NATIONAL ENERGY BOARD

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

AND IN THE MATTER OF an application by NOVA Gas Transmission Ltd. pursuant to section 58 of the NEB Act for approval to construct and operate the West Path Delivery Project and for exemption from sections of the NEB Act and the *National Energy Board Onshore Pipeline Regulations* (OPR).

NOVA GAS TRANSMISSION LTD.

WEST PATH DELIVERY PROJECT

February 2018

To: The Secretary
National Energy Board
Suite 210, 517 Tenth Avenue SW
Calgary, AB T2R 0A8

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COVER LETTER

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$10^6m^3/d$	million cubic metres per day
AB	Alberta
AC	alternating current
ac	Acres
ACT	Alberta Culture and Tourism
AEP	Alberta Environment and Parks
API	American Petroleum Institute
APU	auxiliary power unit
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AUT	automated ultrasonic testing
BC	British Columbia
Bcf/d	billion cubic feet per day
Board	National Energy Board, see also NEB
BT	Blood Tribe
Burton Creek CS	Burton Creek Compressor Station Unit Addition
CAO	Chief Administrative Officer
CDAS	Cochrane & District Agricultural Society
CEAA 2012	*Canadian Environmental Assessment Act, 2012*
CGA	Canadian Gas Association
CGSB	Canadian General Standards Board
COS	cost of service
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CP	cathodic protection
CPOC	Cochrane Pipeline Operators Committee

CPVCOS	cumulative present value cost of service
CSA	Canadian Standards Association
DBRS	Dominion Bond Rating Service
DFO	Fisheries and Oceans Canada
EAS	environmental alignment sheets
ECCC	Environment and Climate Change Canada
ECN	Enoch Cree Nation
EGP	Ecological Gifts Program
EPP	Environmental Protection Plan
EPU	epoxy-polyurethane
ESA	Environmental and Socio-Economic Assessment
ESD	emergency shutdown system
FBE	fusion bond epoxy
Filing Manual	National Energy Board's Filing Manual (Release 2017-01)
FOFN	Foothills Ojibway First Nation
Foothills	Foothills Pipe Lines Ltd.
FT-D	firm service delivery
GJ/d	gigajoules per day
ha	Hectares
HDD	horizontal directional drill
HMI	human machine interface
HRA	*Historical Resources Act*
HRIA	historical resources impact assessment
I/O	input/output
ILI	In-line inspection

IMP	Integrity Management Program
ISO	International Organization for Standardization
km	kilometre
KP	kilometre post
LAA	local assessment area
LMCI	land matters consultation initiative
LTO	leave to open
m	metre
MCC	motor control centre
MD	Municipal District
MNA	Métis Nation of Alberta
MNAR3	Métis Nation of Alberta Region 3
MOP	maximum operating pressure
MSS	Manufacturers Standardization Society
MW	Megawatt
NACE	National Association of Corrosion Engineers
NBC	National Building Codes of Canada
NCC	Nature Conservancy of Canada
NDE	non-destructive examination
NE	northeast
NEB	National Energy Board, see also Board
NEB Act	*National Energy Board Act*
NGTL	NOVA Gas Transmission Ltd.
NNC	Nakcowinewak Nation of Canada
NPS	nominal pipe size

NW	northwest
OD	outside diameter
OFN	O'Chiese First Nation
OPP	over pressure protection
OPR	*National Energy Board Onshore Pipeline Regulations*
PA	TransCanada's Public Awareness Program
PC	pressure control
PCM	post-construction monitoring
PDA	project development area
PLC	programmable logic control
PN	Piikani Nation
PPU	primary power unit
Project	West Path Delivery Project
Proposed Route	Preliminary Route A
RAA	regional assessment area
Rocky View Section	Western Alberta System Mainline Loop (Rocky View Section)
ROW	right-of-way
RT	radiographic testing
SARA	*Species at Risk Act*
SCADA	Supervisory Control and Data Acquisition System
SCN	Samson Cree Nation
SE	southeast
SFN	Sunchild First Nation
SMYS	specified minimum yield stress
SN	Siksika Nation

SNN	Stoney Nakoda Nations
SSPC	Society for Protective Coatings
St. Peter's	St. Peter's Lutheran Church
Stantec	Stantec Consulting Ltd.
SW	southwest
TJ/d	terajoule per day
TOMS	TransCanada's Operational Management System
TOPS	TransCanada Operating Procedures
TransCanada	TransCanada PipeLines Limited
TTFP	Tolls, Tariffs, Facilities and Procedures Committee
TTN	TsuuT'ina Nation
Turner Valley CS	Turner Valley Compressor Station Unit Addition
TVOGG	Turner Valley Oil and Gas Group
TWS	temporary workspace
U.S.	United States
UPS	uninterruptible power systems
VC	valued component
VDC	v direct current
WASML	Western Alberta System Mainline
WCSB	Western Canadian Sedimentary Basin

WEST PATH DELIVERY PROJECT

NOVA Gas Transmission Ltd. (NGTL) applies to the National Energy Board (NEB or Board), pursuant to section 58 of the NEB Act, for an Order approving the construction and operation of the West Path Delivery Project (the Project), and for exemption from sections 30(1)(a) and 31 of the NEB Act, all as described further in this Application.

Additionally, NGTL requests exemption from the requirements of sections 30(1)(b) and 47(1) of the NEB Act to obtain leave to open (LTO) from the Board before installing four valve assemblies for the Project. NGTL also applies for an exemption from the 100% non-destructive examination (NDE) requirement in section 17 of the OPR pursuant to subsections 48(2.1) and 48(2.2) of the NEB Act for certain low-pressure piping systems associated with the Project.

For more information on the LTO and NDE exemption requests, see Section 5: Compressor Station Unit Additions.

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 comprised of approximately 24,000 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 operations of the NGTL System that are common to TransCanada's operation of other federally-regulated pipelines.

WEST PATH DELIVERY PROJECT

6. The Project consists of one pipeline, two compressor station unit additions, and related facilities.

7. The Western Alberta System Mainline (WASML) Loop (Rocky View Section) (hereinafter referred to as Rocky View Section) consists of approximately 21.5 km of 1,067 mm (nominal pipe size [NPS] 42) outside diameter (OD) pipeline, valves and associated facilities. The Rocky View Section begins at NGTL's existing WAS110

Valve Site in NE 16-26-04 W5M (located approximately 0.8 km north of the Town of Cochrane, AB), and ends at NGTL's existing WAS100 Valve Site in NE 10-24-04 W5M (located approximately 16.6 km west of the city of Calgary, AB) within Rocky View County.

8. The Turner Valley Compressor Station Unit Addition (Turner Valley CS) involves the installation of a single 30 MW turbo-compressor package (gas turbine and compressor) and auxiliary systems and will be located at NGTL's existing Turner Valley Compressor Station approximately 3 km northwest of Turner Valley, AB, within SE 15-20-03 W5M.

9. The Burton Creek Compressor Station Unit Addition (Burton Creek CS) involves the installation of a single 30 MW turbo-compressor package (gas turbine and compressor) and auxiliary systems and will be located at NGTL's existing Burton Creek Compressor Station approximately 39 km west of Claresholm, AB, in NW 06-12-01 W5M.

10. Overview maps of the Project are provided as Appendix 1-1 to this Application.

11. The Project does not trigger the requirements of the *Canadian Environmental Assessment Act, 2012* (CEAA 2012) because it is not a designated project pursuant to the *Regulations Designating Physical Activities* and is not located on federal lands. Therefore, a federal environmental assessment pursuant to CEAA 2012 is not required.

12. To meet firm service commitments, the Project is required to be in service for June 1, 2020. A decision from the Board by March 1, 2019, would allow for an April 1, 2019, construction start, if approved, for the compressor station unit additions (including temporary workspace) and the potential Burton Creek CS camp site before the Primary Nesting Period for migratory birds for nesting zones A3 (April 16) and B5 (May 1), and before the typical start of road bans associated with spring breakup.

13. The estimated cost of the Project is $409 million (2020$).

PURPOSE AND JUSTIFICATION

14. The Project is required to connect WCSB producers seeking increased access to intra-basin and export markets. Existing aggregate demand in southern AB and incremental long-term delivery commitments at the NGTL System's AB-BC Border export delivery point provide the support and requirement for the Project.

15. The Project is also supported by NGTL's forecasted market demand and forecasts of gas supply transported on the NGTL System. Combined with aggregate contractual requirements, these forecasts demonstrate that the applied-for facilities will be used and useful over their economic life.

TRANSPORTATION SERVICES AND TOLLS

16. The impacts on tolls as a result of adding the proposed facilities to the NGTL System are outlined in Section 3.2 of this Application.

APPLICATION CONTENT

17. In this Application, NGTL provides information required for the Board's consideration of the Application pursuant to section 58 of the NEB Act, as outlined in the Board's Filing Manual, Release 2017-01 (Filing Manual).

SUPPORTING MATERIAL

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

RELIEF REQUESTED

19. NGTL applies to the Board for:

    a) an Order pursuant to section 58 of the NEB Act approving the construction and operation of the Project and exempting NGTL from the provisions of sections 30(1)(a) and 31 of the NEB Act

    b) an exemption from the requirements of section 30(1)(b) and 47(1) of the NEB Act to obtain LTO from the Board before installing certain tie-in assemblies for the Project

    c) an exemption from the 100% NDE requirement in section 17 of the OPR pursuant to subsections 48(2.1) and 48(2.2) of the NEB Act for certain low-pressure piping systems associated with the Project

    d) such other relief that NGTL might request or that the Board might deem appropriate

Respectfully Submitted,

February 12, 2018
Calgary, Alberta

NOVA Gas Transmission Ltd.

Original signed by

Robert Tarvydas
Director, Regulatory Facilities
Canadian Gas Pipelines

Please direct all communications relating to this Application to:

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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 3	
3.3 Management Systems and Programs under the OPR			
1.	An overview of its management systems, including a description of: • How programs required under the OPR are coordinated within the management system to promote safety and environmental protection; and • The process for any necessary modifications to the management system.	Sections 4, 5, 6	
3.4 Consultation			
3.4.1 Principles and Goals of Consultation			
1.	The corporate policy or vision.	Section 8.1	
2.	The principles and goals of consultation for the project.	Section 7.13, 8.1, 9	
3.	A copy of the Aboriginal protocol and copies of policies and principles for collecting traditional use information, if available.	Section 9.1	
3.4.2 Design of Consultation Program			
1.	The design of the consultation program and the factors that influenced the design.	Section 8.2, 9	
3.4.3 Implementation and Outcomes of Project-Specific Consultation Activities			
1.	The outcomes of the consultation program for the project.	Sections 7, 8, 9	
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 3.4	
2.	Details regarding the concerns of third parties.	Section 3.4	
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 – 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 4 and 5	
2.	The project location and criteria used to determine the route or site.	Sections 4.1, 5.1	
3.	How and when the project will be carried out.	Sections 4 and 5	
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.	Section 3	
6.	The expected in-service date.	Application, Sections 4.15, 5.9, 10.1.3.5	
4.2 Economic Feasibility, Alternatives and Justification			
4.2.1 Economic Feasibility			
1.	Description of the economic feasibility of the project.	Section 3.1	
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.	Section 3.5	
2.	Describe and justify the selection of the proposed route and site including a comparison of the options evaluated using appropriate selection criteria.	Sections 3.5, 4.1	
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, 5	
4.2.2 Justification			
1.	Justification for the proposed project.	Section 3	

GUIDE A – A.1 ENGINEERING

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
A.1.1 Engineering Design Details			
1.	Fluid type and chemical composition.	Section 4.2	
2.	Line pipe specifications.	Section 4.4	
3.	Pigging facilities specifications.	Section 4.5	
4.	Compressor or pump facilities specifications.	Section 5	
5.	Pressure regulating or metering facilities specifications.	Section 4.7	
6.	Liquid tank specifications or other commodity storage facilities.		N/A
7.	New control system facilities specifications.	Section 4.6, 6.2	
8.	Gas processing, sulphur or LNG plant facilities specifications.		N/A
9.	Technical description of other facilities not mentioned above.		N/A
10.	Building dimensions and uses.	Section 5	
11.	If project is a new system that is a critical source of energy supply, a description of the impact to the new system capabilities following loss of critical component.		N/A
A.1.2 Engineering Design Principles			
1.	Confirmation project activities will follow the requirements of the latest version of CSA Z662.	Sections 4, 5, 6	
2.	Provide a statement indicating which Annex is being used and for what purpose.		N/A
3.	Statement confirming compliance with OPR or PPR.	Sections 4, 5, 6	
4.	Listing of all primary codes and standards, including version and date of issue.	Sections 4, 5, 6	
5.	Confirmation that the project will comply with company manuals and confirm manuals comply with OPR/PPR and codes and standards.	Sections 4, 5, 6	
6.	Any portion of the project a non-hydrocarbon commodity pipeline system? Provide a QA program to ensure the materials are appropriate for their intended service.		N/A

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
7.	If facility subject to conditions not addressed in CSA Z662: • Written statement by qualified professional engineer • Description of the designs and measures required to safeguard the pipeline		N/A
8.	If directional drilling involved: • Preliminary feasibility report • Description of the contingency plan	Section 4.11 Appendix 4-6 Appendix 4-7	
9.	If new materials are involved, provide material supply chain information, in tabular format.		N/A
10.	If reuse of materials is involved, provide an engineering assessment in accordance with CSA Z662 that indicates its suitability for the intended service.	Section 4-5 Appendix 4-4	
A.1.3 Onshore Pipeline Regulations			
1.	Designs, specifications programs, manuals, procedures, measures or plans for which no standard is set out in the OPR.	Sections 4, 5	
2.	A quality assurance program if project non-routine or incorporates unique challenges due to geographical location.		N/A
3.	If welding performed on a liquid-filled pipeline that has a carbon equivalent of 0.50% or greater and is a permanent installation: • Welding specifications and procedures • Results of procedure qualification tests		N/A

GUIDE A – A.2 ENVIRONMENT 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.	Section 10 Appendix 10-2	

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
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: i. Table A-2 – Filing Requirements for Biophysical Elements; or ii. Table A-3 – Filing Requirements for Socio-Economic Elements.	Section 10 Appendix 10-2	
3.	Provide supporting evidence (e.g., references to scientific literature, field studies, local and traditional knowledge, previous environmental assessment and monitoring reports) for: • 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.	Section 10 Appendix 10-2	
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.	Section 10 Appendix 10-2	
5.	Applicants must consult with other expert federal, provincial or territorial departments and other relevant authorities on requirements for baseline information and methods.	Section 10 Appendix 10-2	
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.	Section 10 Appendix 10-2	

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
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.	Section 10 Appendix 10-2	
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.	Section 10 Appendix 10-2	
2.	Ensure that commitments about mitigative measures will be communicated to field staff for implementation through and Environmental Protection Plan (EP Plan).	Section 10 Appendix 10-2	
3.	Describe plans and measures to address potential effects of accidents and malfunctions during construction and operation of the project.	Section 10 Appendix 10-2	
Evaluation of Significance			
1.	After taking into account any appropriate mitigation measures, identify any remaining residual effects from the project.	Appendix 10-2	
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”.	Appendix 10-2	
3.	Evaluate the significance of residual adverse environmental and socio-economic effects against the defined criteria.	Appendix 10-2	
4.	Evaluate the likelihood of significant residual adverse environmental and socio-economic effects occurring and substantiate the conclusions made.	Appendix 10-2	
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.	Section 10 Appendix 10-2	

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
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.	Section 10 Appendix 10-2	
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.	Section 10 Appendix 10-2	
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.	Section 10 Appendix 10-2	
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: • 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.	Section 10 Appendix 10-2	
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.	Appendix 10-2	
The Applicant's Evaluation of Significance			
1.	After taking into account any appropriate mitigation measures for cumulative effects, identify any remaining residual cumulative effects.	Appendix 10-2	

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
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".	Appendix 10-2	
3.	Evaluate the significance of adverse residual cumulative effects against the defined criteria.	Appendix 10-2	
4.	Evaluate the likelihood of significant, residual adverse cumulative environmental and socio-economic effects occurring and substantiate the conclusions made.	Appendix 10-2	
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.	Appendix 10-2	
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.	Appendix 10-2	
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.	Appendix 10-2	
4.	For CEAA designated projects, identify which elements and monitoring procedures would constitute follow-up under the CEAA 2012.	Appendix 10-2	
Table A-1 Circumstances and Interactions Requiring Detailed Biophysical and Socio-Economic Information			
Physical and meteorological environment		Appendix 10-1 Appendix 10-2	
Soil and soil productivity		Appendix 10-1 Appendix 10-2	
Vegetation		Appendix 10-1 Appendix 10-2	
Water quality and quantity		Appendix 10-1 Appendix 10-2 Appendix 10-1 Appendix 10-2	
Fish and fish habitat, including any *Fisheries Act* Authorization offsetting measures that are required		Appendix 10-1 Appendix 10-2	
Wetlands		Appendix 10-1 Appendix 10-2	

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
Wildlife and wildlife habitat		Appendix 10-1 Appendix 10-2	
Species at Risk or Species of Special Status and related habitat		Appendix 10-1 Appendix 10-2	
Air emissions		Appendix 10-1 Appendix 10-2	
Greenhouse gas (GHG) emissions		Appendix 10-1 Appendix 10-2	
Acoustic environment		Appendix 10-1 Appendix 10-2	
Human occupancy and resource use		Appendix 10-1 Appendix 10-2	
Heritage resources		Appendix 10-1 Appendix 10-2	
Navigation and navigation safety		Appendix 10-1 Appendix 10-2	
Traditional land and resource use		Appendix 10-1 Appendix 10-2	
Social and cultural well-being		Appendix 10-1 Appendix 10-2	
Human health and aesthetics		Appendix 10-1 Appendix 10-2	
Infrastructure and services		Appendix 10-1 Appendix 10-2	
Employment and economy		Appendix 10-1 Appendix 10-2	

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.	Section 4.2	
2.	A discussion of all potential supply sources.	Section 3.1.3	
3.	Forecast of productive capacity over the economic life of the facility.	Section 3.1	
4.	For pipelines with contracted capacity, a discussion of the contractual arrangements underpinning supply.	Section 3.1	

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
A.3.2 Transportation Matters			
Pipeline Capacity			
1.	In the case of expansion provide: • Pipeline capacity before and after and size of increment • Justification that size of expansion is appropriate	Section 3	
2.	In case of new pipeline, justification that size of expansion is appropriate given available supply.	Section 3	
Throughput			
1.	For pipelines with contracted capacity, information on contractual arrangements.	Section 3.1	
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: • 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 3 Appendix 4-2 Appendix 5-3	
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
A.3.3 Markets			
1.	Provide an analysis of the market in which each commodity is expected to be used or consumed.	Section 3	
2.	Provide a discussion of the physical capability of downstream facilities to accept the incremental volumes that would be delivered.	Section 3	
A.3.4 Financing and Financial Resources			
1.	Evidence that the applicant has the ability to finance the proposed facilities.	Section 3.6	
2.	Evidence that the applicant can manage the potential costs associated with the risks and liabilities that arise during construction and operation, including a product release.	Sections 3.6	
3.	Estimated toll impact for the first full year that facilities are expected to be in service.	Section 3.2	

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
4.	Confirmation that shippers have been apprised of the project and toll impact, their concerns and plans to address them.	Section 3.4	
5.	Information on abandonment costs and the set-aside and collection of them.	Section 3.3	
6.	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.	Appendix 10-2	
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.	Appendix 10-2	All approvals will be in place before the start of construction activities.

GUIDE A – A.4 LANDS

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
A.4.1 Land Areas			
1.	• 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 7-3 Appendix 4-1 Appendix 7-1	
A.4.2 Land Rights			
1.	The type of lands rights proposed to be acquired for the project.	Section 7.8 Tables 7-1, 7-2	
2.	The relative proportions of land ownership along the route of the project.	Section 7.2 Table 7-1	
3.	Any existing land rights that will be required for the project.	Section 7	
A.4.3 Land Acquisition Process			
1.	The process for acquiring lands.	Section 7.9	
2.	The timing of acquisition and current status.	Section 7.9.1	
3.	The status of service of section 87(1) notices.	Section 7.9.1	

Filing No.	Filing Requirement	In Application? References	Not in Application? Explanation
A.4.4 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.	Appendices 7-2, 7-3, 7-4, 7-5	
2.	Confirmation that all notices include a copy of *Pipeline Regulation in Canada: A Guide for Landowners and the Public*.	Section 7-9	
A.4.5 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

3.0 PROJECT JUSTIFICATION

This section provides the justification of the proposed Project, including a description of the:

- markets and supply served by the Project
- firm service shipper commitments that underpin the Project
- toll impacts associated with the Project
- abandonment cost estimate for the Project
- commercial third party notifications
- design of the facilities
- alternatives considered
- financing for the Project

3.1 MARKETS, SUPPLY AND TRANSPORTATION

3.1.1 Introduction

The NGTL System continues to see growing receipt volumes from customers that seek increased access to markets. The Project will provide needed access to both NGTL intra-basin and export markets. This Project is supported by existing aggregate demand in southern AB and incremental long-term delivery commitments at the AB-BC border. The AB-BC border is where the NGTL System interconnects to downstream pipelines that serve western United States (U.S.) markets.

At the AB-BC border, the NGTL System delivers to the Foothills Pipe Lines Ltd. (Foothills) in BC, which transports gas to southern BC markets and the U.S. Pacific Northwest, California and Nevada via Gas Transmission Northwest.

The following sections describe market demand to be served by this Project (Section 3.1.2), the recent trends and forecast for WCSB and NGTL System gas supply (Section 3.1.3), and long-term shipper commitments that underpin the Project (Section 3.1.4).

3.1.2 Markets

The Project is driven primarily by WCSB producers seeking increased access to export markets and the ability to compete for downstream market share. Many plays in the WCSB, such as the Montney and Deep Basin, compete favorably with other basins serving these markets. The Project will provide incremental capacity allowing WCSB gas to compete and capture market growth in the Pacific Northwest and California markets and will provide producers the needed ability to diversify their market portfolio beyond NGTL intra-basin demand. The Pacific Northwest and California markets have peak gas requirements in the spring and summer months, which compliment NGTL intra-basin demand that peaks in the winter, making these markets key for WCSB production.

The Project will serve existing markets in the Pacific Northwest and California that are expected to grow modestly over time. Modest growth within the industrial sector and gas use within the power generation sector is expected to occur. Pacific Northwest and California industrial gas demand and gas demand for power is forecast to increase from approximately 138.8 106m3/d (4.9 Bcf/d) in 2016, to approximately 164.3 106m3/d (5.8 Bcf/d) in 2030. Domestic residential and commercial markets in the Pacific Northwest and California markets are expected to remain essentially flat, with these sectors forecast to grow from approximately 65.2 $10^6m^3/d$ (2.3 Bcf/d) in 2016, to approximately 68 $10^6m^3/d$ (2.4 Bcf/d) in 2030.

The Project will also meet existing NGTL intra-basin market deliveries in Calgary and its surrounding area. Domestic residential, commercial, power-generation and industrial sectors are expected to grow modestly over the forecast period, from 11.9 $10^6m^3/d$ (0.4 Bcf/d) in 2015/16, to 14.9 $10^6m^3/d$ (0.5 Bcf/d) by 2029/30.

Figure 3-1 shows NGTL's forecast of western AB exports, as well as the Calgary and surrounding area deliveries which will be served by the Project.

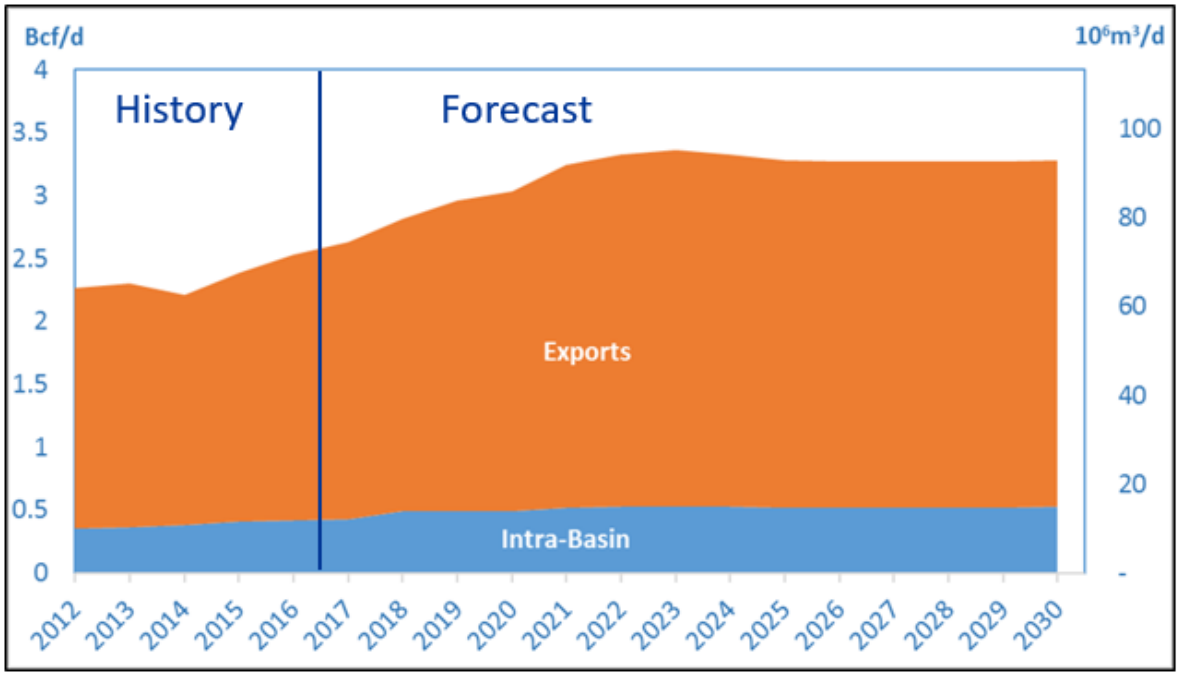

Figure 3-1: Western AB Exports and Calgary Area Intra-Basin Deliveries

3.1.3 Supply

NGTL has prepared a long-term WCSB supply forecast that incorporates conventional and unconventional gas resources. NGTL has also estimated the share of WCSB gas supply that may be transported on the NGTL System after considering

total WCSB supply and the flows expected on other pipeline systems that transport gas production from the WCSB.

The Project will not be sourcing gas supply from a specific location or play, but rather will provide transportation access to supply sources from emergent shale plays in BC and AB, as well as from additional tight conventional supply sources from the Deep Basin of AB.

While the WCSB was once supply constrained, the key issue now facing WCSB producers is the need to access markets for the significant resource potential of the basin. Figure 3-2 shows the WCSB supply outlook.

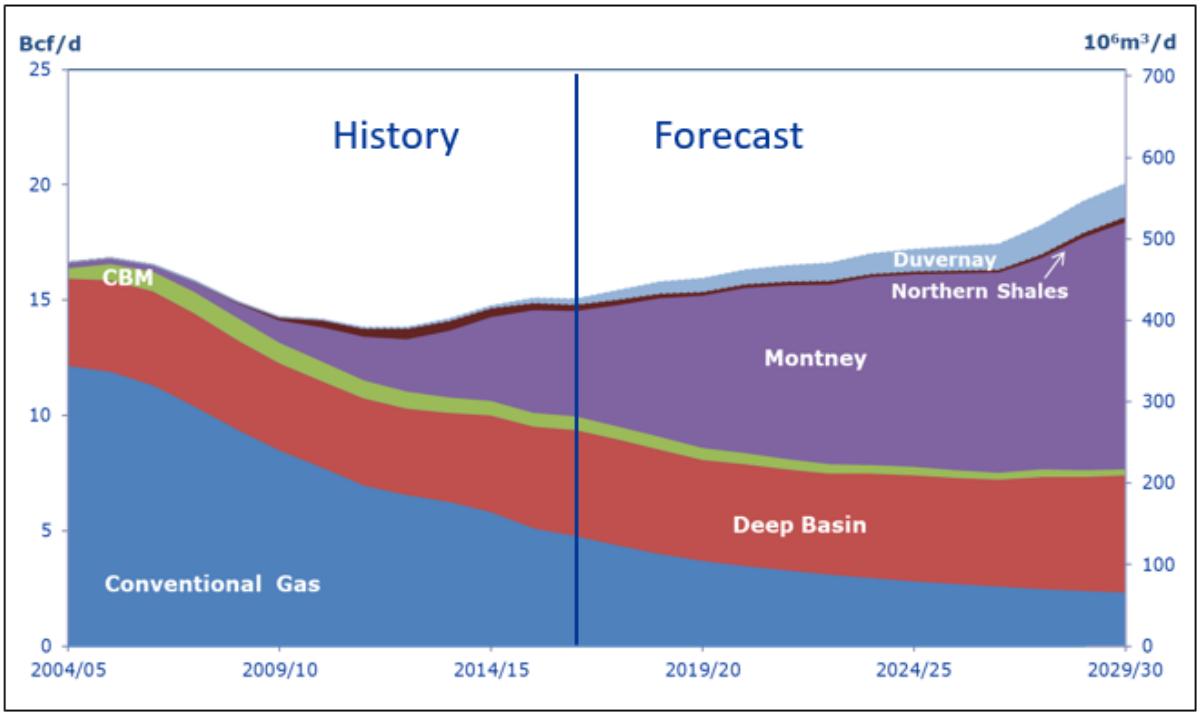

Figure 3-2: WCSB Supply Outlook

The NGTL System supply represents a proportion of total WCSB supply, since gas is also transported on other pipeline systems. The allocation of gas supply among pipelines is determined by a number of factors including proximity to source, transportation tolls, service levels and access to markets. NGTL's forecast of NGTL System supply can be seen in Figure 3-3, with tabular form in Table 3-1, showing that after a period of relatively flat production, aggregate supply is now growing to the end of the forecast period. In addition, NGTL expects receipts to increase in the western portion of the NGTL System where most of the unconventional supply is found, and decrease in areas of conventional production.

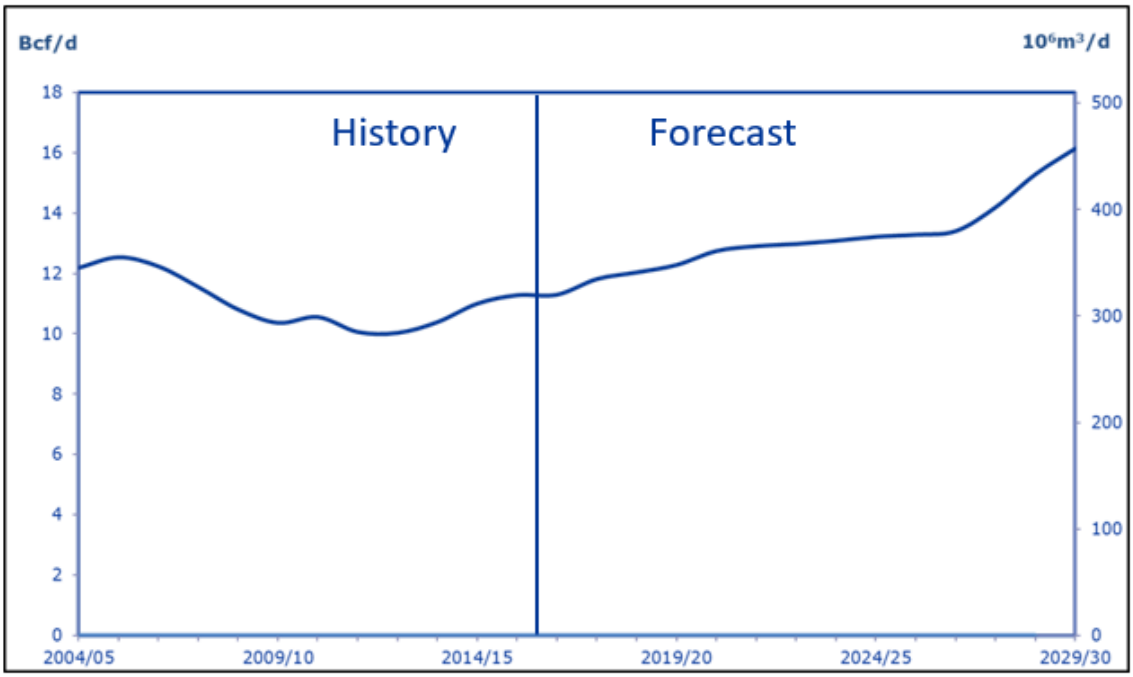

Figure 3-3: NGTL Supply Outlook

Table 3-1: WCSB and NGTL Supply Outlook

Year	WCSB		NGTL System	
	$10^6m^3/d$	Bcf/d	$10^6m^3/d$	Bcf/d
2015/16	427	15.1	319	11.3
2016/17	426	15.1	320	11.3
2017/18	436	15.4	335	11.8
2018/19	447	15.8	341	12.0
2019/20	451	15.9	348	12.3
2020/21	462	16.3	361	12.7
2021/22	467	16.5	366	12.9
2022/23	470	16.6	368	13.0
2023/24	482	17.0	371	13.1
2024/25	487	17.2	374	13.2
2025/26	490	17.3	376	13.3
2026/27	494	17.4	380	13.4
2027/28	516	18.2	402	14.2
2028/29	546	19.3	433	15.3
2029/30	568	20.1	457	16.1

3.1.4 New Service Requests

NGTL held a West Path Expansion Capacity Open Season (Open Season) from May 5, 2017, to May 31, 2017. The expansion capacity available through this Open Season with June 1, 2020 in-service was 288,000 GJ/d which aligns the NGTL System's AB-BC export delivery point capacity to available downstream pipeline capacity to the Pacific Northwest and California. Upon closure of the Open Season, the capacity was fully subscribed by shippers, providing support and the requirement for the Project. The average term of contracts executed was 17.5 years.

For a summary of the firm transportation commitments for this Project, see Table 3-2.

Table 3-2: Requests for New Firm Transportation Service

Start Date	Contract Demand (GJ/d)	Term (years)
June 1, 2020	88,000	22.1
	13,000	18.7
	57,228	16.0
	12,000	15.7
	117,772	15.0
Total	**288,000**	**Average Term 17.5 years**

3.2 TOLLS

This section addresses the toll impacts associated with the Project, including the estimated cost of service (COS) and impact of the Project on NGTL System tolls. NGTL proposes to roll-in the cost of the Project's facilities to the rate base for the rest of the NGTL System, and to apply the existing NGTL System toll methodology, which may change from time to time, to the Project.

3.2.1 Tariff

There are no Tariff amendments associated with the Project. 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.

3.2.2 Estimated Impact on Cost of Service and Tolls

The estimated Project COS and toll impacts are determined using the capital cost estimate of $409 million (2020$) and the firm service delivery (FT-D) Group 1 contract demand referenced in Table 3-2 of 288 TJ/d. The annual COS of the facilities is expected to be approximately $45 million in the first full year of service. NGTL does not anticipate a material impact to the NGTL System tolls, estimating the full-path (average FT-R plus average FT-D) rate impact associated with the Project to

be approximately 0.1¢/Mcf. In addition, NGTL has also considered the impact of the Project on fuel and determined that the change in the NGTL System fuel ratio would be negligible.

3.3 DECOMMISSIONING AND ABANDONMENT

There is no specific timeline for the future decommissioning and eventual abandonment of Project facilities and will be influenced by future service requirements.

The specific approach to decommissioning and abandoning Project facilities will be guided by the Board's decision in Stream 3 of the Land Matters Consultation Initiative (LMCI) proceeding, as well as accepted industry practices and technologies at the time these facilities are decommissioned or abandoned. Approval from the Board and other applicable authorities will be required before these future decommissioning and abandonment activities are initiated.

As part of the LMCI Stream 3 process, the Board, in Decision MH-001-2012, approved a general approach and unit cost estimate for future abandonment of the NGTL System. Based on the method and unit costs from that Decision, $7.8 million is an initial estimate of the cost of abandoning these Project facilities.

The annual collection amount for abandonment costs for the NGTL System is proposed to be collected through a service surcharge. The current NGTL abandonment cost estimate, determined in compliance with Decision MH-001-2012, is $2.5 billion, increasing that estimate by $7.8 million would not significantly affect the annual collection or surcharge amounts.

The abandonment cost estimate, annual collection amount and surcharge amount will be updated periodically in accordance with guidelines established by the Board.

3.4 NOTIFICATION OF COMMERCIAL THIRD PARTIES

On July 21, 2017, NGTL provided a presentation to the Tolls, Tariffs, Facilities and Procedures Committee (TTFP), informing them of the Project.

In that presentation, NGTL outlined the FT-D commitments that underpin the Project and provided detail on the location and type of expansion facilities required to meet these design flows resulting from the contractual obligations. NGTL is not aware of any objections to the Project.

3.5 SYSTEM DESIGN

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

- the design basis for the facility selection
- a summary of the facilities selected to meet service and design flow requirements, including appropriate pipe size and maximum operating pressure (MOP)
- justification for the facility set selected for the Project
- an evaluation of facility alternatives that were considered

3.5.1 Design Basis for the Project

The purpose of the Project is to accommodate new and existing FT-D transportation contracts at the AB-BC Border totaling 3,046,331 GJ/d by June 1, 2020 (as of November 14, 2017), as well as accommodate existing aggregate intra-basin demand in southern AB.

In designing the Project for integration into the existing NGTL System, the NGTL System was simulated to determine the area on the NGTL System that had insufficient capacity to transport the flow requirements. This area then established the design area for the Project. As shown in Figure 3-4, the design area extends from south of the WASML tie-in at the Edson Mainline to the AB-BC border. The areas of the NGTL System that are outside the design area have sufficient capacity to transport System requirements and do not require expansion to meet the aggregate System design flows.

NGTL followed its established facility planning approach when designing the Project. The facility planning approach involves identification and review of facility alternatives that are a combination of pipe and compression facilities that will meet the design flow requirements. Alternatives are identified, using combinations of facility configurations and optimization parameters, that are most likely to meet future gas flows and minimize the long-term costs.

The capital cost of each reasonable alternative is then estimated. The results of the preliminary hydraulics and cost estimates are compared and the best alternatives are selected based on a cumulative present value cost of service (CPVCOS) analysis. The CPVCOS analysis is a calculation of annual COS, which is based on capital and operating cost estimates for each alternative. This calculation includes annual fuel costs, capital costs escalated to the in-service date, annual operating costs, municipal and income taxes, return on investment, and depreciation. The present value of each of the annual cost calculations is determined and then summed to calculate the CPVCOS for each alternative. The proposed facilities are typically selected on the basis of lowest CPVCOS and lowest first-year capital cost. The term used for this analysis is 25 years and the parameters used are provided in Table 3-3.

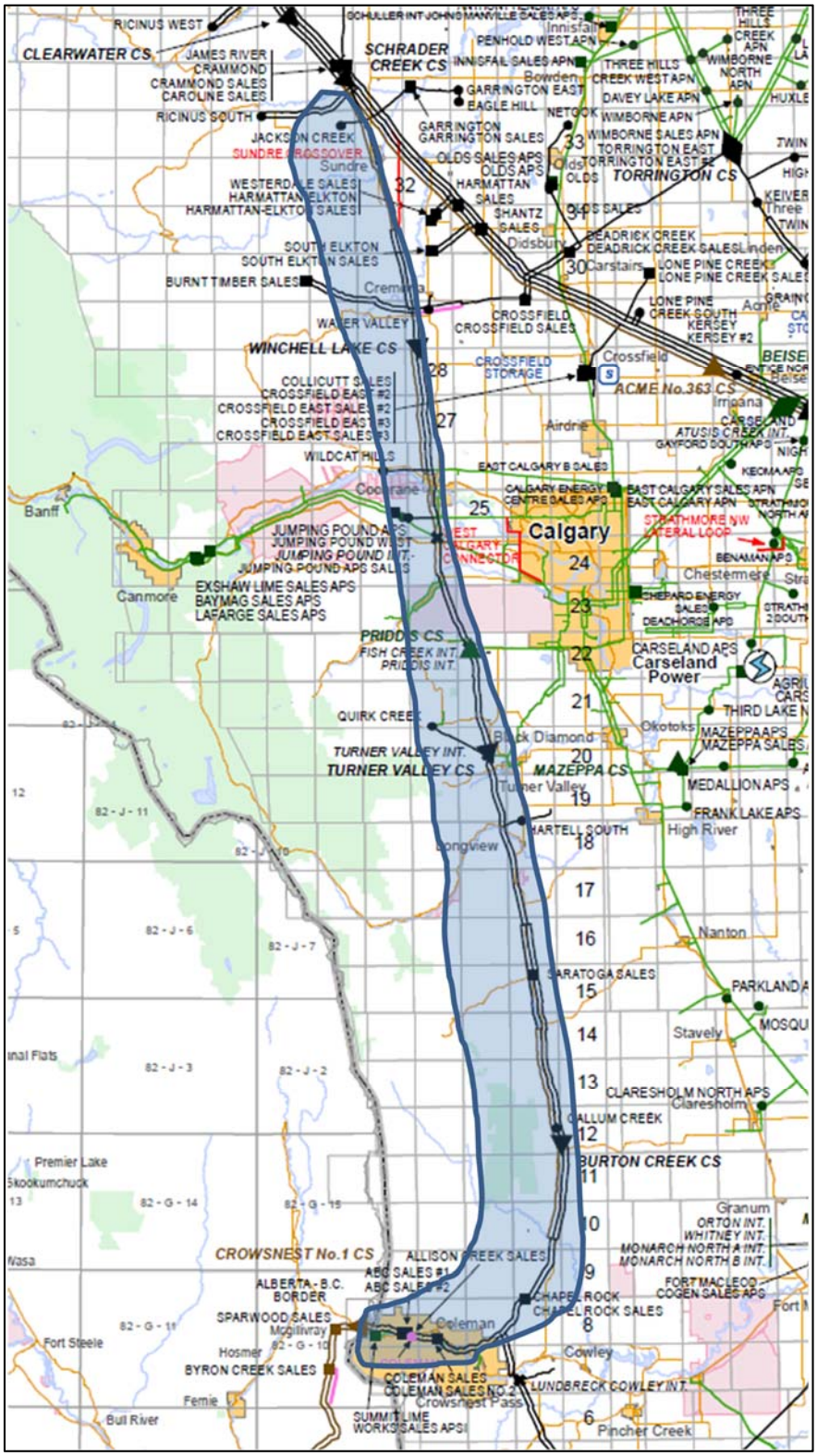

Figure 3-4: Design Area

Table 3-3: Parameters used in Facility Alternative Comparison

Parameter	Value (%)
Discount Factor	8.68 (pre-tax)
Return on equity	10.1
Deemed common equity	40
Return on Debt (not including short term debt)	5.25
Income tax rate	26.99
Municipal tax rate (as a percentage of Gross Plant)	0.5
Depreciation rates: • Pipe • Compression	 2.57 4.08
Escalation rate for operations and maintenance, municipal tax and capital	2.0
Note: Values reflected in this table are inputs to the life cycle cost model and are used only for alternative analysis	

3.5.2 Description of the Proposed Facilities

Based on the analysis described above, the Project facilities were selected as the lowest CPVCOS option to meeting service and design flow requirements. The Project consists of the following facilities:

- Rocky View Section: approximately 21.5 km of NPS 42 pipeline, valves and associated facilities
- Turner Valley CS: 30 MW
- Burton Creek CS: 30 MW

3.5.3 Capacity Impact of the Proposed Facilities

Figure 3-5 provides the System capacity with and without the Project compared to contractual requirements. Existing export capacity at the AB-BC border on June 1, 2020 is 72,972 $10^6m^3/d$ (2,576 MMcf/d or 2,758 TJ/d). Increased contracts result in design flow requirements of 80,590 $10^6m^3/d$ (2,845 MMcf/d or 3,045 TJ/d). Without the Project, there will be a capacity shortfall to contracts of 7,618 $10^6m^3/d$ (269 MMcf/d or 288 TJ/d). With the addition of the Project, the System will have a total delivery capacity to the AB-BC border export point of 81,585 $10^6m^3/d$ (2,880 MMcf/d or 3,085 TJ/d). This is sufficient to accommodate the new and existing FT-D contracts.

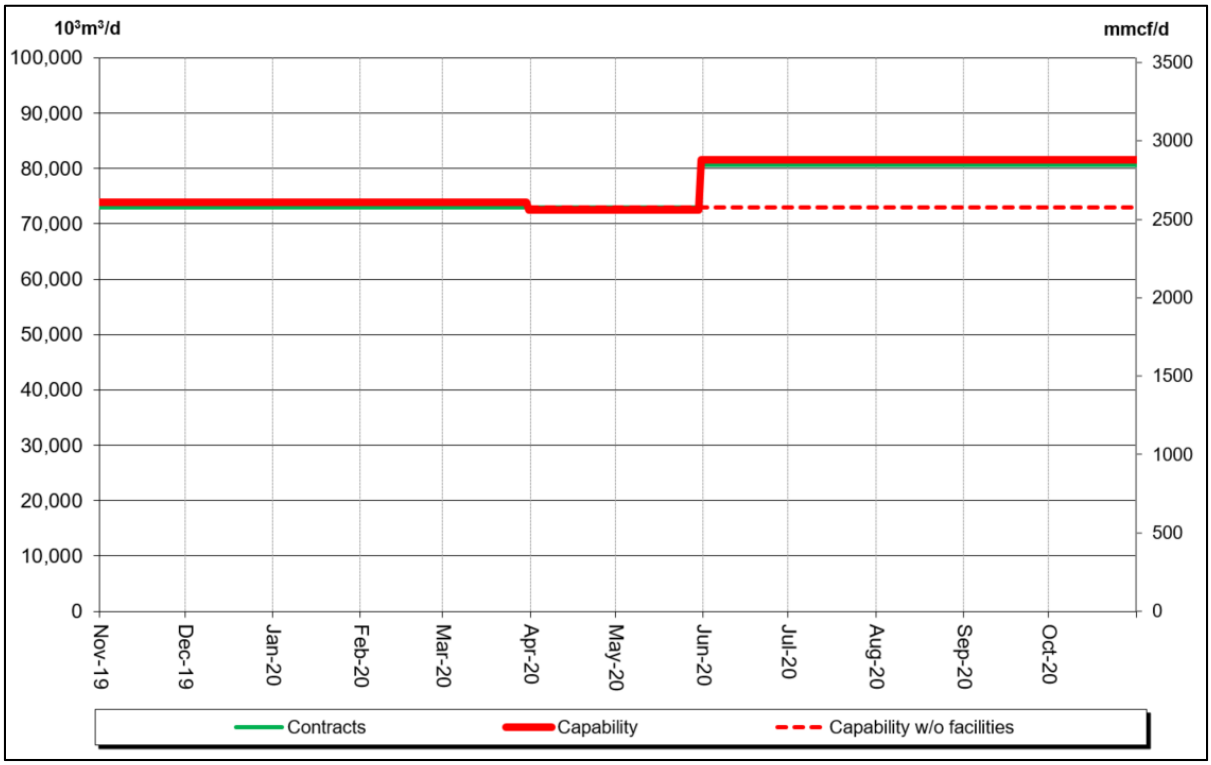

Figure 3-5: AB-BC Border Export Capacity Chart

3.5.4 Alternatives Considered

As a part of the facility selection process, NGTL identified and compared facility alternatives to meet design flows resulting from FT-D contract requirements as well as forecast peak flows. The chosen facilities have been selected on the basis of lowest CPVCOS which is summarized for each in the following tables and discussed below. The alternative analysis tables below only include first year capital cost as there are no long-term capital costs for the three alternatives.

3.5.5 Facility Alternative – Rocky View Section

The alternative to the Rocky View Section is a 30 MW compressor station located south of the Town of Cochrane.

The alternative provides sufficient capacity to accommodate the design flows resulting from the increased FT-D contracts; however, the proposed Rocky View Section was selected based on its CPVCOS savings of $25 Million compared to the alternative as shown in Table 3-4.

Table 3-4: Rocky View Section Alternative CPVCOS

Facility	First Year Capital Cost ($M)	CPVCOS ($M)
Rocky View Section	189	142
New 30 MW Compressor Station	131	167

3.5.6 Facility Alternative – Turner Valley CS

The alternative to the Turner Valley CS is a 40 km NPS 42 loop of the existing NPS 36 WASML located upstream of Turner Valley Compressor Station.

The alternative provides sufficient capacity to accommodate the design flows resulting from the increased FT-D contracts; however, the proposed Turner Valley CS was selected based on its $66 Million lower first year capital cost and its CPVCOS savings of $24 Million compared to the alternative as shown in Table 3-5.

Table 3-5: Turner Valley CS Alternative CPVCOS

Facility	First Year Capital Cost ($M)	CPVCOS ($M)
Turner Valley CS	106	97
40 km NPS 42 WASML Loop	172	121

3.5.7 Facility Alternative – Burton Creek CS

The alternative to the Burton Creek CS is a 37 km, NPS 42 loop of the existing WASML upstream of the Burton Creek Compressor Station.

The alternative provides sufficient capacity to accommodate the design flows resulting from the increased FT-D contracts; however, the proposed Burton Creek CS was selected based on its $45 Million lower first year capital cost and its CPVCOS savings of $12 Million compared to the alternative as shown in Table 3-6.

Table 3-6: Burton Creek CS Alternative CPVCOS

Facility	First Year Capital Cost ($M)	CPVCOS ($M)
Burton Creek Unit Addition	114	100
37 km NPS 42 WASML Loop	159	112

In summary, the cumulative savings of the proposed facilities compared to the alternative facilities, is $53 Million, additionally the CPVCOS savings for the proposed facilities compared to the alternatives is $61 Million.

3.6 FINANCING

TransCanada will fund Project construction through a combination of predictable cash flows generated from operations, new senior debt, as well as subordinated capital in the form of additional preferred shares and hybrid securities, the issuance of common shares and portfolio management.

TransCanada's liquidity, access to capital markets and strong financial position provide significant financial flexibility. At September 30, 2017, TransCanada and other subsidiaries of TransCanada Corporation had approximately $1.4 billion of cash on hand, $8.5 billion of undrawn committed credit facilities and three well supported commercial paper programs.

Over the past five years ending December 31, 2016, TransCanada and TransCanada Corporation have generated $21 billion cash from operations and raised $36 billion in the debt and equity capital markets to support a $22 billion capital program, $14 billion in acquisitions, repay $13 billion in debt maturities and pay $8 billion in dividends.

At September 30, 2017, TransCanada Corporation's consolidated capital structure consisted of 51% senior debt (net of cash), 10% junior subordinated debt, 6% preferred shares and 33% common equity.

TransCanada and TransCanada Corporation have been assigned "A-" level investment grade credit ratings by Moody's Investor Service, Inc., S&P Global Ratings, and FitchRatings in the U.S., and by DBRS in Canada.

See the following appendices for copies of the recent rating agency reports issued by the four credit rating agencies:

- Appendix 3-1 – Moody's Investor Service Credit Opinion report on TransCanada PipeLines Limited dated April 13, 2017
- Appendix 3-2 – S&P Global Ratings report on TransCanada Corporation dated June 30, 2017
- Appendix 3-3 – FitchRatings report on TransCanada PipeLines Limited and TransCanada Corporation dated April 5, 2017
- Appendix 3-4 – DBRS report on TransCanada Corporation and TransCanada PipeLines Limited dated June 9, 2017

4.0 PIPELINE

This section provides a description of routing, design, integrity management and construction details for the pipeline component of the Project, the Rocky View Section. This information is based on preliminary design and is supported by initial results from field investigation and engagement programs. Refinements may be made as additional data is collected and assessed, and as engineering progresses through detailed design.

4.1 ROUTING OVERVIEW

The Rocky View Section involves the construction and operation of a new buried pipeline to transport sweet natural gas, and will include approximately 21.5 km of NPS 42 pipeline and associated facilities.

The Rocky View Section begins at NGTL's existing WAS110 Valve Site within NE 16-26-04 W5M (located approximately 0.8 km north of the Town of Cochrane, AB). Moving south, the Rocky View Section parallels two existing TransCanada-operated pipelines, NGTL's NPS 36 WASML and Foothills' NPS 36 Zone 7 Pipeline, for approximately 88% (18.9 km) of its route. Of the remaining 12% (2.6 km) of the route that does not parallel existing pipelines, approximately 7% (1.6 km) will be trenchless.

The Rocky View Section ends at NGTL's existing WAS100 Valve Site within NE 10-24-04 W5M (located approximately 16.6 km west of the City of Calgary, AB) within Rocky View County.

For the detailed Rocky View Section route map, see Appendix 4-1 and for the pipeline operating schematic drawing, see Appendix 4-2.

4.1.1 Routing Selection

From the outset of Project development, NGTL assessed several route alternatives. When identifying the proposed route for the Rocky View Section, NGTL considered its route selection criteria, as well as feedback received through engagement with potentially affected landowners, stakeholders and Aboriginal groups.

4.1.2 Selection Criteria

NGTL's route selection considered and balanced several criteria when evaluating the route options, including the following, where practical or feasible:

- minimizing length to reduce overall environmental and socio-economic footprint
- ensuring facilities are economical to construct and operate
- paralleling existing linear disturbances, to:

  - minimize the fragmentation of land parcels by introduction of infrastructure to areas in which it currently does not exist
  - maximize the amount of temporary workspace (TWS) on existing ROWs
  - minimize the amount of new (non-parallel and non-overlapping) ROW required
  - minimize potential effects on environmental resources (e.g., native plant communities and wildlife habitat) and agricultural operations
- ensuring public safety
- minimizing the number, and ensuring the construction feasibility of, watercourse, road, rail and utility crossings
- considering and avoiding sensitive environmental features (e.g., wetlands, riparian areas, and watercourse crossings) and sites with known occurrences of provincially or federally listed wildlife and plant species (habitat features for species of management concern, provincially listed species at risk, species and habitats for species listed under the Committee on the Status of Endangered Wildlife in Canada [COSEWIC] or the federal *Species at Risk Act* [SARA])
- avoiding terrain subject to geotechnical issues such as areas of unstable slopes or problem soils, or known seismic activity
- avoiding lands of designated status, such as parks, protected areas, cemeteries and historic, archaeological or heritage sites
- avoiding concentrated areas of rural residences and urban developments
- considering input received from potentially affected landowners, stakeholders and Aboriginal groups through various engagement activities
- consulting with regulatory agencies on an ongoing basis to understand issues that may need to be addressed in the routing process

4.1.3 Route Options

When selecting the proposed Rocky View Section route, NGTL evaluated three preliminary route options (A, B and C) for the Project. All routes start at the tie-in location north of the Town of Cochrane (at the existing NGTL WAS110 Valve Site within NE 16-26-04 W5M) and end at the southern tie-in location (at the existing NGTL WAS100 Valve Site within NE 10-24-04 W5M). The primary difference between the preliminary route options is how they traverse through or near the Town of Cochrane, with all three preliminary route options following the same general path once south of the Town of Cochrane:

- Preliminary Route A begins approximately 800 m north of the Town of Cochrane, and parallels an existing pipeline corridor containing the WASML and Foothills Zone 7 Pipeline for the majority of the route through the Town of Cochrane on

the west side of Highway 22. The route deviates from paralleling the existing NGTL/Foothills corridor at the horizontal directional drill (HDD) crossing of the Bow River, emerging south of the Town of Cochrane and returns to paralleling the existing NGTL/Foothills corridor for approximately 15.5 km. The final 1 km deviates from the corridor for a trenchless crossing of Alberta Transportation's planned Springbank Off-Stream Reservoir and the route terminates at the southern tie-in location.

- Preliminary Route B travels west-southwest of the Town of Cochrane for approximately 4 km, before turning south to cross Horse Creek, the Bow River, McLennan Creek and Jumpingpound Creek. The route traverses approximately 2 km of the Stoney 142, 143, 144, Indian Reserve between the Bow River and Jumpingpound Creek. The route then trends southeastward for approximately 9 km, where it begins to parallel the existing NGTL/Foothills corridor at the planned block valve in SW-15-25-04-W5M, south of the Town of Cochrane. At this point the route follows the same path as Preliminary Route A for approximately 11.5 km until its terminus at the WAS100 Valve Site. Only the portion of the route that follows the same path as Preliminary Route A parallels the existing NGTL/Foothills corridor.
- Preliminary Route C travels east from the WAS110 Valve Site, north of Big Hill Springs Provincial Park and across Bighill Creek Coulee before turning south through agricultural lands east of Cochrane. This portion of the route travels to the east of the Town of Cochrane when heading southward, and requires a crossing of Glenbow Ranch Provincial Park and the Bow River. The route continues south of the Bow River before turning west for approximately 5 km to where it begins to parallel the existing NGTL/Foothills corridor at the planned block valve in SW 15-25-04-W5M, south of the Town of Cochrane. At this point the route follows the same path as Preliminary Route A for approximately 11.5 km until its terminus at the WAS100 Valve Site. Preliminary Route C was removed from consideration early on following desktop assessment and was not carried forward because of the following factors:
  - the route option does not parallel the existing NGTL/Foothills corridor for much of its length (approximately 12 km or 34% of its total length is non-parallel), as compared to approximately 2.59 km or 12% of the total length for Preliminary Route A
  - the route option traverses challenging terrain, including crossings of both the deeply incised Bighill Creek coulee and the Bow River. This presents significant constructability challenges and would affect environmentally sensitive landforms which support native vegetation and provide valuable wildlife habitat.
  - the route requires crossing Glenbow Ranch Provincial Park, an extensive area which has been protected to preserve natural landscapes and historical

features. The park has high values for vegetation, wildlife and heritage resources.

- the route option presented limited and unproven crossing locations of the Bow River
- the route option is the longest of the preliminary routes. It is approximately 13 km longer than Preliminary Route A and approximately10 km longer than Preliminary Route B.

Preliminary Routes A and B were assessed in further detail and a map detailing these routes can be seen in Appendix 4-3.

4.1.4 Engagement on Preliminary Routes A and B

The Project began engaging with landowners, stakeholders (including the Town of Cochrane, Rocky View County and regulators) and Aboriginal groups regarding Preliminary Routes A and B in Q2 2017. This engagement provided useful feedback, helping the Project evaluate both routing options as well as route refinement considerations, including land constraints and environmental sensitivities. NGTL's engagement on the preliminary routes was also informed by its own operational experience in the area and its existing relationships with landowners, stakeholders and Aboriginal groups.

The following provides a summary of NGTL's engagement activities which helped evaluate Preliminary Routes A and B (see Sections 8 and 9 for detailed stakeholder and Aboriginal engagement summaries, respectively):

- Several meetings were held with the Town of Cochrane to understand possible stakeholder and landowner concerns, determine the best methodologies to engage with the local community and stakeholder groups, discuss municipal land use planning, and obtain feedback on preliminary routes.
- Several meetings were held with representatives from Rocky View County to understand possible stakeholder and landowner concerns, determine the best methodologies to engage with the local community and stakeholder groups, discuss municipal land use planning, and obtain feedback on preliminary routes.
- Conducted a site visit with representatives from the Rocky View County and the Cochrane & District Agricultural Society (CDAS) to gather feedback on routing, better understand their planned activities for potential future land use on lands owned by Rocky View County, and learn about possible construction constraints.
- Presented to the Cochrane Pipeline Operators Committee (CPOC) and Town of Cochrane emergency responders to introduce the Project.
- Provided Project information to local stakeholder groups (e.g., Rangers Soccer Club, Off-Leash Advocacy Group, CDAS) to obtain feedback and better understand potential impacts of the Project.

- Met with representatives of the developer of the Fireside Neighbourhood to provide Project information and obtain feedback.
- Met with Alberta Transportation to provide Project information, to seek feedback and understand any interaction between the Project and planned Alberta Transportation infrastructure projects. The proposed Alberta Transportation projects which were consulted on include the Springbank Off-Stream Reservoir, Highway 1A/Highway 22 Interchange, and Highway 1/Highway 22 Interchange. The Project will continue its engagement with Alberta Transportation as the Project and the proposed highway and infrastructure projects progress to identify opportunities to mitigate potential impacts.
- Engaged with Alberta Environment and Parks (AEP), as well as Alberta Culture and Tourism, to review and address provincial resource management interests.
- Provided Project information to Environment and Climate Change Canada (ECCC).
- Met directly with various landowners to provide a detailed summary of the proposed Project, the preliminary routes being considered, and to obtain feedback.
- Since Preliminary Route B would traverse through the Stoney 142, 143, 144, Indian Reserve for approximately 2 km, NGTL met directly with community representatives to provide information about the Project, the preliminary routes being considered, and to obtain feedback.
- Hosted a booth at the CDAS Fall Fair for attendees to learn more about the Project and provide feedback.
- Before route selection, hosted an open house event in September 2017 in Cochrane, with a total of 63 people attending including landowners, community residents, a representative from Stoney Nakoda Nations, and a municipal election candidate.
- Sent mailouts to the broader community providing Project information including the preliminary routes being considered, open house information, and where further information can be obtained.
- To keep landowners, stakeholders and Aboriginal groups informed, established a Project webpage (www.transcanada.com/westpath), used local mail notifications, placed print and digital advertisements with the local newspapers, responded to media enquiries, shared information on TransCanada's social media platforms and provided information to the Town of Cochrane to update residents via social media streams.
- Responded to enquiries received through a dedicated Project email account and telephone number with voicemail services.

4.1.5 Preliminary Route Options Not Selected

As mentioned above, Preliminary Route C was removed from consideration following a desktop assessment and was not further assessed.

After considering NGTL's route selection criteria including results of environmental field investigations and feedback received during engagement activities, Preliminary Route B was not selected. The following provides the primary considerations that led to the determination that Preliminary Route B was less preferable than Preliminary Route A:

- Although Preliminary Route B parallels existing infrastructure, including buried pipelines, only the portion that follows Preliminary Route A (approximately 11.5 km), or just over half of its total length, follows the existing NGTL/Foothills corridor. This limits the ability for the Project to potentially reduce new (non-parallel and non-overlapping) ROW and to maximize the amount of TWS on existing ROWs.
- Preliminary Route B results in an additional length of approximately 3 km when compared to Preliminary Route A. The planned length of Preliminary Route B is approximately 24.5 km versus approximately 21.5 km for Preliminary Route A.
- Although a crossing of the Bow River is required for all options, at least three additional watercourse crossings are required for Preliminary Route B (i.e., Jumpingpound Creek, McLennan Creek and Horse Creek):
  - NGTL has no previous crossing information available for the Bow River in the potential crossing locations for Preliminary Route B since it does not parallel any existing NGTL/Foothills infrastructure at these locations.
  - NGTL has no previous crossing information available for Jumpingpound Creek, which is within a deeply incised valley, since Preliminary Route B would not be paralleling any existing NGTL/Foothills infrastructure at this location.
- Based on desktop data and reconnaissance level field studies of the route south of Jumpingpound Creek, Preliminary Route B was evaluated as likely having a greater environmental impact than Preliminary Route A because it would traverse more environmentally sensitive areas:
  - Preliminary Route B requires more watercourse crossings than Preliminary Route A.
  - Preliminary Route B crosses the Bow River in an area that would affect better wildlife habitat than the crossing on Preliminary Route A.
  - Preliminary Route B south of the Bow River traverses larger areas of contiguous native prairie, which supports valuable ecological communities and provides higher wildlife habitat values than occurs on Preliminary Route A.

- Preliminary Route B also has high heritage values for known archaeological and paleontological sites and high potential for previously unrecorded sites.
- Preliminary Route B crosses a parcel of provincial Crown land with a protective notation relating to the conservation of native fescue grassland, illustrating the presence of a valuable ecological community. These areas of native vegetation have a higher potential for the presence of species at risk or species of management concerns, higher wildlife habitat values, and high potential for intact heritage resources.

4.1.6 Preliminary Route A Selected

After considering NGTL's route selection criteria and feedback received during the abovementioned engagement, Preliminary Route A was chosen as the proposed route for the Project (Proposed Route). The following is a summary of the considerations that led to NGTL selecting the Proposed Route:

- The Proposed Route has the shortest total length, at approximately 21.5 km and parallels the existing WASML and Foothills Zone 7 Pipeline for approximately 88% (18.9 km) of its length. This allows for the potential to reduce the amount of new (non-parallel and non-overlapping) ROW required and maximize the amount of TWS on existing ROWs. Of the remaining approximately 12% (2.6 km) of the Proposed Route that does not directly parallel existing pipelines, approximately 7% (1.6 km) will be trenchless.
- The Proposed Route was evaluated as likely having less of an environmental impact than Preliminary Route B because it would traverse fewer environmentally sensitive areas based on field studies completed in 2017. The Proposed Route requires a single watercourse crossing (the Bow River) to be installed by trenchless methods. Approximately 67% of the route occurs in cultivated/ agricultural lands, and approximately 7% of the route occurs in existing disturbed or developed land, which have limited wildlife habitat and vegetation sensitivities. There are also fewer heritage sensitivities on the Proposed Route.
- Feedback from AEP noted the Proposed Route will avoid and minimize effects to wildlife values by eliminating avoidable watercourse crossings and the associated riparian areas, and will also avoid public lands with protective notations pertaining to native fescue grasslands.

Based on the foregoing, NGTL believes that the Proposed Route appropriately balances the multiple factors and competing interests that were considered when selecting the Proposed Route, and that the Proposed Route is the best option for the Project.

With respect to the Bow River, a crossing which parallels the existing pipeline corridor was evaluated based on the abovementioned routing criteria. This conceptual crossing execution strategy would have involved a shorter HDD length, different exit

location, and conventional trenching up the hill on the south side of the Bow River (Short HDD). This parallel route was determined to be less preferable because of the number and alignment of utilities present within the existing pipeline corridor at this location. This presents constructability challenges if a trenchless installation was employed in parallel to the existing pipeline corridor up the hill on the south side of the Bow River. Further, because of several recent community developments, including high-density housing and recreational facilities, workspace in proximity to the existing pipeline corridor is highly constrained. The spatial constraints are particularly challenging in relation to the need for a welded and tested drag section of pipeline to complete an HDD installation.

As a result, a crossing alignment and longer HDD installation is planned to the east of the existing pipeline corridor, which:

- allows for the trenchless crossing activities (HDD) and required workspace to be situated away from residential buildings, including a high-density residential building on the south side of the Bow River
- allows for sufficient spacing to create a safe workspace for the pipe string by being on the level uplands above the valley, eliminating the need to work on the slope of the hill on the south side of the Bow River
- avoids traffic closures or access restrictions into residential properties such as those along Towers Trail road because they would be included within the HDD section of the Proposed Route
- increases distance between construction areas and the nearby residential buildings, recreational facilities, and parkways
- eliminates the requirement to conventionally construct up the hill south of the Bow River (i.e., open trench), leading to reduced safety concerns and reduced environmental impacts during construction

An update was provided to landowners, stakeholders and Aboriginal groups during the week of October 30, 2017, advising that Preliminary Route A was selected as the Proposed Route, and inviting questions and feedback. This update was communicated by a mailout with a letter explaining the route selection decision, an updated map, and Project fact sheet. Additionally, an advertisement was placed in the Cochrane Times, Cochrane Eagle, and Rocky View Weekly. An update to the Project website was also made, advising of the route selection.

Following route selection, NGTL also hosted an open house event on January 18, 2018, with a total of 76 people attending. NGTL also acknowledges there are landowners that have expressed opposition to the Proposed Route, and NGTL is continuing to work to address these concerns.

4.1.7 Engagement and Route Refinements Evaluated for the Proposed Route

Since initial engagement began on the Project in Q2 2017, NGTL has been seeking feedback on the Proposed Route (i.e., Preliminary Route A and the route south of the Town of Cochrane shared by Preliminary Routes A and B). During these engagement activities, NGTL was asked to evaluate refinements to the Proposed Route. In response to this feedback, and as part of NGTL's ongoing evaluation of the Proposed Route, NGTL worked to revise the Proposed Route to reduce potential impacts where feasible, including with respect to the following:

4.1.7.1 Hill North of Highway 1A Refinement (Approximately KP 19+200 to KP 19+800)

Through consultation with representatives of the landowner and occupant, NGTL was advised that routing east of the existing ROWs at this location was not preferred. Two additional route refinements were then developed for evaluation:

- one which parallels the existing NGTL/Foothills corridor (with various trenchless methodologies considered because of a steep slope)
- a second heading up the hill slightly west of the existing NGTL/Foothills corridor using a conventional construction methodology

Geotechnical studies were conducted, indicating that the hill is underlain by a significant amount of gravel, making trenchless construction methodologies more challenging and less feasible. Therefore, the second alternative, aligning west of the existing corridor, was selected in response because the reduced slope makes conventional construction feasible.

4.1.7.2 Bow River Crossing Refinement (Approximately KP 16+400 to KP 17+500)

As part of NGTL's ongoing evaluation of the Proposed Route at this location, and in part because of landowner feedback, two route refinements were evaluated as part of this crossing:

- one where the feasibility of realigning the HDD route and narrowing the ROW was evaluated
- a second where the route would instead parallel the existing WASML and Foothills Zone 7 Pipeline when crossing the Bow River, with a resulting shorter HDD for the Bow River crossing and then a conventional trenching method for the remainder of this location

Consultation with representatives of the St. Peter's Lutheran Church (St. Peter's), located on the south side of the Bow River crossing, identified concerns regarding the Rocky View Section and permanent ROW being in close proximity to existing buildings and infrastructure. The initial alignment of the Proposed Route would have the HDD path directly adjacent to the existing church building, but approximately 50 m below ground surface at this location, pending ongoing engineering design. In

response to these concerns, the HDD drill path for the Proposed Route was refined at this location by moving its alignment further to the west by approximately 15 m, and the ROW width was reduced from 15 m to 10 m at this location. This realignment of the HDD path increased the separation from the existing structures. The drill path would remain approximately 50 m below the ground surface at this location.

Consultation with representatives of St. Peter's also identified concerns regarding the Rocky View Section traversing their lands and a preference for the Rocky View Section to be located within or parallel to the existing pipeline corridor further to the west. As noted in Section 4.1.6, NGTL had previously evaluated a different alignment and construction execution strategy at this location that would instead have the Proposed Route parallel the existing WASML and Foothills Zone 7 Pipeline when crossing the Bow River. This conceptual Short HDD crossing execution strategy would have involved a shorter HDD length, different exit location, and conventional trenching up the hill on the south side of the Bow River, and was determined to be less preferable. In response to the concerns expressed by St. Peter's, NGTL re-evaluated this conceptual Short HDD strategy. After further evaluation, the Proposed Route and related Bow River crossing strategy was again confirmed as the preferred execution strategy at this location because, in comparison, the conceptual Short HDD execution strategy presented greater constructability challenges and environmental impacts, including the following:

- The slope of the hill on the south of the Bow River, which would need to be conventionally trenched, is at a gradient which poses construction and safety challenges, including an impaired ability to position and guide equipment:
    - conventional trenching on this hill also results in limited space for the HDD pipe installation because the pipe would have to be strung, welded and tested on the level uplands above the escarpment, and walked down the hill slope within the ROW to the exit point
    - temporary closure of Towers Trail road would be necessary during the period when the HDD pipe section is moved from the upland staging area to the exit point of the Short HDD, thus affecting local residents and road users
- The Short HDD presents greater workspace constraints because of the number and alignment of existing utilities in the area, as well as proximity to residences, roads and power poles.
- Construction of stability platforms for cranes and side booms to secure the drag section as it is moved to the HDD site would be required.
- Increased noise and vibrational disturbance to a large number of residences because of the need to place the HDD rig and casing to support hole stability in close proximity to a high-density housing structure. The construction areas for the Short HDD are also closer to recreational facilities, parkways and St. Peter's.

- The steep slope would require extensive erosion control measures, both interim measures during construction and permanent measures following cleanup and reclamation.

In general, these challenges are reduced or avoided with the Proposed Route and related HDD execution strategy for the Bow River crossing as presented in this Application. NGTL also notes that when the Proposed Route traverses the St. Peter's lands, the path of the HDD results in the pipeline being approximately 50 m below ground surface and embedded in bedrock at this depth. NGTL has explained its rationale for the proposed Route and execution strategy for the Bow River crossing to representatives of St. Peter's. NGTL also acknowledges receipt of a letter from St. Peter's (copied to the NEB), dated January 15, 2018, respectfully rejecting the Proposed Route being located within the St. Peter's lands. NGTL further acknowledges there are other landowners that have concerns with the Proposed Route at the Bow River crossing location. NGTL is continuing to work to address the concerns expressed by these landowners.

4.1.7.3 Bow River Crossing Entry Workspace (Approximately KP 16+400)

A number of meetings were held with the Town of Cochrane to provide information about the Project and seek information about potential impacts. During the meetings, concerns were raised regarding the number of trees and vegetation that would be required to be removed to accommodate the workspace planned for the HDD entry site of the Bow River Crossing. As a result, the Project completed a site investigation and refined the proposed temporary workspace by reducing the overall workspace required, thereby minimizing the number of trees and vegetation requiring removal. Additionally, temporary workspace west of the entry location, which contains more open space, will be utilized by using matting over existing utilities, as much as practical, in order to further reduce disturbance.

4.1.7.4 Planned Residential Development Refinement (Approximately KP 13+750 to KP 14+500)

A meeting was held with representatives of the developers of the Fireside Neighborhood within the Town of Cochrane. During the meeting, concerns were raised regarding the potential impact that the Rocky View Section could have on the proposed residential development to the east because of increased setback requirements resulting from new (non-overlapping) permanent ROW. In response to these concerns, a refinement was made such that the entirety of the Rocky View Section ROW will overlap with the existing WASML ROW in this location. Municipal setbacks in this area will remain the same since these setback requirements are measured from the boundary of the pipeline ROW, and the eastern boundary of the Rocky View Section ROW will be the same as the eastern boundary of the existing WASML ROW.

An additional route refinement which would have avoided the future housing subdivision by routing west of the existing ROWs was also evaluated, but was not selected because of the added impact to landowners and creation of a new pipeline corridor that such a refinement presented.

4.1.7.5 Landowner Feedback Refinement (Approximately KP 3+200 to KP 4+300)

During consultation, NGTL presented a potential route refinement that would have routed the Rocky View Section to the east of the existing pipeline corridor, around a treed area at this location. Landowner feedback was that this route refinement was not preferred but that minimizing the need to clear trees was preferred. As a result, the Project maintained the route parallel to the existing pipeline corridor at this location, and reduced the construction ROW for the section of the route through the treed area, in order to minimize clearing trees on the landowner's property.

4.1.7.6 Springbank Off-Stream Reservoir (Approximately KP 0+500 to KP 1+500)

Stantec Consulting Ltd. (Stantec) has been retained as the consultant for the design of Alberta Transportation's Springbank Off-Stream Reservoir project (Reservoir Project). TransCanada and Stantec have been in communication regarding the Reservoir Project since 2015, as the existing WASML and Foothills Zone 7 Pipeline will be impacted by the proposed diversion channel crossing. NGTL has reviewed preliminary designs for the Reservoir Project that were received by TransCanada through consultation with Stantec. As a result, a trenchless methodology (HDD) is proposed for the Project in order to cross the proposed diversion channel of the Reservoir Project. NGTL has also engaged Alberta Transportation to provide Project details and receive additional information on the proposed Reservoir Project. The Project will continue to engage with Alberta Transportation and its consultant as the Project and the Reservoir Project progress to identify opportunities to mitigate potential impacts.

4.1.7.7 Landowner Feedback Refinement (Approximately KP 0+000 to KP 0+500)

A meeting was held with a landowner in proximity to the WAS100 valve site to discuss multiple routing options near their residence. Alternatives that routed the pipeline west of the existing pipeline ROWs as well as an alternative that routed the pipeline east of the residence, parallel to the existing pipeline ROWs were discussed. After receiving feedback from the landowner, a route refinement was incorporated that routed the pipeline west of the existing pipeline ROWs and west of the landowner's residence.

4.1.7.8 Landowner Feedback Permanent ROW Width

Several landowners provided feedback regarding their preference for the Rocky View Section to be parallel to or incorporated within existing ROWs, and for the permanent ROW width to be minimized. In response to these concerns, NGTL routed the Rocky

View Section parallel to the existing WASML and Foothills Zone 7 Pipeline where feasible, and the Rocky View Section ROW will overlap with portions of the existing WASML and Foothills Zone 7 pipeline ROWs, for the majority of the Proposed Route, thereby minimizing the incremental impact to landowners.

NGTL will continue to engage with landowners, stakeholders and Aboriginal groups on the Proposed Route in order to obtain feedback, and address questions and concerns.

4.2 GAS COMPOSITION

The expected composition of the sweet natural gas to be transported by the Project is included in Table 4-1. This table represents the average composition of the gas flowing through the Project.

Table 4-1: Average Composition of Gas

Component	Value (%)
N_2	1.1589
He	0.0334
CO_2	0.5720
C_1	94.7012
C_2	2.9007
C_3	0.4773
C_4I	0.0549
C_4N	0.0695
C_5I	0.0139
C_5N	0.0100
C_6N	0.0066
C_7N	0.0013
C_8N	0.0004

4.3 ENGINEERING DESIGN STANDARDS

The Project, including the proposed Rocky View Section, will be designed, constructed and operated in accordance with Canadian Standards Association Z662-15: Oil and Gas Pipeline Systems (CSA Z662-15) and the OPR, as well as other industry standards, TransCanada specifications, and approval conditions.

4.3.1 Industry Standards

The pipeline component of the Project will be designed, constructed and operated in accordance with the most current version of the industry standards listed in Table 4-2.

Table 4-2: Industry Standards for Pipeline Facilities

Organization	Standard Title
NEB	OPR
CSA	CSA Z245.1-14 Steel Line Pipe
CSA	CSA Z245.12-17 Steel Flanges
CSA	CSA Z245.11-17 Steel Fittings
CSA	CSA Z245.15-17 Steel Valves
CSA	CSA Z662-15: Oil and Gas Pipeline Systems
CSA	CSA Z245.20/21/22-14: Plant-applied external coatings for steel pipe
CSA	CSA Z245.30-14: Field-applied external coatings for steel pipe
CSA	CSA S16-14 Design of Steel Structures
CSA	CSA A23.1-14 Concrete Materials
CSA	CSA A23.2-14 Methods of Concrete Construction
CSA	C 22.1-12 Canadian Electrical Code, Part 1 and 2, Safety Standard for Electrical Installations
CGA	CGA OCC-1-2013 Recommended Practice, Corrosion Control for Buried or Submerged Metallic Piping Systems
ASME	ASME B31.3-2016 Process Piping
ASME	National Building Codes of Canada (NBC 2010)

Note:
1. The CSA standards in this table often incorporate other CSA standards and publications from other organizations (e.g., ASME, ASTM, API, ISO, CGSB, NACE, SSPC and MSS).
2. Standards will be the latest edition.

4.3.2 TransCanada Preliminary Standards and Specifications

The Rocky View Section will be designed, constructed and operated in accordance with TransCanada specifications listed in Table 4-3. 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 4-3: Pipeline Preliminary Standards and Specifications

Name	Description	EDMS No.
Corrosion Prevention		
TEN-CP-DESGN-GL	Corrosion Prevention Design Standard	1003455877
TEN-CP-BUILD-GL	Corrosion Prevention Construction Standard	1003439376
TEN-CP-SURVY-GL	Corrosion Prevention Survey Standard	1003456006
TEN-CP-DELVR-GL	Corrosion Prevention Execution and Deliverables Standard	1003441144
Coating		
TES-COAT-CAD-GL	Thermite Weld Coating on Steel Pipelines	3672126
TES-CO-FBE-GL	External Fusion Bond Epoxy for Steel Pipe	3670892
TES-CO-EPU-GL	Field-Applied External Liquid Coating Systems for Steel Pipes	3671710
TES-CO-INT-G	Internal Coating of Line Pipe for Non-Corrosive Gas Transmission Service	6282
TES-CO-PAINT-GL	Paint Systems for Above Ground Facilities (Coastal and Non-Coastal)	3694704
TES-CO-PET-GL	Application of Petrolatum Tape Coating	7756
Materials		
TES-FITG-CIF	Contoured Insert Fittings Specification	4424021
TES-FITG-EC1	End Closures Specification	3779256
TES-MA-FITG-GL	Carbon Steel Butt-Welding Fittings Specification	3671270
TES-FITG-SAD	Full Encirclement Reinforcing Saddles Specification	3779258
TES-FITG-T01	Instrument Tube Fitting, Instrument Pipe Fitting and Tubing Material Specification	3697116
TES-MA-FLGEC-GL	Carbon Steel Butt-Welding Flanges Specification	3671966
TES-MATL-COMP	Materials Requirements of Pressure Containing Equipment Components Specification	8071725
TES-MATL-MD1	Piping System Materials for Pipeline, Compression and Metering Facilities	3764909
TES-MA-EWPI-GL	Electric-Welded Pipe Specification	3670788
TES-MA-SAWPI-GL	Double Submerged Arc Welded Pipe Specification	3776714
TES-MA-VALV-G	Steel Valves for Gas Service Specification	1001891682
TES-MA-BEND-GL	Induction Bends Specification	8194414
TED-MATL-FRAC	Materials Fracture Control Plan	7076183
Mechanical		
TED-MECH-WT	Determine Pipe Wall Thickness & Material Grade for Gas/Liquid Pipelines and Pipeline Facilities	7912051
TED-INT-LR	Launcher and Receiver Installation and Initial Assessment Technical Directive	8098412
TEP-MECH-TRAN	Transition Design and Joining Methods	6256
TEP-MECH-VENT	Blowdown Sizing and Venting Times for Pipelines	6191
TEP-MECH-WT	Determining Pipe Wall Thickness and Material Grade for Gas/Liquid Pipelines and Pipeline Facilities	6190
TES-ME-STRHO-GL	Pipe Stress Engineering Analysis and Design of Hot Tap Branch Connections Specification (CAN-US-MEX)	7913244
TES-ME-VOP-G	Gas Hydraulic and Gas Pneumatic Operator Specification	3671784
TES-MECH-GAS-LR	Launcher and Receiver Station Design Specification	8115356
TES-MECH-GAS-VA	Valve Assemblies for Gas Service Pipelines	8174819

Table 4-3: Pipeline Preliminary Standards and Specifications (cont'd)

Name	Description	EDMS No.
Stress Analysis and Buoyancy Control		
TES-BUOY-CON	Construction and Installation of Buoyancy Control	6416227
TES-STRS-BUOY	Design of Buoyancy Control Measures for Pipelines	3671271
TES-ME-STRPA-LG	Pipe Stress Engineering Analysis and Design of Pipeline Assemblies Specification (CAN-US-MEX)	7808806
Civil/Structural		
TED-CI-STEEL-GLE	Structural Steel and Miscellaneous Metals	6488
TES-CI-EARTH-GLE	Facility Earthwork Specification (CAN-US)	6457
TES-GLE-CI-SPILE	Driven Steel Pile Specification (CAN-US)	6459
TES-DV32-3115	Portable Chain Link Fence	3744430
TES-CI-CONC-GLE	Concrete Specification	004431054
Construction		
TES-CT-GEN-GL	Pipeline Construction Specification	3745282
TES-ME-HDD-GL	HDD Design and Construction Specification	1003103090
TES-PROJ-ACC	Temporary Access Roads Specification	8960813
TES-PROJ-SSW	Steep Slope Work Specification	9199892
TES-PROJ-COM	Compaction Control Measures for Pipeline Excavations	5974567
TES-PROJ-BLT	Blasting Specification	3672450
TES-PROJ-HDD	Horizontal Directional Drilling Specification	6278794
TES-PROJ-PTMB	Pipe Thruster with Microtunnel Boring Specification	1001389638
TES-PROJ-STK	Temporary Stockpiling of Steel Pipe	5415573
TES-PROJ-ROW	Right of Way Specification	6363243
TES-PROJ-EXC	Excavation Specification	5890120
TES-ILI-DEF	Specification for Deformation In-Line Inspection Technologies	6980231
Welding		
TEP-WELD-ABR	Removal of Arc Burns (New and Existing Facilities) (Cdn)	3670959
TEP-WELD-DEMAG	Demagnetization of Pipe Ends in Preparation for a Tie-in Weld (Cdn-US-Mex)	5876519
TES-WL-AS-GL	Welding of Assemblies and Station Piping Specification (CAN)	3670962
TES-INSERV-CSA	Welding on In-service Pipelines Specification (CDN)	3886791
TES-WELD-PL	Welding of Pipelines and Tie-ins Specification (CDN)	3670960
TEF-WELD-TIE-IN	Tie-In Weld In-process Examination Form (CDN-US-MEX)	8275922
ETB-2015-002	Requirements for Tie-in Welds on Pipelines and Pipeline Facilities	9400587
Non-Destructive Examination		
TEP-NDT-ADT	Procedure for Nondestructive Examination Audits (CDN-US-MEX)	3797402
TEN-NDT	NDT Standard (CDN-US-MEX)	1001828336
TES-NDT-RT	Radiographic Examination of Welds Specification (CDN)	3671368
TES-NDT-UT	Ultrasonic Examination of Girth Welds Specification (CDN)	1001829033
TES-NDT-PA	Phased Array & TOFD Inspections of Welds and Materials (CDN-US-MEX)	9219103
Hydrostatic Testing		
TEP-PRES	Pipeline and Facility Piping Pressure Testing Procedure	1001810622
TES-PRES	Pipeline and Facility Piping Pressure Testing Specification	1001810638
TES-PRES-TH	Design of Test Head Assemblies Specification	3670482

Table 4-3: Pipeline Preliminary Standards and Specifications (cont'd)

Name	Description	EDMS No.
Drafting		
TEP-DRFT-G03	Engineering Drawing Line Thickness, Line Types and Color Procedure	3677695
TEP-DRFT-G04	Layers for Engineering Drawings	3677266
TEP-DRFT-G05	Engineering Drawing Numbering Procedure	3677632
TEP-DRFT-G06	Block Libraries for Engineering Drawings	3677629
TEP-DRFT-G07	Borders for Engineering Drawings	3676454
TEP-DRFT-G08	Symbols for Engineering Drawings	3676491
TEP-DRFT-G09	Scales for Engineering Drawings	3675709
TEP-DRFT-G10	Engineering Drawings Bill of Materials Procedure	3678719
TEP-DRFT-G11	Engineering Drawing Obsoleting Procedure	3675707
TEP-DRFT-G12	Engineering Drawing Superseding Procedure	3675708
TEP-DRFT-G13	Engineering Drawing Abbreviation Procedure	3675728
TEP-DRFT-G14	Engineering Drawing Text and Font Procedure	3675726
TEP-DRFT-G15	Using XREFS for Engineering Drawings	3677256
TEP-DRFT-G16	Using Model Space/Paper Space for Engineering Drawings	3677633
TEP-DRFT-G17	Issued for Information Drawings Procedure	3780542
TEP-DRFT-G18	Engineering Drawings As-Building Procedure	5750819
TEP-DRFT-G20	Engineering Drawing Lifecycle Management Procedure	7703620
TEP-DR-INT-GLE	Drafting and Drafting Coordination Procedure	1003032477
TEP-DRFT-G23	General Drafting Requirements	7704403
TEP-DRFT-G24	Pipeline Redline Drawings Checklist (Cdn-US-Mex)	6798754

Note: 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.

4.4 PIPELINE FACILITIES DESCRIPTION

For a technical description of the Rocky View Section, see Table 4-4.

Table 4-4: Rocky View Section Technical Description

Size	Locations	Pipe Grade (MPa)	WT (mm)	Estimated Length (m)
NPS 42 (1,067 mm)	Line Pipe – Heavy Wall (Class 1, 2, and 3 General, Class 1 Roads)	483	11.5	15,304
NPS 42 (1,067 mm)	Line Pipe – Extra Heavy Wall (Class 4 General, Class 1,2, and 3 Road Crossings)	483	14.6	4,248
NPS 42 (1,067 mm)	Major Crossings - HDD, Class 4 Road and Rail Crossings	483	22	1958
NPS 42 (1,067 mm)	Valve Assembly Pipe	483	16.0	230
NPS 36 (914 mm)	Valve Assembly Pipe	483	13.7	10
NPS 24 (610 mm)	Valve Assembly Pipe	483	9.2	20
NPS 12 (323.9 mm)	Valve Assembly Pipe	241	12.7	36

Table 4-4: Rocky View Section Technical Description (cont'd)

Parameter	Description
Classification Standard	Pipe Material Selection for all pipe sizes including pipe less than or equal to NPS 12 will be per Company Specification TES-MATL-MD1. All pipe sizes greater than or equal to NPS 16 –TES-MA-EWPI-GL and/or TES-MA-SAWPI-GL as applicable. • Line Pipe will be CSA CAT II M5C • Assembly Pipe will be CSA CAT II M45C
Maximum Operating Pressure (MOP)	5,825 kPa
Design Pressure	5,825 kPa
Length	Approximately 21.5 km
Rocky View Section Start and End Locations	**Start:** NE 16-26-04 W5M NPS 42 WASML Loop (Dogpound Section) at the existing WAS110 Valve Site. **End**: NE 10-24-04 W5M NPS 42 WASML Loop (Turner Valley Section) at the existing WAS100 Valve Site.
Burial Depth	Depth of cover will be in accordance with CSA Z662-15. Minimum depth of cover will be 0.9 m.
Coatings	External coating for line pipe: Fusion Bond Epoxy (System 1A) Internal coating for line pipe and heavy wall pipe: Epoxy Paint TES-CO-INT-G External coating for abrasive conditions: Fusion Bond Epoxy (System 2B) External coating for girth welds and tie-ins: External Liquid Coating TES-CO-EPU-GL Irregular-shaped Items coating (i.e., meuller tees, flanges): Petrolatum coating TES-CO-PET-GL CAD Weld Coating: Thermite Weld Coating TES-CO-CAD-GL
Product Carried	The Rocky View Section will transport sweet natural gas that meets NGTL's Gas Quality Specifications outlined in its Tariff, General Terms and Conditions, Article 3, Gas Quality.
Corrosion Control Elements	Cathodic protection (CP) will be provided by existing and/or new NGTL facilities. CP test stations will also be installed where required; test stations may be located at foreign pipe crossings, road crossings, fence lines, etc.
Crossings	Crossings will be designed and installed in accordance with their respective crossing agreement. Pipe wall thickness corresponding to the appropriate class designation will be designated to comply with CSA Z662-15.
Valve Sites	The Rocky View Section will include the installation of the following: At the upstream WAS110 valve site (in NE 16 26-04 W5M): • One below ground NPS 42 isolation valve (WAS110-1-BV2) • One above ground in-line-inspection (ILI) launcher isolation valve (WAS110-1-ST) • One above ground flanged NPS 12 valve to facilitate the kicker line connection At the approximate midway JPW10 valve site (in SW 15-25-04 W5M): • One belowground NPS 42 Mainline block valve (WAS105-1-BV) and associated above ground NPS 12 blowdown valves At the downstream WAS100 valve site (in NE 10-24-04 W5M): • One above ground NPS 12 blowdown valve • One below ground NPS 24 isolation valve on the crossover of the Rocky View Section to the WASML

Table 4-4: Rocky View Section Technical Description (cont'd)

Parameter	Description
Materials for Valves, Flanges, Fittings and Assembly Pipe	The selection of materials for valves, flanges, fittings, and assembly piping will be in accordance with TES-MATL-MD1. Large diameter (NPS 16 and larger) Fittings, Valves, Flanges to be in accordance with TES-MA-FITG-GL, TES-MA-VALV-G, and TES-MA-FLGEC-GL respectively, where applicable because of ILI requirements.
Note: Material grade meets or exceeds minimum requirements. Other CSA Z662-15 compliant or higher grades of steel could be used depending on material availability and in accordance with specification TES-MATL-MD1. All values, including but not limited to pressure, length, grade, coating and wall thickness, are based on preliminary design and might be subject to change. Design is at a preliminary stage and parameters could change as design is refined.	

4.5 ILI FACILITIES DESCRIPTION

As part of construction, an existing ILI launcher facility will be relocated from the existing downstream Turner Valley Section and installed at WAS110. An Engineering Assessment for the reuse of the ILI launcher was completed. For further details, see Appendix 4-4: Engineering Assessment. The Rocky View Section will utilize an existing downstream receiver at the existing valve site WAS67. For a technical description of ILI facilities for the Rocky View Section, see Table 4-5.

Table 4-5: Rocky View Section ILI Facilities Technical Description

Description	Size	WT (mm)	Pipe Grade [1] (MPa)	Estimated Length (m)
Launcher Barrel Overbore	NPS 48	26.2	Grade 483, CAT II, M45C	9 m
Launcher Barrel Matching Bore	NPS 42	16.0	Grade 483, CAT II, M45C	5 m

Parameter	Description
ILI Launcher Pressure Rating	Design Pressure: 8,450 kPa MOP: 8,450 kPa
ILI Facilities Location	**Launcher Site (New) – Valve Site WAS110 – NE 16-26-04 W5M** • A permanent launcher will be relocated from the existing downstream Turner Valley Section, Valve Site WAS100, and installed at WAS110. One above ground NPS 12 flanged valve will be installed on the NPS 12 kicker line to the launcher. **Receiver Site (Existing) – Valve Site – WAS67 – SW-33-016-02-W5M** • The Rocky View Section will be inspectable/piggable from the new launcher (outlined above) through to the existing NPS 42 receiver at WAS67.
Description of ILI Launcher Closure Device	NPS 48 Horizontal End Closure, PN 100, M45C, to match 26.2-mm wall thickness, Grade 483, Supplied to Company Specification: TES-FITG-EC1.
Description of Corrosion-Control Elements	ILI facilities are located above ground and will be primed and painted to prevent atmospheric corrosion as per TES-CO-EPU-GL and TES-CO-PAINT-GL.

Material Grades for Valves, Flanges, Fittings and Assembly Piping	The following material grades may be used for valves, fittings and assembly piping:
	• Assembly Pipe Grade:
	  • minimum 414 MPa for assembly pipe NPS 16 and greater in accordance with TES-MA-EWPI-GL and TES-MA-SAWPI-GL
	  • for assembly pipe NPS 14 and under in accordance with TES-MATL-MD

Table 4-5: Rocky View Section ILI Facilities Technical Description (cont'd)

Parameter	Description
Material Grades for Valves, Flanges, Fittings and Assembly Piping (cont'd)	• Material grades for valves and fittings will be in accordance with: TES-MATL-MD1, TES-MA-FITG-GL, TES-MA-FLGEC-GL and TES-MA-VALV-G. • All large bore fittings (greater than or equal to NPS 16) will meet the minimum pipe grade, CAT II M45C in accordance with TES-MA-FITG-GL.

Note:
1. Material grade meets or exceeds minimum requirements. Other CSA Z662-15 compliant or higher grades of steel could be used depending on material availability and in accordance with specification TES-MATL-MD1. All values, including but not limited to pressure, length, grade, coating and wall thickness, are based on preliminary design and may be subject to change. Design may change as it is refined.

4.6 SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM

The Project will be an integrated part of the NGTL System, which is monitored 24-hours a day by the Supervisory Control and Data Acquisition (SCADA) System in the Operation Control Centre in Calgary.

4.7 PRESSURE CONTROL AND OVERPRESSURE PROTECTION

A summary of pressure control (PC) and over pressure protection (OPP) is provided below.

The PC and OPP systems at NGTL facilities meet OPR and CSA Z662-15 design standards, and design, operation and maintenance philosophy for regular inspection, assessment and testing. Procedures are in place to maintain all facilities in operational condition, and to operate facilities at the correct pressure. In addition, the PC and OPP systems operate independently from each other, and in a continuous and automatic manner. TransCanada's Gas Control Centre operates 24-hour/7-day, and monitors and controls real-time pipeline pressures through the SCADA system. System pressures are proactively monitored and trended by the Control Centre Operators to ensure operational efficiency and OPP.

The Monitor and Control Sub Program: Alarm and Event Management Procedure and Gas Control Overpressure Procedure is in place, describing the actions TransCanada's Gas Control Center will implement if an overpressure condition occurs or is imminent on the pipeline. The procedure describes actions to be taken to control the pipeline operating pressure or reduce the pipeline operating pressure below MOP, should an abnormal operating condition occur.

The pressure sources that affect the Rocky View Section are as follows:

- WASML Loop (Dogpound Section) (1995): Licensed MOP 5,830 kPa
- WASML Loop (Turner Valley Section) (1970): Licensed MOP 5,830 kPa
- WASML (NPS 36 1962): Licensed MOP 5,830 kPa
- Foothills Zone 7 Pipeline (1980): Licensed MOP 8,690 kPa
- Winchell Lake Compressor Station: Licensed MOP 5,825 kPa
- Turner Valley Compressor Station: Licensed MOP Unit #1 5,825 kPa and Unit #2 5,825 kPa

4.7.1 Connecting Pipeline Lateral

The Rocky View Section is designed to have an MOP of 5,825 kPa. The Rocky View Section will be connected to the Dogpound Section, Turner Valley Section, WASML and Foothills Zone 7 Pipeline. An assessment of the Project area's pressure sources has determined there are no sources of overpressure and, as such, no installation of OPP devices will be required.

4.7.2 Compressor Station

The existing Winchell Lake Compressor Station located upstream of the Rocky View Section, and the existing Turner Valley Compressor Station located downstream of the Rocky View Section, both have PC and OPP systems designed to ensure that the piping is not subject to excess pressure. The compressor speed automatically adjusts to maintain the station discharge pressure equal to or less than the station's MOP. Generally, a compressor station's PC and OPP systems use locally programmed controllers in the station and the unit's control systems. The station shuts down automatically before the compressor discharge pressure exceeds the MOP of the downstream line by more than 10%. In addition, each compressor station has pressure relief (or other suitable protective devices) of sufficient capacity and sensitivity to ensure MOP of the station piping is not exceeded by more than 10%. The OPP pressure relief device's set point for the final discharge is equal or less than the station piping design pressure. Triggering of the pressure relief device results in isolation of the station from the pipeline.

4.7.3 PC and OPP Assessment

The evaluation of PC and OPP Systems considered:

- all the sources of overpressure, including potential failure scenarios of components
- collateral effects of failure and whether one failure event can affect operation of the other components or the entire overpressure protection systems

- how redundancy of the components can be improved or implemented if not already in place
- whether pipeline and facility modifications affect the operation or reliability of the overpressure protection system

Based on a review of pressure sources in the area, PC and OPP systems are in place that meet the OPR and the CSA Z662-15 requirements.

4.8 PIPELINE INTEGRITY

In developing its projects, NGTL considers and designs for potential pipeline integrity threat categories as defined by ASME B31.8S Managing System Integrity of Gas Pipelines.

Initial threat identification for the Project is conducted before detailed design to identify potential threats of concern and potential design elements to prevent or mitigate the identified concerns. Pipeline threat identification considers the following nine threat categories managed by TransCanada's Integrity Management Program (IMP):

1. Time-dependent threats:
   - external corrosion
   - internal corrosion
   - stress corrosion cracking
2. Static or resident threats:
   - manufacturing related defects
   - welding or fabrication related defects
   - equipment failures
3. Time-independent threats:
   - mechanical damage
   - incorrect operations
   - weather-related and outside force threats

During the hazard identification process, a qualitative assessment of potential threats, including those listed above, is conducted using the design basis and route selection. Potential Project-specific issues identified for threat management during the hazard identification process will be used to inform recommendations for design, construction and management of operating concerns.

Mitigation of integrity concerns are considered during route selection, detailed design, fabrication, construction and pre-commissioning of the pipeline. This process allows operational management and performance experience to be incorporated in the early stages of project development.

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

- installing launcher facilities to allow in-line inspection of the pipeline. A high-resolution commissioning caliper tool will be used during Project pre-commissioning to inspect for construction-related defects and indications of dents or ovality.
- conducting above-ground cathodic protection surveys to identify areas of pipe coating damage
- performing baseline ILI using magnetic flux leakage and high-resolution caliper tool as per TED-INT-LR Launcher and Receiver Installation and Initial Assessment Technical Directive. Thereafter, the pipeline will be managed according to the IMP.

Before the Project transitions 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. The terms and conditions of the transfer of care and control of the pipeline to operations from the Project are documented through a project turnover memorandum.

4.9 CLASS LOCATION ASSESSMENT

A detailed class location assessment of the Rocky View Section's Proposed Route concluded that approximately 7.8 km of the pipeline meet the CSA Z662-15 criteria for designation as Class 1, approximately 0 km meet criteria for designation as Class 2, approximately 9.4 km meet the criteria for designation as Class 3, and the remaining approximately 4.3 km meet the criteria for designation as Class 4.

Considering the current pace of development in this area, NGTL completed a detailed future and proposed development assessment. As a result, NGTL has increased the Class Location in a number of areas deemed likely to have future development or areas with proposed development. Accordingly, NGTL has selected line pipe wall thickness appropriate for these increased Class Locations. For the Class Location Area Map, including a description of the nature of the populated areas resulting in Class 2, 3, and 4 and including the areas NGTL has increased the Class Location designation, see Appendix 4-5.

4.10 WELDING TECHNOLOGY

The pipeline will be joined by welding. The joining program and non-destructive testing of welds will comply with the requirements of CSA Z662-15 and OPR. The joining program will not involve joining any pipe grade higher than 483 MPa. The

aboveground risers and valve assemblies will be pre-tested following fabrication and prior to delivery onsite.

The use of mechanized welding procedures (either gas metal arc welding or flux-cored arc welding) will be considered, where feasible, for mainline production and tie-in welding. Shielded metal arc welding procedures will be used where mechanized welding procedures are not feasible, and for smaller-diameter pipe at stations and facilities.

All welds shall be non-destructively tested in accordance with Company Specifications and CSA Z662-15. The primary method of non-destructive testing for mainline and other associated girth welds will be automated ultrasonic testing (AUT). radiographic testing (RT) may be used for locations and joint configurations that cannot be effectively AUT tested, such as those at stations and facilities. Magnetic particle testing and manual ultrasonic testing may be utilized to supplement RT and AUT and used as directed by the Company for welds that cannot effectively be inspected by AUT or RT.

4.11 GEOTECHNICAL

NGTL completed a Phase I geohazard assessment of the Proposed Route alignment. Based on the geohazard assessment, NGTL anticipates that there are no slope stability concerns. Inherent geohazards related to fine grained glaciolacustrine and moraine (till) soils, such as erosion and seepage control, will be managed during construction and operation of the pipeline by conventional methods such as trench breakers, diversion berms, subdrains, etc., as required on a location specific basis.

NGTL has also completed a feasibility study of the proposed HDD crossings of the proposed Springbank Off-Stream Reservoir project (see Appendix 4-6) and Bow River (see Appendix 4-7), based on the geotechnical field assessment work completed, which included ground-truth borehole investigations for both HDD crossings and geophysical surveys for the Bow River crossing. Based on the studies, the above noted HDD crossings are feasible. The final geotechnical report and HDD feasibility studies will be filed with the Board before construction. The remaining major crossings of Highway 1A, Canadian Pacific Railway and Highway 1 alignments have also been investigated, both from constructability and geotechnical perspectives. Slip-bore construction has been identified as the feasible trenchless methodology to construct these crossings.

4.12 WATERCOURSE CROSSINGS

Watercourse crossing design at the Bow River considered applicable environmental, regulatory, geotechnical and engineering requirements and constraints. The crossing of the Bow River will be completed using a trenchless (i.e., HDD) crossing method.

Activities will be completed above the high water mark (as defined by DFO [2009];[1] typically, the 1:2-year flood level) with no proposed instream works. Temporary workspace for the proposed HDD will be located approximately 700 m from the right bank high water mark (south), and 125 m from the left bank high water mark (north). The potential effects of the watercourse crossing are assessed in the Environmental and Socio-Economic Assessment (ESA), Section 8.3. The crossing methods are summarized within the Environmental Protection Plan (EPP), Section 8.4, Table 2.

4.13 PIPELINE CONSTRUCTION ACTIVITIES

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

- surveying
- clearing
- soil salvage/handling
- grading
- pipe stringing, bending and welding
- girth weld coating
- trenching
- NDE
- lowering-in
- backfilling
- watercourse and road crossings
- pressure testing
- cleanup and reclamation

Existing roads will be crossed using a boring or drilling method where feasible to minimize impacts on road pavement and local traffic. Where geotechnical conditions do not allow for boring or drilling, NGTL will work with the road owners to minimize disruptions.

4.14 CONSTRUCTION INSPECTION TECHNIQUES AND FREQUENCY

Pipeline construction will be supervised and inspected by qualified Construction and Environmental Inspectors to ensure compliance with all applicable legislation, codes and standards, and approval conditions. Inspection personnel will be on-site for specific activities during construction when their oversight is required.

[1] DFO (Fisheries and Oceans Canada). 2009. Proponent's Guide to Information Requirements for Review Under the Fish Habitat Protection Provisions of the Fisheries Act. Version 1.2. Ottawa, Canada.

4.15 MAJOR MILESTONES FOR PIPELINE SCHEDULE

An NEB decision for the Project is requested by March 1, 2019 to allow construction on the Turner Valley CS and Burton Creek CS to begin for April 1, 2019. Mainline pipeline construction for the Rocky View Section is not expected to begin until August 2019, to correspond with the end of the Primary Nesting Period for migratory birds for nesting zone B4 (April 26 to August 15).

Subject to NEB approval, NGTL anticipates that some early activities can be completed in the period between receipt of the NEB decision and the start of mainline pipeline construction, subject to condition compliance, appropriate environmental screening including desktop review, field studies as necessary, and conduct of non-invasive surveys for nesting birds or other sensitive wildlife, should activities begin after April 26, 2019. Conducting these early activities in advance of mainline pipeline construction will provide for efficient mainline construction execution and reduce potential risks to maintaining the construction schedule for the Rocky View Section. Such early activities may include:

- staging areas (e.g., pipe and equipment yards)
- construction yard and trailer set up
- survey
- access and pioneering (i.e., developing approaches, goal posts, silt fencing, flagging, signage, ramps, matting and associated access entry logistics)

Key dates for the Rocky View Section schedule are as follows:

- NEB decision requested – March 1, 2019
- Start of Rocky View Section mainline construction – August 2019
- Required Project in-service date – June 1, 2020

5.0 COMPRESSOR STATION UNIT ADDITIONS

This section provides details regarding the compression requirements for the Project. This information is based on preliminary design and is supported by initial results from field investigation, hydraulic modelling and engagement programs. Revisions and refinements may be made as additional data is collected and assessed, and as engineering progresses through detailed design.

5.1 FACILITY OVERVIEW

The compression component of the Project involves the installation of an additional compressor unit at NGTL's existing Turner Valley and Burton Creek compressor stations. For detailed maps of the proposed compressor unit additions, see Appendix 5-1.

5.1.1 Turner Valley CS

The Turner Valley CS component of the Project is located approximately 3 km northwest of the Town of Turner Valley, AB in SE 15-20-03 W5M. The Turner Valley CS involves the installation of a single 30 MW turbo-compressor package (gas turbine and compressor), large bore piping and auxiliary systems.

The Turner Valley Compressor Station will continue to discharge along its existing flow path, into the NPS 36 WASML and the NPS 42 WASML Loop (Longview Section).

5.1.2 Burton Creek CS

The Burton Creek CS component of the Project is located approximately 39 km west of Town of Claresholm, AB in NW 06-12-01 W5M. The Burton Creek CS involves the installation of a single 30 MW turbo-compressor package (gas turbine and compressor), large bore piping and auxiliary systems.

The Burton Creek Compressor Station will continue to discharge along its existing flow path, into the NPS 36 WASML, NPS 42 WASML Loop (Nelson Creek Section) and the NPS 36 Foothills Zone 7 Pipeline.

5.2 PRINCIPAL COMPRESSOR STATION UNIT ADDITION COMPONENTS

Based on the preliminary design, the proposed unit additions will each include the following key systems and components, subject to changes on completion of detailed engineering:

- one new 30 MW turbo-compressor
- equipment within compressor building:

  - turbo-compressor package
  - fuel gas skid containing heat exchangers, filtration, and pressure-relief equipment
  - lube oil cooler
- skid-mounted auxiliary power unit (APU) generator building
- skid-mounted primary power unit (PPU) generator building (Burton Creek only)
- skid-mounted mechanical building containing a glycol heating boiler system
- skid-mounted instrument air building containing:
  - air compressors
  - air dryer
  - air receiver
- skid-mounted electrical building containing:
  - station specific control systems, electrical switchgear and motor control centre (MCC)
  - uninterruptible power systems (UPS), including batteries, rectifiers and inverter
- turbo-compressor specific control systems, electrical switchgear and MCC
- utility gas regulation enclosure
- skid-mounted barrel dock
- yard piping:
  - tie-ins to existing yard suction and discharge piping with new suction and discharge valves
  - unit suction and discharge piping ranging between NPS 42 and NPS 36
  - unit purge/load, vent, piping and valves
  - unit anti-surge recycle piping
  - yard piping will be NPS 48, 42, 36, 30 and 16
  - yard suction and discharge blowdown piping and valves
  - yard suction and discharge pressure safety relief piping and valves
  - yard discharge orifice flow meter
  - suction gas scrubber with above-grade storage tank
  - aerial gas coolers
- utilities:
  - compressed air system, including air compressors, air dryer and air receivers
  - glycol heating system, including natural gas boilers, piping, circulating pumps and expansion tank

  - utility gas system including filtering, odorizing, and regulating
  - utility piping and air lines
  - above ground piping rack and electrical cable trays between buildings
  - heating, ventilation, air conditioning systems for all applicable buildings
- electrical:
  - one electrical transformer to provide the main site power
  - one APU generator, including a natural gas fired generator unit in a new skid-mounted auxiliary building
  - 24 and 120 v direct current (VDC) UPS system to be located in the electrical building
  - 600VAC UPS system located in the unit control building
  - alternating current (AC) electrical three-phase power switchgear, MCC and distribution
  - electrical, control and communication wiring, lighting panel and grounding
- controls:
  - the station emergency shutdown system (ESD) will be powered from the onsite 24 VDC UPS (UPS system is powered from the station electrical system designed to use both utility power in the area and the APU in the event of a utility power failure; the brief period between transfers from utility power to APU will not affect the 24 VDC UPS or the ESD system powered from it)
  - in the event of a power failure from both power sources, the ESD system would continue to protect the facility by operating off the battery banks that are part of the UPS system (if the batteries are drained [minimum 4-hour period] and the voltage begins to drop, the system will detect this condition and activate the ESD to return the facility to a safe state)
  - the ESD system is designed to be fail safe (if the system did not have power, it would fail to the safe state of the facility, which is to close the block valves and open the blowdown valves to depressurize the station piping; the ESD system does not require power to operate)
  - each building or skid-mounted building is equipped with emergency lighting powered from either the main 120 VDC battery bank or from individual emergency lighting battery packs mounted in the building (this emergency lighting allows safe evacuation of personnel from the building in the event of a power outage)
  - safety systems will be powered by the UPS in the event of utility and auxiliary power failure to the site
  - programmable logic control (PLC) station control

- PLC ESD control, including fire and gas detection systems
- remote I/O (input/output) for both station and ESD functions located in the yard and compressor building
- control system programming and interface to unit controls
- Supervisory Control and Data Acquisition (SCADA), and human machine interface (HMI) equipment and programming

5.3 ENGINEERING DESIGN STANDARDS

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

5.3.1 Industry Standards

The compression components of the Project will be designed, constructed and operated in accordance with the most current version of the industry standards listed in Table 5-1.

Table 5-1: Industry Standards for Compression Station Facilities

Organization	Standard Title
NEB	OPR
CSA	CSA Z245.1-14 Steel Pipe
CSA	CSA Z245.12-17 Steel Flanges
CSA	CSA Z245.15-13 Steel Valves
CSA	CSA B51-14 Boiler, Pressure Vessel and Pressure Piping Code
CSA	CSA B149.1-15 Natural Gas and Propane Installation Code
CSA	C 22.1-15 Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations
ASME	ASME B31.3-2016 Process Piping
ASME	Boiler and Pressure Vessel Code, Section VIII, Division 1, 2017 Pressure Vessels
NBC	National Building Codes of Canada (NBC 2015)

Note:
1. The CSA standards in this table often incorporate other CSA standards and publications from other organizations (e.g., ASME, ASTM, API, ISO, CGSB, NACE, SSPC and MSS).
2. Standards will be the latest edition.

5.3.2 TransCanada Preliminary Standards and Specifications

For a preliminary list of the applicable TransCanada standards and specifications, see Table 5-2. The final list of applicable specifications and standards will evolve as 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 5-2: Compression Preliminary Standards and Specifications

Name	Description	EDMS Number
Mechanical		
TES-MATL-MD1	Piping System Materials for Pipeline, Compression and Metering Facilities	3764909
TES-MA-SAWPI-GL	Double Submerged Arc Welded Pie Specification	3776714
TES-PIPE-SAW	Specification for Double Submerged Arc Weld Pipe	3776714
TES-PIPE-EW	Specification for Electric Welded Pipe	3670788
TES-MA-EWPI-GL	Electric-Welded Pipe Specification	3670788
TES-MA-FITG-GL	Carbon Steel Butt-Welding Fittings Specification	3671270
TES-MA-FLGEC-GL	Carbon Steel Butt-Welding Flanges Specification	3671966
TES-VALV-G	Steel Valves for Gas Service Specification	1001891682
TES-FITG-T01	Instrument Tube Fitting, Instrument Pipe Fitting and Tubing Material Specification	3697116
TES-ME-PV1-GLE	Pressure Vessels Specification	0006406
TES-DV23-0517	Welding and Pipe Weld Inspection	3784436
TES-WELD-STRU	Welding Procedure Specification for Shielded Metal Arc Welding on Structural Steel	3696371
TES-WELD-PL	Welding of Pipelines and Tie-ins	3670960
TES-WELD-AS	Welding of Assemblies and Station Piping	3670962
TEP-WELD-ABR	Removal of Arc Burns (New and Existing Facilities)	3670959
TES-NDT-UT	Ultrasonic Examination of Girth Welds Specification	1001829033
TES-NDT-RT	Radiographic Examination of Welds	3671368
TES-PRES	Pipeline and Facility Piping Testing Specification	1001810638
TEP-ME-CLOS-GLE	Closure Weld Procedure	3670675
TES-DV26-2906	Tubing and Fittings	0006566
TES-ME-PV1-GLE	Pressure Vessels Specification	0006406
TES-FITG-EC1	End Closure Specification	3779256
TES-MATL-COMP	Material Requirements of Pressure Containing Equipment Components Specification	8071725
TES-1840-PFE	Portable Fire Extinguisher Specification	6663
TES-MECH-ROTARY-AIR COMP-SHEET	Oil-Injected and Oil-Free Rotary Screw Air Compressor Specification	8882018
TES-ME-BOILER-GLE	Hot Water Heating Boilers Specification	3690702
TES-COMP-TURBO	Turbo Compressor Package Specification	6934
TES-FITG-CIF	Contoured Insert Fittings Specification	4424021
TES-ME-FUEL-GLE	Turbine Fuel Gas Conditioning System Design Specification	8469651
TES-ME-ACHE-GE	Natural Gas Aerial Cooler Design, Material and Performance Specification	8686129
TES-ME-FBT-GL	Flange Bolt Tightening Specification	6489784
TES-ORIF-OP1	Specification for Orifice Plates	3769908
TES-RECIP AIR-COMP	Reciprocating Air Compressor Materials	3690691
TES-SEAL-DRY	Mechanical Dry Gas Seals	6521
TES-ME-STRCO-G	Pipe Stress Engineering Analysis and Design of Compressor Stations	7697565

Table 5-2: Compression Preliminary Standards and Specifications (cont'd)

Name	Description	EDMS Number
TES-VALV-U14	Compressor Station Specification for Valves NPS 12 and Smaller	6589
TES-COAT-FBE	External Fusion Bond Epoxy for Steel Pipe Specification	3670892
TES-ME-VOP-G	Gas Hydraulic and Gas Pneumatic Operator Specification	3671784
TES-COAT-P4	Paint Systems for Tank External Surfaces Specification	6317837
TES-MECH-PUMP-AUX	Auxiliary Service Pump Specification	9221053
TEP-PRES	Pipeline and Facility Piping Pressure Testing Procedure	1001810622
TEN-PRES	Pressure Testing Standard (CDN)	1001810598
TES-MECH-GAS-VA	Valve Assemblies for Gas Service Pipelines	8174819
TES-MECH-ASFT	Aboveground Shop Fabricated Tanks	9214522
TES-ME-HVAC-GLE	Heating, Ventilation and Air Conditioning Equipment	1002414893
TES-ME-SITE-G	Site planning for Gas Pipeline Compressor Stations Specification	1003872949
TES-COAT-EPU	Field-Applied External Liquid Coating Systems for Steel Pipes Specification	3671710
TES-COAT-P1	Paint Systems for Above Ground Faculties (Coastal and Non-Coastal)	3694704
TES-ME-INSUL-GLE	Piping and Equipment Insulation Specification	1003873027
Civil		
TES-CI-CIDES-GLE	Civil Design Specification (CAN-US)	8040016
TES-CI-STDES-GLE	Structural Design Specification (CAN-US-MEX)	8040018
TES-CI-FGEO-GLE	Facility Geotechnical Investigation Specification	8040021
TES-CI-FSURV-GLE	Facility Survey Specification (CAN-US)	8040023
TES-CI-STEEL-GLE	Structural Steel and Miscellaneous Metals Specification (CAN)	0006488
TES-CI-PRESB-GLE	Pre-Engineered Metal Skid Building Specification (CAN)	3690601
TES-CI-EARTH-GLE	Facility Earthwork Specification (CAN-US)	0006457
TES-CI-SPILE-GLE	Driven Steel Pile Specification (CAN-US)	0006459
TES-CI-CONC-GLE	Concrete Specification (CAN)	000006466
TES-CI-CPILE-GLE	Bored Cast-in-Place Concrete Piles Specification (CAN)	000006460
TES-CI-FCRET-GLE	Flowable Fill Specification (CAN-US)	005848209
TES-DV03-6100	Grouting of Heavy Machinery	000006468
TES-DV13-3419	Pre-Engineered Compressor Building	000006557
TES-DV14-4300	Overhead Bridge Cranes	003690593
TES-DV32-3113	Chain Link Fence	000006462
TES-CT-EXC-GLE	Excavation Specification	5890120
Cathodic Protection		
TES-CP-MS	Cathodic Protection Material Specification	3670944
TES-CP-IV	Mitigation of Induced AC Voltages	3671383
TES-CP-CS	Cathodic Protection Construction Specification	3670955
TES-COAT-CAD	Coating Application Procedure for Thermite Weld Coating (CDN–US)	3672126

5.4 COMPRESSOR STATION UNIT ADDITION FACILITIES DESCRIPTION

This section describes the compressor station unit additions that will be constructed for the Project. For a technical description of the unit additions, see Table 5-3.

Table 5-3: Technical Description – Compressor Station Unit Additions

Parameter	Description	
Type and power of compressors	Turner Valley CS	30 MW turbo-compressor package.
	Burton Creek CS	30 MW turbo-compressor package.
Fuel type	Turner Valley CS and Burton Creek CS	Fuel type is natural gas.
Piping outside diameter, wall thickness, material type and grade	Turner Valley CS	Compressor unit suction and discharge high pressure pipe will be NPS 42 x 16.0 mm Grade 483 and NPS 36 x 13.7 mm Grade 483. Compressor recycle piping to be NPS 48 x 18.3 mm Grade 483 and NPS 36 x 13.7 mm Grade 483. Station yard piping will be NPS 48 x 18.3 mm Grade 483, NPS 42 x 16.0 mm Grade 483, NPS 36 x 13.7 mm Grade 483, NPS 30 x 11.4 mm Grade 483 and NPS 16 x 7.1 mm Grade 414. Station Pipe lengths: • NPS 16 x 7.1 mm Grade 414, approximately 50 m • NPS 30 x 11.4 mm Grade 483, approximately 300 m • NPS 36 x 13.7 mm Grade 483, approximately 80 m • NPS 42 x 16 mm Grade 483, approximately 50 m • NPS 48 x 18.3 mm Grade 483, approximately 850 m • NPS 48 x 26.2 mm Grade 483, approximately 10 m
	Burton Creek CS	Compressor unit suction and discharge high pressure pipe will be NPS 42 x 23.0 mm Grade 483 and NPS 36 x 19.7 mm Grade 483. Compressor recycle piping to be NPS 48 x 26.2 mm Grade 483 and NPS 36 x 19.7 mm Grade 483. Station yard piping will be NPS 48 x 26.2 mm Grade 483, NPS 42 x 23.0 mm Grade 483, NPS 36 x 15.9 mm Grade 483, NPS 30 x 16.4 mm Grade 483 and NPS 16 x 14.3 mm Grade 414. Station Pipe lengths: • NPS 16 x 14.3 mm Grade 414, approximately 20 m • NPS 30 x 16.4 mm Grade 483, approximately 150 m • NPS 36 x 15.9 mm Grade 483, approximately 80 m • NPS 42 x 23.0 mm Grade 483, approximately 50 m • NPS 48 x 26.2 mm Grade 483, approximately 800 m
Inlet and outlet design pressure	Turner Valley CS	6,410 kPag
	Burton Creek CS	7,100 kPag
MOP	Turner Valley CS	5,826 kPag
	Burton Creek CS	5,826 kPag
Inlet and outlet design temperature	Turner Valley CS	-45ºC to +75ºC
	Burton Creek CS	-45ºC to +75ºC

Table 5-3: Technical Description – Compressor Station Unit Additions (cont'd)

Parameter	Description
Basic description of surge control system, PC and OPP	The recycle (anti-surge) valve will be connected downstream of the compressor unit discharge valve and upstream of the unit check valve. The recycle valve will increase the flow through the compressor as required to maintain the operating point away from surge by circulating gas flow and reducing compressor head. The equipment as provided by the vendor will monitor actual inlet flow and differential pressure across the compressor through a pressure differential transmitter, and is equipped with algorithms to detect and avoid surge. The station PC will be maintained by increasing or decreasing the compressor speed. The station suction and discharge pressure will be monitored using pressure transmitters. The station pressure set-points are set by Gas Control. A discharge relief valve will provide station OPP.
Basic description of emergency shutdown	An ESD pushbutton will be installed at all exit doors in the compressor building and near the scrubber. Perimeter ESD pushbuttons will be added to all fence gates and tied-in to the single fence ESD. The site ESD pushbutton at the control panel in the control building will trigger a station ESD. Fire and/or gas detection in the compressor building will also trigger a station ESD.
Description of boilers and pressure vessels	The suction scrubber for the high-pressure gas system will be swirl/centrifugal type designed to handle the maximum design flow. The scrubber will have automated liquid level control to allow for accumulated scrubber liquids to be drained to an above-ground storage tank. The turbine's fuel gas system will contain gas conditioning equipment including a heat exchanger, filter, and liquids coalescer. The glycol heating system will include low-pressure tanks and boilers as required, and low-pressure tanks will be included on the utility gas system and instrument air system as required.
Description of corrosion control elements	Appropriate cathodic protection (CP) will be provided.

Note: Material grade meets or exceeds minimum requirements. Other CSA Z662-15 compliant or higher grades of steel could be used depending on material availability and in accordance with specification TES-MATL-MD1. All values, including but not limited to pressure, length, grade, coating and wall thickness, are based on preliminary design and might be subject to change. Design is at a preliminary stage and parameters could change as design is refined.

5.4.1 Pipe Coatings

The station pipe coating will follow the TransCanada specifications listed in Table 5-2. The primary coating for the external surface of the below-ground pipe will be fusion bond epoxy (FBE) or epoxy-polyurethane (EPU) per TransCanada specifications TES-COAT-FBE or TES-COAT-EPU, respectfully. Girth welds will be coated in the field and will be protected with field-applied epoxy coating. Below-ground assembly piping will be protected with a suitable liquid-applied epoxy coating. Above ground piping will be primed and painted, and acoustically insulated, if necessary.

5.4.2 Compression Station Schematics

The compressor building for each unit addition will be a free-standing steel rigid-frame structure, supported by reinforced concrete grade beams and piles, and will incorporate fire and gas detectors. The auxiliary buildings will be skid-mounted and supported on steel-driven piles. The buildings will be complete with heating and ventilation equipment.

The station suction relief valve will be installed downstream of the station suction isolation valve and set at the station design pressure to provide thermal relief for the station suction piping and suction scrubber. The station discharge relief valve will be installed upstream of the station discharge isolation valve and will be sized for compressor maximum flow rate at the station design pressure and will be set at the station design pressure. The station discharge relief valve will be installed upstream of the station discharge isolation valve, will be sized for compressor maximum flow rate at 6,410 kPag and will be set at 6,410 kPag.

Process flow diagrams and plot plans for the compressor station unit additions are provided as follows:

- Appendix 5-2: Unit Addition Preliminary Plot Plans
- Appendix 5-3: Unit Addition Preliminary Process Flow Diagrams

5.4.3 Communications

The compressor stations will communicate telemetry information to the TransCanada Operations Control Centre using satellite or wireless cellular radio. Types of data include gas quality, temperature and pressure information.

5.5 UNIT ADDITION CONSTRUCTION ACTIVITIES

Unit addition construction activities will include, but are not limited to:

- installation/use of temporary workspace trailers
- conducting pre-work for clearing
- surveying
- clearing
- removing upper surface material, and salvage, where required
- grading
- piling
- installing foundations
- installing compressor buildings and units
- installing generators
- installing auxiliary buildings and equipment
- piping and pressure testing
- conducting electrical work
- installing the instrumentation system

- installing controls
- commissioning
- conducting pre-startup safety review
- conducting final site cleanup

All welding and NDE testing of welds will be conducted in accordance with the requirements of CSA Z662-15, the OPR except as otherwise exempted, and the welding procedures and specifications in Table 5-4.

5.6 CONSTRUCTION INSPECTION TECHNIQUES AND FREQUENCY

Unit addition construction will be supervised and inspected by qualified Construction and Environmental Inspectors to ensure compliance with all applicable legislation, codes and standards, and approval conditions. Inspection personnel will be on-site for specific activities during construction when their oversight is required.

5.6.1 Construction Camps and Accommodations

A potential requirement for camp accommodations for use during construction of the Burton Creek CS has been identified. NGTL is currently investigating potential camp locations in the vicinity of the Burton Creek Compressor Station and will attempt to use existing disturbed areas where feasible, to help minimize effects on previously undisturbed areas.

The construction of the Turner Valley CS will not require a temporary construction camp. Existing accommodation in Turner Valley, Okotoks and Calgary will be used for any non-local workers.

5.7 LTO EXEMPTION REQUEST – TIE-IN ASSEMBLIES

Construction of the unit additions will be conducted in several phases. Each compressor station expansion will consist of the installation of tie-in connections to the existing station piping, and then subsequent construction of each unit addition. Two valve assemblies are required for each station, one upstream isolation valve, and one downstream isolation valve, which together will isolate the entirety of the new unit from the existing station flow path. Each valve assembly will consist of a tee that will be cut-in to the existing station yard piping, and a new valve located on the branch.

5.7.1 Turner Valley CS

The Turner Valley CS requires two valve assemblies to be installed:

- one upstream isolation valve
- one downstream isolation valve

Based on the preliminary design, the tie in assemblies for the upstream and downstream valves will be fabricated from the following components:

- approximately 30 m of NPS 48 pipe
- two NPS 48 isolation valve assemblies
- four NPS 48 elbows
- two NPS 48 x 48 tees

For further information regarding tie-in locations, see Appendix 5-2.

NGTL seeks exemption from the requirement to obtain LTO from the Board for the upstream and downstream valve assemblies before their installation. Installing the tie-in assemblies in advance of the unit addition construction phase will minimize downtime of the station and ensure NGTL is able to meet firm service requirements. Once the new tie-in assemblies are installed, the existing station will be re-pressurized up to the newly installed valves. The two new valves will remain closed until LTO is received for the balance of the Turner Valley CS.

5.7.2 Burton Creek CS

The Burton Creek CS requires two valve assemblies to be installed:

- one upstream isolation valve
- one downstream isolation valve

Based on the preliminary design, the tie in assemblies for the upstream and downstream valves will be fabricated from the following components:

- approximately 60 m of NPS 48 pipe
- two NPS 48 isolation valve assemblies
- eight NPS 48 elbows
- two NPS 48 x 48 tees

For further information regarding tie-in locations, see Appendix 5-2.

NGTL seeks exemption from the requirement to obtain LTO from the Board for the upstream and downstream valve assemblies before their installation. Installing the tie-in assemblies in advance of the unit addition construction window will minimize downtime of the station and ensure NGTL is able to meet firm service requirements. Once the new tie-in assemblies are installed, the existing station will be re-pressurized up to the newly installed valves. The two new valves will remain closed until LTO is received for the balance of the Burton Creek CS.

5.7.3 Safety Considerations and Rationale for Exemption Request

All pipe, fittings and valves for the tie-in phases of each unit addition will be prefabricated. All prefabricated assemblies and connecting piping are hydrotested in

the shop with the testing witnessed by a TransCanada representative before installation.

The unit additions at each of these stations require tie-in valves to provide a parallel flow path through the new unit. The addition of these valves will allow flexibility, minimize construction risk, and enable commissioning activities for the new equipment to proceed at an acceptable pace. Granting this LTO Exemption Request will minimize outage duration, thus minimizing the system impacts of construction. All four branch valves will remain closed until LTO is received for the respective compressor station unit additions.

Based on the preliminary design, there are eight un-hydro-tested field welds required to install these valve assemblies at Turner Valley CS and seven unhydrotested field welds required to install these valve assemblies at Burton Creek CS. These welds cannot be pressure tested in the field because they are final tie-in welds, but the integrity of these welds will be verified in accordance with industry accepted methods and standards.

Field weld inspection will involve both a visual inspection and NDE that includes one or more of radiographic, ultrasonic, magnetic particle, or liquid penetration examination, depending on the size and type of weld, in accordance with TransCanada's specifications. Inspectors are required to monitor the welding on site, verify that safe practices are implemented, and record welding parameters as part of their inspection to ensure that welding is conducted in conformance with the qualified welding procedures.

TransCanada has processes and safeguards in place to ensure safe construction, such as applicable inspections and testing. NGTL submits that an exemption from the LTO requirement for the tie-in assemblies would not compromise the safety of employees, the public or the environment.

NGTL confirms the shop tests for the tie-in assemblies will comply with the required time duration and pressure testing requirements of CSA Z662-15. NGTL proposes to file the shop test information for the tie-in assemblies as part of the LTO application for the respective compressor station unit additions.

5.7.4 Relief Sought

Pursuant to section 58(1) of the NEB Act, NGTL seeks an exemption from the requirements of sections 30(1)(b) and 47(1) of the NEB Act to obtain LTO from the Board for the tie-in portions of the compressor station unit additions before the installation of the compressor station tie-in assemblies. NGTL proposes to file LTO applications for the balance of the respective compressor station unit additions with the Board after construction is completed.

5.8 ENGINEERING NDE EXEMPTION REQUEST

Section 17 of the OPR requires radiographic or ultrasonic methods of examination of the entire circumference of all weld joints. However, under NEB Order MO-08-2000, other appropriate NDE methods are permitted if radiographic or ultrasonic methods are not practicable in the particular circumstances. The NEB has previously issued case-specific exemptions from the 100% NDE requirement of section 17 of the OPR, pursuant to subsections 48(2.1) and 48(2.2) of the NEB Act. Exemptions have been granted for certain specific auxiliary piping systems associated with compressor stations.

NGTL requests that the Board exempt NGTL from section 17 of the OPR pursuant to subsections 48(2.1) and 48(2.2) of the NEB Act for certain auxiliary piping systems associated with the Burton Creek CS and Turner Valley CS (see Table 5-4).

5.8.1 Piping Systems and Equipment

Table 5-4 describes the piping systems used as part of the Project, including material specification, design pressure, design code and proposed 15% NDE coverage.

Table 5-4: Piping Systems Specifications, Design Pressure and NDE Coverage

Piping System	TransCanada Specification	Design Code	Design Pressure (kPag)	NDE Coverage (%)
Instrument air	TES-MATL-MD1, Table 12	ASME B31.3	1,035	15
Glycol/water heat medium	TES-MATL-MD1, Table 11	ASME B31.3	414	15
Potable water	TES-MATL-MD1, Table 10	ASME B31.3	500	15
Lube oil	TES-MATL-MD1, Table 7	ASME B31.3	1,500	15
Vents	TES-MATL-MD1, Table 5	N/A	N/A	15

The NDE program for the above piping will conform to CSA Z662-15, Clause 7.2.5. In addition, NGTL will pressure test all piping before the piping is placed in service.

For all high-pressure gas piping designed to CSA Z662-15, NGTL will use 100% NDE coverage. For all other piping systems, NGTL selects material and designs joints in accordance with ASME B31.3-2014: Chemical Plant and Petroleum Refinery Piping, as referenced in CSA Z662-15, Clauses 4.14.2.11, 5.1.1, 7.2.4 and 8.1.7. NGTL will ensure that the joints are examined in accordance with CSA Z662-15, Clause 7.10.3.

NGTL will hydrostatically pressure test high-pressure natural gas components of the installed facilities (including the yard piping) in accordance with the requirements of CSA Z662-15, Section 8 before placing them in service.

NDE for facility piping is carried out in accordance with TransCanada specifications TES-WELD-AS, TES-NDT-RT and, where applicable, TES-NDT-UT2. All butt welds are inspected visually, and radiographed or ultrasonically tested for 100% of their circumference. All fillet welds are inspected for 100% of their circumference using magnetic particle inspection or, for non-magnetic welds, a liquid penetrant inspection process.

5.8.2 Safety Considerations

In NGTL's experience there have been no problems or safety issues associated with the practice of conducting percentage NDE inspections on the systems and equipment listed in Table 5-4. In accordance with the requirements of CSA Z662-15, NGTL will be conducting NDE on 15% of production welds per day. The piping systems for which NGTL proposes to test a percentage of welds by NDE inspection are low-risk systems in the facility because they are operating at a low pressure. The list of low risk systems in Table 5-4 operate at stress levels below 20% of the specified minimum yield stress (SMYS).

The glycol/water heat medium, potable water, and lube oil systems contain non-expansive fluids operating at low pressure and in limited quantities. With the exception of potable water piping, the systems include instrumentation that will alert NGTL and shut down the system if the system experiences significant loss of fluid. The instrument air system operates at low pressure and the fluid is not harmful if it were to escape into the atmosphere. The instrument air system also has instrumentation that will alert NGTL and shut down the system if a leak is detected.

The compressor building has natural gas detectors that will alert NGTL if natural gas content above 10% of the lower explosive limit is detected, and will shut down the unit if natural gas above 40% of the lower explosive limit is detected.

NGTL compressor sites are fenced and secured to prevent public access.

5.8.3 Rationale for Requested Exemption

The systems for which NGTL is seeking exemption present a low level of risk and operate at low stress levels. An exemption from the requirement to conduct 100% NDE would result in schedule benefits and cost savings to the Project, without compromising the safety of employees, the public or the environment. Accordingly, and for the reasons outlined above, NGTL requests an exemption from section 17 of the OPR pursuant to subsections 48(2.1) and 48(2.2) of the NEB Act for certain auxiliary piping systems associated with the Burton Creek CS and Turner Valley CS (see Table 5-4).

5.9 MAJOR MILESTONES FOR UNIT ADDITION SCHEDULE

Approval from the Board by March 1, 2019, would allow for an April 1, 2019, construction start for the compressor station unit additions (including temporary workspace) and the Burton Creek CS camp site before the Primary Nesting Period for migratory birds for nesting zones A3 (April 16) and B5 (May 1), and before the typical start of road bans associated with spring breakup.

Key dates for the unit additions' schedule are as follows:

- NEB decision requested – March 1, 2019
- Start of unit addition construction – April 1, 2019
- Required Project in-service date – June 1, 2020

6.0 OPERATIONS

This section provides a description of the processes, procedures and systems for the safe, reliable and efficient operation of the Project.

6.1 OPERATING STANDARDS AND DOCUMENTATION

TransCanada will operate the Project in accordance with all applicable legislation, codes and standards, including the OPR and CSA Z662-15, and approval conditions. The TransCanada Operational Control Centre in Calgary monitors and controls NGTL System operations.

6.1.1 Emergency Preparedness and Response

NGTL confirms that emergency management during Project construction will be governed by the Project-specific Emergency Response Plan, and during operations by TransCanada's overarching Emergency Management Corporate Program Manual and related operating procedures. As part of Project consultation activities NGTL provides information concerning Emergency Preparedness and Response to potentially affected stakeholders, landowners and Aboriginal communities, and TransCanada publishes its Emergency Management Corporate Program Manual in accordance with NEB Order AO-001-MO-006-2016. In the event of an emergency TransCanada's comprehensive Emergency Response Program would be activated. TransCanada employees and contractors receive training for emergency events and if there is an incident, will work closely with landowners and impacted persons or groups, as well as authorities and emergency responders to manage the incident.

To support these efforts, NGTL engaged local First Responders by providing an Emergency Response presentation to the Cochrane Fire Department on January 18, 2018. This presentation outlined TransCanada's Emergency Response process and procedures, as well as how TransCanada and local authorities can work together during the event of an emergency. Ten members of the Cochrane Fire Department, including the Fire Chief, attended the January 18 meeting. Questions raised related to distance between the various pipelines within the ROW, characteristics of the product within TransCanada's pipelines, and location of shut-off valves in the area. The Fire department was also notified of an upcoming TransCanada emergency response exercise planned in the area, and was invited to participate in this exercise in order to observe processes and systems.

6.1.2 Security Management Program

Security management will be governed by TransCanada's Corporate Security Program Manual, Policy, and TransCanada Operating Procedures (TOPs) which adhere to the CSA Z246.1 standard for security management and, subsequently, the

OPR. This includes, but is not limited to, procedures related to security threats, physical security and cyber security.

TransCanada's Corporate Security Program Manual, Policy and TOPs will govern security management during construction and operations. However, the Prime Contractor will also be responsible for developing a security management plan for construction and TransCanada will maintain oversight.

6.1.3 TransCanada Operational Management System

TransCanada's Operational Management System (TOMS) applies to all of TransCanada's assets including the proposed Project. TOMS coordinates TransCanada's Mandated Programs which encompass the programs identified in the OPR. Mandated Programs also apply the requirements of TOMS that are based on regulatory requirements and industry management system standards to structure and manage Mandated Program activities. Through the "plan, do, check, act" continual improvement cycle of TOMS, risks are assessed and addressed through identifying goals, objectives and targets for risk reduction or performance improvement. Additionally, TOMS is refined over time through assurance and management review activities where corrective and preventative actions are identified and implemented, and any necessary modifications are implemented through TransCanada's Management of Change Framework. By implementing TOMS in support of a strong safety culture, TransCanada's projects are designed, constructed, operated and decommissioned or abandoned in a manner that provides for the safety and security of the public, TransCanada personnel and physical assets, and the protection of property and the environment.

6.1.4 Operating Procedures

To address both routine and non-routine pipeline system maintenance, the existing comprehensive registry of TOPs and associated systems will be used for the Project. TOPs are designed to:

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

6.1.5 Third Party Damage Prevention Program

Mechanical Damage is damage to the pipe wall or coating (e.g., dent, gouge, scrape, ovality, chip or scratch) caused by mechanical or non-mechanical equipment including excavators, agricultural equipment and hand operated tools.

TransCanada's Damage Prevention Program is implemented in order to prevent Mechanical Damage. This program educates all staff, contractors and third parties who engage in ground disturbance-related activities to ensure for safe excavation best practices and compliance with applicable regulations. The Damage Prevention Program defines company requirements for aerial patrol, signage, one call notification membership and training protocols for employees who engage in planning or supervising ground disturbance activities.

TransCanada's Public Awareness (PA) Program, an integral component of the Damage Prevention Program, is designed to increase awareness of pipeline safety.

6.1.6 Public Awareness Program

The Aboriginal and stakeholder engagement programs for the Project will be transitioned to TransCanada's existing PA Program and the regional community and Aboriginal relations resource for the remaining lifecycle of the asset. Stakeholders include the affected public, landowners, excavators/contractors, emergency responders and public officials.

The PA Program is intended to increase awareness of pipeline safety and, thereby, protect the public, environment and TransCanada facilities. It reaches the potentially affected Aboriginal groups and stakeholders engaged through Project planning and construction phases.

The PA Program provides for an annual pipeline safety mailing to landowners, excavators/contractors, emergency responders and local public officials, and a biennial mailing to the affected public. At a regional level, dedicated community and Aboriginal relations specialists develop and implement annual plans specific to their area that assess individual regional risks and define supplemental engagement activity to help mitigate these risks. Messaging and engagement strategies are tailored to the respective audience and, at a minimum, include information about how to recognize the signs of a pipeline leak and the importance of calling for a locate request before beginning any ground disturbance activity or crossing the pipeline.

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 the public, contractors and emergency service agencies that might interact with company representatives, or that might be directly affected by company facilities or operations

Ongoing contact with the public provides NGTL with an opportunity to obtain information concerning safety, security and/or potential threats relating to its operations, changes to contact information, and ultimately enables all relevant interested persons to be informed and work together to achieve safety.

6.1.7 Integrity Management

NGTL will implement TransCanada's comprehensive Integrity Management Program (IMP) to monitor and ensure the integrity of the Project. The program uses advanced inspection and mitigation techniques applied within a comprehensive risk based methodology. Risk assessment is used to identify potential integrity threats and initiate inspection and mitigation activities, while results from advanced inspections for known or suspected integrity threats are used to develop specific integrity maintenance activities. Implementation of the IMP will be used in the operations phase to:

- reduce the potential for adverse environmental effects
- protect the installed pipelines and facilities
- maintain reliability
- ensure the safety of the public and personnel

Current regular preventative maintenance programs will be incorporated in the design and operation of the pipeline portion of the Project, including:

- aerial patrols
- internal inspections
- cathodic protection monitoring
- pipeline markers at roads and pipeline watercourse crossings

6.2 CONTROL SYSTEM FACILITIES

6.2.1 Isolation Valve

NGTL will install isolation valve assemblies complete with gas/hydraulic operators at the Project tie-ins to the existing NPS 42 WASML Loop, respective Dogpound and Turner Valley Sections, as well as to crossovers with the existing NPS 36 WASML, which will be fitted with line-break functionality that enables the valves to be automatically closed in the event of a sudden pressure drop to a minimum set pressure.

6.2.2 Emergency Systems

In the event of an emergency, such as a line break, pipeline block valves are equipped with actuators with low-pressure detection that will, on sensing low pressure, cause the valve to close, thus isolating the pipe segment.

7.0 LAND MATTERS

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

7.1 GENERAL LAND INFORMATION

The Rocky View Section component of the Project requires a total length of approximately 21.5 km of new permanent ROW and associated TWS. The new ROW and TWS are located on privately held freehold land, and provincial Crown land, as well as on lands owned in fee simple by a mixture of industry, municipalities (Rocky View County and the Town of Cochrane), and a provincial ministry (Alberta Transportation). The proposed pipeline is located within Rocky View County and the Town of Cochrane, AB.

The Rocky View Section primarily traverses agricultural lands, but also traverses vacant lands, industrial lands, residential lands, and lands used for open space, parks, recreation, and religious institutional purposes. For more information on the Rocky View Section route, see Section 4: Pipeline.

The Turner Valley CS component of the Project is located at the existing Turner Valley Compressor Station site, approximately 3 km northwest of the Town of Turner Valley, AB, in SE 15-20-03 W5M, and will be located entirely on lands owned by NGTL in SE 15-20-03 W5M.

The Burton Creek CS component of the Project will be located at the existing Burton Creek Compressor Station site, located approximately 39 km west of the Town of Claresholm, AB, in NW 06-12-01 W5M and SW 07-12-01 W5M, and will require the expansion of the existing compressor station site to the south, onto private freehold land in NW 06-12-01 W5M.

7.2 IDENTIFICATION OF LANDOWNERS AND OCCUPANTS

As NGTL developed the Proposed Route and locations for the compressor station unit additions, Project maps were used to identify all lands potentially affected by the Project. Surface Public Land Standing Report searches were completed to provide information on the Crown lands relating to all disposition holders that have an interest in the lands. Title searches were completed through Alberta Land Titles to obtain information relating to all potentially affected fee simple lands, including identification of landowners and registered occupants. NGTL also identified unregistered occupants by gathering information from landowners regarding who customarily occupies their land. This land data was then included in a Project Line List, forming the basis of consultation and land acquisition activities.

As outlined in Table 7-1, approximately 74% of all parcels traversed by the Rocky View Section are owned in fee simple by private landowners (Private Fee Simple), and approximately 22% of parcels are owned in fee simple by a mixture of industry (including two NGTL parcels), municipalities (Rocky View County and the Town of Cochrane), and a provincial ministry (Alberta Transportation) (Other Fee Simple). The remaining parcels (approximately 4% of all parcels traversed by the Rocky View Section) are provincial Crown land. For a summary of the proportional land ownership along the Rocky View Section, see Table 7-1.

For a summary of the land ownership for the Turner Valley CS and the Burton Creek CS, see Table 7-2, in Section 7.8.1.

Table 7-1: Land Ownership Along Proposed Route ROW

Land Type	Number of Parcels	Approximate Percentage of Land Parcels Crossed	Number of Landowners
Private Fee Simple	40	74	32
Other Fee Simple	12	22	6
Provincial (Crown)	2	4	1
Total	**54**	**100**	**39**

NGTL has also identified 12 occupants that are potentially affected by the Project.

As discussed in Section 8: Stakeholder Engagement, these landowners and occupants have been provided with Project information. As discussed in Section 4: Pipeline, feedback from these stakeholders was taken into consideration during route selection.

7.3 RIGHT-OF-WAY REQUIREMENTS

For the majority of the length of the Rocky View Section, a minimum construction ROW (including permanent ROW and TWS) of approximately 42 m will be utilized to provide for safe and efficient workspace for construction. The construction ROW will be less than 42 m in certain locations, for example, in the areas where trenchless construction methods (i.e., HDDs) will be used and do not require a 42 m construction ROW, or where available land for construction is limited, such as within the pipeline corridor in the Town of Cochrane.

NGTL requires a permanent ROW of varying widths across the Proposed Route for operations and maintenance purposes. The permanent ROW ranges in width between approximately 10 m and 29 m, and in most areas, will be approximately 17 m in width.

Where feasible, the Rocky View Section parallels existing linear disturbances, such as the existing WASML and Foothills Zone 7 Pipeline. Routing the Rocky View

Section parallel and adjacent to the existing WASML and Foothills Zone 7 Pipeline allows NGTL to minimize incremental environmental, stakeholder, and landowner impacts, through reduction of the size of the new (non-parallel and non-overlapping) permanent ROW required for the pipeline, and facilitates efficient operations and maintenance of the pipeline.

Where the Rocky View Section parallels the existing WASML or Foothills Zone 7 Pipeline, the Rocky View Section ROW will, for the most part, overlap with portions of the existing ROWs, thereby minimizing the incremental impact to landowners. Specific configurations of this overlap will vary, depending on the location of the existing pipelines within the existing ROWs. In most areas where the Rocky View Section ROW overlaps with the existing ROWs, the non-overlapping portion of the permanent ROW required ranges from approximately 3 m to approximately 8 m.

In select locations where the availability of land is limited, the entirety of the Rocky View Section permanent ROW will overlap with the ROW of the existing WASML pipeline. These locations are within the pipeline corridor in the Town of Cochrane and the Fireside Neighbourhood in the Town of Cochrane.

In addition to the typical minimum construction ROW of approximately 42 m, further TWS will be required to accommodate:

- safety elements
- material laydown areas and staging areas
- areas of increased depth of cover
- crossings (e.g., roads, railroads, pipelines, utilities and watercourses with defined banks)
- pipeline deflection areas
- surface material depth and stripping procedure
- timber clearing and storage
- access
- slip-bore locations
- HDD locations
- final tie-in weld locations
- areas where geotechnical or environmental conditions warrant additional TWS

For typical sketches of the ROW and TWS configurations proposed for the Rocky View Section, see Appendix 7-1. The proposed permanent ROW and preliminary TWS requirements for the Rocky View Section are shown in the map attached as Appendix 4-1. An estimated 35 ha of permanent ROW will be required for the Rocky

View Section, of which, approximately 25 ha (71%) will overlap with the existing WASML or Foothills Zone 7 Pipeline ROWs. An estimated 78 ha of TWS will be required for construction of the Rocky View Section.

The TWS requirements for the Rocky View Section are subject to refinement as the Project proceeds through detailed engineering. In addition, before the start of construction, NGTL and the Prime contractor will complete an additional assessment of lands required for construction activities. Once this assessment is completed, additional TWS may be required on a site-specific basis, which will be finalized in the field before, and potentially during construction. These areas, if needed, are expected to be located within the lands assessed in the ESA. In the event that TWS is required outside lands assessed in the ESA, NGTL will conduct a desktop review and field studies if necessary, apply any necessary mitigation as detailed in the EPP, and obtain any necessary permits or authorizations prior to construction.

7.4 VALVE SITE AND LAUNCHER AND RECEIVER LANDS

Valve facilities for the Rocky View Section will be located at the upstream tie-in at NGTL's existing WAS110 Valve Site, and at the downstream tie-in at NGTL's existing WAS100 Valve Site. In addition, a permanent launcher will be relocated from the existing downstream WAS100 Valve Site, and installed at the existing upstream WAS110 Valve Site. While the fence lines at the existing WAS110 and WAS100 Valve Sites will require expansion to accommodate these facilities, it is anticipated that these facilities will be located within the boundaries of the permanent ROW, or will be located within lands upon which NGTL has existing land rights. A block valve will also be installed near the existing JPW10 Valve Site at the approximate halfway point of the Rocky View Section, located at SW 15-25-04 W5M. This block valve will be fenced and located within the boundaries of the permanent ROW. If during detailed design, it is determined that the valve facilities will be located outside of the permanent ROW or outside of lands upon which NGTL has existing land rights, any additional required land rights will be acquired as necessary.

7.5 CATHODIC PROTECTION LAND REQUIREMENTS

The Rocky View Section may require CP such as ground beds at specific intervals along the pipeline route. The requirements for ground beds, including locations and dimensions, will be determined during detailed design.

NGTL expects that any CP facilities will be located within the permanent ROW, however if additional CP needs are identified outside of the permanent ROW, any additional required land rights will be acquired as necessary.

7.6 STOCKPILE SITES AND CONTRACTOR YARDS

Stockpile sites and contractor yards will be required for construction of the Rocky View Section. NGTL is currently investigating potential locations for stockpile sites and contractor yards and will use existing disturbed areas where feasible, to minimize impacts on previously undisturbed areas.

7.7 THIRD-PARTY AGREEMENTS

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

7.8 COMPRESSOR STATION UNIT ADDITION REQUIREMENTS

7.8.1 Compressor Station Site Lands

For estimated land requirements for the Turner Valley CS and the Burton Creek CS, see Table 7-2.

Table 7-2: Compressor Station Site Land Requirements

Component	Legal Description	Area Required (ac)	Remarks
Turner Valley CS	SE 15-20-03 W5M	0	NGTL Owned Land
Burton Creek CS	NW 06-12-01 W5M	1.56 – Permanent 1.01 – Temporary 2.57 – Total	Private Land

7.8.1.1 Turner Valley CS

The Turner Valley CS will be located entirely on land owned by NGTL. The facilities required for the Turner Valley CS will be located within the boundaries of the existing Turner Valley compressor station site. The existing fence line of the compressor station site will be expanded to the north west to accommodate the additional facilities. NGTL has identified that no new permanent land rights are required for the Turner Valley CS. TWS is not anticipated to be required beyond the boundaries of lands owned by NGTL.

7.8.1.2 Burton Creek CS

The Burton Creek CS will require expansion of the existing Burton Creek Compressor Station site. The existing compressor station site will be expanded to the south on freehold land in NW 06-12-01 W5M to accommodate the additional facilities required by the expansion. The Burton Creek CS will require the purchase in

fee simple, or lease of approximately 1.56 acres and approximately 1.01 acres of TWS during construction.

The lands required for the Burton Creek CS are subject to a Nature Conservancy of Canada (NCC) conservation easement. The lands are also subject to the ECCC Ecological Gifts Program (EGP). NGTL has been in consultation with NCC, and has been working with NCC to request authorization from ECCC for disposition or change in use of the EGP lands required for the Burton Creek CS. NGTL has communicated its willingness to work collaboratively with the landowner, NCC, and ECCC on this matter.

A potential requirement for camp accommodations for use during construction of the Burton Creek CS has been identified. NGTL is currently investigating potential camp locations in the vicinity of the Burton Creek Compressor Station and will attempt to use existing disturbed areas where feasible, to help minimize effects on previously undisturbed areas.

7.9 PROCESS FOR ACQUIRING LAND RIGHTS

NGTL confirms that the land acquisition process for the Project will comply with the applicable sections of the NEB Act, including sections 86 and 87.

Notices pursuant to section 87(1) of the NEB Act will be served on owners of lands proposed to be acquired for the Project, as defined in sections 75 and 85 of the NEB Act. For a sample of section 87(1) notices for acquisition of pipeline ROW on Crown and freehold lands, see Appendix 7-2 and Appendix 7-3, respectively. For a sample of section 87(1) notices to be served for private land proposed to be acquired by an Option to Purchase or an Option to Lease see Appendix 7-4 and Appendix 7-5, respectively. When serving such notices, NGTL will include copies of the NEB publication *Landowner Guide.*

For a sample of the ROW Agreement to be used to acquire ROW on freehold lands see Appendix 7-6.

For a sample of the TWS agreement to be used to acquire TWS on freehold lands, see Appendix 7-7.

For a sample of the Option to Purchase and the Option to Lease agreements for acquisition of land at the Burton Creek CS, see Appendix 7-8 and Appendix 7-9, respectively.

7.9.1 Proposed Land Acquisition Schedule

NGTL expects that the appraised land valuations for the affected parcels will become available in Q1 2018 and anticipates commencing the land acquisition process for

permanent and temporary land rights, including serving section 87(1) notices, in Q1/Q2 2018. NGTL anticipates completing land acquisition in Q1 2019. The submission of applications for Crown dispositions are anticipated to occur in Q3/Q4 2018. Table 7-3 provides a preliminary land acquisition schedule. NGTL anticipates that all land rights will be acquired and crossing agreements obtained in advance of the scheduled construction.

Table 7-3: Proposed Land Acquisition Schedule

Dates	Activities
April 2017	Commenced title searches and prepared line lists.
May 2017	Commenced initial engagement with landowners regarding survey access, issued survey notifications and obtained Survey Acknowledgement Forms from all landowners that would voluntary sign.
July 2017	Provided Project information packages to landowners and occupants.
July 2017 to Ongoing	Conducted personal consultation with landowners and occupants.
September 2017	Provided open house invitations to landowners and occupants and held open house.
November 2017	Provided Project route update information packages to landowners and occupants.
November 2017	Engaged a qualified appraiser to assess property values along the Proposed Route and to advise as to fair and reasonable compensation
November 2017	Engaged a qualified urban planner to provide development planning information for lands along the Proposed Route
January 2018	Provided open house invitations to landowners and occupants and held open house.
Q1/Q2 2018	Prepare and serve section 87(1) notices.
Q1/Q2 2018 to Q1 2019	Acquire land rights.
Q1/Q2 2018 to Q1 2019	Obtain third-party agreements.

7.10 COMPENSATION FOR LAND RIGHTS

NGTL's objective is to reach voluntary and reasonable agreements with landowners for land rights, including agreement on the compensation payable for such rights. When NGTL and a landowner cannot agree on compensation, either party may apply to the Minister of Natural Resources Canada to receive the services of a negotiator, or to have the matter settled by arbitration as provided for in sections 88 to 103 of the NEB Act.

7.11 DAMAGES

Section 75 of the NEB Act requires NGTL to do as little damage as possible to landowners' property as a result of its activities and to make full compensation to

landowners for all damages sustained by them in the manner provided for in the NEB Act.

7.12 SURVEY ACCESS

In May 2017, NGTL began approaching landowners to obtain survey access to complete the environmental, geotechnical, and other surveys required to support the Application. NGTL presented landowners with survey acknowledgement forms that described the survey work and gave landowners an opportunity to note any site-specific issues on the property for NGTL to consider when carrying out the survey work, as well as any specific timing or notification issues with respect to the survey work.

NGTL has obtained access to all lands required to complete the necessary environmental, geotechnical, and other surveys required to support the Application. Additional targeted biophysical and archaeological investigations are anticipated to take place in Q2/Q3 2018. NGTL will consult with landowners should any additional surveys be required.

7.13 LANDOWNER CONSULTATION AND CONCERNS

This section describes:

- the principles, goals and scope of NGTL's landowner consultation program for the Project
- NGTL's landowner consultation activities to date
- concerns that have been 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.

7.13.1 Principles and Goals

In addition to the stakeholder engagement principles and goals set out in Section 8, the goals of landowner consultation are to:

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

NGTL applies TransCanada's land management guiding principles on its projects to guide how all TransCanada employees and contractors are required to conduct themselves when working with landowners. For a copy of the land management guiding principles, see Appendix 7-10.

7.13.2 Landowner Consultation Activities

For details of the stakeholder engagement process, which included the notification and engagement of landowners, see Section 8: Stakeholder Engagement.

As noted in Section 7.12, NGTL began approaching landowners to obtain survey access in May 2017. In July 2017, NGTL began consulting with adjacent and nearby landowners surrounding the Turner Valley and Burton Creek compressor stations, as well as with landowners on Preliminary Routes A and B. Contact was made to provide information about the Project and to obtain survey access for environmental, geotechnical, and other surveys.

For NGTL's route assessment process, see Section 4: Pipeline. As noted in Section 4.1.4, Preliminary Routes A and B were shared in materials provided in initial mailouts, face-to-face meetings and at the public open house held on September 21, 2017.

During consultation with landowners, including at the September 21, 2017, open house, NGTL received feedback on Preliminary Routes A and B. NGTL considered this feedback in selecting Route A as the Proposed Route.

Consultation with landowners on the Proposed Route has been ongoing since July 2017, and has continued once Route A was selected as the Proposed Route. During consultation meetings with landowners regarding the Proposed Route, NGTL received further feedback, and made refinements to the Proposed Route where feasible, as described in Section 4.1.7.

Throughout the regulatory process and construction phase, NGTL will continue consulting with landowners to identify and address concerns and acquire the necessary land rights.

7.13.3 Landowner Concerns

A number of concerns have been raised by landowners potentially impacted by the Project since NGTL began landowner consultation in July 2017.

Landowners have raised concerns regarding:

- NGTL's identification and consideration of alternative routes
- pipeline safety, including safety of nearby residents and future nearby residents

- potential impacts to native pasture, removal of vegetation such as trees, hedges, or shrubs, potential impacts to wildlife during construction, potential introduction or spreading of weeds as a result of construction, and reclamation of lands following construction
- potential impacts on late-stage development plans or proposed/potential future development plans, and potential impacts of municipal setback requirements for ROWs on current and potential future land use
- NGTL's permanent ROW being too wide and impacting land use, and whether the Rocky View Section could be incorporated within existing ROWs (e.g., existing WASML or Foothills Zone 7 Pipeline ROWs)
- potential negative impact on property value and marketability, and potential loss of revenue due to interruption of business operations on the lands
- potential interruption of recreational or other uses on the lands
- potential impacts on existing nearby water wells, residences, buildings, and structures
- potential impacts on agricultural/farming operations, including potential impacts on livestock and ability for livestock to cross the construction ROW
- potential impacts to drainage
- ability to change or alter the grade over the permanent ROW
- nuisance and inconvenience as a result of construction, including noise and construction traffic, and increase in operational noise as a result of compressor station unit additions
- compensation for the land rights required for the Project

Several landowners provided feedback regarding routing of the Rocky View Section, particularly with respect to their preference for the pipeline to be parallel to or incorporated within existing WASML or Foothills Zone 7 Pipeline ROWs, and for the permanent ROW width to be minimized. In response to these concerns, NGTL routed the Rocky View Section parallel to the existing WASML and Foothills Zone 7 Pipeline where feasible, and the ROW for the Rocky View Section will, for the most part, overlap with portions of the existing WASML and Foothills Zone 7 Pipeline ROWs, thereby minimizing the incremental impact to landowners. In addition, NGTL considered and made route refinements to its Proposed Route to address concerns and reduce impacts where feasible. See Section 4: Pipeline for further details on route refinements.

NGTL acknowledges that some landowners continue to express concerns including some opposition regarding the Proposed Route and the Project's impact on their land and land uses, particularly along the alignment of the Bow River crossing, as discussed in detail in Section 4.1.7. NGTL is committed to continuing discussions

with landowners to further explain its route selection, to develop mitigation strategies, and to determine fair and reasonable compensation for land rights, as appropriate. As noted in Section 7.9.1, NGTL has engaged a qualified appraiser to assess property values along the Proposed Route to inform these discussions. In addition, NGTL will continue to engage with landowners to address their other concerns.

7.14 SECTION 58 APPLICATION NOTICE

With the application now filed, landowners will be notified of the Application's filing date.[1] Landowners will also be informed that the Board encourages those with additional Project-related comments to raise them to the NEB within 14 days from the date of filing of the Application.

7.15 ONGOING CONSULTATION

Landowner consultation and land rights acquisition will continue throughout the regulatory process.

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

Once the Project is in-service, responsibility for ongoing landowner relations will be transitioned from the Project to operations. Regionally-based NGTL liaisons will continue to build and maintain relationships with landowners and occupants. As construction completion of the Project nears, the PA team will work in collaboration with the Project team to integrate these new assets into the PA Program. For more information on the PA Program, see Section 6.1.6.

[1] While NGTL has not filed the Application using the NEB Online Application System (OAS), it will inform stakeholders within 72 hours of the filing date in accordance with the NEB OAS requirements.

8.0 STAKEHOLDER ENGAGEMENT

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

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

For a description of landowner consultation activities and the Aboriginal engagement program, see Sections 7 and 9 of this Application, respectively.

8.1 PRINCIPLES AND GOALS

The principles and goals of the stakeholder engagement program are to:

- formally introduce the Project to stakeholders
- actively seek and consider comments on:
  - pipeline routing and facility site considerations
  - potential environmental and socio-economic effects
  - mitigation measures, where necessary, to address potential Project impacts
  - enhancement measures, where appropriate, to improve potential positive socio-economic effects
- identify and respond to stakeholder issues and concerns
- provide stakeholders with ongoing Project updates, including the anticipated regulatory schedule and planned application to the NEB
- communicate Project changes to stakeholders
- facilitate ongoing communication that continues through the construction and operations phases to ensure stakeholder concerns and issues, if any, are addressed appropriately and in a timely manner

8.2 DESIGN AND METHODOLOGY

The stakeholder engagement program was designed and implemented in accordance with the principles of NGTL's stakeholder engagement framework and community relations best practices.

The program was designed to foster positive relationships with stakeholders and to offer stakeholders an opportunity to provide input into the project planning and development process.

The stakeholder engagement program is undertaken in a phased approach and implemented using open communication and participatory stakeholder involvement practices.

8.2.1 Identification of Stakeholders and Development of Notification Materials

The first phase of engagement involves the identification of potentially affected stakeholders in the Project area and the development of engagement materials, including letters, maps and informational fact sheets that will be used for notification purposes.

NGTL identifies potentially affected stakeholders or stakeholders that have a potential interest in the Project in advance of implementing an engagement program. NGTL builds an initial list of stakeholders through a combination of:

- desktop research
- NGTL's operating experience in the area
- NGTL's established network of contacts within the communities
- personal contact with and referrals from stakeholders

The identification process is ongoing and continues throughout the Project. Stakeholders are encouraged to identify other relevant stakeholders for inclusion in the stakeholder engagement program. The stakeholder list is regularly updated as additional stakeholders are identified by NGTL or are self-identified. Any stakeholders identified will continue to be notified throughout the duration of the Project unless they request otherwise.

8.2.2 Notification and Engagement

The notification and engagement phase focuses on the public disclosure of the Project and solicitation of stakeholder input, utilizing a number of engagement activities and communication tools. During this phase, NGTL seeks to identify and address stakeholder questions and concerns, provide updates about the Project, and inform stakeholders about the Board's regulatory review process. NGTL's engagement continues throughout the regulatory process and Project construction into operations.

For this Project, NGTL began this phase with preliminary notification of key stakeholders, including municipalities, before undertaking its broader engagement program described in Section 8.6.

8.2.3 Transition to Operations

The third phase of engagement will begin as the Project transitions from construction to operations. Regionally-based NGTL liaisons will continue to build and maintain relationships through consistent and ongoing communication with stakeholders. As completion of Project construction nears, the PA team will work in collaboration with the Project team to integrate these new assets into the PA Program (see Section 6.1.6).

8.3 IDENTIFICATION OF STAKEHOLDERS

Through the process described in Section 8.2.1, the following were identified as Project stakeholders:

- landowners, adjacent landowners and nearby residents potentially impacted by the Project
- regional and municipal elected officials and personnel in the vicinity of Preliminary Routes A and B and the facility sites
- emergency responders
- federal government agencies
- provincial government agencies
- recreational users
- members of the general public
- non-governmental organizations (NGOs)
- other interested stakeholders

8.4 ENGAGEMENT TOOLS AND ACTIVITIES

NGTL is using a wide range of engagement activities and communication tools to engage stakeholders, for the Project including:

- Project email address (westpathdelivery@transcanada.com)
- Project voice mailbox (1-844-551-0054)
- Project website (www.transcanada.com/westpath)
- Project fact sheets
- mailouts to stakeholders introducing the Project and providing Project updates, including fact sheets and NEB brochures
- stakeholder meetings and conference calls
- public open houses with informational displays and handouts

- newspaper advertisements, digital advertisements, and social media posts identifying the location, date and time of open houses and providing Project updates
- recording notes from all engagement activities to inform the Project and ongoing engagement

8.5 PRELIMINARY STAKEHOLDER NOTIFICATION AND ENGAGEMENT

Before starting the broader public components of the stakeholder engagement program, NGTL sought to introduce the Project to key stakeholders to provide initial Project information and understand any questions and/or issues they may have regarding the Project. This preliminary engagement included discussions with:

- provincial agencies
- local industry-related synergy groups such as CPOC and the Turner Valley Oil and Gas Group (TVOGG)
- municipal government personnel

Preliminary Project notification and engagement began in May 2017 and provided insight into the interests and questions of potentially affected stakeholders. This preliminary engagement also enabled NGTL to refine the stakeholder engagement program and materials before starting notification to all stakeholders.

During this preliminary engagement, NGTL shared details of the Project as well as the proposed stakeholder engagement process, and looked for input on both. Stakeholders were also informed of the role of the NEB in reviewing the Project, and provided input on:

- other potentially interested organizations and individuals
- potential environmental effects of the Project
- potential construction effects of the Project
- preliminary route options
- potential Project effects on other infrastructure projects and development
- potential socio-economic effects of the Project

8.5.1 Preliminary Meetings and Engagement with Municipalities and Agencies

For a more detailed summary of engagement including dates and any concerns raised please see Table 8-1.

On May 4, 2017, first phone calls were made to the Town of Cochrane and Rocky View County to introduce the Project. During these initial calls, NGTL outlined the Project scope and proposed timelines. NGTL also discussed the expectation to continue engagement with stakeholders on the Project and to work closely with

municipal governments in developing a stakeholder engagement program for the Project that is responsive, informative and transparent.

Throughout June 2017, individual meetings were held with the Town of Cochrane and Rocky View County administration and NGTL staff to introduce the Project in more detail and answer questions. NGTL presented an overview of the Project, including the purpose, schedule and regulatory process. The preliminary route options were presented for discussion as well as the proposed fact sheet format and information for feedback. It was agreed that further meetings and consultation would be arranged to discuss opportunities for collaboration in terms of stakeholder consultation and fieldwork.

On July 18, 2017, follow up calls were made to the Town of Turner Valley, the Municipal District (MD) of Foothills No. 31 and the MD of Ranchland No. 66. These calls were made to ensure the initial project introduction package had been received and any initial questions or concerns had been addressed.

On August 2, 2017, NGTL met with the CDAS president and board chair to discuss the Project and potential impacts to CDAS operations as a result of Preliminary Route A traversing CDAS grounds. During this meeting NGTL also agreed to sponsor the Cochrane Fair that was scheduled for August 18-20, 2017. NGTL's sponsorship of the event provided the opportunity to host a booth in the marketplace and deliver introductory Project information to the community.

On September 21, 2017, NGTL made a formal Project introductory presentation to CPOC during a quarterly update meeting with industry members and community administration. During the question and answer period, several key areas of interest were raised, including:

- the public engagement and regulatory process
- safety of pipelines
- river crossing methods
- coordination with Alberta Transportation on its proposed Springbank Off-Stream Reservoir, Highway 1A/Highway 22 Interchange, and Highway 1/Highway 22 Interchange

On October 17, 2017, NGTL provided a Project introduction to TVOGG during a quarterly update meeting with industry members and community administration. During the question and answer period, several key areas of interest were raised, including:

- sight, sound and traffic implications of the Turner Valley CS
- the public engagement process
- applicable regulator and associated regulatory process

Following all preliminary meetings, NGTL committed to ongoing engagement with stakeholders to ensure concerns and issues are addressed throughout the Project lifecycle.

8.5.2 Project Notifications

During the week of July 10, 2017, NGTL mailed and emailed an introductory letter to identified Project stakeholders. This letter provided:

- information about the Project
- contact information
- a Project fact sheet including the Preliminary Routes A and B map
- routing information
- the NEB brochure *Information for Proposed Pipeline or Power Line Projects that Do Not Involve a Hearing*

On September 7, 2017, NGTL mailed out open house invitations to over 5,700 area residents and landowners along the Project. This invitation was also emailed to interested stakeholders including municipal stakeholders, government officials and interested stakeholder groups. Details included a Project overview, the preliminary routes map, date, time and location of the open house event.

Open house advertisements were placed in two hard-copy weekly publications in September 2017. The Cochrane Times ran the ad in the September 6, 13 and 20 editions and The Cochrane Eagle ran the ad in the September 7, 14 and 21 editions. The Cochrane Eagle also ran digital ads online between September 14 and 21, 2017. The open house notification was also posted on the Town of Cochrane and Rocky View County website event calendar as well as shared on the Town of Cochrane Facebook page.

As a result of this advertising and the introductory notification package, NGTL received a number of enquiries from residents regarding the exact location of Preliminary Routes A and B, details of the anticipated Project schedule and opportunities for input. All enquiries were responded to by NGTL.

The week of January 8, 2018, NGTL mailed out open house invitations to over 5,700 area residents and landowners along the Project. This invitation was also emailed to interested stakeholders including municipal stakeholders, government officials and interested stakeholder groups. Details included an announcement of the route selection, an overview of routing criteria, an updated map, project information, and the date, time and location of the open house event.

Open house advertisements were placed in three hard-copy weekly publications in January 2018. The Cochrane Times ran the ad in the January 10 edition, The

Cochrane Eagle ran the ad in the January 11 edition, and the Rocky View Weekly ran the ad in the January 9 edition. The Cochrane Eagle and the Rocky View Weekly also ran digital ads online between January 8 to 18, 2018. The open house notification was also posted on the Town of Cochrane and Rocky View County website event calendars as well as shared on the Town of Cochrane Facebook page and TransCanada West Path webpage.

8.6 BROADER NOTIFICATION AND ENGAGEMENT

In July 2017, NGTL began broader stakeholder engagement for the Project. Stakeholder engagement activities included:

- Additional meetings and discussions with:
  - municipal elected officials and personnel
  - CDAS
- ongoing monitoring and response to Project emails and voice mails
- council presentation with Town of Cochrane (on January 8, 2018)
- public open houses (on September 21, 2017, and January 18, 2018)
- emergency response presentation to local fire department (on January 18, 2018)
- advertising public notices
- information mailouts
- updates to Project webpage
- updates on social media (Twitter/Facebook)
- event sponsorship – booth presence at the Cochrane Fair (August 18-20, 2017)

The objectives of these engagement activities were to:

- provide clear, relevant and timely information about NGTL and the Project to stakeholders and interested members of the public
- answer questions about NGTL and the Project
- provide information on NGTL's emergency response process
- foster relationships between NGTL and communities near the Project
- inform stakeholders of the NEB's regulatory process
- provide an opportunity for stakeholders to review the Project and provide feedback
- identify and address concerns
- ensure NEB consultation process requirements were met or exceeded

8.6.1 Open Houses

The first open house for the Project was held on September 21, 2017, at the Spray Lakes Recreation Centre in Cochrane. Informational stations were set up with members of the Project team available to speak to attendees about their individual interests. A total of 63 people attended the open house including landowners, community residents, a representative from Stoney Nakoda Nations, and a municipal election candidate.

The open house provided opportunities for members of the public and stakeholders to learn more about the Project, and for NGTL to seek feedback on Preliminary Routes A and B. Attendees also had the opportunity to discuss the Project with NGTL representatives from various disciplines and review informational displays and handout materials.

Information provided at the event focused on the following topics:

- preliminary Routes A and B
- routing criteria
- watercourse crossing methodology
- environmental protection
- community and Aboriginal engagement
- emergency response and pipeline safety
- the NEB and the regulatory process

The open house exhibit panels were grouped by the following topic areas:

- West Path Delivery Project Details and Maps
- Pipeline Safety and Integrity
- Water Crossing Methods
- Reclamation
- Emergency Planning and Response
- Environment
- Aboriginal Relations
- Stakeholder Engagement

NGTL received and recorded feedback during the open house. Attendees were also encouraged to leave their contact information for any necessary follow-up to occur.

Follow-up items included providing a landowner with further information on river crossings, providing a landowner with a copy of the detailed route map, considering general questions regarding feasibility of route refinements based on proximity to residences, and addressing landowner concerns. Follow up items from the open house were addressed by email/phone calls and subsequent meetings with landowners. A number of landowners attended the open house and their feedback focused on specific impacts on their properties.

Other questions raised by attendees included questions related to pipeline safety and integrity. Attendees were interested to learn about pipeline protection and coating, how NGTL monitors for leaks, and emergency response procedures. Attendees also enquired about environmental impacts and impacts to neighbouring residential communities.

The second Project open house was held January 18, 2018, at the ClubHouse Activity Centre at the Cochrane Ranche Historic Site. The objective of this event was to inform stakeholders of the chosen Proposed Route, provide information on the rationale behind this decision, and address any questions or concerns from stakeholders. Informational stations were set up with members of the Project team available to speak to attendees about their individual interests. A total of 76 people attended.

Information provided at the event focused on the following topics:

- Project routing update
- watercourse crossing methodology
- environmental protection
- community and Aboriginal engagement
- emergency response and pipeline safety
- the NEB and the regulatory process
- NEB landowner guides

The open house exhibit panels were grouped by the following topic areas:

- West Path Delivery Project Details and Maps
- Pipeline Safety and Integrity
- Water Crossing Methods
- Reclamation
- Emergency Planning and Response
- Environment
- Aboriginal Relations
- Stakeholder Engagement
- NEB Information

Many of the attendees were landowners with follow-up items to be addressed through the course of engagement with the NGTL Land Team. Other attendees from the community were interested in information about the Project construction schedule, how we mitigate impacts to traffic and noise, and what, if any, impact there will be to the river during construction. NGTL committed to following up with attendees on a variety of topics including:

- local contracting opportunities
- options for bringing school groups to observe construction activities
- water crossing methodology
- landowner concerns

- additional council meetings
- impacts to recreational river users, soccer field users, and dog park users

NGTL received and recorded feedback during the open house. Attendees were also encouraged to leave their contact information for any necessary follow-up to occur.

8.6.2 Additional Meetings with Stakeholders

For a more detailed summary of engagement including dates and any concerns raised, please see Table 8-1.

On August 2, 2017, NGTL met with the Town of Cochrane staff to provide an update on Project activities. NGTL provided an overview of the open house plans as well as survey information and new staff introductions.

On August 2, 2017, NGTL met with representatives from CDAS to discuss community investment opportunities such as the Cochrane Fall Fair.

On September 12, 2017, NGTL met with Rocky View County staff to provide an update on Project activities. NGTL provided an overview of the open house plans as well as survey information and new staff introductions.

On October 25, 2017, NGTL met with the Town of Cochrane to provide information on the Proposed Route before proceeding to the next stage of planning. NGTL provided a summary of the first open house and key feedback provided that was taken into consideration during the route decision making process. NGTL provided an overview of the Proposed Route, including mapping, environmental considerations, constructability considerations, specifics of construction requirements, crossings anticipated, tentative plan for land owner engagement, and overall process for filing the application for Project approval with the NEB. Town staff highlighted the current Dog Park project delays, and the potential Project impact to the Dog Park project during and after construction. NGTL has committed to continued updates with the Town regarding potential impacts to the Dog Park project, and has committed community investment support for improving the park upon completion of construction.

On December 8, 2017, NGTL met with the Town of Cochrane staff to provide an update on project planning, specifically with respect to the Bow River water crossing, and provide more detailed mapping. The Town provided an update on the Dog Park project.

On December 18, 2017, NGTL met with staff from the MD of Ranchland No. 66 to provide an update on planning activities for the Burton Creek Compressor Station. The discussion highlighted the different accommodation strategies NGTL is looking at for construction of the facility, as well as landowner engagement and potential local sourcing initiatives.

On January 8, 2018, NGTL presented to the Town of Cochrane Town Council with information about the Project and NGTL's community engagement to date. Topics raised during the Question and Answer period focussed on impacts to the Town from traffic and noise, impact to the Dog Park, and methodology for crossing the Bow River.

On January 18, 2018, NGTL presented to the Town of Cochrane Fire Department, including the Fire Chief. The presentation began with an overview of the Project scope and concluded with a presentation on TransCanada's Emergency Management System. Questions raised were primarily specific to the Project, relating to the distance between the various pipelines within the right-of-way, characteristics of the product within the pipeline, and the location of shut-off valves on the expansion. The Fire department was also notified of an upcoming TransCanada emergency response exercise planned in the area, and was invited to participate in this exercise in order to observe processes and systems.

On January 24, 2018, NGTL met with staff from Rocky View County to provide an update on the Project following the selection of the Proposed Route. NGTL communicated anticipated Project timelines and discussed road use in the County. The County indicated they had no concerns to date and NGTL committed to continuing engagement as the Project moves through the regulatory process.

On January 24, 2018, NGTL presented to residents of the Lofts on the Bow Condominium (Condo) on George Fox Trail where approximately 42 residents of the building were in attendance. NGTL presented material addressing the anticipated project schedule, route selection process, water crossing methodology, environmental considerations, TransCanada's pipeline safety and Emergency Response programs, stakeholder and landowner engagement to date, and benefits to the community. Questions from attendees were focussed on potential impacts to residents and NGTL's plans to mitigate them, as well as inquiries about the Bow River HDD crossing, such as how long will the drill be in place, how loud is the drill, and how did NGTL choose this crossing methodology. NGTL committed to continuing engagement with the Condo as the Project moves through the regulatory process and construction planning progresses, and indicated additional information sessions would be held at their request.

8.6.3 Project Update Letters and Advertisements

During the week of October 30, 2017, a mailout was sent to stakeholders that included:

- a map of the selected Proposed Route (i.e., Preliminary Route A)
- a letter outlining the reasons for selecting the Proposed Route and stating NGTL's intention to file its Application with the NEB in early Q1 2018
- NEB brochure titled: *Information for Proposed Pipeline or Power Line Projects that Do Not Involve a Hearing*

This mailout was also sent by email to municipal stakeholders, government officials and interested stakeholder groups that have provided email contact information.

Print ads were placed in the Cochrane Times, Cochrane Eagle, and Rocky View Weekly. Digital ads ran with the Cochrane Eagle and Rocky View Weekly.

8.7 SECTION 58 APPLICATION NOTICE

With the application now filed, Project stakeholders will be notified of the Application's filing date.[1] Stakeholders will also be informed that the Board encourages those with additional Project-related comments to raise them to the NEB within 14 days from the date of filing of the Application.

8.8 ONGOING ENGAGEMENT

For a summary of the stakeholder engagement activities for the Project before submission of this Application, see Table 8-1. For copies of communication materials distributed, see Appendices 8-1 through 8-7. For a general summary of stakeholder issues and NGTL's response, see Table 8-2.

NGTL has continuously considered stakeholder feedback regarding the pipeline route. As a result, engagement has and will continue to include ongoing discussions with the Town of Cochrane, Rocky View County, the Town of Turner Valley, Municipal District of Foothills No. 31, MD of Ranchland No. 66, CPOC, and TVOGG.

NGTL will continue to notify all stakeholders about the Project and address issues and concerns throughout the regulatory process and construction as they arise.

As noted in Section 8.2.3, once the Project is in-service NGTL's PA program will be implemented for the Project, as described in Section 6.1.6.

Table 8-1: Stakeholder Engagement Summary

Stakeholder	Communication Type	Content	Stakeholder Input	Date

Town of Cochrane	Ongoing engagement (meetings, emails, telephone discussions)	• Project overview letter
		• Project Fact Sheet
		• Project Update Fact Sheet
		• Project map
		• NEB information
		• TransCanada Community Relations Brochure
		• TransCanada Aboriginal Relations Brochure
			• Concerns about impacts on existing and planned infrastructure
			• Concerns about impact on Dog Park project
				• Engaged since May 2017.
				• Meetings with staff held on:
				  • June 19, 2017
				  • August 2, 2017
				  • October 25, 2017
				  • December 8, 2017
				• Presentation to council on January 22, 2018

[1] While NGTL has not filed the Application using the NEB Online Application System (OAS), it will inform stakeholders within 72 hours of the filing date in accordance with the NEB OAS requirements.

Table 8-1: Stakeholder Engagement Summary (cont'd)

Stakeholder	Communication Type	Content	Stakeholder Input	Date
Town of Cochrane (cont'd)		• Community Relations Commitment Statement • Your Safety, Our Integrity Brochure		
Town of Turner Valley	Ongoing engagement (meetings, emails, telephone discussions)	• Project overview letter • Fact Sheet • Project Update Fact Sheet • Project map • NEB information • TransCanada Community Relations Brochure • TransCanada Aboriginal Relations Brochure • Community Relations Commitment Statement • Your Safety, Our Integrity Brochure	• Interested in noise level during construction, as well as what the new additions will look like • Want to ensure that adjacent landowners are consulted with	• Engaged since May 2017. • Representatives in attendance during October 17, 2017 TVOGG quarterly meeting.
MD of Foothills No. 31	Ongoing engagement (emails and telephone discussions)	• Project overview letter • Fact Sheet • Project Update Fact Sheet • Project map • NEB information • TransCanada Community Relations Brochure • TransCanada Aboriginal Relations Brochure • Community Relations Commitment Statement • Your Safety, Our Integrity Brochure	• No concerns raised to date • Interested in contracting opportunities for local businesses • Request for council presentation in Q1 2018	• Engaged since May 2017.
MD of Ranchland No. 66	Ongoing engagement (emails, telephone discussions, and meetings)	• Project overview letter • Fact Sheet • Project Update Fact Sheet • Project map • NEB information • TransCanada Community Relations Brochure • TransCanada Aboriginal Relations Brochure • Community Relations Commitment Statement • Your Safety, Our Integrity Brochure	• No concerns raised to date	• Engaged since May 2017. • Met with Chief Administrative Office (CAO) on December 18, 2017

Rocky View County	Ongoing engagement (meetings, emails, telephone discussions)	• Project overview letter
		• Fact Sheet
		• Project Update Fact Sheet
		• Project map
		• NEB information
		• TransCanada Community Relations Brochure
			• Concerns with road access and allowance	• Engaged since May 2017
				• Meetings with staff held on:
				  • June 21, 2017
				  • August 2, 2017
				  • September 12, 2017
				  • January 24, 2018

Table 8-1: Stakeholder Engagement Summary (cont'd)

Stakeholder	Communication Type	Content	Stakeholder Input	Date
Rocky View County (cont'd)		• TransCanada Aboriginal Relations Brochure • Community Relations Commitment Statement • Your Safety, Our Integrity Brochure		
CPOC	Presentation to Committee during quarterly meeting.	• Project details • Project map • Fact Sheet • PowerPoint presentation • NEB information	• Interest in routing, coordination with the Fire Department, pipeline safety, the public engagement process, water crossings and environmental impacts	• Presented to group during September 21, 2017 meeting.

CDAS	Meetings, emails and telephone discussions	• Project details
		• Project map
		• Sponsorship
		• Event presence
		• NEB information
		• TransCanada Community Relations Brochure
		• TransCanada Aboriginal Relations Brochure
		• Community Relations Commitment Statement
		• Your Safety, Our Integrity Brochure
			• Concerns regarding potential impacts to CDAS operations as a result of Proposed Route traversing CDAS ground
			• Numerous visitors to booth at Cochrane Fair – Open House invitations provided
				• Meeting held on:
				  • June 21, 2017
				  • August 2, 2017
				  • August 18-20, 2017 (Cochrane Fair)

TVOGG	Presentation to group during quarterly meeting.	• Project details • Project map • Fact Sheet • PowerPoint presentation • NEB information	• Questions about size of CS expansion, need for project, and regulator questions.	• Presented to group during October 17, 2017 meeting.

Alberta Transportation	Ongoing engagement (meetings, emails, telephone discussions)	• Project details
		• Maps showing the Proposed Route overlaid on preliminary configurations / designs of the Highway 1A / Highway 22 and Highway 1 / Highway 22 interchanges.
			• Looking to work collaboratively to address potential conflicts, possible schedule overlaps or work space requirements for:
			• Highway 1A/Highway 22 Interchange project
			• Potential Highway 1/ Highway 22 Interchange upgrade as part of future Highway 22 Twinning project
			• Springbank Off-Stream Reservoir project
				• Meetings with staff held on:
				  • August 14, 2017
				  • January 11, 2018

Identified stakeholders	Mailout	• Project introduction letter • Project fact sheet • NEB brochure • TransCanada Community Relations Brochure	• Questions regarding pipeline specifications, monitoring, and inspection • Questions regarding specific property impacts	• Week of July 10, 2017

Table 8-1: Stakeholder Engagement Summary (cont'd)

Stakeholder	Communication Type	Content	Stakeholder Input	Date
Identified stakeholders (cont'd)		• TransCanada Aboriginal Relations Brochure • Community Relations Commitment Statement • Your Safety, Our Integrity Brochure		
All stakeholders along Preliminary Routes A and B, and around Burton Creek and Turner Valley Compressor Stations	Mailout	• Open house notification postcard	• No input relating directly to open house notification (note that an RSVP was not required)	• Week of September 6, 2017
All stakeholders	Open House Notice Newspaper Advertisement	• Project details • Project map • Open house event details	• No input relating directly to open house notification (note that an RSVP was not required)	• September 7, 2017
Open House – Self Identified Stakeholders	Email	• Open House Thank You Card	• No input received	• October 10, 2017
Identified stakeholders	Mailout	• Routing Update Notification Letter • Updated West Path Delivery Project Fact Sheet- October 2017 • Current Proposed Route Map • NEB Brochure	• No input received	• Week of November 1, 2017
All stakeholders along Proposed Route, and around Burton Creek and Turner Valley Compressor Stations	Mailout	• Open house notification postcard	• No input relating directly to open house notification (note that an RSVP was not required)	• Week of January 8, 2018
All stakeholders	Open House Notice Newspaper Advertisement	• Project details • Project map • Open house event details	• No input relating directly to open house notification (note that an RSVP was not required)	• Week of January 8, 2018

Table 8-2: Summary of Stakeholder Issues

Stakeholder Issue	Stakeholder	NGTL Response
Pipeline safety and integrity	Cochrane residents, Town of Cochrane, Rocky View County, Town of Turner Valley, MD of Foothills No. 31, MD of Ranchland No. 66	NGTL has an extensive pipeline maintenance and IMP. NGTL integrates safety into the design, construction, and operation of our pipeline system. Throughout the course of stakeholder engagement for this Project, NGTL has shared information with stakeholders about NGTL's pipeline maintenance and integrity programs.
Routing alternatives	Landowners, Stony Reserve, Town of Cochrane, local businesses	See Section 4: Pipeline.

Table 8-2: Summary of Stakeholder Issues (cont'd)

Stakeholder Issue	Stakeholder	NGTL Response
Environmental impacts and water crossings	Town of Cochrane, Cochrane residents, Off-Leash Advocacy Group, Cochrane Rangers Soccer Club	In constructing any pipeline project, NGTL's intent is to avoid or minimize the potential for impacts on the land and the environment. Extensive effort goes into collecting and analyzing site specific information about the land and the environment, along with many discussions with provincial government ministries, landowners, and other stakeholder to understand potential impacts and to develop an effective EPP.
Proximity to other existing infrastructure in utility corridor	Town of Cochrane, Cochrane residents and landowners	NGTL has met with various landowners and stakeholders throughout the Project to discuss the potential for the pipeline route to be incorporated within or parallel to existing and future infrastructure ROW. Based on landowner and stakeholder feedback, as well as data collected during field surveys, NGTL made several refinements to the route since it was initially proposed. With respect to the Dog Park, Springbank Off-Stream Reservoir, Highway 1A/Highway 22 Interchange, and Highway 1/Highway 22 Interchange projects, NGTL met early and often with Town staff to share updates on engagement with other projects.
Impact of pipeline on municipal infrastructure (i.e., Roads, dog park, soccer fields etc.)	Town of Cochrane	NGTL remains committed to ongoing engagement with the Town about current and future projects and plans its routing to minimize impact on existing infrastructure
Impact of construction and implications of expansion at Turner Valley Compressor Station site (including noise, traffic)	Town of Turner Valley, TVOGG members	NGTL's compressor stations are designed to comply with the sound levels outlined in the Alberta Energy Regulator's Directive 038 "Noise Control". To ensure the sound levels identified in Directive 038 are achieved, control measures are incorporated into the design and construction of all new facilities which reduce noise to local receptors. Safety is a top priority at NGTL and steps will be taken to ensure the safety of the public and workers during construction activities. Adherence to speed limits and all traffic laws is required by NGTL and is an expectation of contractors working for NGTL.

8.9 STAKEHOLDER ENGAGEMENT MATERIALS

Stakeholder engagement materials for the Project include the following:

- Appendix 8-1: Presentation to CPOC members – September 21, 2017
- Appendix 8-2: Project Introduction Mailout – Week of July 10, 2017
  - Notification Cover Letter
  - West Path Delivery Project Fact Sheet
  - TransCanada Community Relations Brochure
  - TransCanada Aboriginal Relations Brochure
  - Community Relations Commitment Statement
  - Your Safety, Our Integrity Brochure
  - NEB Brochure: *Information for Proposed Pipeline or Power Line Projects that Do Not Involve a Hearing*
- Appendix 8-3: Open House Materials
  - Open House Notice Invitation Postcard – Week of September 6, 2017

- Open House Notice Invitation Postcard – Week of January 8, 2018
- Open House Notice Newspaper Advertisement – Week of September 11, 2017, and January 8, 2018
- Open House Display Boards – September 2017 and January 2018
- Open House Handout Materials:
  - Project Fact Sheets – July 2017 and October 2017
  - Water Crossings Fact Sheet
  - Environment Brochures
  - Safety Brochures
  - Compressor Station Brochure
  - Construction Booklet
  - General TransCanada Brochures
  - NEB Brochure
  - NEB Landowner Guides
- Open House Thank You Postcard – October 10, 2017

- Appendix 8-4: Project Route Update Mailout – Week of November 1, 2017
  - Routing Update Notification Letter
  - Updated West Path Delivery Project Fact Sheet – October 2017
  - Proposed Route Map
  - NEB Brochure: *Information for Proposed Pipeline or Power Line Projects that Do Not Involve a Hearing*
  - Proposed Route Newspaper Advertisement
- Appendix 8-5: Presentation to Town of Cochrane – January 8, 2018
- Appendix 8-6: Presentation to Town of Cochrane Fire Chief – January 18, 2018
- Appendix 8-7: Presentation to Lofts on the Bow Condo – January 24, 2018

9.0 ABORIGINAL ENGAGEMENT

The Aboriginal engagement program for the Project is guided by TransCanada's *Aboriginal Relations Policy*. This policy has been submitted previously to the Board. The design of NGTL's engagement program is consistent with the NEB's guidance on consultation as set out in its Filing Manual.

The Aboriginal engagement program is designed to foster productive dialogue and exchange of information with potentially affected Aboriginal groups interested in the Project. It is developed and adapted according to the nature, location and potential effects of the Project, and to the interests, information needs and concerns of Aboriginal groups. While the underlying principles remain the same, the scope and depth of engagement may vary according to the potential for Project-related effects and the identified interests of each Aboriginal group.

9.1 PROJECT SCOPE AND LOCATION

Factors that influenced the design of the Aboriginal engagement program include the Project scope and location. As described in Section 4.0: Pipeline, NGTL began engaging with landowners, stakeholders and Aboriginal groups regarding Preliminary Routes A and B in Q2 2017. After considering NGTL's route selection criteria and feedback received during engagement, Preliminary Route A was chosen as the Proposed Route for the Project, requiring a total length of approximately 21.5 km of new permanent ROW and associated TWS, located within Rocky View County and the Town of Cochrane. The entire route is within the White Area of Alberta, and is on either freehold land or previously disturbed, TransCanada-leased land with no third-party access, with the exception of approximately 0.08 ha within the bed and banks of the Bow River, which are Crown. However, since the Bow River will be crossed using a trenchless crossing method, there will be no surface disturbance or access restrictions as a result of Project construction activities.

Following the selection of the Proposed Route, while no direct effects on the availability of traditional resources or current use sites or areas were predicted for the Project development area, potential effects related to the availability of traditional resources or to sites or areas of current use in proximity to the Project development area remained under assessment during Project planning. As such, NGTL continued to engage with potentially affected Aboriginal groups. In carrying out the effects assessment, NGTL determined that potential effects on the availability of traditional resources or on sites or areas of current use in proximity to the Project development area are predicted to be negligible in magnitude for both construction and operation of the Project.

9.2 IDENTIFICATION OF POTENTIALLY AFFECTED ABORIGINAL GROUPS

NGTL initially identified potentially affected Aboriginal groups based on the location of the Project within asserted traditional territories, regional boundaries and/or areas of interest. This initial identification was compiled through a combination of desktop research, TransCanada's own operating experience, including past projects in the region, existing agreements, and an established network of contacts with Aboriginal groups in the Project area.

In addition to its initial assessment, NGTL contacted the NEB on November 9, 2017, to request from the NEB, a preliminary list of potentially impacted Aboriginal groups for the Project. In this request, NGTL included information about the nature of the Project, a map of the Project and a list of potentially affected Aboriginal groups it had identified and contacted about the Project. On November 22, 2017, the NEB identified the following additional Aboriginal groups as having known or asserted traditional territory in the area which may be impacted by the Project:

- Enoch Cree Nation
- Foothills Ojibway First Nation
- Nakcowinewak Nation of Canada
- O'Chiese First Nation
- Samson Cree Nation
- Sunchild First Nation

The potentially affected Aboriginal groups engaged on the Project are provided in Table 9-1.

Table 9-1: Aboriginal Groups Identified for Engagement

Group	Name
First Nations, Treaty 6	Enoch Cree Nation (ECN)
	O'Chiese First Nation (OFN)
	Samson Cree Nation (SCN)
	Sunchild First Nation (SFN)
First Nations, Treaty 7	Blood Tribe (BT)
	Piikani Nation (PN)
	Siksika Nation (SN)
	Stoney Nakoda Nations (SNN)
	TsuuT'ina Nation (TTN)
Non-Treaty First Nations	Foothills Ojibway First Nation (FOFN)
	Nakcowinewak Nation of Canada (NNC)
Métis Organizations, Settlements, and Locals	Métis Nation of Alberta (MNA)
	Métis Nation of Alberta Region 3 (MNAR3)

9.3 SUMMARY OF ENGAGEMENT ACTIVITIES

This section provides an overview of the engagement activities carried out with each potentially affected Aboriginal group from July 5, 2017, to February 6, 2018.

Engagement with the Aboriginal groups initially included notification and provision of Project information for their review, and follow-up phone calls and emails to discuss any questions and concerns they may have about Project activities. On July 5, 2017, initial Project notification packages were provided to potentially affected Aboriginal groups identified by NGTL. Included with the packages were:

- Project introduction letter
- Project fact sheet, including Project overview map
- Project shapefiles, where available
- TransCanada brochures for Stakeholder Engagement and Aboriginal Relations
- NEB brochure *Information for Proposed Pipeline or Power Line Projects That Do Not Involve a Hearing*
- TransCanada brochure "Your Safety, Our Integrity"

On November 24, 2017, Project notification packages were provided to potentially affected Aboriginal groups identified by the NEB, except for Foothills Ojibway First Nation who was provided the Project notification package on December 7, 2017. These notification packages included a Project fact sheet and overview map depicting the Proposed Route, as well as the other information outlined above.

With the Application now filed, all potentially affected Aboriginal groups will also be notified of the Application's filing date.[1] As part of this notification, Aboriginal groups will also be informed that the NEB encourages those with additional Project-related comments or concerns to raise them to the NEB within 14 days from the date of filing of the Application.

The following notifications were also provided:

- On September 8, 2017, NGTL sent invitations to the Project Open House held in Cochrane on September 21, 2017, to BT, PN, SN, SNN, TTN, MNA and MNAR3.
- On November 2, 2017, NGTL sent a Project update advising of route selection, including a fact sheet and Project map to BT, PN, SN, SNN, TTN, MNA and MNAR3.

[1] While NGTL has not filed the Application using the NEB Online Application System (OAS), it will inform stakeholders within 72 hours of the filing date in accordance with the NEB OAS requirements.

- On January 5, 2018, NGTL emailed an invitation to all potentially affected Aboriginal groups to the Project Open House in Cochrane on held on January 18, 2018.

Where engagement has occurred in addition to the notifications listed above, summaries of these activities with the respective Aboriginal groups are provided below. These summaries also identify any questions and concerns communicated to NGTL, as well as the actions taken by, or planned to be taken by NGTL to address those issues and concerns.

Since providing the Project information package and the January 2018 Open House invitation to FOFN, NNC, OFN, and SCN, NGTL has not received a response from these communities. NGTL remains available to respond to any questions and concerns about the Project, should any arise.

9.3.1 Blood Tribe

On August 2, 2017, NGTL met with BT and confirmed BT's interest in the Project.

On November 24, 2017, BT confirmed with NGTL it had reviewed the Project as currently proposed and noted its interest in receiving updates regarding any archaeological discoveries during construction. NGTL agreed and committed to notifying BT of any archaeological resources encountered during construction. The community also stated they have no outstanding questions or concerns regarding the Project.

9.3.2 Enoch Cree Nation

On November 27, 2017, ECN confirmed its interest in continuing to receive Project information from NGTL and its interest in receiving updates regarding any archaeological discoveries during construction. NGTL agreed and committed to notifying ECN of any archaeological resources encountered during construction. The community also stated they have no outstanding questions or concerns regarding the Project.

9.3.3 Métis Nation of Alberta Region 3

On August 1, 2017, NGTL met with MNAR3 to review the Project information, and MNAR3 confirmed interest in receiving Project information and in potential economic opportunities. NGTL agreed to follow-up with a meeting prior to construction. MNAR3 confirmed that there are no Métis locals within the Project area.

NGTL met with MNAR3 on September 14, 2017, and MNAR3 confirmed that it currently has no Project-specific concerns.

On December 1, 2017, NGTL received an email from MNAR3 expressing interest in work and contract opportunities, and NGTL and MNAR3 will schedule a follow-up meeting prior to construction.

NGTL met with MNAR3 at the Open House in Cochrane on January 18, 2018, where MNAR3 expressed interest in a future discussion around work opportunities. NGTL and MNAR3 will schedule a follow-up meeting prior to construction.

NGTL remains available to respond to any questions and concerns about the Project, should any arise.

9.3.4 Piikani Nation

On August 23, 2017, NGTL met with PN to review the Project. PN expressed interest in any Crown land parcels and the proposed Bow River crossing.

On November 29, 2017, PN confirmed it has no outstanding questions or concerns regarding the Project. PN confirmed interest in receiving updates regarding any archaeological discoveries during construction. NGTL committed to notifying PN of any archaeological resources encountered during construction.

On December 15, 2017, PN re-confirmed it has no outstanding questions or concerns regarding the Project. PN and NGTL met on January 11, 2018, to further review the Project.

NGTL met with PN on January 11, 2018, to further discuss the Project and the selection of the Proposed Route. PN re-confirmed it has no outstanding questions or concerns regarding the Project.

9.3.5 Siksika Nation

On August 18, 2017, NGTL and SN met to review the Project. The community expressed an interest in the Project with a focus on the proposed Bow River crossing.

On September 14, 2017, NGTL met with SN, and SN confirmed interest in conducting further community review of the Project.

On December 8, 2017, SN confirmed it has reviewed the Project, and communicated its interest in receiving updates regarding any archaeological discoveries during construction. NGTL agreed and committed to notifying SN of any archaeological resources encountered during construction. The community also stated they have no outstanding questions or concerns regarding the Project.

9.3.6 Stoney Nakoda Nations

An introductory meeting with SNN was held on June 19, 2017, to confirm their interest in the Project and to review Preliminary Route Options A and B, with Preliminary Route B crossing Stoney 142, 143, 144, Indian Reserve for approximately 2 km.

NGTL met with SNN at the Open House in Cochrane on September 21, 2017. The community advised that it was currently reviewing the Project and advised it would be unable to meet until November 2017.

On October 16, 2017, SNN emailed NGTL to request additional Project information via their internal communication protocol document. NGTL returned the completed communication protocol document and appended the Project fact sheet on October 20, 2017, which outlined the decision to choose Preliminary Route A as the Proposed Route.

NGTL met with SNN on December 12, 2017, to review the Project and route selection, and discuss any potential field work from areas with public access. NGTL agreed and committed to notifying SNN of any archaeological resources encountered during construction.

NGTL met with SNN on January 16, 2018, to further review and discuss the Project.

NGTL has not been made aware of any outstanding Project-related questions or concerns raised during its engagement activities to date with SNN.

9.3.7 Sunchild First Nation

On December 1, 2017, SFN communicated its interest in receiving updates regarding any archaeological discoveries during construction. NGTL agreed and committed to notifying SFN of any archaeological resources encountered during construction. The community also stated they have no outstanding questions or concerns regarding the Project.

9.3.8 TsuuT'ina Nation

On August 17, 2017, NGTL met with TTN and the community confirmed its interest in the Project. NGTL and TTN met on October 13, 2017, to review the Project.

NGTL received confirmation from TTN on January 23, 2018, that TTN has assessed the Project site and has concluded that TTN has no concern regarding the Project at this time. NGTL and TTN are arranging a meeting to further discuss Project information.

NGTL has not been made aware of any outstanding Project-related questions or concerns raised during its engagement activities to date with TTN.

9.4 FUTURE ENGAGEMENT AND FOLLOW-UP

Information sharing will continue through the regulatory review process until the completion of Project construction. NGTL remains available to respond to questions or concerns about the Project.

Once the Project is in-service, responsibility for ongoing engagement with Aboriginal groups will be transitioned from the Project to operations. Regionally-based NGTL liaisons will continue to build and maintain relationships with Aboriginal groups.

As construction completion of the Project nears, the PA team will work in collaboration with the Project team to integrate these new assets into the PA Program. For more information on the PA Program, see Section 6.1.6.

10.0 ENVIRONMENTAL AND SOCIO-ECONOMIC MATTERS

This section provides a summary of the need for and scope of the effects assessment, along with the approach, findings, and conclusions of the ESA. The scope of the ESA for the Project is based on the description of the Project components provided in Sections 1, 4 and 5 of the Application.

10.1 SCOPE

At the request of NGTL, Stantec prepared the ESA for the Project. For a copy of the Environmental Interactions Table summarizing the ESA, see Appendix 10-1, and the ESA, see Appendix 10-2.

10.1.1 Need for Effects Assessment

The ESA report was prepared in accordance with the Filing Manual.

This Project is not a designated project identified in the *Regulations Designating Physical Activities* under the CEAA 2012 and is not located on federal land. Consequently, a federal environmental assessment under CEAA 2012 is not required.

In addition to regulatory approval required under section 58 of the NEB Act, NGTL will require additional provincial and local authorizations to construct and operate the Project. For discussion of these additional permits, licences and approvals see Section 1.1.3 of the ESA.

10.1.2 Scope of the Project

Based on the guidance contained in the Filing Manual, the ESA provides an assessment of potential effects associated with the physical works, undertakings and related activities for the Project, as detailed in Sections 1, 4 and 5.

The ESA includes assessment of the effects associated with Project construction activities, operations, and accidents or malfunctions. Potential effects of decommissioning or abandonment activities will be assessed in accordance with applicable regulatory requirements at the time of decommissioning or abandonment and is not considered in this assessment.

10.1.3 Scope of the Assessment

The ESA is organized into the following sections:

- **Section 1**: Introduction – provides an overview of the Project, the regulatory framework, and assessment scope.
- **Section 2**: Project Description – provides purpose and need for the Project, alternatives to the Project, a description of the Project location and current use, Project components, Project activities for construction, operations and

decommissioning or abandonment, the Project schedule and Project workforce estimates.

- **Section 3**: Consultation and Engagement – provides a summary of Project related engagement with potentially affected stakeholders including regulators, landowners and Aboriginal groups.
- **Section 4**: Assessment Methods – provides a description of the effects assessment approach, scoping of the assessment, existing conditions, interactions between the Project and valued components, assessment methods including cumulative effects assessment, and the determination of significance.
- **Section 5**: Assessment of Effects on Soil Capability
- **Section 6**: Assessment of Effects on Vegetation and Wetlands
- **Section 7**: Assessment of Effects on Wildlife and Wildlife Habitat
- **Section 8**: Assessment of Effects on Fish and Fish Habitat
- **Section 9**: Assessment of Effects on Water Quality and Quantity
- **Section 10**: Assessment of Effects on the Atmospheric Environment
- **Section 11**: Assessment of Effects on the Acoustic Environment
- **Section 12**: Assessment of Effects on Human Occupancy and Resource Use
- **Section 13**: Assessment of Effects on Traditional Land and Resource Use
- **Section 14**: Assessment of Effects on Heritage Resources
- **Section 15**: Assessment of Effects on Socio-economic Components including Employment and Economy, Infrastructure and Services, Social and Cultural Wellbeing, and Human Health
- **Section 16**: Assessment of Effects of the Environment on the Project
- **Section 17**: Accidents and Malfunctions

In addition, the following five appendices in the ESA include:

- Appendix A – EPPs
- Appendix B – Environmental Site Information Sheets for Turner Valley and Burton Creek CS
- Appendix C – Environmental Alignment Sheets for Rocky View Section
- Appendix D – Technical Data for Soil Capability
- Appendix E – Wildlife Species at Risk and Species of Management Concern
- Appendix F – Atmospheric Environment Technical Data Report
- Appendix G – Acoustic Environment Technical Data Report
- Appendix H – Post-Construction Monitoring

10.2 ASSESSMENT METHOD

Pursuant to Section A.2 of the Filing Manual, the level of detail provided in the ESA corresponds to the Project's nature and magnitude, its anticipated environmental and socio-economic effects, and the level of public interest. The approach applied a framework for assessing project-specific environmental and socio-economic effects, including accidents and malfunctions, as well as cumulative effects likely to result from the Project, in combination with other projects or activities that have been or will be carried out. For the purposes of the assessment, the term *environment* refers broadly to biophysical and socio-economic elements.

The ESA focuses on valued components (VC), which are environmental elements of particular value or interest to regulators and other parties and are identified based on the biophysical and socio-economic elements listed in Table A-1 of the Filing Manual. Project-related and cumulative environmental effects are assessed sequentially in the ESA. Potential project-related environmental effects and the mechanisms through which they act are discussed first, considering design and mitigation measures that help to reduce or avoid the effect. Residual Project-related environmental effects are characterized using specific criteria (e.g., direction, magnitude, geographic extent, duration, frequency) defined for each VC. The significance of residual Project-related environmental effects is then determined based on pre-defined criteria or thresholds. If there is an identified potential for residual environmental effect of the Project to interact cumulatively with the residual environmental effects of other projects or physical activities, these cumulative environmental effects are also assessed. The ESA analysis includes the determination of significance of any residual effects following mitigation and the significance of cumulative effects.

10.3 SELECTION OF VALUED COMPONENTS

The VCs that were selected:

- represent a broad environmental, ecological or human environment component that have the potential to be affected by the Project
- are a part of the heritage of Aboriginal peoples[1] or a part of their current use of lands for traditional purposes
- are of scientific, historical, archaeological importance
- have been identified as important issues or concerns by stakeholders, or in other effects assessments in the region

[1] As defined by the *Constitution Act, 1982.*

Based on the considerations above, VCs included in this assessment are:

- soil capability
- vegetation and wetlands
- wildlife and wildlife habitat, including species at risk
- fish and fish habitat
- water quality and quantity
- atmospheric environment, including greenhouse gas emissions
- acoustic environment
- human occupancy and resource use
- traditional land and resource use
- heritage resources
- socio-economic components related to:
    - employment and economy
    - infrastructure and services
    - human health
    - social and cultural well-being

Additionally, changes to the Project that may be caused by the environment and potential effects related to accident and malfunctions are also assessed.

10.4 POTENTIAL EFFECTS, EFFECT PATHWAYS AND MEASURABLE PARAMETERS

The assessment of each VC begins with a description of the pathways whereby specific Project activities and actions could result in an environmental effect (i.e., the effect pathways). For each VC, the Project's potential effects are identified and assessed in the context of the VC's existing conditions, as well as its biophysical or socio-economic characteristics, regulatory context, and relevant input received from the consultation process.

Once effect pathways are identified, one or more measurable parameters are selected to facilitate quantitative (where possible) and qualitative assessment of potential project residual effects and cumulative effects. Measurable parameters provide defensible and acceptable means to characterize change in a VC attributable to the Project, and contribute to the determination of the significance of those effects.

10.5 SPATIAL BOUNDARIES

Spatial boundaries for assessing Project and cumulative effects include the:

- project development area (PDA)
- local assessment area (LAA)
- regional assessment area (RAA)

10.5.1 Project Development Area

The PDA encompasses the anticipated area of physical disturbance associated with the construction and operation of the Project components.

- The PDA of the Rocky View Section is 107 hectares (ha), including the pipeline ROW and temporary workspace, and excluding the areas of trenchless crossings where no disturbance is planned
- Turner Valley CS is 7.7 ha, including portions of the existing compressor station, the area required for the unit addition and temporary workspace
- Burton Creek CS is 3.3 ha, including portions of the existing compressor station, the area required for the unit addition and temporary workspace

10.5.2 Local Assessment Area

The LAA encompasses the area in which project-related effects (direct or indirect) are predicted to occur. The LAA encompasses the PDA and is VC specific.

10.5.3 Regional Assessment Area

The RAA is the area within which potential cumulative effects – the predicted likely residual effects from the Project component in combination with those of past, present and reasonably foreseeable projects – are assessed. The RAA encompasses the PDA and the LAA and is VC specific.

10.6 TEMPORAL BOUNDARIES

Temporal boundaries identify when an environmental effect will be evaluated in relation to specific Project phases and activities. Temporal boundaries for this assessment include:

10.6.1 Construction

Construction of the unit additions at Turner Valley and Burton Creek Compressor Stations are planned to commence in April 2019 and is expected to be completed in May 2020 (14 months). Mainline pipeline construction of the Rocky View Section is planned to start in August 2019 and is expected to be completed in May 2020 (9 months).

10.6.2 Operation

The Project has an anticipated in-service date of June 2020 and is anticipated to be operated for more than 25 years.

10.7 CHARACTERIZING RESIDUAL EFFECTS

Residual effects are effects that are predicted to occur after the application of mitigation has been considered. The nature or significance of effects before mitigation are not described or quantified.

Residual effects are evaluated for each biophysical or socio-economic effect, taking into account how the proposed mitigation will avoid or reduce the effect. The direction, magnitude, geographical extent, duration, frequency and reversibility are identified for each effect.

10.7.1 Significance Definition

Consistent with the guidance of the Filing Manual, the assessment establishes a significance definition, which is used to determine the significance of residual Project effects and residual cumulative effects.

The significance definition involves establishing threshold criteria beyond which a residual effect on a VC would be considered significant. Standards include government or industry regulations or goals for physical aspects such as air quality and water quality. Thresholds reflect the limits of a condition for a measurable parameter or VC based on guidelines or regulations if available and applicable. Where thresholds are not set by guidelines or regulations, the threshold is developed using a combination of input from the consultation process, resource management objectives, scientific literature, and professional judgment. The definitions for determining the significance of residual effects are described in the individual VC sections of the ESA.

10.8 CUMULATIVE EFFECTS

In addition to assessing Project-related residual effects, section A.2.7 of the Filing Manual requires that the assessment consider cumulative environmental effects predicted to result from the Project's residual effects in combination with the residual effects of other past, present, and reasonably foreseeable future projects or physical activities.

With respect to the cumulative effects assessment, two conditions must be met to pursue an assessment of cumulative environmental effects:

- there are predicted likely residual Project effects on the VC
- the residual Project effects act cumulatively with effects of other past, present and reasonably foreseeable future projects or physical activities

Where either the first or the second of these conditions are not met, there is no expectation that the Project will contribute cumulatively to residual effects, and

further assessment is not warranted. If both of the two conditions are met, then the assessment of cumulative effects continues within the VC section following assessment of Project residual effects.

10.9 DETERMINATION OF SIGNIFICANCE

Following the guidance of the Filing Manual, the assessment evaluates the significance of residual project effects and residual cumulative effects. Residual project effects and cumulative effects are evaluated in the context of changes relative to existing conditions in the RAA.

The determination of significance involves applying the established threshold criteria (i.e., the significance definitions, Section 10.7.1) beyond which a residual effect on a VC would be considered significant.

The Project and cumulative residual effects assessments consider both positive and adverse effects. However, a significance determination is provided only for adverse effects.

If a residual adverse Project effect or residual adverse cumulative effect is determined to be significant, per the guidance of the Filing Manual, the likelihood of the significant effect is evaluated.

10.10 FINDINGS AND SIGNIFICANCE

Following implementation of planned mitigation, the ESA for the Project determined that residual environmental or socio-economic effects arising from Project construction and operation are predicted to be not significant. The Project will contribute incrementally to effects to vegetation, wetlands, wildlife and wildlife habitat, species at risk/special status and related habitat, noise, human occupancy and resource use, and infrastructure and services. Contributions to cumulative effects on these VCs are anticipated to be negligible to low, and in combination with of other past, present, or reasonably foreseeable future projects or physical activities are predicted to be not significant. Potential adverse environmental effects are expected to be mitigated effectively with appropriate environmental protection measures identified within the EPPs developed for the Project.

Potential effects of decommissioning or abandonment activities will be assessed in accordance with applicable regulatory requirements at the time of decommissioning or abandonment.

10.11 COMMITMENT

NGTL accepts the findings of the ESA and will adhere to the recommendations and mitigation measures identified in the ESA and the EPPs. The EPPs form a portion of the ESA (Appendix A).

To ensure that mitigation measures are followed, NGTL will have qualified environmental inspectors on the Project and will develop an environmental orientation program for Project personnel.

10.12 CONTINUING ENVIRONMENTAL FIELD STUDIES

On-going field surveys are proposed to support construction planning, support preparation of provincial and municipal regulatory applications, confirm that the environmental mitigation measures identified in the ESA report and EPPs (Appendix A) are appropriate, and, if required, identify additional mitigation measures for the Project-specific EPPs and Environmental Alignment Sheets (Appendix B).

NGTL will complete field studies pertaining to outstanding *Historical Resources* Act (HRA) requirements, as well as any mitigation required by Alberta Culture and Tourism (ACT) relative to the Project, prior to construction and under snow-free and unfrozen ground conditions, as specified under the HRA requirements. HRA clearance for all three Project components will be obtained prior to construction.

Additionally, before commencing construction various surveys will be conducted for the purpose of site-specific mitigation implementation as appropriate (e.g., three-lift soil delineation, weed survey, non-intrusive nesting bird surveys).

10.13 POST-CONSTRUCTION MONITORING

NGTL's post-construction monitoring activities will include an assessment of reclamation success including identification of any environmental issues and an assessment of the effectiveness of mitigation practices. PCM activities will also identify recommended corrective actions for outstanding environmental issues.

NGTL's PCM objectives focus on:

- visually inspecting the Project footprint using ground reconnaissance to capture previously unidentified environmental issues
- evaluating the natural recovery of lands disturbed during pipeline construction
- assessing the effectiveness of mitigation practices used during pipeline construction

- evaluating the recovery of ecological function of wetlands disturbed by pipeline construction
- recommending remedial measures, if warranted, to be implemented to address outstanding environmental issues in a timely manner
- develop and implement adaptive management measures, where necessary, based on monitoring results

NGTL will implement PCM activities following final clean up. By initiating activities in year one during the first full growing season after final clean up, issues identified and remedial actions taken during the first year can be assessed, and any residual outstanding issues can be managed during the subsequent year. Preliminary work will involve development of an Environmental Issues List based on a review of relevant planning, construction and environmental reports and any other documentation of potential issues encountered during construction. The Environmental Issues List will form the basis for inspection and monitoring of issues that were identified during the construction and reclamation phases of the Project.

10.14 ENVIRONMENTAL REGULATORY CONSULTATION

Consultation was initiated in June 2017, with government officials who might be involved in the regulatory reviews, approvals or construction phases of the Project. Their inputs, issues and concerns were taken into account during field assessments and in preparation of the ESA for the Project.

Consultation is planned and underway with Alberta Environment and Parks, Fish and Wildlife Branch, to address a variety of matters including:

- environmental mitigation measures for working in Key Wildlife Biodiversity Zones
- environmental mitigation measures and timing considerations for sensitive wildlife, including migratory and nesting birds

ACT has been engaged to determine the HRA requirements for the Project. HRA clearance has been received for the Turner Valley and Burton Creek CS. Conduct of an Historical Resources Impact Assessment (HRIA) for the Rocky View Section was completed under permit issued by ACT. Review of the HRIA is underway and NGTL is committed to completion of any remaining requirements or mitigation specified by ACT before Project construction.

NGTL has provided Project information and updates to ECCC, Canadian Wildlife Service, and has provided a letter summarizing the biophysical findings for the Project as they relate to federally regulated species and species at risk.

NGTL will continue to engage with these agencies regarding provincial and federal environmental management objectives.