annual revenue requirement for the entire NGTL System. From this, revenue for non-transportation and full-path transportation services are deducted, producing a net transportation revenue requirement. This net transportation revenue requirement is split into two functions:

transmission and metering. As part of the toll design, the net transmission revenue requirement is allocated equally (50%/50%) between receipt and delivery services.

This single, system-wide cost pool and equal allocation of transmission costs between receipt and delivery shippers underscores the importance of both services and highlights the fundamental framework of the NGTL System – that receipt shippers put gas onto the NGTL System as a whole (i.e., gas received on the system is considered to be at the NIT hub) and delivery shippers take gas off the system as a whole (i.e., gas delivered off the system is considered to be from the NIT hub).

NGTL is mindful that the Board did not endorse NGTL's proposal for rolled-in tolling in two recent decisions: the GH-001-2012 Decision for the Northwest Mainline Komie North Extension (Komie North) and the GH-001-2014 Decision for the North Montney Mainline Project (North Montney). In both instances, the Board expressed concerns that rolled-in tolling for these projects under NGTL's existing rate design did not adhere to the cost causation principle.¹ The circumstances of the Project are different.

This Project is required to provide additional service in an area where NGTL already provides service. The new receipt meter stations associated with the Project are similarly situated to existing NGTL System receipt meter stations in the area for which the existing rate design applies. Receipt rates at these nearby stations are currently unconstrained by the application of the floors and ceilings methodology,² and NGTL expects the new stations located on the Project will also be unconstrained.

In GH-001-2012, the Board denied the proposed tolling treatment for the Komie North Project due in part to concerns over the level of cross-subsidy shippers would receive. In that instance, the rates applicable to receipt stations on the Komie North Project were expected to be at the ceiling level. As a result, the same toll would apply to the new receipt station as to existing receipt stations requiring a shorter distance of haul to market. These circumstances do not apply to the Project.

The receipt meter stations located on the existing Groundbirch Mainline are currently unconstrained by the ceiling, and the new receipt stations located on the Tower Lake segment are also expected to be tolled below the ceiling. As such, and in contrast to GH-001-2012, the applicable rates at these receipt stations will demonstrate the same distance sensitivity in tolls that applies elsewhere on the system at unconstrained locations.

¹ See GH-001-2014 Report, page 41.

² See NGTL's Compliance Filing to the RHW-1-2010 Decision and Order TG-04-2010, *Firm Transportation Receipt Floor and Ceiling Rates Phase 2 Report*, June 25, 2015, Section 3.3 and Table 2 for receipt stations Groundbirch, Groundbirch East, Saturn, Tremblay, Tremblay No. 2 and Tremblay No. 3.

In GH-001-2014, the Board approved the proposed rolled-in tolling treatment, with conditions, for a transition period ending with the commencement of delivery at the Mackie Creek delivery point. For the period following transition, the Board provided NGTL the opportunity to develop and seek approval of an alternative tolling methodology, absent which the North Montney Mainline Project would be tolled on a stand-alone basis. In reaching this decision, the Board expressed concerns over the degree of integration of the North Montney Project with the rest of the NGTL System, noting in particular that gas received on that project would also be delivered off that Project to the new Mackie Creek interconnection with Prince Rupert Gas Transmission (PRGT), a pipeline proposed to be built to provide transportation to the Pacific NorthWest LNG Project without utilizing other existing NGTL System facilities. The Board also found that the North Montney facilities would not increase capacity of the existing system but might increase throughput on the existing system during transition.

In the present circumstances, there is no new delivery point associated with the Project that could affect the degree of integration with the existing NGTL System. All gas received on the Project will physically flow to existing FT-D Group 1, 2 and 3 locations elsewhere on the NGTL System, increasing the overall supply available to all NGTL delivery customers. As a result of the Project, throughput on the existing NGTL System will be higher than it would be without the Project. The Project will also increase capacity on the existing System through looping of the Groundbirch Mainline. As a result, the Project will increase supply available to all customers on the System.

Through the relief requested, NGTL seeks to confirm that the cost of the Project facilities will be treated the same as the cost of existing NGTL System facilities in terms of inclusion in rate base and tolling methodology. Like the NGTL System itself, the NGTL rate design has evolved over time and is expected to continue to evolve to ensure it continues to appropriately and reasonably allocate system costs to the users of the system. In this regard, NGTL observes that the current rate design, approved in RHW-1-2010, was the outcome of a rate design review completed through the adoption of TTFP Resolution T2008-01 in September 2009. NGTL expects that it will continue to review its rate design methodology with stakeholders from time to time through the TTFP process, recognizing that as the system evolves over time, the applicable rate design might also need to evolve.

6.2 TARIFF

The Project, in conjunction with the rest of the NGTL System, will be used to provide transportation services in accordance with the NGTL Tariff in effect. The only amendments to the Tariff associated with the Project will be addition of the new receipt points to the Table of Rates, Tolls and Charges when the Project receipt stations are placed in service.

6.3 ESTIMATED IMPACT ON COST OF SERVICE AND TOLLS

NGTL undertook an analysis of the costs and revenues associated with the Project to determine the incremental cost to provide service as contracted, as well as the estimated impact to tolls on the NGTL System.

The estimated COS and toll impact are based on the following capital costs, contract demand and economic assumptions. These changes are presented as incremental to the existing NGTL Revenue Requirement and tolls.

6.3.1 Estimated Capital Cost

The estimated Project capital cost is provided in Table 6-1.

Table 6-1: Estimated Capital Cost (2017 \$)

Component	Capital Cost (\$ millions)
Pipeline	452
Metering	18
Total	470

6.3.2 Economic Parameters

The overall impact of the Project on the NGTL System Revenue Requirement was evaluated using the economic parameters shown in Table 6-2.

Table 6-2: Cost of Service Parameters

Parameter	Value (%)
Return on Equity	10.10
Deemed Common Equity	40.0
Return on Debt	6.31
Income Tax Rate	25.0
OM&A as a Percentage of Capital	1.0
Municipal Tax as a Percentage of Capital	0.5
Depreciation Rates	
Pipeline	2.59
Meter Stations	5.12
Escalation Rate for OM&A and Municipal Tax	2.0

6.3.3 Cost of Service and Toll Impacts

The results of the annual COS analysis related to the capital costs in Table 6-1 are presented for the years 2017 through 2021 in Table 6-3, which summarizes the capital cost, incremental rate base and COS associated with the Project capital expenditures.

The expected increase in NGTL's annual revenue requirement as a result of the Project expenditures is approximately \$53.9 million in 2018, the first full year the Project facilities are in service.

Table 6-3: Cost of Service (\$000s)

Proposed Facilities	2017	2018	2019	2020	2021
Month in Service	November				
Project Capital Cost (2017\$)	469,886				
Average Incremental Rate Base	77,364	462,163	450,001	437,839	425,677
OM&A	799	4,889	4,987	5,086	5,188
Depreciation	2,028	12,170	12,170	12,170	12,170
Municipal Taxes	399	2,444	2,493	2,543	2,594
Return	6,055	36,169	35,217	34,265	33,314
Income Tax	(4,549)	(1,749)	(950)	(229)	422
Total COS	4,732	53,923	53,916	53,836	53,688

The incremental FT–R contracts total 16,713 $10^3\text{m}^3/\text{day}$ (590 MMcf/d) for the period starting November 2017 through to February 2019. Additional delivery quantities totaling 12,535 $10^3\text{m}^3/\text{day}$ (442 MMcf/d) indirectly associated with the Project were also considered in the toll impact analysis.

Associated indirect delivery quantities were estimated based on historical FT–R contract utilization rates of 75% for the specific customer and area. NGTL anticipates that incremental delivery quantities will be delivered from the System in an amount equal to the utilized receipt contracts. Revenue from indirect delivery quantities are estimated using the average FT-D Group 1 delivery toll.

Estimated toll impacts related to incremental COS, incremental receipt contract revenue and revenue from associated delivery quantities are provided in Table 6-4.

Table 6-4: Towerbirch Expansion COS and Toll Impact

Project Details	2017	2018	2019	2020	2021
Incremental COS (\$Millions)	4.7	53.9	53.9	53.8	53.7
Incremental Receipt Contract Demand (MMcf/d)	3	271	585	590	590
Associated Indirect Delivery Quantities (MMcf/d)	2	203	439	442	442
Illustrative Toll Impact (cents/Mcf/d)					
Average Receipt Toll Impact Due To COS	0.06	0.64	0.56	0.51	0.51
Average Receipt Toll Impact Due To Receipt Contract Demand	(0.01)	(0.65)	(1.16)	(1.02)	(1.03)
Cumulative Average Receipt Toll Impact	0.05	(0.01)	(0.60)	(0.51)	(0.52)
Average Delivery Toll Impact Due To COS	0.06	0.61	0.53	0.47	0.47
Average Delivery Toll Impact Due To Indirect Delivery Quantities	(0.00)	(0.42)	(0.73)	(0.60)	(0.61)
Cumulative Average Delivery Toll Impact	0.06	0.19	(0.20)	(0.13)	(0.14)
Cumulative Full Path Toll Impact	0.11	0.18	(0.80)	(0.64)	(0.66)
Illustrative Toll Impact (\$/10³m³/d)					
Average Receipt Toll Impact Due To COS	0.02	0.22	0.20	0.18	0.18
Average Receipt Toll Impact Due To Receipt Contract Demand	(0.00)	(0.23)	(0.41)	(0.36)	(0.36)
Cumulative Average Receipt Toll Impact	0.02	(0.01)	(0.21)	(0.18)	(0.18)
Average Delivery Toll Impact Due To COS	0.02	0.22	0.19	0.17	0.17
Average Delivery Toll Impact Due To Indirect Delivery Quantities	(0.00)	(0.15)	(0.26)	(0.21)	(0.22)
Cumulative Average Delivery Toll Impact	0.02	0.07	(0.07)	(0.04)	(0.05)
Cumulative Full Path Toll Impact	0.04	0.06	(0.28)	(0.22)	(0.23)
Note: 1. Contract demand quantities are annualized averages. 2. Full path toll impact is the total of average receipt and average delivery toll impacts.					

The incremental COS for the Project is greatest in the first full year of service (2018) and declines as the rate base depreciates over time. Incremental contracts associated with the Project will ramp up between 2017 and 2019.

As a result of timing differences between incurred costs and expected revenue, a full-path toll increase of 0.18¢/Mcf (\$0.06 /10³m³) is estimated for 2018 when full costs are being incurred, and all incremental contracts are not yet in service and billable.

Once all incremental contracts are in service and billable in 2019, a full path toll reduction for the overall System of 0.28¢/Mcf is expected and a comparable positive benefit is expected to continue through the remainder of the analysis period (2017 to 2021). NGTL expects a full-path toll reduction of approximately 0.66¢/Mcf (\$0.23/10³m³) by the end of the analysis period.

NGTL has also considered the impact of the Project on system fuel and determined that the change in the NGTL System fuel ratio would be negligible.

6.4 ABANDONMENT COST ESTIMATE

As required by the NEB Filing Manual,³ NGTL provides an Abandonment Cost Estimate (ACE) for the Project as calculated in accordance with the methodology prescribed in the Board's MH-001-2012 Decision. The estimated ACE for the Project is \$8.7 million,⁴ which represents approximately 0.4% of the ACE approved for the entire NGTL System. The specific abandonment approach and cost estimate will be updated when an application to abandon these facilities is filed.

There could be a commensurate impact on the Annual Contribution Amount (ACA) and abandonment surcharge calculations on the NGTL System, which will be reflected in the periodic updates of NGTL's ACE, as required by the MH-001-2012 Decision, and in the annual ACA calculation filings.

6.5 FINANCING

NGTL will fund the construction cost of the Project with proceeds from its parent company, TransCanada PipeLines Limited (TransCanada). TransCanada may, from time to time, access the debt capital markets on behalf of NGTL and pass through the financing on these terms and conditions. In July 2015, TransCanada issued \$750 million of long-term debt in the Canadian capital markets on behalf of NGTL to fund NGTL's current growth. The financing transaction comprised a single-tranche \$750 million 10-year medium-term note debenture with a coupon rate of 3.3%.

TransCanada expects to fund its existing capital program in 2015 and beyond, including projects undertaken by NGTL, through a combination of cash flow from its consolidated operations, access to capital markets in Canada and the U.S., and cash on hand. In addition, as of June 30, 2015, TransCanada and other subsidiaries of TransCanada Corporation had approximately \$6.2 billion of capacity on \$7 billion of committed, revolving credit facilities.

TransCanada has been assigned an "A-" level investment-grade credit rating by Moody's Investor Service, Inc. and Standard & Poor's Rating Services in the U.S., and by DBRS Limited (DBRS) in Canada. NGTL's outstanding debt has also been assigned the equivalent investment-grade credit rating by DBRS.

³ NEB Filing Manual, Guide A, page 4A36.

⁴ The estimated ACE amount is shown in 2015 dollars.

Copies of the recent credit agency rating results for NGTL and TransCanada are found in the following appendices:

- Appendix 6-1: DBRS report on NGTL (June 19, 2015)
- Appendix 6-2: DBRS reports on TransCanada Corp. and subsidiaries (June 5, 2015)
- Appendix 6-3: Standard & Poor's summary on TransCanada Corp. (May 15, 2014)
- Appendix 6-4: Standard & Poor's summary on TransCanada PipeLines Limited (May 15, 2014)
- Appendix 6-5: Moody's credit opinion on TransCanada PipeLines Limited (June 8, 2015)

For a copy of TransCanada's 2014 Annual Report, see Appendix 6-6.

7.0 PIPELINE DESIGN

This section provides Project information on pipeline routing, design and integrity management. This information is based on preliminary design and is supported by initial results from field investigation and engagement programs. Revisions and refinements are expected as additional data are collected and assessed, and as detailed engineering design progresses.

7.1 ROUTING OVERVIEW

The Project involves construction and operation of approximately:

- 32 km of NPS 30 pipeline (Tower Lake Section)
- 55 km of NPS 36 pipeline (Groundbirch Mainline Loop)

For detailed pipeline route maps, see Appendix 15-2.

7.1.1 Pipeline Routing

The Project is located in northwestern Alberta and northeastern British Columbia. It will involve construction through various terrain types, including agricultural land, rolling hills, treed areas and various water crossings.

NGTL has continued to refine the proposed route for the Project since Q3 2014, based on the route selection criteria below, preliminary constructability assessments and environmental considerations. Feedback from Aboriginal groups, stakeholders and government agencies was also used to select the proposed route. The current pipeline route will be subject to further refinement based on final detailed design and supplemental field studies.

Appendix 7-1 and Appendix 7-2 depict the main route alternatives considered for each pipeline section.

7.1.2 Route Selection Criteria

During the route selection process, NGTL considered and balanced, to the extent possible and where practicable, the following criteria:

- paralleling existing linear disturbances
- reducing potential fragmentation of wildlife habitat
- optimizing the use of TWS on existing ROW or other existing disturbances
- reducing the amount of new (non-parallel) ROW required
- reducing the development of new access into remote areas
- reducing the number and complexity of watercourse crossings

- avoiding or reducing effects on identified environmentally sensitive areas (e.g., wetlands)
- avoiding or minimizing routing through areas of unstable terrain
- avoiding lands of designated status such as parks, cemeteries, reserves under the *Indian Act* and known historic sites
- incorporating input from Aboriginal groups, stakeholders and landowners
- ensuring the facilities are economical to construct and operate
- incorporating input from regulatory agencies
- reducing the number of road crossings, particularly of highways and paved roads
- ensuring construction feasibility of watercourse, rail and road crossings along the selected route
- optimally locating the pipeline corridor in producing areas to maximize potential for future connections

For a review of the route selection criteria and routing alternatives considered, see Sections 2.2 and 2.3 of the ESA.

7.1.3 Project Component Tie-Ins and Routing

Groundbirch Mainline Loop

The proposed Groundbirch Mainline Loop includes a pipeline that parallels the existing NGTL Groundbirch Mainline ROW to the greatest extent possible. The Loop originates at the existing Gordondale Receipt Meter Station in SE 12-79-12 W6M and terminates at a proposed valve site in NE 27-78-17 W6M. The proposed Loop will tie into:

- an existing valve site in NW 36-78-14 W6M
- the approved (but not yet constructed) Groundbirch Compressor Station in SW 35-78-16 W6M
- existing meter station sites, the Tremblay, Tremblay No. 2, and Tremblay No. 3 Receipt Meter Stations in NE 27-78-17 W6M
- the existing Groundbirch Mainline and the proposed Tower Lake Section through a series of direct crossovers

The proposed loop pipeline route crosses several named watercourses, including Pouce Coupé River, Sergeant Creek and McQueen Creek.

This Project component is intended to create a loop of an existing NGTL pipeline, and the route selection is based on the alignment of the existing pipeline.

However, some route deviations from the alignment with the Groundbirch Mainline were necessary to accommodate:

- existing third-party dispositions
- feedback from landowners
- constructability
- adequate spacing to assemble HDD drag sections in the ROW

For the approximate lengths of both parallel and new ROW, see Table 7-1.

Tower Lake Section

The proposed Tower Lake Section is an approximately 32 km pipeline that will begin at a proposed valve site, connecting to the proposed Groundbirch Mainline Loop in NE 27-78-17 W6M and extending north to tie into the proposed Dawson Creek North and Dawson Creek North No. 2 Receipt Meter Stations, and then terminating at the proposed Tower Lake Receipt Meter Station. The pipeline will parallel third-party disturbances (existing or proposed) where possible. The proposed pipeline route crosses several named watercourses, including the Kiskatinaw River and Coal Creek.

Route selection on the Tower Lake Section focused on minimizing disturbance by paralleling existing infrastructure (e.g., pipeline corridors). Route deviations were necessary to minimize congestion and conflicts with existing or proposed third-party infrastructure. Deviations were also caused by landowner feedback, constructability concerns and spatial requirements associated with HDD crossings.

For the approximate lengths of both parallel and new ROW, see Table 7-1.

Table 7-1: Pipeline Section Parallel and New ROW

Project Component	Feature (Pipeline/Road)	Approximate Parallel ROW^{1,2} (km)	Approximate New ROW² (km)
Groundbirch Mainline Loop	Pipeline	46	–
	Roads and other ³	1	–
	New Cut	–	8
Tower Lake Section	Pipeline	22	–
	Roads and other ³	minimal	–
	New Cut	–	10
Note: 1. Pipelines paralleled include existing NGTL pipelines as well as existing and proposed foreign pipelines. 2. Lengths are approximate and are subject to change based on detailed design. 3. Miscellaneous dispositions such as seismic lines, transmission lines, other existing and proposed dispositions.			

7.2 ENGINEERING DESIGN STANDARDS

The Project will be designed, constructed and operated in accordance with CSA Z662-15, the OPR and TransCanada specifications listed in Section 7.2.2.

7.2.1 Industry Standards

The Project will be designed, constructed and operated in accordance with the provisions of the OPR, and industry standards listed in Table 7-2.

Table 7-2: Industry Standards for Pipeline and Facilities

Standard ^{1,2}	Title
Canadian Gas Association (CGA) OCC-1-2013 (June 2013)	<i>Recommended Practice, Control of External Corrosion on Buried or Submerged Metallic Piping Systems</i>
CSA Z662-15	<i>Oil and Gas Pipeline Systems</i>
CSA Z245.1-14(9th edition)	<i>Steel Pipe</i>
CSA Z245.11-13 (7th edition)	<i>Steel Fittings</i>
CSA Z245.12-13 (7th edition)	<i>Steel Flanges</i>
CSA Z245.15-13 (8th edition)	<i>Steel Valves</i>
CSA Z245.20-14 (7th edition)/Z245.21-14	<i>External Fusion Bond Epoxy Coating for Steel Pipe/ External Polyethylene Coating for Pipe</i>
CSA S16-14 (8th edition)	<i>Steel Structures</i>
CSA A23.3-14 (12th edition)	<i>Design of Concrete Structures</i>
CSA G40.20-13/G40.21-13	<i>Structural Quality Steel</i>
CSA A23.1-14	<i>Concrete Materials and Methods of Concrete Construction</i>
CSA A23.2-14	<i>Test Methods and Standard Practices for Concrete</i>
CGA OCC-1-2013	<i>Recommended Practice, Corrosion Control for Buried or Submerged Metallic Piping Systems</i>
CSA 22.1-12	<i>Canadian Electrical Code Part I and II, Safety Standard for Electrical Installation</i>

Note:

1. The standards in this table are current to September 1, 2015.
2. The CSA standards in this table often incorporate other CSA standards and publications from other organizations, e.g., American Society of Mechanical Engineers (ASME), American Society for Testing and Materials (ASTM), American Petroleum Institute (API), International Organization for Standardization (IOS), Canadian General Best Standards Board (CGSB), National Association of Corrosion Engineers (NACE), Steel Structures Painting Council (SSPC), and Manufacturers Standardization Society (MSS).

7.2.2 TransCanada Specifications

The Project will be designed, constructed and operated in accordance with TransCanada specifications listed in Table 7-3. All TransCanada specifications comply with the OPR and industry codes and standards.

The specifications listed are subject to change as Project planning progresses through detailed design and as individual specifications are added, updated or replaced to incorporate legislative and regulatory changes, and technological advances.

TransCanada has established internal processes that monitor external and internal standards, codes, specifications and procedures to ensure its facilities are constructed and operated in compliance with industry standards.

Where there is no existing Canadian standard that applies to the product, equipment or facility, TransCanada bases the internal specifications on recognized industry standards such as API, ASTM or ASME. If discrepancies exist between TransCanada and industry standards, the more stringent requirements will be followed.

Table 7-3: Preliminary List of Company Specifications and Standards

Title		Effective Date	Rev No.	EDMS No.
Cathodic Protection				
TED-CP-DD	<i>Cathodic Protection Design</i>	13-Feb-15	3	3746511
TES-CP-COM	<i>Cathodic Protection Commissioning</i>	30-Jan-15	1	6878838
TES-CP-CR	<i>Cathodic Protection Criteria Specification</i>	26-Sept-14	6	3678793
TES-CP-CS	<i>Cathodic Protection Construction Specification</i>	12-Sept-14	7	3670955
TES-CP-FRGN	<i>Foreign Crossing Cathodic Protection Requirements</i>	27-Nov-14	4	3840655
TES-CP-IV	<i>Mitigation of Induced AC Voltage Effects</i>	8-Jan-13	3	3671383
TES-CP-MS	<i>Cathodic Protection Materials Specification</i>	10-Nov-14	7	3670944
TES-CP-ITP	<i>Corrosion Prevention Inspection Test Plan Specification</i>	23-Feb-2015	01	6792321
Coating				
TES-COAT-CAD	<i>Coating Application Procedure for Application of Thermite Weld Coating</i>	30-May-13	3	3672126
TES-COAT-EP	<i>External Polyethylene Coating for Pipe</i>	31-Jan-11	3	3678529
TES-COAT-EPU	<i>External Liquid Coating Systems for Below-Ground Facilities</i>	1-Aug-13	11	3671710
TES-COAT-FBE	<i>External Fusion Bond Epoxy for Steel Pipe</i>	3-Mar-15	7	3670892
TES-COAT-HSS	<i>Heat Shrink Sleeve Installation</i>	3-Oct-13	3	3735848
TES-COAT-INT	<i>Internal Coating of Line Pipe For Non-Corrosive Gas Transmission Service</i>	30-Sep-12	5	0006282
TES-COAT-P1	<i>Paint Systems for Above-Ground Facilities (Non-Coastal)</i>	22-May-14	8	3694704

Table 7-3: Preliminary List of Company Specifications and Standards (cont'd)

Title		Effective Date	Rev No.	EDMS No.
TES-COAT-PET	<i>Coating Application Procedure for Petrolatum Coating</i>	28-Feb-13	2	0007756
TEP-COAT-ABR	<i>External Liquid Coating Systems for Abrasive Conditions</i>	28-Feb-13	4	3764914
Materials				
TES-FITG-CIF	<i>Specification for Contoured Insert Fittings</i>	15-Oct-14	3	4424021
TES-FITG-EC1	<i>Specification for End Closures</i>	23-Mar-13	2	3779256
TES-FITG-LD	<i>Specification for High Yield Carbon Steel Buttwelding Fittings</i>	6-Dec-10	4	3671270
TES-FITG-SAD	<i>Full Encirclement Reinforcing Saddle Specification</i>	14-Oct-14	4	3779258
TES-PIPE-EW	<i>Specification for Electric Welded Pipe</i>	22-Mar-13	3	3670788
TED-MECH-VENT	<i>Directive for Blowdown Sizing for Pipeline Venting</i>	9-Dec-14	0	8174962
TES-FITG-T01	<i>Instrument Tube Fitting, Instrument Pipe Fitting and Tubing Material Specification</i>	11-Sep-13	6	3697116
TES-FLGE-LD	<i>Specification for High Yield Carbon Steel Butt Welded Flanges</i>	16-Oct-14	5	3671966
TES-MATL-COMP	<i>Specification for the Materials Requirements of Pressure Containing Equipment Components</i>	8-Jan-14	0	8071725
TES-MATL-MD1	<i>Piping System Materials for Pipeline, Compression and Metering Facilities</i>	30-Dec-02	0	3764909
TES-PIPE-SAW	<i>Specification for Double Submerged Arc Welded Pipe</i>	22-Mar-13	2	3776714
TES-VALV-LD-G	<i>Specification for Steel Valves for Gas Services</i>	8-Dec-14	0	8820778
Mechanical				
TED-MECH-WT	<i>Determining Pipe Wall Thickness and Material Grade for Gas/Liquid Pipelines and Pipeline Facilities</i>	17-Apr-13	0	7912051
TED-INT-LR	<i>Launcher and Receiver Installation and Initial Assessment Technical Directive (CDN-US-MEX)</i>	12-Jan-15	1	8098412
TEP-MECH-TRAN	<i>Selection of Transition Pieces and Joining Methods</i>	24-Apr-14	3	0006256
TEP-MECH-VENT	<i>Blowdown Sizing for Pipeline Venting Times for Pipelines</i>	9-Dec-14	2	0006191
TEP-MECH-WT	<i>Determining Pipe Wall Thickness and Material Grade for Gas/Liquid Pipelines and Pipeline Facilities</i>	20-Mar-14	3	0006190
TEP-VALV-FAB	<i>Procedure for Supplemental Preparation During Valve Fabrication</i>	19-Apr-13	1	5741242
TEP-VOPR-GH	<i>Gas Hydraulic Valve Operator Control Packages and Functional Applications</i>	28-Mar-00	2	3671367
TEP-PRES-TH	<i>Test Head Management Procedure (CDN)</i>	13-Jan-14	4	3671274

Table 7-3: Preliminary List of Company Specifications and Standards (cont'd)

	Title	Effective Date	Rev No.	EDMS No.
TES-PRES-TH	<i>Design of Pipeline Test Head Assemblies</i>	27-Mar-13	2	3670482
TES-MECH-FBT	<i>Specification for Flange Assembly</i>	9-Jul-12	2	6489784
TED-MECH-VS-GAS	<i>Gas Valve Spacing Directive (US-CDN-MEX)</i>	21-Jul-14	0	8689164
TES-VOPR-GH	<i>Gas Hydraulic Valve Operators</i>	24-Nov-99	0	3671784
Stress Analysis and Buoyancy Control				
TES-BUOY-CON	<i>Construction and Installation of Buoyancy Control</i>	21-Jan-13	1	6416227
TES-STRS-BUOY	<i>Design of Buoyancy Control Measures for Pipelines</i>	20-Feb-13	3	3671271
TES-STRS-GPAS	<i>Pipe Stress Engineering Analysis for Gas Pipeline Assemblies</i>	6-Feb-13	0	7808806
Civil / Structural				
TES-DV05-1213	<i>Structural Steel</i>	15-Jul-09	2	0006488
TES-DV05-5000	<i>Miscellaneous Metals</i>	15-Jul-09	0	0006491
TES-DV31-2333	<i>Excavating, Backfilling and Site Grading</i>	7-Apr-14	2	0006457
TES-DV31-6216	<i>Driven Steel Piles</i>	15-Jun-10	1	0006459
TES-DV32-3115	<i>Portable Chain Link Fence</i>	28-Feb-11	1	3744430
Construction				
TES-PROJ-COM	<i>Compaction Control Measures</i>	8-Apr-11	1	5974567
TES-PROJ-BLT	<i>Blasting Specification</i>	30-Dec-02	0	3672450
TES-PROJ-EXC	<i>Excavation Specification</i>	14-Jan-11	1	5890120
TES-PROJ-HDD	<i>Horizontal Directional Drilling Specifications</i>	12/11/2014	1	6278794
TES-PROJ-PCS	<i>Pipeline Construction Specification</i>	26-Jun-14	3	3745282
TES-ILI-DEF-GAS	<i>Specification for Deformation In-Line Inspection Technologies</i>	13-May-14	1	6980231
TES-PROJ-ROW	<i>Right-of-Way Specification</i>	19-Jan-15	1	6363243
TES-PROJ-STK	<i>Temporary Stockpiling of Steel Pipe</i>	15-Mar-10	0	5415573
TOP	<i>Flange Bolt Tightening Procedures</i>	25-Sep-13	7	3863194
Welding				
TEP-WELD-ABR	<i>Removal of Arc Burns</i>	15-Feb-12	2	3670959
TEP-WELD-CLOS	<i>Closure Weld Procedure</i>	11-Jan-10	2	3670675
TEP-WELD-DEMAG	<i>Demagnetization of Pipe Ends in Preparation for a Tie-in Weld</i>	11-May-12	2	5876519
TES-WELD-AS	<i>Welding of Assemblies and Station Piping</i>	25-Sep-14	4	3670962
TES-WELD-BC	<i>Specification for Welding on In-service Pipelines</i>	16-Jul-12	2	3886791
TES-WELD-PL	<i>Welding of Pipelines and Tie-ins</i>	6-Jan-12	4	3670960
TES-WELD-STRU	<i>Welding Procedure Specification for Shielded Metal Arc Welding on Structural Steel</i>	13-May-14	3	3696371

Table 7-3: Preliminary List of Company Specifications and Standards (cont'd)

Title		Effective Date	Rev No.	EDMS No.
Nondestructive Examination				
TEP-NDT-ADT	<i>Procedure for Nondestructive Examination (NDE) Audits</i>	22-Oct-13	1	3797402
TES-NDT-MT	<i>Magnetic Particle Inspection Specification</i>	23-Aug-13	1	7610003
TES-NDT-RT	<i>Radiographic Examination of Welds</i>	13-Mar-12	5	3671368
TES-NDT-UT1	<i>Mechanized Ultrasonic Examination of Pipeline Girth Welds</i>	13-Mar-12	3	3670963
TES-NDT-UT2	<i>Manual Ultrasonic Examination of Welds</i>	12-Apr-15	3	3670958
Hydrostatic Testing				
TES-HYDRO-CDN	<i>Hydrostatic Testing Specification</i>	22-Oct-13	1	7591539
Note: 1. The specifications in this table are current to May 6, 2015.				

7.2.3 Quality Management Program

TransCanada has developed and implemented a Quality Management System based on the International Organization for Standardization (ISO) 9000 standard, which defines the processes used to control and monitor quality throughout the life cycle of a project. This includes a project execution plan, quality management plan and other relevant documents, procedures, work instructions, forms, templates and associated records identified by the processes as requiring control.

Quality management ensures a consistent quality approach in design, procurement of materials and services, and construction of pipeline projects. The quality objectives established for this Project are as follows:

- engineering designs are clearly documented, consistent with acceptable design standards in accordance with operating performance requirements
- all work complies with applicable acts, regulations, statutes, permitting requirements and generally accepted engineering practices
- equipment and materials procured and installed are consistent with the engineering design
- documentation providing objective evidence of conformance to the requirements is maintained and records retained

To comply with TransCanada's proprietary quality management system and the requirements specified by the NEB where appropriate, TransCanada will provide technical oversight for pipeline engineering and technical activities, and will also ensure coordination with prime contractors and other third-party engineering consultants to ensure that TransCanada's engineering specifications and project requirements are met.

All purchased items and contracted services will be obtained from suppliers and contractors of assessed capabilities who have been pre-qualified in accordance with TransCanada's internal supplier management and pre-qualification procedures or have been pre-qualified by a prime contractor to TransCanada. Documentation received for each purchase will be recorded and reviewed by the applicable subject matter expert to ensure it meets project requirements. Evidence of this review will be retained as part of the permanent project records.

During construction, each prime contractor will be responsible for ensuring the work performed is in accordance with contract documents, Project design, applicable standards, specifications and procedures, and the Project-specific quality plan. TransCanada inspectors will monitor all construction activities to ensure compliance.

Design changes during construction will be managed in accordance with the appropriate change management procedures and in accordance with TransCanada's standard engineering practices. Supplier surveillance will be in accordance with the approved quality plan and Inspection and Test Plan (ITP), which defines the levels of inspection required based on the criticality of materials/equipment purchased. The quality plan/ITP will define the applicable material/equipment specification surveillance checklists to be used for surveillance activities. Before purchase order execution, NGTL will identify the preferred inspection agency, and as necessary, the qualified company representative to conduct the inspection.

7.2.4 Pipe Procurement

TransCanada has an established line pipe supply base with more than 20 pre-qualified mills in North America and overseas. TransCanada has pre-qualified the pipe mills and coating plants based on technical merit. TransCanada procures line pipe manufactured under line pipe and coatings specifications developed over 50 years and which meet or exceed API or CSA requirements. Pipe procurement is complemented with technical pre-production meetings and an onsite quality surveillance program during pipe manufacturing and coating application.

7.3 GAS TYPE AND COMPOSITION

The expected composition of the natural gas to be transported by the Project meets the Tariff. See Table 7-4 and Table 7-5 for composite average values of the composition of the gas expected to flow through the Project.

Table 7-4: Groundbirch Mainline Loop Typical Composition of Gas

Compound	Formula	%
Inert Gas (Helium and Nitrogen)	He/N ₂	0.22
Carbon Dioxide	CO ₂	0.42
Methane	C1	90.98
Ethane	C2	6.36
Propane	C3	1.45
iso-butane	C4I	0.25
n-butane	C4N	0.23
iso-pentane	C5I	0.05
n-pentane	C5N	0.03
Hexanes Plus	C6N	0.01
Total		100.00

Table 7-5: Tower Lake Section Typical Composition of Gas

Compound	Formula	%
Inert Gas (Helium and Nitrogen)	He/N ₂	0.31
Carbon Dioxide	CO ₂	0.15
Methane	C1	86.51
Ethane	C2	10.71
Propane	C3	1.97
iso-butane	C4I	0.13
n-butane	C4N	0.18
iso-pentane	C5I	0.02
n-pentane	C5N	0.01
n-hexane	C6N	0.00
n-heptane	C7N	0.00
n-octane	C8N	0.00
Total		100.00

7.4 PIPELINE SECTION COMPONENTS

Project pipeline components include pipeline, valves, launcher and receiver sites, CP facilities, and communications and controls equipment, as required. For an overview of the Tower Lake Section and Groundbirch Mainline Loop, see Table 7-6.

For the process flow diagrams for the Project, see Appendix 7-3 to Appendix 7-6. The diagrams show the major components, including interconnections to existing pipelines and facilities, piping, valves, launcher and receiver sites, meter stations and

compressor stations. For the estimated pipe specifications for the Project, see Table 7-7.

Table 7-6: Pipeline Description

Pipeline Section	Class Location ¹	NPS	Pipe Diameter (mm)	Approximate Pipe Length (km)	Maximum Operating Pressure (kPa)
Groundbirch Mainline Loop	Class 1/Class 2	36	914	55	9930
Tower Lake Section	Class 1/Class 2	30	762	32	9930
Note:					
1. Final class location determination will be completed during detailed design.					

Table 7-7: Preliminary Line Pipe Lengths by Wall Thickness

Province	Pipeline Section ¹	Estimated Length ² (m)	Pipe Diameter (mm)	Material Grade (MPa)	Wall Thickness (mm)
Groundbirch Mainline Loop					
British Columbia	Class 1 line pipe	30,600	914	483	12.7
	Class 1 heavy wall pipe	995	914	483	15.9
	Class 2 line pipe	2730	914	483	13.3
	Class 2 heavy wall pipe	70	914	483	18.8
	HDD pipe	2140	914	483	22.2
Alberta	Class 1 line pipe	17,260	914	483	12.7
	Class 1 heavy wall pipe	1090	914	483	15.9
	Class 2 line pipe	410	914	483	13.3
Tower Lake Section					
British Columbia	Class 1 line pipe	27,030	762	483	10.0
	Class 1 heavy wall pipe	1070	762	483	13.3
	Class 2 line pipe	1600	762	483	10.9
	Class 2 heavy wall pipe	80	762	483	15.9
	HDD pipe	2120	762	483	18.8
Note:					
1. Final selection of materials for valves, fittings and assembly piping will be determined during detailed design in accordance with TransCanada specifications. Material grade will meet or exceed minimum requirements. Other CSA Z662-15-compliant or higher grades of steel could be used depending on material availability and in accordance with TransCanada specifications. All values, including but not limited to pressure, length, grade, coating and wall thickness, are based on preliminary design and are subject to change.					
2. Lengths are approximate and are subject to change based on detailed design.					

7.4.1 Valve Locations

Valve locations are typically positioned near existing facilities or near roadways where existing access is possible. For preliminary valve locations, see Table 7-8 and Table 7-9. Valve locations will be finalized in the detailed design phase to optimize the location based on accessibility and areas used for pre-existing facilities. Mainline block valve spacing will adhere to TransCanada specifications and CSA Z662-15.

Table 7-8: Groundbirch Mainline Loop Preliminary Mainline Block and Crossover Valve Locations

Valve Type	Approximate KP ¹	Approximate Easting	Approximate Northing	LSD
One NPS 36 mainline block valve assembly with two NPS 24 crossover valves to the existing Groundbirch Mainline	0.0	328689 ²	6190038 ²	SE 12-79-12 W6M
One NPS 36 mainline block valve assembly with two NPS 24 crossover valves to the existing Groundbirch Mainline	22	685327 ³	6188371 ³	NW 36-78-14 W6M
One NPS 36 mainline block valve with two NPS 36 crossover valves to the approved Groundbirch Compressor Station	44	664741 ³	6187242 ³	SW 35-78-16 W6M
One NPS 36 mainline block valve assembly with one NPS 24 crossover valve to the existing Groundbirch Mainline	54	654507 ³	6185311 ³	NE 27-78-17 W6M
Two NPS 8 and one NPS 6 crossover valves to the existing Tremblay Receipt No. 1, No. 2 and No. 3 Meter Stations	56	654466 ³	6185311 ³	NE 27-78-17 W6M
One NPS 24 crossover assembly	55	654171 ³	6185319 ³	NE 27-78-17 W6M
Note: 1. Locations are approximate and are subject to change based on detailed design. 2. Coordinates are in UTM zone 10U. 3. Coordinates are in UTM zone 11U.				

Table 7-9: Tower Lake Section Preliminary Mainline Block and Crossover Valve Locations

Valve Type	Approximate KP	Approximate Easting	Approximate Northing	LSD
One NPS 30 mainline block valve assembly connecting to the proposed Groundbirch Mainline Loop and one NPS 24 side valve assembly	0.0	654117 ³	6185372 ³	NE 27-78-17 W6M
One NPS 24 side valve assembly to the proposed Dawson Creek North and Dawson Creek North No. 2 Receipt Meter Stations	12	652674 ³	6194932 ³	SE 27-79-17 W6M
One NPS 24 side valve assembly to the proposed Tower Lake Receipt Meter Station	32	645820 ³	6208559 ³	SW 07-81-17 W6M
<p>Note:</p> <p>1. Locations are approximate and are subject to change based on detailed design.</p> <p>2. Coordinates are in UTM zone 10U.</p> <p>3. Coordinates are in UTM zone 11U.</p>				

7.4.2 Minimum Depth of Cover

The pipeline will maintain a minimum depth of cover of 0.9 m. Depth of cover will increase in the following circumstances:

- agricultural lands will have a minimum depth of cover of 1.2 m
- valve site locations will have a minimum depth of cover of 1.1 m
- road crossings will have a minimum depth of cover of 1.5 m or as agreed to with the relevant statutory authority or third-party owner, whichever is greater
- buried utility and foreign pipeline crossings, above or below the pipeline, will have a minimum clearance of 0.3 m or as agreed to with the third-party owner, whichever is greater
- watercourse crossings with defined beds and banks will have a minimum depth of cover of 1.8 m; increased depth of cover might be required at locations where there is the potential for bed scour (the need for increased depth of cover will be determined as engineering design and construction planning progress)

For typical depth of cover drawings and typical engineering drawings, see Appendix 7-7, which includes:

- minimum requirements for pipe ditches
- foreign pipeline and utility crossings
- road crossings
- watercourse crossings

7.5 PIPELINE CORROSION CONTROL ELEMENTS AND FACILITIES

7.5.1 Pipe Coatings

The primary coating for the external surface of the below-ground pipe will be fusion-bonded epoxy (FBE). Field girth welds will be protected with a liquid-applied coating.

An additional mechanical protection system, such as sand padding or rock shield, will be used if large and/or angular backfill material is encountered. Abrasion-resistant coating will be used where pipe is installed using boring, HDD or other methods that could cause abrasion to the coating during installation.

Below-ground assembly piping will be protected with a liquid-applied coating. Above-ground piping will be primed and painted.

7.5.2 Cathodic Protection

In addition to the pipe coating, CP will be provided through impressed current CP systems. The system may utilize existing CP systems as well as new CP systems if required, and may include groundbeds and rectifiers as determined during detailed design.

Where practicable, the rectifiers and groundbeds will be located at sites where a convenient source of electrical power exists. Sacrificial anodes may also be used at specific locations, which will be identified during detailed design.

CP test points will be installed, where required, along the pipeline and at road, foreign pipeline and utility crossings. This will allow the effectiveness of the operation of the CP system to be monitored through operations and demonstrates compliance to applicable code requirements.

7.5.3 Launcher and Receiver Facilities

NGTL will install launchers and receivers on the pipeline sections for the purpose of In-Line Inspection (ILI) during pipeline operation. For facility specifications on launcher and receiver facilities for ILI of Project pipeline sections, see Table 7-10. For typical launcher/receiver designs, see Appendix 7-8.

Table 7-10: ILI Facilities Specifications

Item	Pipe	Barrel Piping
Groundbirch Mainline Loop		
Pipe Outside Diameter	NPS 36 (914 mm)	NPS 42 (1067 mm)
Pipe Material Type and Grade	Grade 483 (per TES-PIPE-SAW)	Grade 483 (per TES-PIPE-SAW)
Pipe Wall Thickness	19.7 mm	23.0 mm
Maximum Operating Pressure	9930 kPa	
Pig Trap Locations	Launcher – SE 12-79-12 W6M	
	Receiver – NE 27-78-17 W6M	
Pig Trap Pressure Rating	PN 100 (9930 kPa)	
Description of Pig Trap Closure Device	End Closure, Horizontal, NPS 42, PN 100, M45C, To Match 23.0 mm Wall Thickness, Grade 483	
Description of Corrosion Control Elements and Facilities	Launcher and receiver facilities are located above-ground and will be primed and painted to prevent atmospheric corrosion.	
Tower Lake Section		
Pipe Outside Diameter	NPS 30 (762 mm)	NPS 36 (914 mm)
Pipe Material Type and Grade	Grade 483 (per TES-PIPE-SAW)	Grade 483 (per TES-PIPE-SAW)
Pipe Wall Thickness	16.4 mm	19.7 mm
Maximum Operating Pressure	9930 kPa	
Pig Trap Locations	Launcher – SW 07-81-17 W6M	
	Receiver – NE 27-78-17 W6M	
Pig Trap Pressure Rating	PN 100 (9930 kPa)	
Description of Pig Trap Closure Device	End Closure, Horizontal, NPS 36, PN 100, M45C, To Match 19.7 mm Wall Thickness, Grade 483	
Description of Corrosion Control Elements and Facilities	Launcher facilities are located above-ground and will be primed and painted to prevent atmospheric corrosion.	
Note: 1. ILI facility specifications are preliminary and will be confirmed during detailed design.		

7.5.4 Overpressure Protection

The Pressure Control and Overpressure Protection (OPP) design of the Project will comply with the requirements of CSA Z662-15, including Clause 4.18: Pressure Control and Overpressure Protection (OPP) of Piping, and Clause 10.9.5: Pressure Control, Pressure Limiting and Pressure Relieving Systems. TransCanada's OPP design and operating philosophies also meet the intent and purpose of NEB Safety Advisory SA 2012-01.

NGTL ensures that maintenance programs and their frequency meet the requirements of CSA Z662-15. NGTL also has the ability to audit customers' maintenance records and conduct site visits, if necessary, to confirm compliance. In addition, the pressure

control and OPP systems operate and monitor independently, and automatically and continuously.

The maximum operating pressure (MOP) for all Project components is 9930 kPa. The MOP of the existing NGTL System will not increase because of the Project.

Groundbirch Mainline Loop

The MOP/design pressure (9930 kPa) of the Groundbirch Mainline Loop is consistent with the existing Groundbirch Mainline and all pipeline systems it directly connects to. No new pressure sources will be created with the addition of this proposed pipeline section.

The primary pressure sources of the Groundbirch Mainline Loop are the approved Groundbirch Compressor Station (MOP of 9930 kPa) and existing Saddle Hills Compressor Station (MOP of 9930 kPa), both of which have pressure control and OPP systems that meet CSA Z662-15 standards.

All pressure sources in the area have been identified and considered, and have OPP systems that meet the design operating and testing requirements of CSA Z662-15.

Tower Lake Section

The MOP/design pressure (9930 kPa) of the Tower Lake Section is consistent with the facilities to which it connects. No new pressure sources will be created with the addition of this proposed pipeline section.

The primary source of pressure on Tower Lake Section is the proposed Tower Lake, Dawson Creek North and Dawson Creek North No. 2 Receipt Meter Stations, which rely on the upstream customer to provide pressure control and OPP. For more information on meter station pressure control and OPP, see Section 9.2.5.

7.5.5 Pipeline Integrity

When designing facilities, NGTL considers nine potential operational pipeline integrity threat categories, separated into three groups. During operations, these threats are managed through TransCanada's Integrity Management Program (IMP). The nine threat categories are as follows:

1. time-dependent threats:
 - a. external corrosion
 - b. internal corrosion
 - c. stress corrosion cracking

2. static or resident threats:
 - a. manufacturing-related defects
 - b. welding or fabrication related
 - c. equipment failures
3. time-independent threats:
 - a. mechanical damage
 - b. incorrect operations
 - c. weather-related and outside forces

During the hazard identification process, a qualitative assessment of potential threats is completed using the design basis and route selection criteria. Potential Project-specific issues identified for threat management are used to develop recommendations for design, construction and operations.

NGTL's Pipe Integrity group is involved with the Project during route selection, detailed design, fabrication, construction and pre-commissioning of the pipeline, and provides input for mitigation of integrity concerns. This process allows operational management and performance experience to be incorporated in the early stages of the Project.

Specific threat management measures to be employed on the Project include:

- permanent launcher and receiver facilities will be installed to allow ILI of the pipeline during operations
- a high-resolution caliper ILI tool will be used during Project pre-commissioning to inspect for dents or ovalities
- above-ground cathodic protection surveys may be employed to identify areas of pipe coating damage
- baseline magnetic flux leakage (MFL) and high-resolution caliper ILI will be performed in the first year of operation, after which the pipeline will be managed according to the IMP

Before Project turnover to operations, the threat identification will be updated to incorporate Project development data. The updated threat identification will provide input for integration of the asset in the IMP.

7.6 TERRAIN – GEOHAZARD, GEOTECHNICAL AND HYDROTECHNICAL ASSESSMENTS

Preliminary terrain analysis for the Project involved desktop mapping of terrain features. This mapping process then feeds into field-based geohazard, geotechnical and hydrotechnical assessments, which are conducted along the alignment of the pipeline.

The desktop mapping was based on mapping collected from various sources, including LiDAR, satellite imagery and published surficial geology maps. The mapping process involves delineation of areas of the ground with a defined depositional environment and/or geomorphological process. After delineation, a terrain unit that describes the primary expected geological deposit at and below the surface is then assigned to each approximate delineated area. To verify information from desktop mapping, a field program was completed between Q4 2014 and Q1 2015.

For confirmation from a qualified professional engineer that the Project has been, and continues to be, assessed and designed for the potential effects of those conditions not specifically addressed in CSA Z662-15, see Appendix 7-9.

7.6.1 Muskeg and Organics

During desktop mapping, potential areas of organic and muskeg deposits, general soil units and drainage conditions were identified. Subsequent field investigations in 2014 and 2015 included hand auger sample collection and laboratory testing, which provided more detailed information about the thickness and lateral extent of organic/muskeg deposits along the pipeline route.

This information will be used to develop mitigation measures that will be implemented in locations along the pipeline route where these conditions exist. This information will also be used to develop the requirements for buoyancy control along the pipeline route.

Detailed buoyancy-control requirements for the pipeline section will be determined during the detailed engineering design phase. NGTL expects that standard buoyancy-control measures will be used for the Project. Potential buoyancy-control measures include:

- continuous concrete coating
- swamp (saddle) weights
- river (bolt-on) weights
- screw anchors

7.6.2 Geohazard Assessment

An initial geohazard assessment was completed by Golder in Q4 2014. A focused geohazard assessment to obtain information on specific areas of potential concern along the route was completed in Q3 2015. Geohazards evaluated in both assessments included locations of potential landslides, seismic activity, liquefaction, debris flow, fluvial scour and significant slopes. Site-specific geohazard mitigation will be incorporated along the ROW based on the results of these assessments.

Where required, mitigation measures for design and construction can include:

- micro re-routes to avoid unstable slopes
- detailed geotechnical investigation to understand the nature of instability if it is not possible to avoid the area
- implementation of slope stabilization measures, including horizontal drains and/or toe buttress, where applicable
- implementation of erosion protection measures, particularly in toe areas of watercourse crossings
- diligent effort during construction to avoid reactivating old slides
- selection of heavy wall pipe to accommodate additional strains potentially induced by slides where they cannot be avoided
- selection of low-friction backfill, where required and applicable, to minimize the impact of potential hill slides
- selection of reduced depth of cover to minimize the impact of potential slides and to facilitate strain relief if necessary

If required during operations, mitigation measures can include:

- detailed geotechnical investigation and engineering assessment to understand the nature of the slides and their potential impact on pipe integrity
- monitoring ground movement and/or pipe strains during pipeline operation
- assessment of pipeline deformation using ILI data
- implementation of slope stabilization measures, including horizontal drains and/or toe buttress, where applicable
- strain relief, where necessary
- pipe realignment, including placing pipeline on surface with mechanisms to accommodate ground sliding

7.6.3 Geotechnical and Hydrotechnical Assessments

Geotechnical and hydrotechnical assessments were completed by Golder from Q2 2014 through Q2 2015. The geotechnical and hydrotechnical assessments focus on the following key design issues:

- history of landslides and the potential for reactivation of old slides along the route based on soil type and subsoil conditions
- areas of potential stress concentrations, such as thick organic deposits
- scour and erosion potential at watercourse crossings
- subsurface conditions for watercourse crossings using trenchless methods

Geotechnical assessments have included a determination of the stratigraphy and its variation at the proposed trenchless watercourse crossing sites (in particular, the existence of gravel and cobble layers in the drill path). Important factors also include fracture characteristics in bedrock, potential underground cavities and significant changes in boundaries of subsurface units. For preliminary findings of subsurface conditions at the HDD crossings, see the preliminary HDD feasibility studies in Appendix 8-2 to Appendix 8-5.

7.6.4 Pipeline Watercourse Crossings

Watercourse crossings are identified through a desktop review and confirmed by field surveys. Five named watercourse crossings have been identified. For the locations of named watercourse crossings traversed by the Project pipeline sections, see Table 7-11.

Based on hydrotechnical assessment and HDD feasibility studies (see Appendix 8-2 to Appendix 8-5), the Project has selected preliminary crossing methods. For information on the selection criteria and methods to be used at the crossings identified in Table 7-11, see Section 8.2.14.

Table 7-11: Preliminary Crossing Locations of Named Watercourses

Watercourse Name	Preliminary Location			Preliminary Pipeline Crossing Method	Preliminary Equipment Crossing Method
	Northing	Easting	UTM Zone		
Groundbirch Mainline Loop					
Sergeant Creek	6187360	687852	10	<ul style="list-style-type: none">isolate (if water present)open cut (if dry or frozen to bottom)	Temporary bridge
Pouce Coupe River	6188292	684021	10	<ul style="list-style-type: none">HDD	Temporary access from either side of the crossing
McQueen Creek	6188604	675505	10	<ul style="list-style-type: none">isolate (if water present)open cut (if dry or frozen to bottom)	Temporary bridge
Tower Lake Section					
Kiskatinaw River	6205991	271830	10	<ul style="list-style-type: none">HDD	Temporary access from either side of the crossing
Coal Creek	6194008	653726	10	<ul style="list-style-type: none">isolate (if water present)open cut (if dry or frozen to bottom)	Temporary bridge
	6189962	654122	10		
Note: 1. Locations are preliminary and will be confirmed during detailed design.					

8.0 PIPELINE CONSTRUCTION

This section describes the pipeline construction plans for the Project, including:

- construction procedures and execution
- safety
- quality
- inspection and monitoring
- construction schedule

The information in this section is based on preliminary design. Construction plans will be further developed during detailed design and will incorporate input from the selected construction contractors.

8.1 PIPELINE CONSTRUCTION STRATEGY

The Project could be constructed in up to two construction spreads depending on the availability and capacity of qualified contractors during the required construction period.

If the Project is constructed in two spreads, construction would be broken up as follows:

- Tower Lake Section
- Groundbirch Mainline Loop

A preliminary schedule was determined based on constructability, logistics, terrain characteristics, safety and environmental considerations, as discussed in Section 8.2.

8.1.1 Construction Contracts

Depending on the availability and capacity of qualified construction contractors, up to two prime contractors could be retained for Project construction.

NGTL will award separate contracts for portions of the Project work outside the scope of the prime contractor construction contracts, for activities such as construction surveying, inspection and NDE.

8.2 SECTION 58 ACTIVITIES

Prior to the start of pipeline construction, upon receipt of regulatory approval, NGTL proposes to commence construction of temporary infrastructure required to facilitate Project construction. These temporary facilities will include:

- temporary access
- stockpile sites
- contractor yards

In addition to the temporary construction infrastructure, NGTL also proposes to commence ROW preparation activities at certain locations. ROW preparation activities (not to exceed 40 km in aggregate) include:

- clearing
- stripping/grading

NGTL proposes to conduct this pre-construction work under section 58 of the NEB Act in late Q1 2017, subject to regulatory approval. These activities will focus on areas that require additional preparation, such as horizontal directional drilling (HDD) crossing locations and equipment/material laydown areas.

Further, these activities are requested in order to minimize the risk of incidental take of migratory birds, their nests or eggs, and to minimize construction duration within an area known to restrict activities due to high fire ban rating, while still maintaining the required in-service timeframe.

8.3 CONSTRUCTION SCHEDULE

Pipeline construction activities will progress in a manner that will avoid applicable wildlife timing restrictions, where feasible. Where wildlife timing restrictions cannot be avoided, NGTL will work with the appropriate agencies to develop appropriate mitigation.

For the Project, general pipeline construction activities are expected to begin in Q2 2017. The Project has an anticipated in-service date of November 1, 2017 (Q4 2017).

Construction activities are anticipated to be carried out in both frozen and unfrozen conditions. The timing of final cleanup and reclamation activities will depend on seasonal access to the pipeline ROW and will typically be completed within 12 months of construction. The pipeline ROW will be assessed during spring/summer following construction to evaluate reclamation requirements. For a preliminary construction schedule, see Figure 8-1.

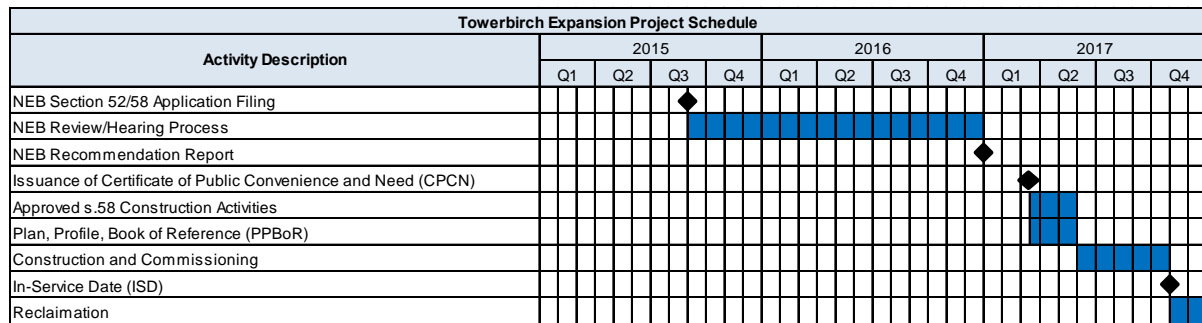


Figure 8-1: Preliminary Pipeline Construction Schedule

8.4 CONSTRUCTION RESOURCES

Construction will require personnel with various skills, ranging from entry-level labourers to highly skilled trades, and include inspection and project management staff. During peak construction periods, the pipeline sections that make up the Project could require an aggregate construction workforce of approximately 700 to 750 workers, as shown in Table 8-1. Additional information is provided in ESA Section 6 and ESA Appendix J.

The demand for personnel and equipment will provide contracting and employment opportunities for qualified local and Aboriginal businesses and individuals.

Table 8-1: Estimated Construction Resources

Project Component	Estimated Peak Workforce (Number of Personnel)	Expected Peak Timeframe
Tower Lake Section*	300	Q2 2017 – Q3 2017
Groundbirch Mainline Loop*	450	Q2 2017 – Q3 2017
Note: *Estimated workforce per section if Project is separated into two spreads.		

8.4.1 Project Workforce Accommodations

NGTL anticipates that pipeline construction personnel will be housed in hotel/rental accommodations in nearby towns and cities. No new project-specific accommodations (i.e., construction camps) will be constructed as part of the Project.

The anticipated work force for the Project will be similar to what was encountered on the existing Groundbirch Mainline, which used hotel/rental accommodations in nearby towns and cities. Further, as peak workforce will be over the summer months, NGTL anticipates recreational vehicle sites and/or campsites/grounds may also be used.

8.5 CONSTRUCTION ACCESS

Construction access is designed to maximize the use of existing public roads as well as privately owned and maintained all-season and seasonal industry roads. New temporary access to the pipeline ROWs will be minimized to the greatest extent possible.

Access to the Project during construction will be primarily by existing roads, including Highway 49 and Highway 97, other existing access roads, industry access roads and the Project ROW. No new permanent access is planned to support Project construction or operations.

Neither highways nor publicly or privately owned all-season roads are expected to require timber or vegetation clearing. At this time, no Project-related upgrades to existing roads are expected.

Access via the Project ROW will be prepared to safely accommodate the movement of construction vehicles and equipment. Ongoing maintenance of the travel lane will be required throughout the construction season.

During construction, vehicles will use existing bridges where available and feasible. In the absence of existing bridges, other techniques will be used to cross watercourses with defined banks that might be located along the ROW. The crossing method will be determined by NGTL and will reflect conditions at the time of construction. Examples of crossing methods include timber mats, culverts and temporary clear-span bridges. For a list of preliminary crossing methods at named watercourse crossings, see Table 7-10 and for the watercourse crossing assessment, see Appendix G of the ESA. For proposed access requirements for the Groundbirch Mainline Loop, see Table 8-2, and for Tower Lake Section access, see Table 8-3.

Table 8-2: Groundbirch Mainline Loop Temporary Access

Preliminary Legal Location	Preliminary Length (m)	Preliminary Width (m)	Road Use Type
Alberta			
NE 1-79-12 W6M	110	10	Temporary
NE 4-79-12 W6M	35	10	Temporary
NE 5-79-12 W6M	45	10	Temporary
SW 1-79-13 W6M	26	10	Temporary
NE 30-78-13 W6M	210	10	Temporary
SE 36-78-14 W6M	30	10	Temporary
NE 30-78-13 W6M	230	10	Temporary

Table 8-2: Groundbirch Mainline Loop Temporary Access (cont'd)

Preliminary Legal Location	Preliminary Length (m)	Preliminary Width (m)	Road Use Type
British Columbia			
NE 34-78-14 W6M	725	10	Temporary
NW 33-78-14 W6M	750	10	Temporary
NE 32-78-14 W6M	1000	10	Temporary
SE 3-79-15 W6M	700	10	Temporary
NW 31-78-15 W6M	125	10	Temporary
NW 36-78-16 W6M	200	10	Temporary
SW 31-78-16 W6M	60	10	Temporary
SE 27-78-17 W6M	230	10	Temporary
NE 27-78-17 W6M	200	10	Temporary
Note: Locations, lengths and widths subject to change pending detailed design.			

Table 8-3: Tower Lake Section Temporary Access

Preliminary Legal Location	Preliminary Length (m)	Preliminary Width (m)	Road Use Type
British Columbia			
NE 34-78-17 W6M	30	10	Temporary
NE 11-79-17 W6M	85	10	Temporary
NE 23-79-17 W6M	270	10	Temporary
NW 23-79-17 W6M	60	10	Temporary
NE 22-79-17 W6M	60	10	Temporary
SE 27-79-17 W6M	60	10	Temporary
SW 03-80-17 W6M	140	10	Temporary
SW 03-80-17 W6M	66	10	Temporary
SW 09-80-17 W6M	400	10	Temporary
SW 18-80-17 W6M	800	10	Temporary
NW 24-80-18 W6M	400	10	Temporary
NE 23-80-18 W6M	900	10	Temporary
SE 36-80-18 W6M	400	10	Temporary
NE 36-80-18 W6M	240	10	Temporary
Note: Locations, lengths and widths subject to change pending detailed design.			

8.5.1 Construction Logistics

Project construction logistics will involve moving equipment, materials and supplies by truck and/or rail to staging areas, stockpile sites and to the ROW. In addition to the equipment and materials required for construction, fuel and other supplies will be procured locally or transported from major distribution centres for use onsite.

8.6 CONSTRUCTION SAFETY

During construction, the prime contractor(s) will have overall responsibility for health and safety at their worksite. This includes:

- protecting the general public and employees of TransCanada, the prime contractor, subcontractors, suppliers, any other contractors and visitors
- protecting and preserving NGTL property and the property of all third parties on, along, adjacent to or near the site from damage resulting from performance of any work, and exercising suitable precautions necessary to prevent damage thereto
- developing a Site-Specific Safety Plan (SSSP) that outlines how the prime contractor will implement, measure and review its health, safety and environment (HSE) processes onsite
- implementing all applicable health and safety laws and regulations
- monitoring activities at the site to ensure that the health and safety system is functioning properly and providing records to verify the system is functioning
- implementing a task hazard assessment process (Job Safety Analysis) that breaks tasks down into steps, identifies the hazards associated with each step and identifies the appropriate control measures for the identified hazards
- ensuring all personnel (contractors, employees, company representatives, visitors) complete a site-specific orientation before site access
- using proper personal protective equipment, as required
- stopping work activity immediately and notifying supervisors of unsafe conditions or acts
- in the event of an incident of elevated severity (e.g., major or critical) or of incidents where there was an elevated potential for severity, immediately stopping site activities that might obscure investigation evidence, completing a thorough investigation and preparing a written report identifying root causes and corrective measures
- reporting all incidents, including near-hits/misses and learning opportunities
- developing a site-specific traffic management plan
- developing an Emergency Response Plan

- developing a Project-specific safety inspection and audit program in conjunction with NGTL
- ensuring procedures are in place to increase safety awareness and heighten the level of planning associated with all high-risk activities
- ensuring that required first aid services, equipment and supplies are available at the worksite
- ensuring equipment is inspected and maintained in a safe operating condition as specified by regulations and the manufacturer

8.6.1 Safety Management Program

NGTL will develop a Safety Management Plan (SMP) that provides the prime contractor with a minimum level of awareness of potential construction hazards associated with the Project. The SMP also outlines key safety guidelines for the prime contractor to consider when developing their site-specific safety plan so that a collaborative commitment to Project safety is achieved.

Where required, NGTL will coordinate obtaining safe work permits and completing a detailed incident report form from the OPR.

For operations, see Section 10.4.

8.6.2 Emergency Response during Construction

Before construction, each prime contractor will be responsible for developing and implementing an emergency response plan to cover potential emergencies at their worksite and while travelling and hauling to and from their worksite during construction. This plan will be communicated during the site-specific safety orientation before accessing the site. NGTL will consult with emergency response agencies to ensure that appropriate communications, understanding and cooperation are in place for the Project during construction. This will ensure that the construction emergency response plans appropriately link into the plans maintained by other affected agencies.

For additional information on TransCanada's Emergency Management Program during operations, see Section 10.3.1.

8.6.3 Security Management Program

During construction, the Physical Security for Construction Sites TOP provides detailed security requirements and plan elements for the prime construction contractors on the Project. Prime contractor security management plans will be audited to ensure compliance with the TOP. In addition, the prime contractor is

expected to conduct ongoing security assessments to update the security management plan implemented for the Project.

8.6.4 Environmental Protection Plan

The EPPs for the Project components, as required under OPR Section 48, have been designed to avoid or reduce adverse effects on the environment. See Appendix A of the ESA.

8.6.5 Construction and Environmental Inspection

Construction inspectors are responsible for reviewing, understanding and ensuring that the contractor is constructing the pipeline in compliance with contract documents, the Project design, applicable standards, specifications, procedures and TransCanada's quality management system.

Environmental inspectors will be responsible for ensuring that environmental mitigation measures are followed and commitments adhered to during construction.

The persons responsible for inspecting the pipeline and facility construction activities will be retained before construction activities start and will possess the necessary qualifications.

8.7 QUALITY MANAGEMENT – CONSTRUCTION

All TransCanada-purchased items and contracted services will be obtained from suppliers and contractors who have been pre-qualified by TransCanada's internal supplier management and pre-qualification procedures.

During construction, each prime contractor will be responsible for ensuring the work being performed is done in accordance with contract documents, the Project design, applicable standards, specifications, procedures and the project-specific quality plan.

Design changes during construction will be managed in accordance with the appropriate change management procedures and in accordance with TransCanada's standard engineering practices.

8.8 PIPELINE CONSTRUCTION ACTIVITIES

Pipeline construction activities will include, but are not limited to:

- surveying
- clearing
- soil stripping and salvage
- grading

- trenching
- pipe stringing, bending and welding
- NDE
- coating
- pile driving
- road and foreign line crossing
- watercourse crossings
- lowering-in
- buoyancy control
- backfilling
- pipeline cleaning
- pressure testing of pipeline components
- fencing at valve sites
- cleanup and reclamation

8.8.1 Right-of-Way and Site Preparation

The pipeline ROW will be cleared in accordance with the EPP. Grading requirements along the ROW will vary from no grading in flat or muskeg areas, to grade cuts in some localized areas. Grading will depend on such factors as slope angle and soil type. Grading of the ROW will be performed to the extent necessary to accommodate field pipe bending limits and ensure safe movement of pipe, equipment and personnel along the ROW.

Where applicable, topsoil will be stripped, stockpiled and replaced in a manner that prevents topsoil loss and mixing with subsoil, or degradation of soil quality.

After topsoil or surface material is salvaged, irregular ground surfaces will be graded to provide a safe work surface. This would include grading of any TWS. This will be completed using graders, excavators and bulldozers. Specialized construction techniques will be used in specific locations, such as steep slopes, along the proposed route. For typical drawings that show ROW and TWS use during construction, see Appendix 8-1.

8.8.2 Stringing, Welding, Bending, Coating and Nondestructive Examination

In general, pipe will be trucked from a local stockpile site and strung along the ROW.

For the pipeline to match terrain contours, a bending machine will be used to bend the pipe along the ROW. The individual pipe joints will then be lined up, clamped in place and welded by either mechanical or manual welding methods. Welding procedures will be determined during detailed design. The joining program and weld NDE will comply with the requirements of the OPR and CSA Z662-15. All welds will undergo NDE and once validated, will be coated as per CSA Z662-15 and TransCanada specifications.

8.8.3 Trenching, Installation and Backfill

Once the centreline of the pipeline has been staked, a single trench will be created using conventional open-trench pipeline construction methods. Hydraulic excavators and/or trenching machines will be used to excavate the trench to the specified dimensions determined during detailed design. Open-trench installation will take place in accordance with the procedures described in the EPP. For the minimum width of the trench and depth of cover to the pipe, see Appendix 7-7.

Measures such as the installation of rock shields or wood lagging might be used, as required, to ensure that the pipe and pipe coatings are not damaged during lowering-in and backfill operations. After the joined pipeline is lowered into the trench, the pipe will be covered with suitable native backfill material. In frozen conditions, settlement of backfill materials will depend on, among other things, ice content of the soil placed in the trench. Ditch settlement in areas with high-ice-content soils could be offset with varying amounts of suitable material obtained along or adjacent to the ROW or with imported fill.

At any time during pipeline construction activities, the length of open-trench and pipe stringing gaps will be reduced, to the extent practical, to minimize environmental, socio-economic and safety concerns. The trench will be slightly wider where required, e.g., rock terrain or where buoyancy control is required (see Section 8.5 of the EPP).

8.8.4 Watercourse and Road Crossing Construction

NGTL's process for selecting watercourse crossing locations and techniques was developed using industry-accepted design and installation practices, upgraded to reflect site-specific assessments and Fisheries and Oceans Canada (DFO) Measures to Avoid Causing Harm to Fish and Fish Habitat. The criteria that NGTL typically balances in selecting a pipeline crossing method are: watercourse parameters, fisheries values and integrated construction/mitigation strategies.

Alberta's Code of Practice for Pipelines and Telecommunications Lines Crossing a Water Body under the *Water Act*, was also considered in the decision-making process for the watercourse crossing methods proposed for the Project.

Fisheries timing windows apply for six of the watercourse crossings to be constructed for the Project. Timing windows for Alberta (Restricted Activity Period [RAP]) and British Columbia (Window of Least Risk) are as follows:

- 12-WC-GB-01: RAP – April 16 to July 15, annually
- Pouce Coupé and Kiskatinaw Rivers: Window of Least Risk – July 15 to August 15, annually
- Sergeant Creek, 15-WC-GB-04 and 79-WC-TL-08A1: Window of Least Risk – July 15 to March 31, annually

As pipeline installation for the Project is planned to occur during these windows, NGTL will work with AEP and BCOGC to implement appropriate mitigation.

For a list of the watercourse crossings and additional details on the proposed crossing method for each watercourse, see Appendix G of the ESA. For a list of preliminary named crossings, see Table 7-11.

Both trenchless and trenched watercourse crossing techniques were considered for the Project. The following sections describe the alternative methods considered.

Isolated Crossings

An isolated crossing method is a form of open-cut crossing that will be used for watercourses with open water or under-ice flow that can be handled by isolation equipment. Isolated methods, using dams and pumps or flumes, divert flow around or across a construction zone to allow trench excavation, pipe installation and backfilling to occur away from flowing water. Silted water is typically left in the trench during these activities and then pumped onto a nearby vegetated or snow-filled area, rather than back into the watercourse.

Isolated methods are generally considered feasible at crossing sites where:

- watercourse flows are less than 4 m³/s
- channel widths are less than 100 m
- water depths are less than 2 m

Given the relatively small size and low flows of many of the proposed Project crossings, NGTL has a high level of confidence that, if required, isolated crossing methods will be successful.

Open-Cut Crossings

The open-cut crossing method is preferred for minor watercourses and drainages where flow is absent and is expected to be absent for the duration of in-stream activities. Any water collected from the excavation will be discharged to an upland area or otherwise filtered to reduce the amount of sediment being discharged back into the watercourse.

The open-cut method will require additional TWS, but has a smaller footprint than other construction methods and reduced construction periods. The open-cut method will be considered as the contingency method for watercourses using trenchless methods.

Trenchless Crossings

Trenchless crossing methods are generally considered for watercourses with sensitive and/or high-value fisheries, (e.g., coldwater sport fish and SARA species), and/or

with flows, water depths and channel widths that cannot be effectively isolated. Based on NGTL's crossing selection process for the Project, the following watercourse crossings are proposed to be trenchless crossings:

- Pouce Coupé River (Groundbirch Mainline Loop)
- Unnamed Creek – to be completed simultaneously with Highway 97 due to proximity (Groundbirch Mainline Loop)
- Kiskatinaw River (Tower Lake Section)
- Unnamed Creek (Tower Lake Section)

For the preliminary HDD feasibility report for the trenchless watercourse crossing for the Pouce Coupé River see Appendix 8-2, for the Kiskatinaw River see Appendix 8-3 and for the Unnamed Creek on the Tower Lake Section see Appendix 8-4.

For the preliminary trenchless feasibility report for the Highway 97 crossing on the Groundbirch Mainline Loop, see Appendix 8-5.

Pipeline Cleaning and Pressure Testing

The pipeline will be cleaned with pipeline inspection gauges (pigs) to remove construction debris. This debris will be collected and disposed of following applicable regulations. Pre-fabricated components, such as aboveground risers, valve assemblies and elbow fittings with associated piping, will be tested before arrival onsite in accordance with the pressure testing requirements in Clause 8 of CSA Z662-15. Where possible, the facilities will also be pressure tested onsite in order to reduce the number of untested welds.

A preliminary review indicates there are nearby potential water sources suitable for hydrostatic testing. A hydrostatic test plan will be prepared during detailed design and submitted to the NEB prior to hydrotesting all pipeline sections.

Water for hydrostatic testing will be drawn from permitted sources and, after use, will be disposed of in approved disposal locations in accordance with the applicable regulatory requirements. A mixture of water and glycol or methanol might be used for hydrostatic testing of aboveground piping where a risk of freezing exists. Any hydrostatic test medium consisting of other than pure water will be disposed of in accordance with applicable regulations.

8.8.5 Cleanup and Reclamation

General machine cleanup will begin along the pipeline ROW following backfill activities. In summer construction areas on agricultural lands, final cleanup will be completed directly following construction. Any final cleanup tasks not completed immediately following construction, due to the onset of frozen ground conditions,

will be addressed the following year as required. Examples of additional cleanup measures include replacing surface material and installing erosion-control measures.

Watercourse crossings will be reclaimed in accordance with all applicable regulatory requirements. The ROW and TWS will be reclaimed as necessary and as soon as practical after final cleanup.

8.9 COMMISSIONING

On successful completion of hydrotesting, the pipeline will be prepared for commissioning and startup. Commissioning will be conducted by qualified TransCanada representatives.

9.0 METER STATION

This section provides meter station information for the Project. The information is based on preliminary design and is supported by initial results from field investigation and engagement programs. Revisions and refinements are expected as additional data are collected and assessed, preliminary locations are optimized and as engineering progresses through detailed design.

9.1 ENGINEERING DESIGN STANDARDS

The Project will be designed, constructed and operated in accordance with CSA Z662-15 and the OPR, as well as other industry standards and TransCanada specifications.

9.1.1 Industry Codes and Standards

In addition to CSA Z662-15, various other industry codes and standards will be used in the design, construction and operation of the meter station portion of the Project (see Table 9-1).

Table 9-1: Industry Standards for Meter Station Facilities

Standard ^{1,2}	Title
CGA OCC-1-2013	Recommended Practice, Control of External Corrosion on Buried or Submerged Metallic Piping Systems
CSA Z662-15	Oil and Gas Pipeline Systems
CSA Z245.1-14	Steel Pipe
CSA Z245.11-13	Steel Fittings
CSA Z245.12-13	Steel Flanges
CSA Z245.15-13	Steel Valves
CSA Z245.20-14 / Z245.21-14	External Fusion Bond Epoxy Coating for Steel Pipe / External Polyethylene Coating for Pipe
CSA S16-09	Steel Structures
CEC 22.1-15	Canadian Electrical Code Part I and II, Safety Standard for Electrical Installation
Measurement Canada	<i>Electricity and Gas Inspection Act</i> Electricity and Gas Inspection Regulation
Note: 1. The standards in this table are current to September 1, 2015. 2. The CSA standards in this table often incorporate other CSA standards and publications from other organizations (e.g., ASME, ASTM, API, IOS, CGSB, NACE, SSPC and MSS).	

9.1.2 TransCanada Standards, Procedures and Specifications

For a current list of potentially applicable company specifications and standards, see Table 9-2. The final list of applicable specifications and standards will evolve as meter station planning progresses through detailed design and as individual specifications and procedures are added, updated or replaced to incorporate legislative and regulatory changes, and technological advances.

Table 9-2: Preliminary List of Company Specifications and Standards

Name	EDMS No.	Effective Date	Rev No.
MATERIALS			
TES-FITG-LD Specification for Carbon Steel Buttwelding Fittings	003671270	23-Jun-15	5
TES-FITG-T01 Instrument Tube Fitting, Instrument Pipe Fitting and Tubing Material Specification	003697116	11-Sep-13	6
TES-FITG-EC1 Specification for End Closures	003779256	26-Mar-13	2
TES-FITG-SAD Full Encirclement Reinforcing Saddle Specification	003779258	14-Oct-14	4
TES-FLGE-LD Specification for Carbon Steel Buttwelding Flanges	003671966	16-Oct-14	5
TES-MATL-MD1 Piping System Materials for Pipeline, Compression and Metering Facilities	003764909	30-Dec-02	0
TES-MATL-PV1 Specification for Pressure Vessels	000006406	13-Apr-09	3
TES-PIPE-EW Specification for Electric Welded Pipe	003670788	22-Mar-13	3
TES-PIPE-P8 Specification for Meter Tube Pipe	003695410	21-May-14	2
TES-PIPE-SAW Specification for Double Submerged Arc Welded Pipe	003776714	22-Mar-13	2
TES-VALV-LD-G Specification for Steel Valves for Gas Service	008820778	30-Sep-14	4
MECHANICAL			
TEP-MECH-WT Determining Pipe Wall Thickness and Material Grade for Gas/Liquid Pipelines and Pipeline Facilities	000006190	20-Mar-14	3
TED-MECH-WT Determining Pipe Wall Thickness and Material Grade for Gas/Liquid Pipelines and Pipeline Facilities	007912051	17-Apr-13	0
TEP-MECH-TRAN Selection of Transition Pieces and Joining Materials	000006256	24-Apr-14	3
TEF-MECH-TRAN Transition Inspection Report	005740916	23-Apr-13	1
TEP-VALV-FAB Procedure for Supplemental Preparation During Valve Fabrication	005741242	19-Apr-13	1
TEP-VOPR-GH Gas Hydraulic Valve Operator Control Packages and Functional Applications	003671367	28-Mar-00	2
TES-VOPR-GH Gas Hydraulic Valve Operators	003671784	24-Nov-99	0
TES-MECH-FBT Specification for Flange Assembly	006489784	09-Jul-12	2
TES-STRS-GPAS Pipe Stress Engineering Analysis for Gas Pipeline Assemblies	007808806	06-Feb-13	0

Table 9-2: Preliminary List of Company Specifications and Standards (cont'd)

Name	EDMS No.	Effective Date	Rev No.
COATING			
TES-COAT-CAD Coating Application Procedure for Thermite Weld Coating	003672126	30-May-13	3
TES-COAT-EPU External Multi-Component Liquid Coating Systems for Below-Ground Facilities	003671710	01-Aug-13	11
TES-COAT-FBE External Fusion Bond Epoxy for Steel Pipe	003670892	03-Mar-15	7
TES-COAT-P1 Paint Systems for Above-Ground Facilities (Non-Coastal)	003694704	22-May-14	8
TES-COAT-PET Coating Application Procedure for Petrolatum Coating	000007756	28-Feb-13	2
TES-COAT-HSS Heat Shrink Sleeve Installation	003735848	03-Oct-13	3
TES-COAT-HDG Hot Dip Galvanizing	006713035	26-Oct-11	0
CATHODIC PROTECTION	003678529	31-Jan-11	3
TES-CP-CS Cathodic Protection Construction Specification	003670955	12-Sept-14	7
TES-CP-MS Cathodic Protection Materials Specification	003670944	10-Nov-14	7
TES-CP-IV Mitigation of Induced AC Voltage Effects	003671383	08-Jan-13	3
TES-CP-FRGN Foreign Crossing Cathodic Protection Requirements	003840655	27-Nov-14	4
CONSTRUCTION			
TES-DV05-1213 Structural Steel	000006488	15-Jul-09	2
TES-DV10-8500 Communication Mast	005590010	31-Mar-11	1
TES-DV26-2906 Tubing and Fittings	000006566	15-Oct-09	0
TES-DV31-2333 Excavation, Backfilling and Site Grading	000006457	07-Apr-14	2
TES-DV31-6216 Driven Steel Piles	000006459	15-Jun-10	1
TES-DV32-3115 Portable Chain Link Fence	003744430	28-Feb-11	1
TES-5510-05 Meter/Regulating Station Control and Auxiliary Panels	003671921	25-Apr-00	2
JOINING PROGRAM			
TED-WELD-JP Joining Program	003750713	13-Feb-12	2
TED-WELD-STRU Welding Engineer Standard for Structural Steel	003696375	03-May-13	2
TEP-WELD-ABR Removal of Arc Burns (New and Existing Piping Facilities)	003670959	15-Feb-12	2
TES-WELD-PL Welding of Pipelines and Tie-ins	003670960	06-Jan-12	4
TES-WELD-AS Welding of Assemblies and Station Piping	003670962	25-Sep-14	4
TES-WELD-STRU Welding Procedure Specification for Shielded Metal Arc Welding on Structural Steel	003696371	16-May-14	3
TES-WELD-BC Specification for Welding on In-Service Pipelines (Cdn)	003886791	16-Jul-12	2
NON-DESTRUCTIVE TESTING			
TES-NDT-MT Magnetic Particle Inspection Specification	007610003	23-Aug-13	1
TES-NDT-VT Visual Examination	007381161	08-Aug-12	0
TES-NDT-PT Liquid Penetrant Inspection Specification	008210608	23-Oct-13	0
TES-NDT-UT2 Manual Ultrasonic Examination of Welds	003670958	12-Apr-15	3

Table 9-2: Preliminary List of Company Specifications and Standards (cont'd)

Name	EDMS No.	Effective Date	Rev No.
TES-NDT-UT1 Mechanized Ultrasonic Examination of Pipeline Girth Welds	003670963	13-Mar-12	3
TES-NDT-RT Radiographic Examination of Welds	003671368	13-Mar-12	5
HYDROTESTING			
TES-HYDRO-CDN Hydrostatic Testing Specification	007591539	22-Oct-13	1
TEP-PROJ-LTO Project Leave to Open Procedure	003690877	30-Jun-05	3
OVERPRESSURE PROTECTION			
TEP-OPP-VER-CDN Verification of Customer Overpressure Protection Systems for New Receipt Meter Stations	006967781	14-Nov-14	2
TEF-OPP-VER-NEW Customer Overpressure Protection Systems for New and Modifications to Existing Receipt Meter Station – Request for Information Form	006587713	31-Oct-14	3
TEP-OPP-VER-ENG-REVIEW Verification of Customer Overpressure Protection System – Engineering Review Procedure	008174697	15-Dec-14	0
<p>Note:</p> <p>This table provides a preliminary list of the TransCanada standards and specifications that will be used for the Project. A final list of applicable standards and specifications will evolve as Project planning progresses through detailed design, and as individual specifications and procedures are added, updated or replaced to incorporate legislative and regulatory changes, and technological advances.</p>			

9.2 METER STATION FACILITIES

9.2.1 Preliminary Locations

The preliminary locations for the proposed receipt metering facilities were determined by the custody transfer points and a preliminary desktop assessment of the suitability of the proposed site. A follow-up, on-the-ground review will need to be completed to assess:

- terrain
- soil conditions
- proximity to:
 - existing access road or roads planned by third parties
 - the connecting customer
 - third-party electrical power supply

For preliminary locations resulting from this assessment, see Table 9-3 and for maps, see Appendix 15-3 and Appendix 15-4.

Table 9-3: Preliminary Meter Station Locations

Meter Station Name	Northing	Easting	UTM
Tower Lake Receipt Meter Station	6208570	645817	Zone 10
Dawson Creek North Receipt Meter Station	6194906	652674	Zone 10
Dawson Creek North No. 2 Receipt Meter Station	6194906	652674	Zone 10
Note: Locations provided are approximate and may be subject to change during detailed design			

9.2.2 Piping Design

The station piping design at the receipt meter stations will include above and below-ground piping and valves, as determined during detailed design. They will be designed with an MOP of 9930 kPa.

For the piping materials for the new meter stations, see Table 9-4.

Table 9-4: Piping Materials at Meter Station Sites

Meter Station	Pipe Diameter	Wall Thickness (mm)	Pipe Material Grade (MPa)	Pipe Material Standard	Location Factor	Maximum Operating Pressure (kPa)
Tower Lake Receipt Meter Station	NPS 12	12.7 mm	359 MPa	CSA Z245.1	0.625	9930
	NPS 8	12.7 mm	241 MPa	ASTM A333	0.625	9930
	NPS 4	6.0 mm	241 MPa	ASTM A333	0.625	9930
Dawson Creek North Receipt Meter Station	NPS 12	12.7 mm	359 MPa	CSA Z245.1	0.625	9930
	NPS 8	12.7 mm	241 MPa	ASTM A333	0.625	9930
	NPS 4	6.0 mm	241 MPa	ASTM A333	0.625	9930
Dawson Creek North No. 2 Receipt Meter Station	NPS 12	12.7 mm	359 MPa	CSA Z245.1	0.625	9930
	NPS 8	12.7 mm	241 MPa	ASTM A333	0.625	9930
	NPS 4	6.0 mm	241 MPa	ASTM A333	0.625	9930

9.2.3 Fluid Analysis

Gas sampling to monitor gas composition and heating values will be done through a monthly continuous gas sample taken at the facilities, as well as daily readings provided by gas chromatograph. For information on the expected gas composition for the Project, see Section 7.3.

9.2.4 Station Flows and Associated Inlet Pressures

Because the meter stations do not include pressure regulation, outlet pressure will equal inlet pressure, less a small piping loss. For preliminary estimates of minimum and maximum station flows, and maximum station operating pressure, see Table 9-5.

Table 9-5: Meter Station Flow and Operating Pressure

Meter Station	Minimum Flow (10³m³/d)	Maximum Flow (10³m³/d)	Maximum Operating Pressure (kPa)
Tower Lake Receipt Meter Station	224	8950	9930
Dawson Creek North Receipt Meter Station	224	8950	9930
Dawson Creek North No. 2 Receipt Meter Station	224	8950	9930

9.2.5 Overpressure Protection

NGTL relies on the upstream customer to provide pressure control and overpressure protection (OPP) at its facility. NGTL verifies that this OPP process is reviewed and assessed for compliance with CSA Z662-15, Section 4.18 and Section 10.9.5.

The upstream customer must complete TransCanada's OPP Customer Request for Information form before a facility is placed in service, as per CSA Z662-15. The form requests the following information:

- the OPP system that will be employed to protect the NGTL receipt points
- customer's facility information
- customer's OPP design drawings, including a Process and Instrument Diagram or as-built drawings
- planned maintenance programs for OPP devices and systems, including its frequency and type of maintenance
- operational philosophy that details all reasonable emergency scenarios that could apply to the OPP system, such as loss of power or valve failure (i.e., NGTL will ensure the customer's pressure control system and the OPP system operate independently so that a failure in one system does not cause the other system to become inoperative)
- OPP device calibration and maintenance records

The upstream customer's information will be reviewed and if any deficiencies are identified, NGTL will work with the customer to ensure the OPP system is adequate and reliable. The facility will not be placed in service until the customer OPP information is checked and verified by a professional engineer.

With respect to OPP verification and monitoring, NGTL ensures that the maintenance programs and their frequency meet the requirements of CSA-Z662-15. In addition, NGTL has the ability to audit maintenance records and conduct site visits, if necessary, to confirm compliance. The upstream customer's OPP system is required to be automatic and continually operating without reliance on manual intervention.

9.2.6 Gas Quality

These receipt meter stations will include a chilled mirror dew point tester, continuous gas sampler and gas chromatograph to monitor gas quality at the facility.

Monthly gas sampling will be done to verify data accuracy of the gas chromatograph. Gas is sampled to review the gas composition, which in turn determines billing requirements based on gas quality.

9.2.7 Meter Station Schematics

All three proposed meter stations will be designed with the same parameters and required capacities. For a generic meter station operating schematic and plot plan see:

- Appendix 9-1: Towerbirch Receipt Meter Station Process and Instrumentation Diagram
- Appendix 9-2: Towerbirch Receipt Meter Station Plot Plan

As shown on the operating schematics, three new buildings will be required for custody transfer metering at each station, including two skid-mounted meter run buildings and a skid-mounted instrumentation building.

These buildings will house the measurement equipment and will be supported by steel piles.

9.2.8 Corrosion Control Elements and Facilities

The meter station piping and equipment will be cathodically protected by the pipeline CP system. For a description of the corrosion-control elements to be used at the meter station facilities, see Section 7.5.

9.2.9 Power Type and Source

Power required for the proposed meter stations will be supplied by a nearby producer facility, utility power provider in the area or a site-installed natural gas TEG. Diesel-fired generators will be required during construction but will not be used for operations.

The power supply option will be chosen during detailed design. TEG or third-party power, if available, will be sized according to the site requirements of each meter station, typically 3 kW to 10 kW.

If the power supply to any meter station is interrupted, an uninterruptible power supply (UPS) system will provide continuous battery power to the critical control circuits. This UPS will be capable of maintaining the meter station control system for approximately 72 hours.

9.2.10 Communications

The meter station will communicate telemetry information to the TransCanada Operations Control Centre (OCC) using satellite or wireless cellular radio. Types of data include gas quality, temperature and pressure information. Customers may ask to receive plant signals in real time. This type of communication will be done by a data radio or buried cable, and the requirements will be determined during detailed design.

9.3 CUSTODY TRANSFER METERING

The custody transfer metering will include:

- flow computers
- pressure transmitters
- ultrasonic meters
- resistance temperature devices (RTD)
- a gas chromatograph
- an orifice meter

9.3.1 Towerbirch Meter Stations

All three receipt meter stations are expected to have two NPS 8 ultrasonic meter runs operating in parallel, each run consisting of a primary multipath meter and a single-path check meter in series along with NPS 12 yard piping and one NPS 4 buy-back meter run. For flow capacity of these meter stations, see Table 9-5. Other equipment will include a separator mounted on a separate skid and gas quality analyzer equipment.

9.3.2 Measurement Accuracy

In addition to the ultrasonic meters, NGTL will measure temperature and pressure at the meter locations. Data from the temperature and pressure transmitters will be sent to a local flow computer, which will calculate the gas volume and energy content using industry standard calculations. All gas metering equipment will be certified by Measurement Canada and will meet the Measurement Canada acceptance criterion of $\pm 2\%$. TransCanada Calibrations, a federally accredited flow laboratory, will perform the calibration and provide certification documentation.

9.3.3 Proving Method

Proving will be accomplished by calibrating individual measurement devices at the proposed meter stations. Metering assemblies, consisting of ultrasonic gas flow meters, flow conditioners and related spool pieces, will be flow-calibrated at recognized flow laboratories. Using a standardized and federally recognized process, high-accuracy flow tests will be performed under conditions approximating field applications.

9.4 METER STATION CONSTRUCTION

9.4.1 Construction Strategy

At this stage in preliminary design, NGTL plans to maximize use of existing access roads, and minimize environmental issues by bundling all work into work packages that align with customer in-service dates and pipeline construction cycles wherever possible. The preliminary construction strategy for the three meter stations is to construct Tower Lake Receipt Meter Station for the November 1, 2017 in-service, in September and October 2017. Construction of both the Dawson Creek North No. 2 and Dawson Creek North Receipt Meter Stations will occur during Q1 2018 for their respective in-service dates of April 1 and September 1, 2018. This schedule will be finalized during detailed design.

9.4.2 Construction Procedures and Execution

NGTL will employ conventional construction methods and industry best practices in constructing the new meter stations. Construction activities will include:

- surveying
- clearing
- excavating
- grading
- pile driving
- installing foundations
- installing meter run and instrumentation buildings
- welding
- NDE
- hydrotesting
- coating
- electrical installation
- installing communications
- commissioning
- pre-startup safety review
- final site cleanup

Construction will be done in accordance with applicable TransCanada specifications, standards and operating practices, and the Project EPP.

9.4.3 Construction Safety

NGTL will develop a Safety Management Plan (SMP) that provides the prime contractor with a minimum level of awareness of potential construction hazards associated with the Project. The SMP also outlines key safety guidelines for the prime contractor to consider when developing their site-specific safety plan so that a collaborative commitment to Project safety is achieved.

A SSSP will be developed and implemented. NGTL will fulfill the requirements of the SSSP and will be authorized to halt any construction activity if the work is not being performed in a manner that meets all applicable safety policies and standards.

Where required, NGTL will coordinate obtaining all safe work permits, and all personnel will be required to complete a contractor safety orientation before working on the worksite.

Safety requirements will include a daily safety meeting (or meetings), led and documented by the active controller, as well as the use of incident reporting forms and procedures that will include near-hit reporting.

For additional safety information during construction, see Section 8.6. For safety information during operations, see Section 10.4.

9.4.4 Construction Techniques

Before installing the proposed metering facilities, the site will be surveyed to identify any existing underground facilities or objects. The site will be prepared by stripping, as required. Standard construction techniques will be used for the metering facilities and connections to the pipeline system.

The metering facilities will be skid-mounted and installed on steel piles. Yard piping will be pre-fabricated and pre-tested. NDE testing of each field weld will be completed using radiographic methods before field welds are hydrotested and field-coated with epoxy.

9.4.5 Construction Inspection

Meter station construction will be supervised and inspected by qualified construction and environmental inspectors to ensure compliance with all applicable regulations, standards and codes.

9.4.6 Construction Schedule

Meter station site clearing could occur in conjunction with section 58 pipeline clearing activities. Construction of the new meter facilities is tentatively scheduled to begin in Q3 2017 and continue through Q2 2018. For an overview of the construction schedule, see Table 9-6.

Table 9-6: Meter Station Construction Schedule

Meter Station	Estimated Construction	Requested In-Service
Tower Lake Receipt	September – October 2017	November 1, 2017
Dawson Creek North No. 2 Receipt	January – March 2018	April 1, 2018
Dawson Creek North Receipt	January – March 2018	September 1, 2018

9.4.7 Construction Resources

Approximately 20 to 25 workers will be required to construct each meter station. Personnel skill requirements will range from entry-level labourers to highly skilled trades. Peak requirements for personnel and services will occur during Q4 2017 and Q1 2018.

9.4.8 Project Workforce Accommodations

NGTL anticipates that meter station construction personnel will be housed in hotel/rental accommodations in nearby towns and cities. No new Project-specific accommodations (i.e. construction camps) will be constructed as part of the Project.

9.4.9 Site Security

To ensure facilities are not tampered with by outside parties during the construction cycle, 24-hour site security, including appropriate fencing, signs and lighting, will be required for all facilities.

9.4.10 Access Plan

Each meter station facility will require road access during the construction cycle. NGTL plans to use temporary access roads to construct the pipeline or existing roads where available rather than build any new roads. Post-construction, existing year-round access will be required to ensure NGTL personnel can access the facility for planned maintenance and in an emergency.

9.4.11 Quality Management Program

All welding and NDE testing of welds will be done in accordance with the requirements of CSA Z662-15, the OPR, and the welding procedures and specifications in Table 9-2.

The construction contractor will conduct the welding in accordance with the welding procedures provided by NGTL. Fabrication and assembly of welded pipe spools will take place at the fabrication facility/yard and final fit-up welds will be done at site.

NGTL will hire an independent third party for NDE on all welds required for the Project.

Pressure vessels will be designed and fabricated according to TransCanada specification TES-MATL-PV1. These vessels will be confirmed during detailed design and are anticipated to include separators.

9.4.12 Non-Destructive Examination

For all high-pressure gas piping designed to CSA Z662, NGTL will use 100% NDE coverage.

NDE for facility piping will be done in accordance with TransCanada specifications TES-NDT-ADT, TES-NDT-RT, TES-NDT-VT, TES-MDT-MT and TES-NDT-UT2. All butt welds will be inspected visually and radiographed or ultrasonically tested for 100% of their circumferences. All fillet welds will be inspected for 100% of their circumference using magnetic particle inspection.

9.4.13 Hydrotest Inspection

Pressure testing of the meter station facilities will meet the requirements of CSAZ662-15 and the OPR. Before hydrostatic testing begins NGTL will submit to the Board a table listing the field welds that are not expected to be pressure tested and provide justification for each weld not pressure tested, as well as a plot plan showing the location of each untested weld.

NGTL intends to use only water for hydrotesting. Depending on field conditions, however, a methanol water mixture might be used to avoid potential freezing of the test water. Any hydrostatic test water containing methanol will be trucked from site and recycled or disposed of at an approved facility.

9.4.14 Commissioning

After successful completion of integrity validation, the meter stations will be prepared for commissioning and startup. Commissioning will be conducted by qualified TransCanada representatives.

9.4.15 Emergency Response

NGTL will prepare an emergency response plan that will be implemented in the event of an emergency during Project construction (see Section 8.5.1). For information on emergency response during operations, see Section 10.3.1.

10.0 OPERATIONS

This section describes the processes, procedures and systems that will be used to ensure the safe, reliable and efficient operation of the Project.

10.1 OPERATING STANDARDS AND DOCUMENTATION

NGTL will operate the pipeline and associated facilities in accordance with all governing regulatory requirements, permit conditions and other approvals, including the OPR and CSA Z662-15 and TransCanada's Operating Procedures (TOPs).

10.2 OPERATING PROCEDURES

To address pipeline system maintenance, the existing TOPs and associated systems will be used for the Project. These operating procedures:

- describe how work is to be accomplished (e.g., resources required and work instructions)
- identify specific competence requirements, where appropriate
- identify documentation requirements
- provide references to applicable health, safety and/or environmental requirements

10.2.1 Operations Control

The NGTL System is monitored and controlled by the Operations Control Centre (OCC). Located in Calgary, the OCC remotely monitors and controls the operation of the NGTL System and other TransCanada-owned and operated pipelines.

The OCC is staffed 24 hours per day and uses a computer-based SCADA system, which controls gas compression, metering and remote valve facilities to ensure the required gas volumes, line pack and contract pressures are achieved daily. The SCADA system alerts the OCC operator of operational changes in the pipeline system. Status and control information is received and sent by the SCADA system to and from specific mainline valves, and compressor and metering facilities.

The SCADA system captures and retains a broad range of data from across the entire pipeline system, including:

- key operating parameters such as pressure, temperature, flow and gas quality
- operational data and status points of various compressor stations, meter stations and valves
- status of protective devices, including fire detection
- other data points, including security status, gas detection and communication status

At receipt meter stations, analyzers are installed to ensure gas quality. Analyzers continuously monitor the gas flow and, if high levels of H₂S or H₂O are detected, they cause the station block valves to close automatically. This isolates the station from the pipeline system.

In the unlikely event of a pressure drop, pipeline mainline block valves, which are equipped with actuators with low-pressure detection, will automatically close on sensing low pressure, to isolate the pipe segment.

Additionally, the OCC will receive, analyze and dispatch the required personnel to provide the necessary response outlined in the appropriate operating procedures in response to alarms.

A second fully functional control centre, the TransCanada Backup Control Centre, is used as backup in case the OCC becomes unavailable for any reason. The TransCanada Backup Control Centre is ready for service at all times. Each control centre houses redundant communication systems to monitor pipeline status.

10.3 MANAGEMENT SYSTEMS AND PROGRAMS

TransCanada's management systems will apply to the entire lifecycle of the Project, and consists of the Emergency Management Program, Integrity Management Program, Safety Management Program, Security Management Program and EPP.

10.3.1 Emergency Management Program

TransCanada is accountable for emergency management for the NGTL System.

Before the Project components are put into operation, TransCanada will develop new emergency management plans or update existing emergency management plans to incorporate the proposed pipeline, pipeline loop and meter stations as required.

The emergency management plans will include the following:

- communications protocols
- access requirements
- operational awareness of the product being transported
- TransCanada's emergency response procedures

Once the Project components are placed into service, TransCanada's Emergency Management System will be used to manage all emergency events associated with the facilities. TransCanada's Emergency Management System is activated in the event of a pipeline rupture or other emergency event. Activation includes deployment of emergency responders to the site and establishment of a regional and corporate Emergency Operations Centre (EOC) to assist with management of the event.

TransCanada's Emergency Management System includes using the Incident Command System (ICS). The ICS is a standardized onsite management system designed to enable effective, efficient incident management by integrating a combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure.

The ICS is used to manage an incident or a non-emergency event, and can be used equally well for both small and large situations. The ICS will help address the event in a unified command approach with provincial and federal regulatory bodies and local emergency services such as fire suppression and police. TransCanada's ICS is a standardized on-scene emergency management tool specifically designed to provide an integrated organizational structure to support emergency response. The ICS is the combination of facilities, equipment, personnel, procedures and communications operating within a common organizational structure, designed to aid in the management of resources during incidents. All notification and communication protocols are in line with the ICS process.

TransCanada personnel receive annual emergency response training to respond effectively to all pipeline incidents and regularly perform desktop and field based emergency response drills. Site personnel work with the local emergency responders to ensure the safety of those at site.

TransCanada's Emergency Management System will meet the NEB's expectations for emergency preparedness and response, as it governs all aspects of preparedness and response. It was developed in accordance with the NEB OPR (SOR/99-294), CSA Z731-03 (Emergency Preparedness and Response) and the NEB Emergency Procedures Manual to All dated March 26, 2015.

10.3.2 Integrity Management Program

On transition to operations, NGTL's IMP uses coordinated risk-control measures designed to ensure all pipe assets are operated and managed to achieve the following goals and objectives:

- minimize any safety impact on the public and employees
- minimize frequency and consequences of pipeline incidents, damage and failure
- minimize effects on the environment
- protect installed pipelines and facilities through effective security
- ensure compliance with regulatory requirements
- maintain service reliability

NGTL's coordinated risk-control measures are encompassed in the overall pipeline maintenance plan and involve performing the following activities as necessary:

- Monitoring – detection of hazards via patrols, leak detection, CP protection surveys and operating conditions.
- Prevention methods – used to protect against the likelihood of damage and failure, and include CP, physical barriers, signs and use of the Public Awareness(PA) Program.
- Assessment methods – used to determine the actual condition of the pipeline via ILI, hydrostatic testing and direct assessment.
- Remediation – used to correct a known pipeline condition issue and can include recoating, pipeline repair/replacement or a pressure de-rate.
- Mitigation methods – used to reduce the consequences of a failure and can include a pressure de-rate, use of access restrictions and micro-routing.

10.3.3 Security Management Program

Security management will be governed by TransCanada's corporate security policy and TOPs, which adhere to CSA Z246.1 for security management. This includes the Security Threats TOP and another procedure specific to physical security and construction security.

TransCanada's Corporate Security Policy and TOPs will govern security management during construction and operations.

10.4 HEALTH, SAFETY AND ENVIRONMENT

All activities associated with the Project, including HSE performance, will meet or exceed applicable laws and regulations.

NGTL will address responsibilities for HSE performance of the Project by using TransCanada's HSE Management System Framework, the supporting safety management and EPPs.

The HSE framework will apply to the complete lifecycle of the Project, from design and construction, through to operations and sale or abandonment.

This framework has been developed to meet applicable elements of the ISO 14001, an international standard for environmental management systems and Occupational Health and Safety Assessment Series 18001 Standard, an international standard for health and safety management systems.

The HSE Framework is reviewed and updated periodically to reflect evolving business and regulatory requirements.

10.5 PUBLIC AWARENESS PROGRAM

The Aboriginal and Stakeholder Engagement programs for the Project will be transitioned to TransCanada's existing Public Awareness (PA) Program and the regional community relations resource for the remaining lifecycle of the asset.

During Project construction, the Project team will engage the PA team to plan and coordinate transitional stakeholder outreach activities. This includes the in-service notifications and integration mailing that might occur as part of the transition.

Following the Project going into service, continued stakeholder outreach will be implemented by NGTL's regionally based community specialists and through the corporate PA Program.

The PA Program is designed to increase awareness of pipeline safety and, thereby protect the public, environment and TransCanada facilities. It reaches the public, excavators and contractors, emergency response providers and local public officials, educating them about living and working safely near TransCanada facilities. It provides safety messaging on special incident response notification and/or evacuation procedures, as appropriate, and information about TransCanada's Integrity Management Program.

The PA Program functions through a variety of approaches, which can include:

- landowner visits
- annual mailout programs
- stakeholder meetings
- directed focus on groups involved in activities on or near the Project

The goals of the PA Program are to:

- protect the public from injury
- protect the installed facilities
- minimize third-party damage to facilities
- provide the following information to landowners and communities that might be affected by the facilities:
 - location of company facilities
 - product information to increase awareness
 - contact information for the company
 - leak detection and awareness
 - steps to take in the event of an emergency
- ensure that emergency response services agencies completely understand TransCanada's emergency response procedures and how to work together during an emergency

- inform contractors of requirements for working on or near NGTL System facilities
- maintain contact with landowners, community groups, contractors and emergency service agencies that might interact with company representatives, or that might be directly affected by company facilities or operations

This ongoing contact with stakeholders also provides TransCanada with an opportunity to obtain information concerning security and/or potential threats relating to its operations.

10.6 DECOMMISSIONING, ABANDONMENT AND SITE RECLAMATION

There is no specific timeline for the future decommissioning and eventual abandonment of the Project facilities. A decision on when to abandon these facilities will be influenced by service requirements.

Prior approval from the Board and other applicable authorities will be required before these future decommissioning and abandonment activities are initiated.

11.0 LAND MATTERS

This section describes the land requirements for the Project, NGTL's process for acquiring land rights and NGTL's consultation with landowners.

11.1 GENERAL LAND INFORMATION

The Project requires approximately 87 km of new ROW and TWS in two sections located on privately held freehold and Crown land in AB and BC. The Tower Lake Section will require approximately 102 ha of permanent ROW and 41 ha for TWS while the Groundbirch Mainline Loop will require approximately 145 ha of permanent ROW and 102 ha for TWS.

11.2 IDENTIFICATION OF LANDOWNERS AND LAND USERS

As NGTL developed the proposed route, Project route maps were used to identify all lands potentially directly affected by the Project. Title information was searched and obtained to identify potentially affected landowners as well as land users such as trappers, Crown leaseholders and other disposition holders.

Following completion of the title information searches, NGTL determined that the proposed route of the permanent ROW crosses 69 tracts of land owned in fee simple by individuals and 13 tracts of land owned in fee simple by corporations. In total, 86% of the permanent Project footprint is located on freehold land, and the remaining 14% is on provincial Crown land.

For a summary of the proportional land ownership along the proposed pipeline ROW, see Table 11-1.

For the land ownership breakdown for the meter station sites, see Section 11.4.1.

NGTL has also determined that land users such as trappers, guide/outfitters, snowmobile clubs, and agricultural tenure holders might also be affected by the Project. NGTL has identified:

- two Registered Trapping Permit Areas (Alberta)
- one Farm Development Leaseholder (Alberta)
- seven Inactive Trapper Permit Areas (British Columbia)
- one Active Permit Trapping Area (British Columbia)

Table 11-1: Land Ownership along Proposed Pipeline Route

Pipeline Section	Land Type	Approximate Percentage of Land Crossed (%)	Length ¹ (km)
Tower Lake Section	Freehold	93	30
	Provincial (Crown)	7	2
	Total	100	32 km
Groundbirch Section	Freehold ¹	82	45
	Provincial (Crown)	18	10
	Total	100	55 km
Note: 1. Length subject to change pending detailed design.			

NGTL provided these stakeholders with Project information, as part of the stakeholder engagement process (see Section 12). NGTL considered feedback from stakeholders to the extent possible during route selection.

NGTL is also notifying any other directly affected industrial land tenure holders, including, but not limited to energy, mining and forestry companies.

11.3 RIGHT-OF-WAY REQUIREMENTS

In total, the Project will parallel existing NGTL System pipelines or other existing or proposed linear disturbances for approximately 69 km. For the remaining approximately 18 km of the Project, existing linear disturbances are either not present or could not be paralleled due to constructability and other considerations. For a breakdown of parallel and new-cut ROW distances by pipeline section, see Table 11-2.

Table 11-2: Parallel and New Right-of-Way – Pipeline Segments

Project Component	Approximate Parallel ROW ^{1,2} (km)	Approximate New ROW ² (km)
Groundbirch Mainline Loop	47	8
Tower Lake Section	22	10
TOTAL	69	18
Note: 1. Includes pipelines and access roads. Pipelines paralleled include NGTL System and other pipelines. 2. Approximate length, subject to change pending detailed design.		

Based on safety considerations (including transportation of personnel, vehicle movement and equipment storage) the Project requires a minimum construction ROW of 32 m, as identified in the typical ROW configurations in Appendix 11-1. NGTL will retain a minimum 20 m of permanent easement for operations and maintenance purposes.

In addition to the minimum construction ROW width, TWS will be required to accommodate:

- material laydown areas and staging areas
- areas of increased depth of cover
- crossings (e.g., roads, pipelines, utilities and watercourses with defined banks)
- pipeline deflection areas
- surface material depth and stripping procedure
- timber clearing and storage
- access and egress
- areas where geotechnical or environmental conditions warrant

For typical sketches of the ROW, TWS and additional TWS configurations proposed for the Project pipeline sections, see Appendix 11-1.

Before construction, NGTL and its prime contractors will complete an assessment of land required for construction activities. Once this assessment has been completed, site-specific TWS, in addition to previously identified TWS, might be required. The extent and locations of this TWS will be finalized in the field before, and potentially during, construction. Desktop and field studies in support of the ESA will address any potential environmental effects associated with the additional TWS. All locations will be reviewed to ensure an appropriate assessment has been completed.

TWS lands will not be required for NGTL's operational needs and will, therefore, be returned to the provincial Crown or the landowner after construction, cleanup and final reclamation.

For a breakdown of the estimated land requirements for permanent land rights and TWS for the Project, see Table 11-3 and Table 11-4.

Table 11-3: Groundbirch Mainline Loop Approximate Land Required for Permanent ROW and TWS

Land Type	Area (ha)
Permanent ROW	144.9
TWS	101.6
Total	246.5

Table 11-4: Tower Lake Section Approximate Land Required for Permanent ROW and TWS

Land Type	Area (ha)
Permanent ROW	101.8
TWS	41.0
Total	142.8

11.4 PROJECT FACILITY REQUIREMENTS

11.4.1 Meter Station Site Land

For the estimated requirements for the meter stations, see Table 11-5.

Table 11-5: Meter Station Site Lands

Component	Legal Description	Area Required (ha)	Remarks
Dawson Creek North Receipt Meter Station and Dawson Creek North No. 2 Receipt Meter Station	SE 27-79-17 W6M	0.72	Freehold Land
Tower Lake Receipt Meter Station	SW 7-81-17 W6M	0.36	Freehold Land

11.4.2 Valve Site Lands

Several valve sites will be required for the Project. These valve sites will be fenced and located within the boundaries of the permanent pipeline ROW. For a preliminary list of valve locations, see Table 7-8. NGTL will obtain the necessary land rights for these above-ground facilities.

11.4.3 Launcher and Receiver Lands

Launcher and receiver sites will be fenced and located within the boundaries of the permanent pipeline ROW. For a preliminary list of launcher and receiver locations, see Table 7-9. NGTL will obtain the necessary land rights for these facilities.

11.4.4 Cathodic Protection

The Project might require land for CP, such as groundbed easements at specific intervals along the pipeline route. The requirements for groundbeds, including locations and dimensions, will be determined during detailed design.

NGTL expects that any CP facilities will be located in the ROW. As such, NGTL believes the area assessed by the ESA is broad enough to include any land that might be required for CP purposes.

11.4.5 Stockpile Sites, Contractor Yards

Stockpile sites, temporary access roads and contractor yards will be required during Project construction. NGTL is currently exploring potential sites and will attempt to use existing cleared areas and established sites where possible to help minimize effects on previously undisturbed areas.

11.4.6 Third-Party Agreements

Where the proposed pipeline crosses or is adjacent to other existing linear facilities or developments, or road access is required, NGTL will obtain the necessary agreements and approvals from each third-party owner in accordance with requirements of the applicable legislation.

11.5 PROCESS FOR ACQUIRING LAND RIGHTS

Land rights acquisition activities are scheduled to begin in Q3/Q4 2015. Notices, in accordance with section 87 of the NEB Act, will be served on owners, as defined in sections 75 and 85 of the NEB Act, before NGTL enters into any land acquisition agreements.

NGTL's offers of compensation will be based on the appraised values of the lands required and pattern of dealings in the area.

Section 87(1) notices are scheduled to be provided to all private landowners in Q3/Q4 2015. For a sample copy of the notice proposed to be served on landowners pursuant to subsection 87(1) of the NEB Act for statutory ROW and pipeline installations on Crown and private lands, see Appendix 11-2. When serving such notices, NGTL will include copies of the NEB publication *Pipeline Regulation in Canada: A Guide for Landowners and the Public*.

For a sample copy of the easement agreement that NGTL proposes to sign with directly affected freehold landowners to acquire permanent land rights, see Appendix 11-3.

For a sample copy of the TWS agreement NGTL proposes to sign with directly affected freehold landowners to acquire temporary land rights, see Appendix 11-4. As noted, if it is determined during construction that additional workspace is needed, NGTL will obtain further agreements from landowners for this additional workspace.

11.6 PROPOSED LAND ACQUISITION AND SCHEDULE

Land rights acquisition activities are scheduled to begin in Q3/Q4 2015. The submission of applications for Crown land interim licences and Crown dispositions are planned for Q1 2016.

For a preliminary acquisition schedule for each Crown land licence, permit and disposition required for the Project, see Table 11-6 (AB) and Table 11-7 (BC). These tables also provide the schedule for private land acquisition. For a statistical summary of land acquisition activities to date for Groundbirch Mainline Loop, see Table 11-8, and for Tower Lake Section, see Table 11-9. Land rights agreements will also be required for temporary access at locations to be finalized through detailed design.

NGTL has received signed survey acknowledgements from 100% of landowners along the proposed ROW.

NGTL anticipates that all land rights will be acquired and crossing agreements obtained before construction.

Table 11-6: Alberta Land Approvals and Preliminary Schedule

Approval	Department	Planned Submission Date	Required Receipt Date	Status
Permanent easement for the pipeline, and mainline block valve sites on Crown land.	AEP	Q1 2016	Q3 2016	Planned
Temporary occupation of Crown land for TWS.	AEP	Q1 2016	Q3 2016	Planned
Permanent easement and temporary occupation of private lands.	N/A	Q3 2015	Q2 2016	Planned

Table 11-7: British Columbia Land Approvals and Preliminary Schedule

Approval	Department	Planned Submission Date	Required Receipt Date	Status
Permanent easement for the pipeline, meter stations and mainline block valve sites on Crown land.	BCOGC	Q1 2016	Q3 2016	Planned
Temporary occupation of Crown land for TWS.	BCOGC	Q1 2016	Q3 2016	Planned
Permanent easement and temporary occupation of private lands.	N/A	Q3 2015	Q2 2016	Planned

Table 11-8: Groundbirch Mainline Loop Status of Land Acquisition (Freehold Land)

Project Component	Total s.87 Notices Required	Total s.87 Notices Served	Total Land Rights Agreements Required	Total Land Rights Agreements Obtained	Total Land Rights Agreements Outstanding	Estimated Timing of Land Acquisition (including service of s.87(1) notices)
Pipeline (ROW and TWS)	86	0	86	0	86	Q3/2015–Q2 2016
Valve Sites	2	0	2	0	2	Q3/2015–Q2 2016
Stockpile Sites	0	0	0	0	0	Q3/2015–Q2 2016

Table 11-9: Tower Lake Section Status of Land Acquisition (Freehold Land)

Project Component	Total s.87 Notices Required	Total s.87 Notices Served	Total Land Rights Agreements Required	Total Land Rights Agreements Obtained	Total Land Rights Agreements Outstanding	Estimated Timing of Land Acquisition (including service of s.87(1) notices)
Pipeline (ROW and TWS)	37	0	34	0	34	Q3/2015–Q2 2016
Valve Sites	0	0	0	0	0	Q3/2015–Q2 2016
Stockpile Sites	0	0	0	0	0	Q3/2015–Q2 2016
Meter Stations	2	0	2	0	2	Q3/2015–Q2 2016

11.7 COMPENSATION FOR LAND RIGHTS

NGTL's objective is to reach agreements with landowners for land rights, including agreement on compensation for land rights. When NGTL and a landowner cannot agree on compensation for land rights, either party may apply to the Minister of Natural Resources to receive the services of a negotiator, or to have the matter settled by arbitration.

11.8 DAMAGES

NGTL is committed to doing as little damage as possible to landowners' property as a result of its activities, and will make full compensation, in the manner provided for in the NEB Act, to landowners for any damages sustained by them.

11.9 LANDOWNER CONSULTATION AND CONCERNS

This section describes:

- principles, goals and scope of NGTL's landowner consultation program for the Project
- NGTL's landowner consultation activities to date
- concerns raised by landowners and NGTL's response to those concerns
- NGTL's plans for ongoing consultation

In this section, reference to landowners includes occupants where appropriate.

11.9.1 Principles and Goals

In addition to the stakeholder engagement principles and goals set out in Section 12, the goals of landowner consultation are to:

- share Project information
- identify and address Project-related landowner concerns
- support the acquisition of land rights necessary for Project construction, operations and maintenance

11.9.2 Landowner Consultation Activities

Through landowner consultation, NGTL's goal is to reach mutually satisfactory agreements for land access and land rights for Project construction, operations and maintenance. Throughout Project development, NGTL has had ongoing meetings and discussions with landowners. As of August 6, 2015, NGTL had held over 130 meetings, as well as numerous emails and phone calls with directly affected landowners.

Beginning in Q2 2014, NGTL representatives and external land agents consulted with all landowners on the proposed route. Contact was made to provide information about the Project and to obtain survey permission and access for environmental, geotechnical investigation and survey field studies. Landowners were provided with the Project mailouts in July 2014 (see Section 12).

Landowner consultation will continue throughout the life of the Project.

NGTL will arrange further meetings with landowners on an ongoing basis to:

- achieve service of the section 87(1) notices to landowners
- discuss issues related to land access and land rights acquisition, including compensation

- discuss the process for reaching agreement about land access and land rights
- provide updated Project information
- address questions or concerns that remain outstanding or have arisen since the point of last contact

Through consultation with landowners, specific issues and concerns are recorded and addressed on an ongoing basis. For a summary of landowner concerns and NGTL's responses, see Appendix 11-5. NGTL will continue to consult with landowners to identify the specific nature of the concerns or issues raised and ways to address them.

Several landowners and Crown disposition holders provided feedback on the pipeline routing. This feedback has been, and will continue to be, incorporated in NGTL's routing assessment, to the extent possible and practical. Multiple routing options were explored that balanced landowner concerns with NGTL's other routing criteria. Several route refinements were also made to address landowner concerns and to ensure the Project route would parallel other linear facilities to the greatest extent possible (see Section 7.1). NGTL remains committed to addressing landowner concerns throughout the development and construction phases of the Project.

11.9.3 Ongoing Consultation

Landowner consultation and land rights acquisition activities will continue during the regulatory review process.

Throughout the construction phase, NGTL will maintain contact with landowners and land users to address Project-related issues and concerns, and ensure that agreed-on mitigation or avoidance strategies are implemented.

Once the Project goes into service, NGTL's regionally based liaisons will continue to build and maintain relationships through consistent and ongoing communication with stakeholders. TransCanada's PA Program will be implemented as described in Section 10.5.

12.0 STAKEHOLDER ENGAGEMENT

This section describes NGTL's stakeholder engagement program for the Project. The overriding principle underpinning the stakeholder engagement program is that stakeholders will be engaged in a fair, honest, open, consistent and timely manner by NGTL representatives, and will have the opportunity to provide input into NGTL's project planning.

This section outlines the principles and goals that TransCanada used in designing its stakeholder engagement program, describes how that program is being implemented for the Project as it evolves and summarizes the feedback received to date.

For a description of the landowner consultation for the Project, see Section 11 and for the Aboriginal Engagement Program, see Section 13.

12.1 PRINCIPLES AND GOALS

The purpose and goals of the Stakeholder Engagement Program for the Project are to:

- formally introduce the Project to key stakeholders
- actively seek and consider comments on:
 - pipeline routing and facility site selection
 - potential environmental and socio-economic effects
 - mitigation, where necessary, to address potential adverse Project impacts
 - enhancement measures, where appropriate, to improve potential positive socio-economic effects
- identify and respond to issues and concerns before filing this Application
- provide stakeholders with ongoing Project updates, including communication about the proposed Project and the anticipated regulatory schedule and planned application to the Board
- ensure, where practical and reasonable, that stakeholder concerns or issues, if any, were incorporated in Project planning
- communicate changes to the Project, if any, to stakeholders
- facilitate ongoing communications that continue through the construction and operations phases to ensure future stakeholder concerns and issues, if any, are addressed appropriately and in a timely manner

12.2 DESIGN AND METHODOLOGY

The Stakeholder Engagement Program was designed and conducted by NGTL in accordance with the principles of TransCanada's stakeholder engagement framework, as well as community relations and communications best practices. The program is designed to:

- foster positive relationships with stakeholders
- provide opportunities for stakeholder input into the Project planning and development process
- provide information for stakeholders that minimizes uncertainty and increases clarity

The Stakeholder Engagement Program is undertaken in a phased approach and implemented using open communication and participatory stakeholder involvement practices. The phases of the program include:

- identification of stakeholders and development of notification materials
- notification and engagement
- transition of Project from construction to operations

12.2.1 Identification of Stakeholders and Development of Notification Materials

The first phase of engagement involves identifying potentially interested and affected stakeholders in the Project area and developing engagement materials, including letters, maps and information fact sheets that will be used for notification purposes. NGTL identifies those stakeholders most likely to be affected by, or have a potential interest in the Project before implementing an engagement program. NGTL compiles an initial list of potential stakeholders through a combination of:

- desktop research
- TransCanada and NGTL's own operating experience in the area
- TransCanada and NGTL's established network of contacts in the community
- personal contacts with and referrals from stakeholders

Stakeholders are encouraged to identify other potentially interested stakeholders for inclusion in the stakeholder engagement program.

As the process of identification is ongoing and continues throughout the evolution of the Project, the stakeholder list is regularly updated. In addition, stakeholders can self-identify by contacting the Project email account or toll-free telephone number.

NGTL initially identified the following stakeholders:

- landowners and occupants whose lands are traversed by the Project
- adjacent landowners and occupants
- land users (e.g., guides, outfitters and trappers)

- community members
- municipal leaders and representatives (e.g., regional districts and municipalities)
- elected officials (i.e., provincial and federal)
- government agencies and representatives
- non-government organizations
- emergency responders

12.2.2 Notification and Engagement

The notification and engagement phase focuses on public disclosure of the Project and solicitation of stakeholder input, using several engagement activities and communication tools. During this phase, NGTL seeks to:

- identify and address stakeholder questions and concerns
- provide clear, relevant and timely information about the Project
- provide an opportunity for stakeholders to provide feedback on the Project
- answer stakeholder questions about NGTL/TransCanada and the Project
- foster relationships between NGTL and communities along the proposed route
- inform stakeholders about the Board's regulatory review process
- ensure the Board's engagement process requirements are met or exceeded

NGTL's engagement continues throughout the regulatory process and Project construction.

12.2.3 Transition to Operations

The third phase of engagement will begin as the Project transitions from construction to operations. Any ongoing stakeholder concerns or issues related to Project construction or operations are managed through NGTL's regionally based liaisons, which will continue to build and maintain relationships through consistent and ongoing communication with stakeholders. TransCanada's PA Program will be implemented for the Project, as described in Section 10.5.

12.3 ENGAGEMENT TOOLS AND ACTIVITIES

An important component of NGTL's consultation is to provide timely and current information. Project information is continually produced, updated and distributed through hand delivery, mail, email and postings on the Project website. A toll-free telephone number and email address are also available to enable ready contact. The following sections outline some of the typical communication tools used.

12.3.1 Print Materials

A number of general information print materials were developed for the Project and used in mailouts, presentations, responses to inquiries, media backgrounders and at open houses. These materials included:

- Project letter to stakeholders
- Project Fact Sheet
- public notices
- Project maps
- open house invitations
- open house display boards
- PowerPoint presentations

12.3.2 Media Relations

Along with TransCanada's extensive community outreach program, TransCanada has a media relations program with a dedicated media line (403-920-7859 and 800-608-7859) and email address (communications@transcanada.com) to respond to incoming media inquiries in a timely and efficient manner.

12.3.3 Website

NGTL launched the Project website (www.transcanada.com/towerbirch.html) in June 2014. The website provides an overview of the Project, including routing and maps, Project schedule information, environment, safety and emergency response.

Through the website, stakeholders are encouraged to email any inquiries to the Project email address (towerbirch@transcanada.com), which is monitored daily by a Project representative.

12.3.4 Engagement Activities

In addition to the tools discussed above, NGTL also uses the following:

- personal contact with stakeholders including face-to-face meetings
- newspaper and radio advertisements
- open house engagements
- Project information distribution by mail and email
- media releases
- digital media posts
- TransCanada program brochures (e.g., Aboriginal Relations, Stakeholder Engagement) and the NEB brochure *Information for Proposed Pipeline or Power Line Projects That Involve a Hearing*

For sample copies of the following Project materials provided to stakeholders through engagement activities, see Appendix 12-1 through Appendix 12-10:

- Towerbirch Expansion Project July 11, 2014 letter to stakeholders
- Towerbirch Expansion Project Fact Sheet
- NEB brochure: *Information for Proposed Pipeline or Power Line Projects that Involve a Hearing*
- TransCanada brochure: *Your Safety, Our Integrity*
- Aboriginal Relations and Stakeholder Engagement brochures
- TransCanada corporate brochure
- open house invitations
- open house newspaper advertisements
- TransCanada Community Investment Brochure
- Towerbirch Expansion Project Public notice

For stakeholder activities undertaken to date for the Project, see Section 12.4.

12.4 IMPLEMENTATION OF THE ENGAGEMENT PROGRAM

NGTL's notification and engagement activities for the Project and feedback received from stakeholders are summarized in the sections following. For detailed summaries of stakeholder comments and NGTL responses, see the engagement logs covering communication with stakeholders between May 26, 2014 and August 6, 2015 in Appendix 12-11.

12.4.1 Overview

Initial implementation of the phased Stakeholder Engagement Program began in May 2014 and is ongoing. Preliminary Project notification emails sent to local government stakeholders on May 26, 2014 provided a high-level summary of the Project.

On July 15, 2014, NGTL mailed initial Project notification packages to all primary stakeholders to advise them of the preliminary details of the proposed Project. In October 2014, NGTL extended open offers to meet with regional and local municipalities to further discuss the Project materials provided.

On April 29, 2015 NGTL emailed a Project notification to all primary stakeholders to advise them of a scope refinement to the Project and provide additional information regarding NEB's regulatory process. Engagement activities and further planned activities are summarized in the sections following. The

Towerbirch Project Description was filed with the Board on May 29, 2015 and NGTL provided notice and a copy of the filing to stakeholders. NGTL continues to engage with stakeholders to provide updated Project information and to address any questions, concerns or issues that might arise.

12.4.2 Meetings with Local Government Stakeholders

From August 2014 to August 2015, NGTL met with representatives from two regional and three local districts in close proximity to Project components to provide information on the Project, and to understand and address their questions and concerns. Meetings were held with representatives from the following regional governments:

- Peace River Regional District
- Saddle Hills County
- City of Dawson Creek
- City of Fort St John
- District of Chetwynd

As requested by Saddle Hills County, NGTL made a Project presentation to the Saddle Hills County Council on February 10, 2015. The City of Dawson Creek and the Peace River Regional District have requested Project presentations to take place in fall 2015.

NGTL's council presentation to Saddle Hills County introduced the Project and explained TransCanada's natural gas transmission pipelines and the need for energy infrastructure. NGTL representatives:

- spoke to the role of the NEB
- described TransCanada's Stakeholder Engagement Program
- described TransCanada's landowner notification and consultation
- explained essential components of TransCanada's safety, integrity and maintenance programs

Local government representatives from Saddle Hills County were generally interested in information on:

- proposed pipeline routes and facility locations
- potential positive socio-economic impacts on their community
- impact on local infrastructure
- workforce accommodation
- project and regulatory timelines
- pipeline characteristics, maintenance and safety

12.4.3 Open Houses

In August 2015, open house events were hosted in Bonanza, AB and Groundbirch, BC to provide participants with information about the Project.

These events were open to the general public to provide an opportunity for participants to ask questions and provide input to the Project.

Open house invitations were sent to local county and municipal council members, along with key staff via email on July 22, 2015. All landowners along the proposed pipeline route were personally contacted and invited by Project land agents. The open houses were also advertised in local newspapers three weeks before the events.

Advertisements were placed in the following local newspapers between July 15 and July 31, 2015:

- Rycroft Central Peace (Rycroft – Bay Tree, Bonanza, Silver Valley, Saddle Hills County, Birch Hills County)
- Northern Horizon (Bay Tree, Groundbirch, Bear Canyon, Beaverlodge, Blueberry Mountain, Bluesky, Bonanza, Canyon Creek, Chetwynd)
- Dawson Creek Mirror (Dawson Creek – Groundbirch, Bay Tree)
- Alaska Highway News (Fort St. John)
- Chetwynd Echo (Chetwynd, Groundbirch)

Advertisements were also aired on the following local radio stations between July 21 and August 3, 2015:

- CHAD/Peace FM (Dawson Creek/Bay Tree, Groundbirch)
- CJDC/Peace Country's Country (Dawson Creek, Bay Tree, Groundbirch)
- Moose FM/CKFU FM (Fort St John, Tower Lake)
- CHRX FM/Sun FM (Fort St John, Tower Lake)

The open houses were held in the McLeod Community Hall in Groundbirch, BC on August 5, 2015 from 5:00 to 8:00 p.m. and the Bonanza Agricultural Society Hall in Bonanza, AB on August 4, 2015 from 5:00 to 8:00 p.m. There were 24 attendees at the Bonanza, AB event and 25 attendees at the Groundbirch, BC event.

Open house attendees were able to learn more about the Project through discussions with TransCanada representatives and by reviewing Project information displays and handouts. Attendees were encouraged to ask questions and raise any issues or concerns they might have.

12.5 STAKEHOLDER FEEDBACK

Throughout extensive consultation and engagement with local government, the following matters have been the primary topics of discussion:

- visual effects of ROW construction
- watercourse crossing methods
- local contracting and hiring opportunities available through the Project
- effects on recreational land users
- potential effects on community infrastructure
- traffic management
- capacity of small, local governments with limited staff resources to assess applications and consult through council presentations and meeting requests
- Land Use Permits in the Peace River Regional District

Consultation and engagement with the general public, including community members, landowners, nearby occupants and other stakeholders has been accomplished through open house events, the project telephone line and email address, and Project representation at community events.

During consultation and engagement with the general public, the primary topics of conversation were:

- construction ROW width
- TransCanada's general level of activity in northeastern BC
- location of facilities sites
- local contracting and hiring opportunities available through the Project
- timing of land acquisition
- reclamation and land use after construction
- necessity of crossing agreements to traverse pipeline ROW
- pipe integrity and emergency response
- weed management on the Project and the existing Groundbirch ROW

Feedback gathered through consultation and engagement with local government and the general public has been discussed at length and, when possible, will continue to be incorporated in project planning and execution.

12.6 ONGOING STAKEHOLDER CONSULTATION

NGTL will continue to engage stakeholders through all Project phases and respond appropriately through the regulatory review process and until completion of Project construction. Updates to the Project website and monitoring of the email address and toll-free telephone line will also continue until construction is complete.

Once the Project is in service, regionally based NGTL liaisons will continue to build and maintain relationships through consistent and ongoing communication with stakeholders. TransCanada's PA Program will be implemented for the Project as described in Section 10.5.

13.0 ABORIGINAL ENGAGEMENT

The Aboriginal Engagement Program for the Project was developed and implemented to anticipate, prevent, mitigate and manage potential Project-related effects on the exercise of Aboriginal or Treaty rights and interests. This section describes NGTL's Aboriginal Engagement Program for the Project, and engagement completed to date, including:

- principles and goals of the Aboriginal Engagement Program
- design of the Aboriginal Engagement Program
- outcome of engagement activities to date
- socio-economic opportunities
- planned ongoing engagement

NGTL recognizes and respects the preference of individual communities and organizations to be addressed in a way that distinguishes their First Nation or Métis identity. In this Application, the term Aboriginal communities and organizations is used when referring to more than one community, and might encompass First Nation and Métis communities or organizations that could be potentially affected by or interested in the Project. Organizations might include tribal councils, Métis provincial organizations and other provincial–territorial organizations.

13.1 PRINCIPLES AND GOALS

For this Project, NGTL adopted TransCanada's policies, principles and practices in the design and implementation of the Aboriginal Engagement Program.

13.1.1 Principles

The following principles guide NGTL's Aboriginal Engagement Program:

- respect the diversity of Aboriginal cultures, recognize the importance of the land and cultivate relationships based on trust and respect
- work together with Aboriginal communities to understand their perspective and identify impacts of company activities with respect to each community's values and needs to find mutually acceptable solutions and benefits
- respect the legal and constitutional rights of Aboriginal peoples and recognize that NGTL's relationships with Aboriginal peoples are separate and different from the relationships between Aboriginal peoples and the Crown

NGTL recognizes that its Aboriginal Engagement Program is separate from, but complementary to, the Crown's duty to consult Aboriginal peoples about potential impacts of Crown decisions on Aboriginal and treaty rights. NGTL's Aboriginal Engagement Program does not purport to supplant or diminish the Crown's activities in that regard but can be used to inform both the NEB's and the Crown's understanding.

13.1.2 Goals

The goals of the Aboriginal Engagement Program for the Project are to:

- develop and share timely information to allow for informed, effective and meaningful engagement with communities
- identify acceptable community engagement protocols and practices
- respond promptly to commitments and communication with respect to the needs and interests and concerns identified by each community
- strive to create short- and long-term employment and business opportunities for Aboriginal peoples affected by NGTL's activities
- support learning opportunities to provide a well-trained source of Aboriginal employees and build capacity in Aboriginal communities
- support the participation (e.g., capacity funding and information sharing) of Aboriginal communities and organizations who might be affected by the Project through negotiation of mutually acceptable work plans and budgets
- use TK to inform the Project design, where feasible
- ensure that input from and concerns of Aboriginal communities and organizations are gathered, understood and considered in Project design and execution, as appropriate
- ensure that Aboriginal communities and organizations are aware of how their input has influenced the ESA and Project planning

13.2 DESIGN OF THE ABORIGINAL ENGAGEMENT PROGRAM

The Aboriginal Engagement Program is designed to foster productive dialogue and exchange of information with potentially affected Aboriginal communities and organizations with an interest in the Project. It is also developed and adapted according to the nature, location and potential effects of the Project, and the interests, information needs and concerns of Aboriginal communities and organizations. While the underlying principles remain the same, the purpose, scope and depth of engagement varies according to the potential for Project-related effects and the identified interests of each Aboriginal community and organization.

At the core of the Aboriginal Engagement Program is an iterative process designed to provide Aboriginal communities with opportunities to participate in the Project. To implement the engagement program, NGTL uses a wide range of activities and communication tools to engage Aboriginal communities and organizations.

The following section describes NGTL's Aboriginal Engagement Program and approach to implementation of the program with potentially affected Aboriginal

communities and organizations, inclusive to August 1, 2015. For a summary of engagement for each potentially affected Aboriginal community and organization, see Section 13.6.3 and for detailed records of engagement, see Appendix 13-1.

NGTL's Aboriginal engagement is guided by TransCanada's Aboriginal Relations Policy (see Appendix 12-5), and is carried out according to a five-step process, as follows:

- Step 1: Initial Determination
- Step 2: Community Identification and Confirmation
- Step 3: Sharing Project Information
- Step 4: Responding to Questions, Issues and Concerns
- Step 5: Incorporating Traditional Land Use (TLU) and Traditional Ecological Knowledge (TEK) as appropriate

Factors that influenced the Aboriginal Engagement Program design include:

- Project scope: approximately 32 km of new pipeline (Tower Lake Section) and approximately 55 km of pipeline loop (Groundbirch Mainline Loop) and three meter stations
- Project location and nature of the land: the Tower Lake Section crosses approximately 93% freehold land and 7% Crown land and the Groundbirch Mainline Loop crosses approximately 82% freehold land and 18% Crown land
- approximately 79% of the Project will parallel or proposed existing linear disturbances

13.2.1 Step 1: Initial Determination of Potentially Affected Aboriginal Communities and Organizations

To identify a preliminary list of Aboriginal communities and organizations that might be affected by the Project, NGTL considered the proximity of the Project to:

- reserves under the *Indian Act*
- First Nations asserted traditional territory
- Aboriginal settlements and communities
- Aboriginal harvesting and traditional use areas

The Project is located within the boundaries of Treaty 8 in AB and BC. The Project does not cross any lands that are defined as a reserve, or that have been designated for reserve, under the *Indian Act*. No Métis Settlements governed by the Métis Settlements General Council are traversed by the Project. The Project area is located in Métis Nation of Alberta – Region 6. The Project is also located in the Northeast Region of the Métis Nation of BC and the BC Métis Federation.

NGTL determined its initial list of Aboriginal communities and organizations potentially affected by the Project through a combination of desktop research,

NGTL's own operating experience, including past projects in the region, and an established network of contacts with Aboriginal communities and organizations in the Project area.

As a result of the initial assessment, NGTL determined that the following Aboriginal communities and organizations might have an interest in the Project, or interests potentially affected by the Project:

- BC Métis Federation (BCMF)
- Fort St John Métis Society (FSJMS)
- Red River Métis Society (RRMS)
- Dawson Creek Métis Federation (DCMF)
- Blueberry River First Nations (BRFN)
- Doig River First Nation (DRFN)
- Duncan's First Nation (DFN)
- Fort Nelson First Nation (FNFN)
- Halfway River First Nation (HRFN)
- Horse Lake First Nation (HLFN)
- Kelly Lake Cree Nation (KLCN)
- Kelly Lake First Nation (KLFN)
- Kelly Lake Métis Settlement Society (KLMSS)
- McLeod Lake Indian Band (MLIB)
- Métis Nation of Alberta (MNA)
 - Métis Nation of Alberta – Region 6 (MNA Region 6)
- Métis Nation of BC (MNBC)
 - Moccasin Flats Métis Society (MFMS)
 - North East Métis Association (NEMA)
- Prophet River First Nation (PRFN)
- Saulteau First Nations (SFN)
- Treaty 8 Tribal Association (T8TA)
- Western Cree Tribal Council (WCTC)
- West Moberly First Nations (WMFN)

13.2.2 Step 2: Community Identification and Confirmation

On July 15, 2015, NGTL received a list of additional potentially affected Aboriginal communities and organizations from the Major Projects Management Office (MPMO). As a result, the following three additional Aboriginal communities and organizations were identified for preliminary Project engagement:

- Dene Tha' First Nation (DTFN)
- Grande Prairie Métis Local 1990 (GPML 1990)
- Métis Nation of Alberta – Region 4 (MNA Region 4)

Through the initial identification processes described in Section 13.2.1, NGTL is of the view that there is limited potential for Project-related effects on two of the additional Aboriginal communities and organizations, DTFN and MNA – Region 4, as identified by the MPMO.

Of the originally identified Aboriginal communities and organizations, HRFN indicated they are not interested in the Project and NGTL has not received a response from FNFN, WCTC or the Treaty 8 Tribal Association regarding interest in the Project.

After the initial identification and regulatory validation, Aboriginal communities and organizations were contacted by NGTL to confirm:

- whether the Project crosses lands identified by the community as being in their asserted traditional territory or area of interest
- whether the community has an interest in the Project and the appropriate first point of contact for communications

Confirmation of Aboriginal communities for Project engagement was also intended to identify a community-specific engagement approach to the Project.

For the locations of Aboriginal groups in proximity to the proposed Project, see Figure 13-1. Due to distance of their communities from the proposed Project, FNFN, PRFN and DTFN are not shown in Figure 13-1. Also, because BCMF, MNBC and MNA represent membership, including chartered communities, affiliated communities and locals, they are not shown in Figure 13-1.

13.2.3 Step 3: Sharing Project Information

Project-related information was provided to potentially affected Aboriginal communities and organizations at the onset of the engagement process and continues to be provided on an ongoing basis. The initial information package described in Section 13.2.4 provided a summary of the Project scope, including a map showing the Project area, proposed route, Project schedule and NGTL contact information.

Project Information Packages

NGTL provided initial Project notification packages to potentially affected Aboriginal communities between June 2014 and July 2015. Project notification packages consisted of both hard copies and digital copies of the fact sheet, Project shape files and an overview map.

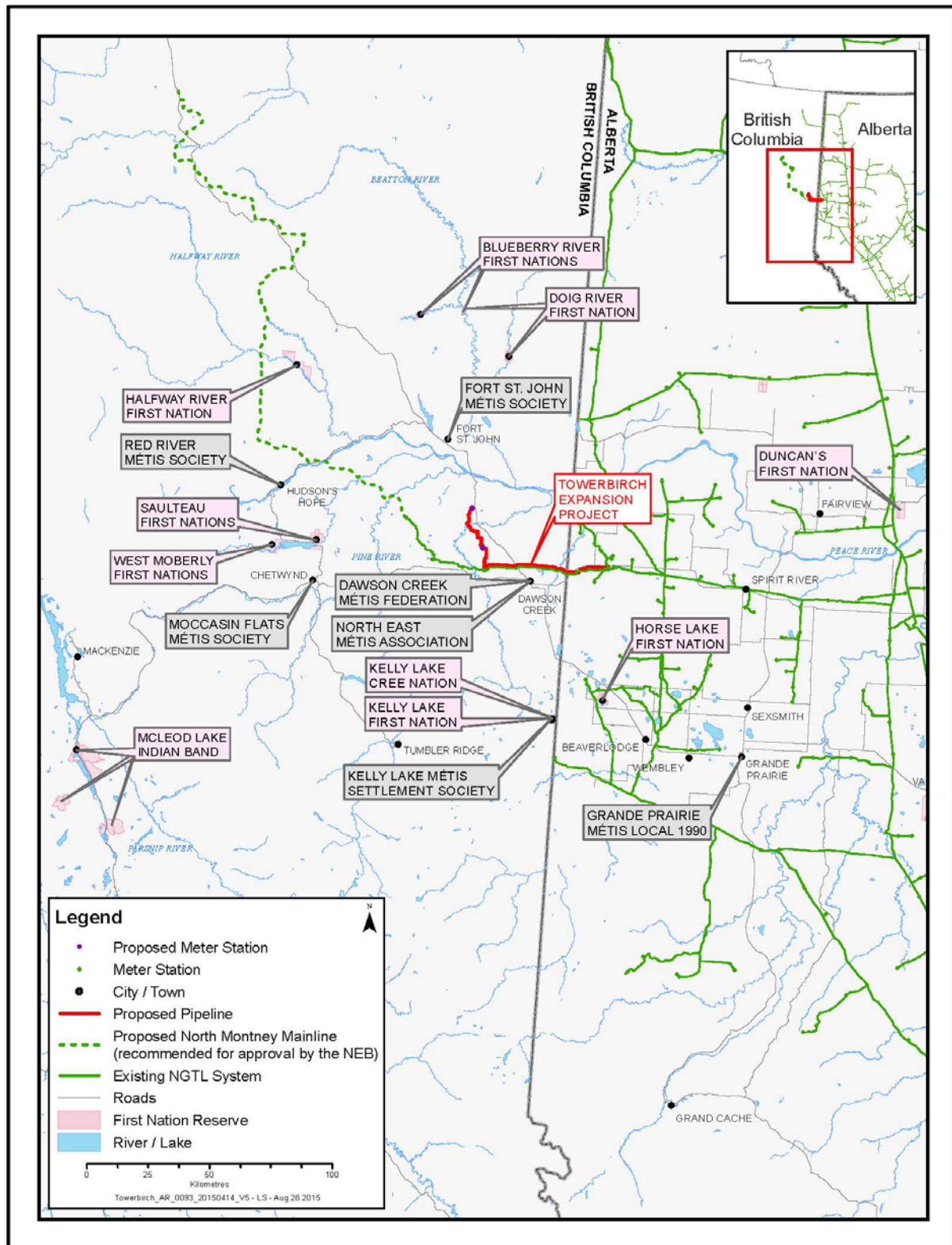


Figure 13-1: Aboriginal Communities in Proximity to Project Area

The following information was provided to Aboriginal communities and organizations:

- Preliminary Project Fact Sheet (June 2014)
- NEB brochure *Information for Proposed Pipeline or Power Line Projects That Involve a Hearing* (see Appendix 12-3)
- TransCanada brochure *Your Safety, Our Integrity* (see Appendix 12-4)
- TransCanada brochures *Stakeholder Engagement, Aboriginal Relations* (see Appendix 12-5)

Project Description

The Project Description was filed with the Board on May 29, 2015 and NGTL provided notice and a copy of the filing to those Aboriginal communities and organizations potentially affected by the Project. This notification included an updated Project-specific fact sheet (see Appendix 12-2).

On August 6, 2015, NGTL notified the three additional Aboriginal groups identified by the MPMO. These groups were sent an updated Project-specific fact sheet, a hard copy of the Project Description, and the NEB and TransCanada brochures provided to the initially identified Aboriginal communities and organizations.

Face-to-Face Meetings

NGTL believes meetings are often the most important forum for the exchange of information. Meetings were held with interested Aboriginal communities and organizations to enable them to learn more about the Project, as well as to determine interest in engagement and to develop a process for involvement.

Meetings were also held to:

- introduce the Project (timelines, Project description, regulatory requirements and process)
- provide a broad understanding of the NEB process
- discuss methods for conducting engagement in the community
- identify and develop strategies to address capacity issues with Aboriginal communities to participate in the Project review, including negotiating TK protocol agreements and engagement capacity work plans
- identify community concerns, interests and opportunities
- obtain input and feedback on environmental field studies
- identify site-specific issues and concerns and discuss proposed mitigation measures

- identify economic development opportunities including training, contracting and employment

Aboriginal engagement logs (see Appendix 13-1) describe the meetings, emails, mailouts and phone calls held to date, issues and concerns raised, and how these have been, are being or cannot be addressed by the Project.

Work Plan Agreements

Work plans are used to identify the engagement activities agreed to be undertaken by the Aboriginal communities and organizations potentially affected by NGTL's projects. These agreements typically define and support the engagement process and include funding provisions for community investment and community capacity development.

13.2.4 Step 4: Responding to Questions, Issues and Concerns

Questions, issues and concerns expressed by Aboriginal community and organization representatives during engagement activities are documented by NGTL. Concerns might also be communicated to NGTL technical specialists for a response and/or resolution, as appropriate. Once a response or resolution is developed it is provided to the Aboriginal community or organization's representatives for further comment or dialogue. This process can be iterative and repeated until a satisfactory response or resolution is achieved.

Issues and concerns that arise during participation in field surveys, and possible mitigation measures designed to address those issues, are discussed by participants in the field and recorded by NGTL personnel. Following field surveys, the recorded issues and concerns are either provided to the Aboriginal community or organization representatives in writing, or discussed in a follow-up meeting with the Aboriginal community or organization representatives, as requested. The results of those discussions are used to help refine the ESA, EPP and environmental alignment sheets for the Project.

NGTL's land department engages directly with registered trapline holders through NGTL's trapper notification and compensation program to manage concerns specific to potential Project effects on traplines held by Aboriginal community members. Where requested, an Aboriginal community's consultation process may encourage updates on engagement with trapline holders to ensure continuity of trapper engagement.

13.2.5 Step 5: Incorporating TLU and TEK

Where a project might directly affect the exercise of potential or established Aboriginal and Treaty rights and related interests, NGTL provides opportunities for interested communities and organizations to provide Aboriginal TK for consideration in the application.

Generally, NGTL understands TK to be knowledge that is held by, and unique to, Aboriginal peoples. TK can consist of TEK and TLU information, which is typically identified by, and gathered through, engagement with interested Aboriginal communities and organizations.

The primary objective of the Project's TK Program is to gather information to assist in identifying potential effects of the Project on environmental and socio-economic elements of identified interest to Aboriginal communities and organizations.

The TK Program for the Project seeks to:

- identify and consider potential adverse effects on the current use of lands and resources for traditional purposes, including potential effects on:
 - sites of cultural and historical importance
 - hunting, trapping, fishing or gathering areas
 - other areas or importance
- gather TEK for incorporation in the ESA and Project planning
- identify issues and concerns about the Project, including:
 - pipeline routing and facility site selection
 - potential adverse environmental effects and socio-economic effects
 - proposed measures to avoid, mitigate or otherwise manage potential adverse Project effects

TEK/TLU baseline information, including information collected during biophysical field participation has been incorporated throughout the ESA, specifically Section 5 and Section 6 of the ESA. Section 5 describes the environmental and socio-economic setting, which includes traditional land and resource use (TLRU). The TLRU setting provides an overview of the TLRU activities being conducted in the Project area, including hunting, trapping, fishing, plant harvesting and culturally important sites and areas, and considers input from Aboriginal communities and organizations through TLU information and participation in the biophysical studies.

Section 6 of the ESA describes the environmental and socio-economic effects assessment, including potential effects on TLRU (specific issues and concerns identified through engagement activities) and NGTL's response and mitigation measures.

13.3 TRADITIONAL KNOWLEDGE DATA COLLECTION PROTOCOLS

Protocols and processes are developed between NGTL, its environmental consultants and each Aboriginal community and organization participating in the TK Program for the Project. Data and information that Aboriginal communities and organizations might consider confidential is defined within TK Protocol Agreements signed with Aboriginal communities, and will not be included in materials submitted on the public record for the Application. However, this information will be used by NGTL to inform Project design and mitigation recommendations in accordance with the protocols and processes agreed on between NGTL and each Aboriginal community and organization.

As well, collection protocols are developed considering the guidance provided in the NEB Filing Manual and the CEAA Agency's *Considering Aboriginal Traditional Knowledge in Environmental Assessments Conducted Under the CEAA – Interim Principles*.

13.3.1 Traditional Knowledge Program Activities

The following groups have elected to contribute TEK during participation in the biophysical field studies for the Project:

- Duncan's First Nation
- Horse Lake First Nation
- Kelly Lake Cree Nation
- McLeod Lake Indian Band
- Prophet River First Nation
- Saulteau First Nation

Three Aboriginal groups, including BRFN, WMFN and DRFN have chosen not to share TEK for Project purposes during their participation in the biophysical field studies. However, all three communities have participated in the biophysical field studies and field participants contributed to the discussion of issues and concerns and of potential mitigation measures to reduce potential Project-related effects.

To date, the following groups have identified an interest in conducting independent TLU studies for the Project:

- Doig River First Nation
- Duncan's First Nation
- Horse Lake First Nation
- Kelly Lake Cree Nation
- McLeod Lake Indian Band
- MNA Region 6
- Métis Nation of BC
- Saulteau First Nation
- West Moberly First Nation

NGTL has been unable to confirm BRFN's and PRFN's interest in conducting TLU studies for the Project. NGTL will continue its engagement efforts throughout Project planning.

NGTL will continue to progress the TLU studies and evaluate and assess additional TEK and TLU information and reports as they become available.

For a summary of each Aboriginal group's participation in the field study program and update on the status of TLU study progress to date, see Table 13-1.

Table 13-1: TK Program Status by Aboriginal Community

Aboriginal Group	Field Study Participation	TLU Study
Blueberry River First Nation	Aquatics Wildlife (winter tracking) Soils Archaeology	No response to date about plans for a TLU study.
Doig River First Nation	Aquatics Wildlife (winter tracking) Vegetation Soils Archaeology	Currently conducting independent study. NGTL awaiting final TLU study.
Duncan's First Nation	Aquatics Wildlife (winter tracking) Vegetation Wetlands Soils Archaeology	Requested to conduct an independent TLU study; NGTL will continue to follow up with DFN to determine interest in conducting a TLU study.
Horse Lake First Nation	Participation in Supplemental Field Studies planned for Q3/Q4 2015	Requested to conduct an independent TLU study, NGTL and HLFN are currently progressing a TLU Study Protocol Agreement.
Kelly Lake Cree Nation	Aquatics Wildlife (winter tracking) Soils Archaeology	Requested to conduct an independent TLU study, NGTL and KLCN are currently progressing a TLU Study Protocol Agreement.
McLeod Lake Indian Band	Wildlife (Winter tracking) Soils Archaeology	Requested to conduct an independent TLU study; NGTL will continue to follow up with MLIB to determine interest in conducting a TLU study.
Prophet River First Nation	Wildlife (winter tracking) Archaeology	No response to date about plans for a TLU study.
Saulteau First Nation	Wildlife (winter tracking) Soils Archaeology	Requested to conduct an independent TLU study; NGTL will continue to follow up with SFN to determine interest in conducting a TLU study.

Table 13-1: TK Program Status by Aboriginal Community (cont'd)

Aboriginal Group	Field Study Participation	TLU Study
West Moberly First Nation	Aquatics Wildlife (winter tracking) Archaeology	Requested to conduct an independent TLU study; NGTL and WMFN are currently progressing a TLU Study Protocol Agreement.
BC Métis Federation	Site visits	No TLU studies are planned. BCMF information is being collected through Project site visits.
Métis Nation of BC	Site visits	Currently conducting independent study. NGTL awaiting final TLU study.
MNA Region 6	N/A	Interested in conducting an independent study. NGTL and MNA – Region 6 are currently progressing TLU Study Protocol Agreement.
Kelly Lake Métis Settlement Society	Helicopter site visits	No TLU studies are planned. KLMSS information is being collected through Project site visits.

13.4 OUTCOMES OF THE ENGAGEMENT PROGRAM

Since June 2014, all Aboriginal engagement activities and comments, as well as issues and concerns raised from those activities, have been and will continue to be tracked and a response provided. Aboriginal engagement information is collected and managed in a database designed specifically to support this work and captures the engagement efforts with each Aboriginal community and organization.

Information collected includes the following:

- list of Aboriginal communities and organizations who were provided with Project-specific information
- description of how and when information was provided
- dates and location of activities and meetings throughout the engagement process
- summary of engagement efforts and outcomes, including information on issues and concerns raised, and responses and measures taken to address the concerns, where appropriate
- description of outstanding concerns and proposed follow-up with Aboriginal communities and organizations, if required

13.4.1 Summary of Concerns and Responses

Input received from Aboriginal communities and organizations during the engagement program is considered throughout Project planning, and development of the Application and the ESA. Although community members and representatives raised a wide range of issues throughout the engagement process, recurring themes have emerged, as follows:

- consultation fatigue
- lack of capacity to engage on the Project
- increased access and access restrictions
- cumulative effects
- environmental concerns, including habitat fragmentation
- training and employment
- participation in field studies

For a detailed summary of the issues raised by potentially affected Aboriginal communities and organizations with NGTL's responses and cross-references to where these issues are considered in the Application, see Appendix C of the ESA.

13.4.2 Mitigation and Issue Resolution

NGTL attempts to work collaboratively with Aboriginal communities and organizations to address Project-related concerns where possible, and to provide information on how their input influenced Project design changes. The mitigation measures identified for the Project are developed by NGTL in collaboration with Aboriginal communities and organizations during the engagement process, as described above. NGTL continues to discuss with Aboriginal communities and organizations the proposed measures to avoid, mitigate or otherwise manage potential effects of the Project and to address or respond to concerns identified.

13.4.3 Aboriginal Engagement Activities

This section provides an overview of the engagement activities carried out with each potentially affected Aboriginal community and organization from June 2014 to August 1, 2015.

NGTL will continue to document and respond to Project-related issues and concerns identified by each Aboriginal community and organization as engagement progresses. NGTL will also continue to share Project information with these communities.

NGTL's engagement activities with Aboriginal communities and organizations, including a list of issues and concerns, are summarized in this section. For specific responses to issues and concerns raised by Aboriginal communities and organizations, including potential mitigation measures identified as addressing specific concerns, see Appendix C of the ESA.

Some Aboriginal communities have provided community members to participate in biophysical field studies, but have not responded to NGTL's requests for formal meetings on the Project. In these situations, issues and concerns raised by those community members during field studies were recorded and provided to community representatives for review. This information will continue to be used by NGTL to inform Project routing and mitigation.

Blueberry River First Nations

NGTL initially shared Project information with BRFN in June 2014.

NGTL extended invitations to meet with BRFN on three occasions in 2014 (July, September and October) and twice in June and July 2015. To date, NGTL has not received a response from BRFN to arrange a meeting to discuss the Project.

BRFN representatives have participated in numerous biophysical field studies for the Project, including aquatics, soils, archaeology and wildlife field studies.

BRFN has raised the following key issues through the Project's biophysical field studies:

- potential impacts on wildlife and wildlife habitat
- potential restrictions to accessing traditional land and resources

All issues and concerns collected during the biophysical field studies have been provided to BRFN for their review and have been responded to by NGTL in Appendix C of the ESA. At time of filing, BRFN had not responded to NGTL's attempts to vet the issues and concerns collected during the biophysical field studies. NGTL will continue to make efforts to engage with BRFN on this Project.

British Columbia Métis Federation

NGTL initially shared Project information with BCMF in June 2014 and held an introductory conference call with BCMF in July 2014 to confirm that BCMF received the Project information and to discuss Project-specific engagement activities.

NGTL committed to meet with BCMF-affiliated communities closest to the Project – DCMF, FSJMS and RRMS – to identify interests and concerns related to the Project. BCMF expressed an interest in conducting mapping workshops with BCMF-affiliated communities to identify areas of interest and concern. NGTL and BCMF signed a Letter of Agreement and work plan to provide BCMF-affiliated communities with funding to engage with NGTL on the Project in November 2014.

NGTL held Project mapping workshops with DCMF and FSJMS in November 2014 and January 2015. NGTL facilitated site visits with DCMF and FSJMS in May 2015 based on information collected during the mapping workshop. In March 2015, based

on the information collected in the Project mapping workshop, RRMS indicated that they were not interested in a site visit.

BCMF has raised the following interests and issues through Project engagement activities to date:

- consultation fatigue
- potential Project employment and training opportunities

In response to these issues, NGTL's Supply Chain and Aboriginal Contracting team met with BCMF in April 2015 and June 2015 to provide additional information on potential contracting and employment opportunities with NGTL projects.

NGTL is currently reviewing a proposal to participate in BCMF's Industry Forum scheduled for fall 2015. NGTL continues to engage with BCMF to follow up on proposed mitigation measures and responses, and to address any potential concerns about the Project. At time of filing, all issues and concerns have been responded to in meetings, correspondence or in Appendix C of the ESA.

Dawson Creek Métis Federation

NGTL initially shared Project information with DCMF in June 2014.

NGTL met with DCMF to discuss the Project in November 2014 and held a Project mapping workshop. DCMF also participated in a second mapping workshop in January 2015. Based on the information collected during these workshops, NGTL facilitated a site visit with DCMF in May 2015.

DCMF has raised the following interests and issues through Project engagement activities to date:

- potential employment and training opportunities
- consultation and engagement with Métis organizations
- additional monitoring opportunities throughout the life of the Project
- potential impacts on environmentally sensitive areas
- potential impacts on surface water and ground water
- potential impacts on fish and fish habitat
- reclamation activities

At time of filing, all issues and concerns have been responded to in meetings, correspondence or in Appendix C of the ESA. For further information on engagement with DCMF, see the BCMF engagement summary.

Fort St. John Métis Society

NGTL initially shared Project information with FSJMS in June 2014.

NGTL met with FSJMS to discuss the Project in November 2014 and held a Project mapping workshop in January 2015. Based on the information collected during these workshops, NGTL facilitated a site visit with FSJMS in May 2015.

FSJMS has raised the following interests and issues through Project engagement activities to date:

- potential employment and training opportunities
- potential impacts on surface water and groundwater
- potential impacts on fish and fish habitat
- potential impacts on air quality

At time of filing, all issues and concerns have been responded to in meetings, correspondence or in Appendix C of the ESA. For further information on engagement with FSJMS, see the BCMF engagement summary.

Red River Métis Society

NGTL initially shared Project information with RRMS in June 2014.

NGTL met with RRMS to discuss the Project and hold a Project mapping workshop in November 2014. In March 2015, based on the information collected in the Project mapping workshop, RRMS indicated they were not interested in a site visit.

NGTL met with RRMS to provide a Project update and additional Project information in June 2015.

RRMS has raised the following interests and issues through Project engagement activities to date:

- potential impacts on wildlife and wildlife habitat
- potential increase in access to traditional land and resources
- potential strain on infrastructure and services near the Project
- potential Project employment and training opportunities
- contractor health and safety records

At time of filing, all issues and concerns have been responded to in meetings, correspondence or in Appendix C of the ESA. For further information on engagement with RRMS, see the BCMF engagement summary.

Dene Tha' First Nation

NGTL had not initially identified DTFN as an Aboriginal community potentially affected by the proposed Project because of the existing Community Cooperation Protocol Agreement between DTFN and TransCanada. The Project is outside their traditional territory as defined in the Agreement.

In July 2015, NGTL received direction from the MPMO to engage with DTFN. In August 2015, NGTL provided DTFN with Project information, as well as a copy of the Project Description filed with the NEB on May 29, 2015.

DTFN has not communicated any issues or concerns about the Project to date. NGTL will continue to notify DTFN of major Project milestones and will respond to requests or concerns that might be identified.

Doig River First Nation

NGTL initially shared Project information with DRFN in June 2014. NGTL attempted to schedule a Project meeting with DRFN several times in July, August and September 2014 and January, February and June 2015. NGTL and DRFN met to discuss the Project in July 2015.

DRFN representatives have participated in numerous biophysical field studies for the Project, including aquatics, soils, vegetation, archaeology and wildlife field studies.

DRFN has raised the following key issues through Project engagement activities to date:

- wildlife and wildlife habitat
- TLRU and access

DRFN is currently conducting a TLU study for the Project. NGTL continues to engage with DRFN to follow up on proposed mitigation measures and responses, and to address any potential concerns about the Project. At time of filing, all issues and concerns have been responded to in meetings, correspondence or in Appendix C of the ESA.

Duncan's First Nation

NGTL initially advised DFN of the Project during a meeting in May 2014 before sending out Project notification packages in June 2014. NGTL held Project meetings with DFN in August and October 2014. NGTL facilitated an ESA workshop with DFN in October 2014.

DFN representatives have participated in numerous biophysical field studies for the Project, including aquatics, archaeology, soils and wildlife field studies.

DFN has raised the following interests and issues through Project engagement activities to date:

- potential impacts on wildlife and wildlife habitat, including declining animal (particularly moose) populations in the area
- potential impacts on surface water and groundwater

- potential impact on traditional practices due to increased activity and access
- potential restrictions to accessing traditional land and resources
- potential accidents or malfunctions
- Project planning, design and construction
- additional monitoring opportunities throughout the life of the Project
- potential Project employment and training opportunities
- cumulative effects
- concerns about the regulatory process and engagement
- importance of Saddle Hills area to DFN

NGTL is waiting for DFN to provide potential meeting dates to discuss next steps for engagement. DFN has expressed an interest in completing a TLU study for the Project. NGTL continues to engage with DFN to follow up on proposed mitigation measures and responses, and to address any potential concerns about the Project. At time of filing, all issues and concerns have been responded to in meetings, correspondence or in Appendix C of the ESA.

Fort Nelson First Nation

NGTL initially shared Project information with FNFN in June 2014. To date, FNFN has not responded to NGTL's Project notifications or communicated any issues or concerns relating to the Project.

The Project footprint is located outside FNFN traditional territory and NGTL will continue to provide updates on major Project milestones and to respond to requests or concerns that might be identified.

Halfway River First Nation

NGTL initially shared Project information with HRFN in June 2014. HRFN informed NGTL in October 2014 that they have no issues or concerns about the Project.

NGTL will continue to notify HRFN of major Project milestones and will respond to requests or concerns that might be identified.

Horse Lake First Nation

NGTL initially shared Project information with HLFN in June 2014. To date, NGTL has not been able to schedule a Project meeting with HLFN despite attempts in July and August 2014 and May 2015.

NGTL invited HLFN to participate in biophysical field studies for the Project in July, September, October, November and December 2014 but received no response until an additional round of invitations were sent to HLFN in May 2015. Since May 2015, HLFN representatives have participated in supplemental archaeology, fish and fish habitat, vegetation and wildlife field studies.

HLFN has expressed interest in completing a map review and site assessment for the Project and has provided NGTL with a proposal. NGTL is reviewing the Map Review and Site Assessment proposal HLFN submitted in July 2015.

At time of filing, all issues and concerns collected during the biophysical field studies have been responded to by NGTL in Appendix C of the ESA.

Kelly Lake Cree Nation

NGTL initially shared Project information with KLCN in June 2014. NGTL held Project meetings with KLCN in February and May 2015 and presented Project information to community members at the KLCN Spring Gathering in April 2015.

KLCN representatives have participated in numerous biophysical field studies for the Project, including aquatics, archaeology, soils and wildlife field studies.

KLCN has raised the following interests and issues through Project engagement activities to date:

- potential impacts on wildlife and wildlife habitat
- potential restrictions to accessing traditional land and resources
- participation in biophysical field studies
- additional environmental monitoring opportunities
- potential Project employment and training opportunities
- water quality

KLCN has expressed an interest in completing a TLU study for the project. NGTL is reviewing the TLU study proposal submitted in July 2015. NGTL continues to engage with KLCN to follow up on proposed mitigation measures and responses, and to address any potential concerns about the Project. At time of filing, all issues and concerns have been responded to in meetings, correspondence or in Appendix C of the ESA.

Kelly Lake First Nation

NGTL initially shared Project information with KLFN in June 2014. NGTL met with KLFN in February 2015 to discuss the Project.

KLFN is interested in potential Project employment and training opportunities.

NGTL will continue to notify KLFN of major Project milestones and will respond to requests or concerns that might be identified.

Kelly Lake Métis Settlement Society

NGTL initially shared Project information with KLMSS in June 2014. NGTL met with KLMSS in August 2014 to discuss the Project. NGTL held a mapping exercise with KLMSS in September 2014. Based on the information collected during these workshops, NGTL facilitated a helicopter flyover with KLMSS in October 2014.

KLMSS has raised the following interests and issues through Project engagement activities to date:

- potential impacts on wildlife and wildlife habitat, including declining animal populations in the area
- potential impacts on surface water and groundwater
- potential impacts on vegetation
- potential impacts on air quality
- potential restrictions to accessing traditional land and resources
- potential spills and response techniques
- potential Project employment and training opportunities
- participation in biophysical field studies
- Towerbirch ROW is a hunting area
- potential destruction of moose licks, particularly on the Tower Lake portion of the ROW

NGTL continues to engage with KLMSS to follow up on proposed mitigation measures and responses, and to address any potential concerns about the Project. At time of filing, all issues and concerns have been responded to in meetings, correspondence or in Appendix C of the ESA.

McLeod Lake Indian Band

NGTL initially shared Project information with MLIB in June 2014. NGTL held a Project meeting with MLIB in September 2014 and a Project update meeting with MLIB in June 2015.

MLIB has participated in numerous biophysical field studies for the Project, including archaeology, soils and wildlife field studies.

MLIB has raised the following issues through Project engagement activities to date:

- potential impacts on environmentally sensitive areas
- potential impacts on surface water and groundwater
- waterway crossings and proximity of the Project to waterways

MLIB has expressed an interest in completing a TLU study for the Project. NGTL is currently waiting for a TLU study proposal from MLIB. NGTL continues to engage with MLIB to follow up on proposed mitigation measures and responses, and to address any potential concerns about the Project. At time of filing, all issues and concerns have been responded to in meetings, correspondence or in Appendix C of the ESA.

Métis Nation of Alberta

On behalf of itself and its subsidiaries, TransCanada collaborates with MNA and the MNA Regions to identify the potentially affected Métis communities in proximity to proposed TransCanada projects, as described in the Memorandum of Understanding (MOU) with the MNA. MNA works in collaboration with the Regions to determine the potentially affected Métis Regions and Locals. The process provides potentially affected Métis Regions and Locals the opportunity to participate in engagement activities to review the Project.

At time of filing, MNA has not communicated to NGTL any issues or concerns about the Project. NGTL will continue to notify MNA of major Project milestones and will respond to requests or concerns that might be identified.

Métis Nation of Alberta Region 4

In June 2014, NGTL contacted MNA Region 4 to introduce the Project. NGTL then determined that the Project fell within Region 6 and not within Region 4 boundaries.

In July 2015, NGTL received direction from the MPMO to engage with MNA Region 4. In August 2015, NGTL provided MNA Region 4 with a copy of the Project Description filed with the NEB in May 2015.

MNA – Region 4 has not communicated any issues or concerns relating to the Project. NGTL will remain available to discuss any questions or concerns that MNA Region 4 might raise.

Métis Nation of Alberta Region 6

NGTL initially shared Project information with MNA Region 6 in June 2014. In November 2014, NGTL held a meeting with MNA Region 6 and the Region 6 Metis Locals, including Peace River Métis Local, Fairview Métis Local and GPML 1990, to discuss the Project and potential engagement opportunities.

NGTL was advised by MNA Region 6 that they would engage with the Metis Locals potentially affected by the Project, including Peace River Métis Local, Fairview Métis Local and GPML 1990 as defined in the MNA–TransCanada MOU on engagement with the Metis.

MNA Region 6 has raised the following interests and issues through Project engagement activities to date:

- potential impacts on wildlife
- potential impacts on water quality
- potential increase in invasive vegetation
- additional environmental monitoring opportunities
- potential Project employment and training opportunities
- importance of the Gordondale area as animal habitat for hunting

MNA Region 6 has expressed an interest in completing a TLU study for the project. NGTL is negotiating a TK Protocol Agreement with MNA Region 6. NGTL continues to engage with MNA Region 6 to follow up on proposed mitigation measures and responses, and to address any potential concerns about the Project. At time of filing, all issues and concerns have been responded to in meetings, correspondence or in Appendix C of the ESA.

Grande Prairie Métis Local 1990

In November 2014, NGTL held an introductory Project meeting with MNA Region 6. Representatives of GPML 1990 attended this meeting.

In July 2015, NGTL received direction from the MPMO to engage directly with GPML 1990 in addition to NGTL's ongoing engagement with MNA Region 6. As indicated earlier, NGTL's engagement with MNA Region 6 includes engagement with the potentially affected Locals.

In August 2015, NGTL provided GPML 1990 with a copy of the Project Description filed with the NEB in May 2015.

NGTL will continue to engage with GPML 1990 through MNA Region 6, as directed by MNA.

Métis Nation of British Columbia

NGTL initially shared Project information with MNBC in June 2014. NGTL and MNBC held an introductory conference call and meeting in July and August 2014 to confirm that MNBC received the Project information and to discuss Project-specific engagement activities.

NGTL committed to meet with MNBC chartered communities closest to the Project, including MFMS and NEMA, to identify issues and concerns with the proposed Project. MNBC expressed an interest in conducting mapping workshops with MNBC chartered communities to identify areas of interest and concern to be visited during a site visit.

NGTL held a mapping workshop with NEMA in November 2014 and facilitated field visits in December 2014. NGTL held a mapping workshop with MFMS in June 2015 and based on the information collected, MFMS indicated that they were not interested in a site visit.

MNBC expressed interest in potential Project employment and training opportunities. NGTL's Supply Chain and Aboriginal Contracting team met with MNBC in April 2015 to provide additional information on potential contracting and employment opportunities on NGTL projects.

MNBC is currently conducting a TLU study for the Project. NGTL continues to engage with MNBC to follow up on proposed mitigation measures and responses, and to address any potential concerns about the Project.

At time of filing, all issues and concerns have been responded to in meetings, correspondence or in Appendix C of the ESA.

Moccasin Flats Métis Society

NGTL initially shared Project information with MFMS in June 2014.

NGTL met with MFMS in June 2015 to discuss the Project and hold a Project mapping workshop. In June 2015, based on the information collected during the mapping workshop, MFMS indicated they were not interested in a site visit.

MFMS has raised the following issues through Project engagement activities to date:

- potential impacts on environmentally sensitive areas
- cumulative effects
- potential Project employment and training opportunities

At time of filing, all issues and concerns have been responded to in meetings, correspondence or in Appendix C of the ESA. For further information on engagement with MFMS, see the MNBC engagement summary.

North East Métis Association

NGTL initially shared Project information with NEMA in June 2014.

NGTL and Golder met with NEMA to discuss the Project and hold a mapping workshop in November 2014. Based on the information collected during these workshops, Golder facilitated a site visit with NEMA in December 2014.

NEMA has raised the following issues through Project engagement activities to date:

- potential impacts on environmentally sensitive areas
- potential impacts on vegetation
- potential impacts on air quality
- potential spills and response techniques
- cumulative effects
- potential Project employment and training opportunities
- participation in biophysical field studies
- concerns about the regulatory process and engagement

At time of filing, all issues and concerns have been responded to in meetings, correspondence or in Appendix C of the ESA. For further information on engagement with NEMA, see the MNBC engagement summary.

Prophet River First Nation

NGTL initially shared Project information with PRFN in June 2014. NGTL extended invitations to meet with PRFN in August, October 2014 and June 2015. To date, however, NGTL has not been able to schedule a meeting with PRFN to discuss the Project.

PRFN representatives have participated in archaeology and wildlife field studies for the Project.

PRFN has raised the following issues through Project engagement activities to date:

- potential impacts on wildlife and wildlife habitat
- potential restrictions to accessing traditional land and resources

NGTL is waiting for PRFN to provide NGTL with potential meeting dates to discuss the Project. At time of filing, all issues and concerns have been responded to by NGTL in Appendix C of the ESA. NGTL will continue to make efforts to engage with PRFN on this Project.

Saulteau First Nations

NGTL initially shared Project information with SFN in June 2014 and held an introductory Project meeting the same month. In August, September and October 2014 and in June 2015, NGTL made attempts to schedule follow-up Project meetings, but has not received a response from SFN.

NGTL's Supply Chain and Aboriginal Contracting team members met with SFN in January 2015 to provide additional information about potential contracting opportunities with NGTL development projects in the region.

SFN representatives have participated in numerous biophysical field studies for the Project, including archaeology, soils and wildlife field studies.

SFN has raised the following issues through Project engagement activities to date:

- potential impacts on wildlife and wildlife habitat
- potential impacts on fish and fish habitat
- potential impacts on surface water and groundwater
- potential impacts on vegetation
- potential restrictions to accessing traditional land and resources
- concerns about the regulatory process and engagement

SFN has expressed an interest in completing a TLU study for the project. NGTL is waiting for SFN to provide NGTL with potential meeting dates to discuss the Project. NGTL continues to engage with SFN to follow up on proposed mitigation measures and responses, and to address any potential concerns about the Project. At time of filing, all issues and concerns have been responded to in meetings, correspondence or in Appendix C of the ESA.

Treaty 8 Tribal Association

NGTL initially shared Project information with T8TA in June 2014. T8TA has not communicated any issues or concerns relating to the Project to NGTL. NGTL will continue to notify T8TA of major Project milestones and will respond to requests or concerns that might be identified.

NGTL is currently engaging directly with applicable member Nations from T8TA.

West Moberly First Nations

NGTL initially shared Project information with WMFN in June 2014. NGTL held an introductory Project meeting with Chief and Council in September 2014 and held a follow-up Project meeting in July 2015.

WMFN has participated in numerous biophysical field studies for the Project, including archaeology, soils and wildlife field studies.

WMFN has raised the following issues through Project engagement activities to date:

- potential impacts on wildlife and wildlife habitat, including caribou protection on the AB portion of the Project
- potential impacts on surface water and groundwater

- potential impacts on fish and fish habitat
- potential impacts on traditional practices due to increased activity and access
- potential impacts on environmentally sensitive areas
- reclamation activities
- cumulative effects and consultation fatigue
- potential Project employment and training opportunities
- concerns about the regulatory process and engagement

WMFN has expressed an interest in completing a TLU study for the project. NGTL is negotiating a potential TK Protocol Agreement with WMFN. NGTL continues to engage with WMFN to follow up on proposed mitigation measures and responses, and to address any potential concerns about the Project. At time of filing, all issues and concerns have been responded to in meetings, correspondence or in Appendix C of the ESA.

Western Cree Tribal Council

NGTL initially shared Project information with WCTC in June 2014. At time of filing, WCTC has not communicated to NGTL any issues or concerns about the Project. NGTL will continue to notify WCTC of major Project milestones and will respond to requests or concerns that might be identified.

NGTL is currently engaging directly with applicable member Nations from WCTC.

13.5 ABORIGINAL SOCIO-ECONOMIC OPPORTUNITIES

The Project has the potential to provide socio-economic opportunities for Aboriginal communities and organizations, including initiatives to support employment, employment training, education, contracting and business development, and community investment. NGTL is in ongoing dialogue with Aboriginal communities and organizations to identify opportunities relevant to each community or organization.

The following sections describe the opportunities being developed and implemented in the following areas:

- capacity development, education and training
- community investment
- contracting and employment

13.5.1 Capacity Development, Education and Training

NGTL recognizes the importance of encouraging and enabling community participation in the Project. NGTL will provide support and resources to communities to increase their ability to participate in Project activities as well as support community long-term goals for skills development and training.

In collaboration with local Aboriginal communities and organizations, and supported by TransCanada's Northeastern BC Aboriginal Education and Training Strategy, NGTL has been and will continue to work with communities to identify opportunities for capacity development. As part of NGTL's ongoing engagement program, NGTL and the general contractors will work with the community or organization (through their human resource coordinators, local economic development and education officers, or other designated responsible representative) to support the community or organization's immediate and/or long-term training needs.

Training and capacity development programs TransCanada and NGTL have supported and sponsored in the past include:

- all-terrain vehicle training
- first-aid
- Workplace Hazardous Materials Information System (WHMIS)
- pipeline construction safety certification workshops
- Building Environmental Aboriginal Human Resources (BEAHR) environmental monitoring training modules

Other programs include:

- the Aboriginal Human Resource Council's Guiding Circles community career practitioner's workshops
- the Alberta Labourer's Training Trust Fund
- training partnership with government
- industry peers and TransCanada
- Career Preparation and Scholarship Research and Application Completion workshops
- Job Readiness Literacy programs

13.5.2 Community Investment

TransCanada has identified three focus areas for community investment:

- community – supporting initiatives that bring communities together, develop leadership and engage members through employment training
- safety – funding initiatives that enable communities to respond quickly and effectively to local needs and focus on emergency preparedness, accident prevention, and education and training
- environment – working with organizations to conserve important habitat, protect species at risk and educate individuals about the importance of the environment

NGTL recognizes that each community's needs and interests are unique and funding to communities is designed to provide flexibility to develop initiatives that will support each community's long-term goals.

Through its engagement with Aboriginal communities and organizations, NGTL has provided funding to, or participated in, the following initiatives in the Project area:

- Nenan Dane za Deh Zona Family Services Society (Sun Run, Pink Mountain Cultural Camp)
- DRFN language retention initiative
- WMFN and SFN youth and Elder cultural camps
- Youth and community sports (Doig River baseball team, Saulteau youth snowboard workshop and trip)
- Annual Treaty 8 Health and Wellness Gathering
- Community Education and Employment Coordinator training workshops
- Treaty 8 Education Strategy
- BRFN education and literacy training
- Northeast BC Stay in School Program – this program is designed to recognize students from Treaty 8 Aboriginal communities who have successfully completed their school year from grades K–12
- Spirit of the Peace Competition Powwow
- Proposed Chetwynd Wellness Community Centre – this upgraded facility will have the capacity to meet growing demands on medical services from Chetwynd and surrounding area, including WMFN, SFN and MLIB
- BCMF Industry Forum
- sponsored community events in SFN, DRFN, WMFN, MLIB and HRFN

NGTL has been contributing to community investment initiatives with local Aboriginal communities and organizations in the Project area since 2008 and will continue to identify social and economic opportunities in the region.

13.5.3 Aboriginal Contracting and Employment Program

NGTL is committed to supporting local communities by providing contracting and employment opportunities on all NGTL projects to qualified Aboriginal and local businesses. NGTL has developed an Aboriginal Contracting and Employment Program that aligns with TransCanada policy. The Aboriginal contracting team meets with Aboriginal communities and seeks to identify specific economic opportunities within their capacity.

Although hiring generally takes place through the general contractor, NGTL will attempt to match the Aboriginal communities' and organizations' businesses with subcontracting and employment opportunities by facilitating discussions between each community or organization and the contractor.

13.5.4 Program Overview and Introduction

The Aboriginal Contracting and Employment Program consists of the following steps:

1. Identification of potential contracting and employment opportunities.
2. Contractor resourcing and qualifications assessment and interest determination.
3. Partnership support and aboriginal evaluation criteria.
4. Contract award.
5. Construction and contract monitoring.

13.5.5 Identification of Potential Contracting and Employment Opportunities

Initial steps in the Aboriginal Contracting and Employment Program are as follows:

- meet with Aboriginal communities and organizations in proximity to the Project to share TransCanada's Contracting and Employment Program practices
- provide a detailed overview of the Project, which includes an accurate scope of work that can be used to determine areas for economic opportunities to support the construction and in-service milestones of the Project

For a list of potential contracting opportunities by Project phase, see Table 13-2.

Table 13-2: Potential Contracting and Employment Opportunities

Project Phase	Project Phase Employment Requirements	Potential Employment and Contracting Opportunities
Development	The development phase requires specialized services such as pipeline engineering, geo-technical, environmental and land services. Most of the preparatory work is completed through specialized Prime Contractors. Some contracting opportunities available to Aboriginal and local contractors during this phase are typically subcontracted by the Prime Contractor.	Surveying and Geotechnical – soil sampling, vegetation removal, field work support Environmental field study participation Wildlife monitoring Transportation Equipment rentals Building access Brushing and clearing
Pre-Construction	Pre-construction involves preparation of the pipeline sites, ROW and infrastructure to prepare for pipeline construction. During this phase, services are often provided by Aboriginal and local contractors.	ROW clearing Support services related to camp operations, including catering, water supply, maintenance, sewage and garbage disposal Site preparation and temporary infrastructure Access road building and maintenance Heavy equipment operating Equipment rental and leasing Janitorial services Fuel supply, flag personnel
Construction	Most of the project work occurs during the construction phase. As such, there are more contracting opportunities available to Aboriginal and local contractors during this phase.	Security services Medical services Material hauling Charter transportation: hot shots/bus/air Skilled trades Electrical and mechanical work Pressure testing and inspections Equipment rentals and leasing Catering Housekeeping and janitorial services Waste and sewage services Hydrovac services Construction monitoring Shipping services Fuel supply, flag personnel and recycling services Site cleanup Reclamation
Operations	There are fewer contracting opportunities during the operations phase.	Site cleanup ROW maintenance Road, equipment and general maintenance Weed, rodent and pest control Reclamation Catering

13.5.6 Contractor Resourcing and Qualifications Assessment and Interest Determination

Assessment and interest determination of contractor qualifications, capability and readiness involves the following steps:

- gather information about Aboriginal contractors or their joint venture partners that might align with goods or services required for the Project
- in collaboration with Aboriginal communities and organizations, develop an Aboriginal contractors database that can be used by the Project's contractors and other industry partners
- engage industry associations, and training and employment and human resources offices to assess available manpower qualifications and availability

13.5.7 Partnership Support and Aboriginal Evaluation Criteria

Steps at the partnership support and Aboriginal contractor evaluation stage include:

- provide potential contractors with a list of contractors affiliated with local Aboriginal communities and organizations to be considered for work on the Project
- identify the appropriate contacts in Aboriginal communities and organizations for employment and contracting
- insert Aboriginal economic participation clauses in NGTL's prime contracts to ensure Aboriginal participation is considered on the Project
- encourage and assist all contractors to maximize local Aboriginal participation through direct employment and subcontracting opportunities during pre-construction and construction phases of the Project
- require each construction contractor to submit an Aboriginal participation plan
- include Aboriginal participation as an evaluation criterion when evaluating and awarding prime contracts

13.5.8 Contract Award

The contract award process involves the following steps:

- inform Aboriginal communities and organizations of the successful prime contractors
- arrange meetings between the prime contractor and the communities to ensure understanding of the business protocols, qualification requirements, construction schedule and employment opportunities, and establish a single point of contact in each party
- offer debrief meetings with unsuccessful Aboriginal contractors to help them understand why they were not selected, and provide feedback

13.5.9 Construction and Contract Monitoring

The construction and contract monitoring process involves the following steps:

- provide a potential dedicated resource person to act as a construction liaison between Aboriginal communities and organizations and the prime contractors to facilitate effective communication
- provide guidance and support to the prime contractors, Aboriginal communities and organizations throughout the Project construction phase
- implement the terms of any participation agreement signed with Aboriginal communities and organizations
- track and monitor the Aboriginal contracting and employment participation
- meet with Aboriginal communities and organizations (when requested or contractually required) to review their participation
- if requested, provide a post-construction debrief meeting to Aboriginal communities and organizations to understand the successes and challenges with respect to their economic participation

13.6 ONGOING ENGAGEMENT

At the time of filing, NGTL continues to actively engage with all Aboriginal communities and organizations identified as having an interest in the Project or having Aboriginal interests potentially affected by the Project.

Engagement activities will continue during all Project phases. NGTL will continue to respond to questions and comments, and identify and seek resolution to Aboriginal communities and organizations' concerns. Ongoing engagement activities will continue, with the intent to:

- gather supplemental information and identify additional concerns
- identify and address or resolve any engagement-related commitments and/or outstanding issues and concerns
- continue to progress work plans that provide capacity funding for communities
- continue to understand each community's interest in employment and contracting opportunities
- continue to gather input through TK Program activities

13.6.1 Pre-Construction and Construction

NGTL will continue to engage with Aboriginal communities and organizations potentially affected by the Project during the pre-construction and construction phases and respond to all reasonable feedback provided through the regulatory review process and until completion of Project construction. Updates to the Project website and monitoring of the email address and toll-free telephone line will also continue until construction is complete.

Open lines of communication with Aboriginal communities and organizations will be maintained throughout the pre-construction and construction phases of the Project to provide economic opportunities for Aboriginal communities and organizations, including capacity-building initiatives to support employment such as TransCanada's Aboriginal Construction Training Program, contracting and business development, and community investment, as described in Section 13.7.

During construction, ongoing engagement activities will continue using various approaches that are responsive to the Aboriginal communities and organizations involved in the engagement program. NGTL will also continue to implement and track any commitments to confirm these activities have been completed.

13.6.2 Operations

Following construction, regionally based Aboriginal Relations liaisons will continue to build and maintain relationships with local Aboriginal communities and organizations, which will be ongoing over the life of the facilities.

TransCanada's PA Program will be implemented once the Project is in service (see Section 10.5). This program facilitates consistent, ongoing communication about safety, integrity and emergency response with Aboriginal communities and organizations, and key community stakeholders and interested parties, such as landowners, the public, government representatives, excavators/contractors and emergency response agencies.

14.0 ENVIRONMENTAL AND SOCIO-ECONOMIC MATTERS

This section summarizes the need for and scope of the effects assessment, along with the approach and findings of significance of the ESA.

Golder prepared the ESA for the Project on behalf of NGTL. The ESA assesses the Project based on the description of the Project components outlined in Section 1 of this Application.

14.1 NEED FOR EFFECTS ASSESSMENT

The Project involves construction of gas pipeline components over 40 km in length, which therefore requires a CPCN pursuant to Section 52 of the NEB Act. Application to the NEB involves filing an ESA prepared in accordance with the *NEB Filing Manual* and CEEA 2012. The NEB is responsible for the assessment of the Project, but other federal authorities, including those with special knowledge or expertise, might provide assistance to the Board.

14.2 SCOPE OF THE PROJECT

Consistent with section 19 of CEEA 2012 and guidance in the *NEB Filing Manual*, the ESA provides an assessment of potential effects associated with the physical works, undertakings and related activities described below:

- construction and operation of approximately 55 km of 914 mm (NPS 36) pipeline (Groundbirch Mainline Loop), approximately 32 km of 762 mm (NPS 30) pipeline (Tower Lake Section), three meter stations and related facilities, including:
 - pipeline valves sites
 - launcher and receiver facilities
 - CP systems
 - miscellaneous works such as pipeline warning signs, fencing and integration with communication and control systems
 - alternating current mitigation
 - hydrostatic testing
- construction-related temporary infrastructure, such as:
 - access (e.g., roads and travel lanes and shooflies)
 - pipe and equipment storage sites
 - contractor offices and yards

The ESA includes an assessment of the effects associated with construction activities, operations, decommissioning or abandonment activities, and accidents or malfunctions. The ESA analysis includes determination of significance of any residual effects following mitigation and the significance of cumulative effects.

14.3 SCOPE OF THE ASSESSMENT

The ESA considers the mandatory factors listed in sections 19(1), 5(1) and 5(2) of CEAA 2012, as well as guidelines in the *NEB Filing Manual*. The scope of the ESA includes construction, operations, and decommissioning and abandonment of the Project.

The ESA is organized in the following sections:

- Section 1: Introduction – provides an overview of the Project and the proponent, the regulatory framework, purpose and organization of the document, and identifies the ESA team.
- Section 2: Project Description – describes the route-selection process and rationale, justification and need for the Project, Project components, Project location and the schedule of activities for Project construction and operations.
- Section 3: Engagement Programs – provides a summary of consultation and engagement with landowners, regulators, First Nations and Métis communities and organizations, and other stakeholders.
- Section 4: Environmental and Socio-Economic Effects Assessment Methodology – describes the effects assessment methodology, including effects descriptors and criteria for significance determination.
- Section 5: Environmental and Socio-Economic Setting – describes the existing biological and socio-economic environment.
- Section 6: Environmental and Socio-Economic Effects Assessment – identifies the potential environmental and socio-economic effects of the Project, mitigation to avoid or reduce potential effects, residual effects following implementation of mitigation, and determination of the significance of any residual effects.
- Section 7: Cumulative Effects Assessment – describes the cumulative effects assessment methodology, and assesses residual effects of the Project in combination with effects from other physical activities that have been or will be carried out.
- Section 8: Inspection, Monitoring and Follow-Up – outlines the various biophysical and socio-economic inspection, monitoring and follow-up programs.
- Section 9: Summary and Conclusions – provides a summary of the environmental and socio-economic assessment and its conclusions.

- Section 10: Closure – provides closure of the ESA report.
- Section 11: References – provides the sources of information to which the reader is referred throughout the ESA report.
- Appendix A: Environmental Protection Plans – describes the plans to address environmental mitigation and reclamation, chemical and waste management plan, traffic control management plan, hydrovac cutting handling plans, directional drilling procedures and contingency plans for any unanticipated circumstances, including spills, effects of adverse environmental conditions and biological, traditional or heritage resource discoveries.

Additional appendices to the ESA include:

- Environmental Alignment Sheets
- Project Specific Issues and Concerns Identified During Aboriginal Engagement Activities and Planned Mitigations
- Terrain and Terrain Stability Mapping
- Soil Profiles
- Map Code Descriptions
- Watercourse Crossings Report
- Wildlife Observations
- TCPL Health, Safety and Environment Commitment
- Projects or Activities Considered in the Cumulative Effects Assessment
- Traditional Knowledge Report
- Economic Impact Modelling Report

14.4 ASSESSMENT METHODOLOGY

The ESA evaluated the potential environmental and socio-economic effects of the construction, operations and maintenance, and decommissioning and abandonment phases of each component of the Project.

The methodology for this ESA was developed based on the *NEB Filing Manual*, Release 2015-01, using Guide A: Facilities Applications (NEB Act section 52 and section 58 Applications), Section A.2 (Environmental and Socio-Economic Assessment), and pursuant to CEAA 2012 and involves the following steps:

- determining the environmental and socio-economic valued components (VC) and associated key indicators that might interact with the Project
- describing and studying the existing biophysical and socio-economic environment setting (i.e., baseline conditions) in which the Project will be constructed and operated

- identifying potential Project-environment interactions
- determining the temporal and spatial boundaries of interactions between the Project and the VCs
- assessing the Project-specific effects, including:
 - identification of potential Project effects, recommended mitigation measures and predicted residual effects
 - evaluation of residual Project effects and determination of their significance
- conducting the cumulative effects assessment for the Project in combination with other physical activities that have been or will be carried out
- identifying any inspection, monitoring and follow-up programs that will be completed during and post-construction to evaluate effectiveness of planned mitigation and address environmental issues identified during Project operations

14.5 SPATIAL BOUNDARIES

Spatial boundaries define the geographic extents within which the potential environmental or socio-economic effects of the Project will be considered. As such, these spatial boundaries define the study areas for the ESA report, as follows:

- Project footprint, consisting of areas directly disturbed by the pipeline and meter stations, including temporary infrastructure to support construction such as temporary access, storage sites and contractor offices and yards
- local study area (LSA), established to assess the potential, largely direct effects of the Project on the local environment
- regional study area (RSA), established to assess the potential, largely indirect effects of the Project within the broader, regional context
- socio-economic study area (SSA), established to assess the area in which socio-economic effects might occur as a result of the Project

The LSAs and RSAs used in the effects assessment vary by environmental and socio-economic element. The SSA includes communities where there would be physical, social or economic interaction between the Project and the community or community residents, and their economic, social or cultural resources and pursuits.

These spatial areas were used to capture the potential direct and indirect effects of the Project on each VC and its associated key indicators, as well as to understand the context within which the effects can occur. Spatial ecological boundaries are described in the discussions of each applicable biological element.

14.6 TEMPORAL BOUNDARIES

The temporal boundaries establish the period(s) for which Project-specific and potential cumulative environmental effects were considered in the ESA. The following temporal boundaries were used for the Project assessment:

- construction – encompasses site preparation and the construction activity period from start of construction to start of operations
- operations – encompasses operations and maintenance activities throughout the life of the Project
- decommissioning and abandonment – encompasses facility decommissioning, abandonment and reclamation activities

14.7 BIOPHYSICAL AND SOCIO-ECONOMIC ELEMENTS

The environmental assessment identified biophysical and socio-economic components that could be affected by development of the Project. These include:

- physical elements, such as soil, water quantity and quality, atmospheric environment and acoustic environment
- biological elements, such as fish and fish habitat, vegetation and wetlands, and wildlife and wildlife habitat, inclusive of species at risk
- socio-economic elements, such as human occupancy and resource use, heritage resources, traditional land and resource use, social and cultural well-being, human health, infrastructure and services, navigation and navigation safety, and employment and economy. Economic effects include the impact on gross domestic product, full-time equivalent job creation and labour income, and government revenue.

Where appropriate and available, TEK was incorporated in the consideration and discussion of these elements. Effects arising from potential accidents and malfunctions, and effects of the environment on the Project were also considered.

14.8 POTENTIAL ENVIRONMENTAL AND SOCIO-ECONOMIC EFFECTS

The effects assessment considers the potential interactions between the Project infrastructure components and activities and the VCs, within the identified spatial and temporal boundaries. Project interactions can be direct (i.e., as a result of a Project infrastructure component or activity affecting a VC), or indirect (i.e., as a result of a change to one VC affecting another VC).

Potential effects of the Project on the key indicators are determined by comparing the baseline conditions with those expected to result from introduction of the Project. In addition to assessing the potential Project effects on VCs, the assessment considers effects of the environment on the Project (e.g., severe weather or seismic activity).

14.9 FINDINGS OF SIGNIFICANCE

The ESA is organized by biophysical and socio-economic components. Where necessary, discussion is broken out by Project component to consider specific biophysical and socio-economic effects associated with the individual components.

The biophysical and socio-economic elements assessed in the ESA are as follows:

- physical and meteorological environment
- terrain
- soil and soil productivity
- vegetation
- surface water
- groundwater
- fish and fish habitat
- wetlands
- wildlife and wildlife habitat
- species at risk or species of special status and related habitat
- air emissions
- greenhouse gas emissions
- acoustic environment
- human occupancy and resource use
- heritage resources
- traditional land and resource use
- navigation and navigation safety
- social and cultural well-being
- human health and aesthetics
- infrastructure and services
- employment and economy

Based on the observations in the ESA, the Project is not expected to have a significant adverse effect on any biophysical or socio-economic element, provided the mitigation measures identified in the ESA are effectively implemented.

14.9.1 Cumulative Effects

It is recognized that all project-related residual effects that are predicted for a valued environmental or socio-economic component have the potential to contribute to broader regional cumulative effects on that component, even if the stand-alone project effects are considered not significant. An assessment of the Project's residual effects

in combination with the effects of past, present and reasonably foreseeable future projects was completed on these valued environmental and socio-economic components and is presented and discussed in the ESA. The cumulative effects methodology used in the ESA follows the guidance in the *NEB Filing Manual* and is consistent with best practices offered in the CEA Agency's *Draft Technical Guidance for Assessing Cumulative Effects Under the Canadian Environmental Assessment Act, 2012*. The cumulative effects were determined to be not significant for all biophysical and socio-economic elements.

14.10 COMMITMENT

NGTL accepts the findings of the ESA and will adhere to the recommendations and mitigation measures identified in the ESA and the EPP. The EPP (appended to the ESA) forms a portion of the ESA.

To ensure that mitigation measures are followed, NGTL will have qualified environmental inspectors on the Project and will develop an environmental orientation for Project personnel.

14.11 POST CONSTRUCTION MONITORING

NGTL will implement a Project-specific post-construction monitoring program (PCMP) for the Project, which will be used to:

- evaluate the recovery of areas disturbed during construction
- identify environmental issues that might have arisen post-construction
- identify and coordinate the implementation of any remedial measures that are warranted
- identify additional special measures to address any outstanding or new environmental issues

NGTL will implement the PCMP after the first, third and fifth complete growing seasons following Project commissioning on forested public lands and following the first two complete growing seasons on agricultural land. The PCMP will be initiated in Year 1 to identify any unresolved issues when construction is complete. In following years, NGTL will assess only unresolved issues identified in the previous year's Environmental Issues List plus newly identified concerns.

For example, during Year 2 ground reconnaissance, field crews will not assess the entire ROW, but will instead focus on those issues observed during the Year 1 ground reconnaissance that remain unresolved. Additionally, areas of potential environmental concerns identified during construction, including areas of potential terrain instability (steep slopes) and areas sensitive to disturbance (e.g., wetlands and watercourses),

will also be assessed in the PCMP and monitored during spring breakup for at least two years following construction. The monitoring program will measure the Project's success in:

- implementing the mitigation measures committed to by the Project
- re-establishing equivalent land capability and wetland function

NGTL will develop an issues tracking list for use during construction and operations, to ensure outstanding issues are investigated, resolved and reported.

For further details on post-construction monitoring, see Section 8.5 of the ESA.

14.12 FOLLOW-UP PROGRAM

A follow-up program verifies the effectiveness of mitigation measures following construction and involves applying additional mitigation measures if required. According to CEAA 2012, a follow-up program:

- verifies the accuracy of the Project assessment
- determines the effectiveness of any measures taken to mitigate the adverse environmental or socio-economic effects of the Project

In practice, follow-up programs are developed where there is uncertainty in the predicted effects or efficacy of mitigation measures. As a Designated Project under CEAA 2012, NGTL has identified the elements and monitoring procedures that require follow-up under CEAA 2012, which are outlined in the ESA.

14.13 ENVIRONMENTAL REGULATORY CONSULTATION

Consultation was initiated in June 2014 with government officials who might be involved in the regulatory reviews, approvals or construction phases of the Project. Their input, issues and concerns were taken into account during field assessments and in preparation of the ESA for the Project.

For a summary list of consultation with regulators on environmental aspects of the Project, see Appendix 14-1.

Consultation is planned and underway with provincial and federal regulators to address a variety of matters, including:

- proposed wildlife habitat areas (WHAs)
- ungulate winter ranges
- old growth management areas (OGMAs)
- environmental mitigation measures for western toad
- timing windows for Project activities

- weed control and revegetation
- water withdrawals and watercourse crossings
- access control on Crown lands in Alberta

NGTL will continue to engage with these agencies and provide the Board with a status update in Q1 2016.

