



Trans Mountain Pipeline ULC



Trans Mountain Expansion Project

An Application Pursuant to Section 52 of the National Energy Board Act

December 2013

Volume



Project Design & Execution - Construction

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

**the *Canadian Environmental Assessment Act*, 2012,
S.C. 2012, c. 37, as amended,
and the Regulations made thereunder;**

AND IN THE MATTER OF

**an application by Trans Mountain Pipeline ULC
as General Partner of Trans Mountain Pipeline L.P.
(collectively “Trans Mountain”)
for a Certificate of Public Convenience and Necessity and
other related approvals pursuant to Part III of the *NEB Act***

**APPLICATION BY TRANS MOUNTAIN FOR APPROVAL OF
THE TRANS MOUNTAIN EXPANSION PROJECT**

December 2013

**To: The Secretary
The National Energy Board
444 — 7th Avenue SW
Calgary, AB T2P 0X8**

Trans Mountain Expansion Project

Application Pursuant to Section 52 of the *National Energy Board Act*

Guide to the Application

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Transmittal - Letter to the National Energy Board	
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Volume 4C	Project Design and Execution – Operations and Maintenance
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Section 4.0	Facilities Construction	Appendix D	Key Construction Specifications and Plans to be Developed for TMEP
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ABBREVIATIONS AND ACRONYMS

This table lists the abbreviations and acronyms used in this volume of the application.

Term	Meaning
%	per cent
AB	Alberta
ACMP	Access Control Management Plan
AUT	Automated Ultrasonic Testing
bbl/d	US petroleum barrels per day
BMP	Blasting Management Plan
BC MoTI	British Columbia Ministry of Transportation and Infrastructure
BC	British Columbia
CEP	Construction Execution Plan
CNR	Canadian National Railway
CP	cathodic protection
CPCN	Certificate of Public Convenience and Necessity
CQMP	Construction Quality Management Plan
CSA	Canadian Standards Association
CSP	Construction Safety Plan
CSRS	Canadian Spatial Reference System
DFO	Fisheries and Oceans Canada
DOAR	Deactivated and Overgrown Access Road
ETEP	Edmonton Terminal Expansion Project
ESB	Electrical Service Buildings
EPMP	Environmental Protection and Management Plan
EPP	Environmental Protection Plan
EPRP	Emergency Preparedness and Response Plan
ERP	Emergency Response Plan
ETWS	extra temporary work space
FRCP	Fire Response Contingency Plan
GIS	Geographic Information System
ha	hectare
HDD	horizontal directional drill
HSMP	Health and Safety Management Plan
HSSM	Health & Safety Standards Manual
IRP	Incident Response Plan
ILI	in-line inspection
IFR	Internal Floating Roof
JWH&S	Joint Worksite Health and Safety Committee
km	kilometre
KMC	Kinder Morgan Canada Inc.
KP	Kilometre Post
LPI	Liquid Dye Penetrant Inspection
m	metre
m ³	cubic metre
m ³ /d	cubic metres/day

Term	Meaning
MFLNR	Ministry of Forests, Lands and Natural Resource Operations
MOP	maximum operating pressure
MPI	Magnetic Particle Inspection
MUT	Manual Ultrasonic Testing
NAD	North American Datum
NDT	non-destructive testing
NEB	National Energy Board
NPS	nominal pipe size
OD	outside diameter
OPR	Onshore Pipeline Regulations
PSSP	Project Specific Safety Plan
PIP	Public Information Plan
QC	Quality Control
RAP	restricted activity period
RK	Reference kilometre
RMLBV	Remote Mainline Block Valve
RT	Radiographic Testing
SMP	Security Management Program
SRA	Security Risk Assessment
TVAU	Tank Vapour Adsorption Unit
TCP	Traffic Control Plan
TMEP	Trans Mountain Expansion Project
TMP	Traffic Management Plan
TMPL	Trans Mountain Pipeline
TMX	Trans Mountain Expansion
TRANS	Alberta Transportation
TSP	Timber Salvage Plan
Trans Mountain	Trans Mountain Pipeline ULC
TUC	Transportation and Utility Corridor
TWS	temporary work space
VFD	Variable Frequency Drive
VCU	Vapour Combustion Unit
VRU	Vapour Recovery Unit
WMT	Westridge Marine Terminal
WCC	Worker Code of Conduct
WSP	Workplace Security Plan

NEB FILING MANUAL CHECKLIST

CHAPTER 3 – COMMON INFORMATION REQUIREMENTS

Filing #	Filing Requirement	In Application? References	Not in Application? Explanation
3.1 Action Sought by Applicant			
1.	Requirements of s.15 of the Rules.	Volume 1 Section 1.1	---
3.2 Application or Project Purpose			
1.	Purpose of the proposed project.	Volume 2 Section 1.1	---
3.4 Consultation			
		Volumes 3A, 3B, 3C; Volumes 5A, 5B Section 3; Volume 8A Section 3	--
3.4.1 Principles and Goals of Consultation			
1.	The corporate policy or vision.	Volume 3A Section 1.2.1 Volume 3B Section 1.2.1	--
2.	The principles and goals of consultation for the project.	Volume 3A Section 1.2.2 Volume 3B Section 1.2.2 Volume 5A Section 3.2.1 Volume 5B Section 3.2.1	--
3.	A copy of the Aboriginal protocol and copies of policies and principles for collecting traditional use information, if available.	Volume 3B Section 1.3.5	--
3.4.2 Design of Consultation Program			
1.	The design of the consultation program and the factors that influenced the design.	Volume 3A Section 1.3 Volume 3B Section 1.3 Volume 5A Section 3.1.1, 3.2.2 Volume 5B Section 3.1.1, 3.2.2	--
3.4.3 Implementing a Consultation Program			
1.	The outcomes of the consultation program for the project.	Volume 3A Section 1.7 Volume 3B Section 1.5 Table 1.5.1 Volume 5A Section 3.1.5, 3.2.4 Volume 5B Section 3.1.5, 3.2.4	--
3.4.4 Justification for Not Undertaking a Consultation Program			
2.	The application provides justification for why the applicant has determined that a consultation program is not required for the project.	N/A	N/A
3.5 Notification of Commercial Third Parties			
1.	Confirm that third parties were notified.	Volume 2 Section 3.2.2	--
2.	Details regarding the concerns of third parties.	Volume 2 Section 3.2.2	--
3.	List the self-identified interested third parties and confirm they have been notified.	N/A	N/A
4.	If notification of third parties is considered unnecessary, an explanation to this effect.	N/A	N/A

CHAPTER 4 – SECTIONS 4.1 AND 4.2: COMMON REQUIREMENTS FOR PHYSICAL PROJECTS

Filing #	Filing Requirement	In Application? References	Not in Application? Explanation
4.1 Description of the Project			
1.	The project components, activities and related undertakings.	Volume 2 Section 2.0; Volume 4A	--
2.	The project location and criteria used to determine the route or site.	Volume 2 Section 4.0; Volume 4A	--
3.	How and when the project will be carried out.	Volume 2 Section 2.3; Volume 4B Section 2.0	--
4.	Description of any facilities, to be constructed by others, required to accommodate the proposed facilities.	N/A	N/A
5.	An estimate of the total capital costs and incremental operating costs, and changes to abandonment cost estimates.	Volume 2 Section 2.9	--
6.	The expected in-service date.	Volume 2 Section 1.1; Volume 4B Section 2.1	--
4.2 Economic Feasibility, Alternatives and Justification			
4.2.1 Economic Feasibility			
1.	Describe the economic feasibility of the project.	Volume 2 Section 3.5	--
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.	Volume 2 Section 3.0; Volume 8A Section 2.2	--
2.	Describe and justify the selection of the proposed route and site including a comparison of the options evaluated using appropriate selection criteria.	Volume 2 Section 4.0; Volume 8A Section 2.2	--
3.	Describe the rationale for the chosen design and construction methods. Where appropriate, describe any alternative designs and methods evaluated and explain why these other options were eliminated.	Volume 2 Section 4.0; Volume 8A Section 2.2	--
4.2.3 Justification			
1.	Provide a justification for the proposed project	Volume 2 Section 3.4	--

GUIDE A – A.1 ENGINEERING

Filing #	Filing Requirement	In Application? References	Not in Application? Explanation
A.1.1 Engineering Design Details			
1.	Fluid type and chemical composition.	Volume 4A Section 3.1.1	--
2.	Line pipe specifications.	Volume 4A Section 3.2.8	--
3.	Pigging facilities specifications.	Volume 4A Section 3.3.1, 3.3.2	--
4.	Compressor or pump facilities specifications.	Volume 4A Section 3.4	--
5.	Pressure regulating or metering facilities specifications.	Volume 4A Section 3.5	--
6.	Liquid tank specifications, or other commodity storage facilities.	Volume 4A Section 3.4	--
7.	New control system facilities specifications.	Volume 4A Section 3.3	--
8.	Gas processing, sulphur or LNG plant facilities specifications.	N/A	N/A
9.	Technical description of other facilities not mentioned above.	N/A	N/A
10.	Building dimensions and uses.	Volume 4A Section 3.3, 3.4, 3.5	--
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	N/A
A.1.2 Engineering Design Principles			
1.	Confirmation project activities will follow the requirements of the latest version of CSA Z662.	Volume 4A Section 2.2	--
2.	Provide a statement indicating which Annex is being used and for what purpose	Volume 4A Section 2.3	--
3.	Statement confirming compliance with OPR or PPR.	Volume 4A Section 2.1	--
4.	Listing of all primary codes and standards, including version and date of issue.	Volume 4A Section 2, Table 5.1.1	--
5.	Confirmation that the project will comply with company manuals and confirm manuals comply with OPR/PPR and codes and standards.	Volume 4A Section 2.6, Table 5.1.2	--
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 – all hydrocarbons	N/A
7.	If facility subject to conditions not addressed in CSA Z662: <ul style="list-style-type: none"> • Written statement by qualified professional engineer • Description of the designs and measures required to safeguard the pipeline 	Volume 4A Section 2.9	--
8.	If directional drilling involved: <ul style="list-style-type: none"> • Preliminary feasibility report • Description of the contingency plan 	Volume 4A Section 2.12	--
9.	If the proposed project involves the reuse of materials, provide an engineering assessment in accordance with CSA Z662 that indicates its suitability for the intended service.	Volume 4A, Section 2.7	--
10.	If new materials are involved, provide material supply chain information, in tabular format.	Volume 4A Section 2.7	
11.	If reuse of material is involved, provide an engineering assessment in accordance with CSA Z662 that indicates its suitability for the intended service.	Volume 4A, Section 2.7	--
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 or PPR.	--	Existing standards will be followed
2.	A quality assurance program if project non-routine or incorporates unique challenges due to geographical location.	--	No unique challenges
3.	If welding performed on a liquid-filled pipeline that has a carbon equivalent of 0.50% or greater and is a permanent installation: <ul style="list-style-type: none"> • Welding specifications and procedures • Results of procedure qualification tests 	--	Welding on liquid filled pipe will not be conducted

GUIDE A – A.2 ENVIRONMENTAL AND SOCIO-ECONOMIC ASSESSMENT

The following table identifies where information requested in the National Energy Board (NEB) Filing Manual Guide A – A.2 Environmental and Socio-economic Assessment checklist may be found in the various volumes of the Application for the Trans Mountain Expansion Project.

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	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>i.e.</i> , baseline information) in the area where the project is to be carried out.	Volume 5A: ESA - Biophysical • Sections 5.0 and 6.0 Volume 5B: ESA - Socio-Economic • Sections 5.0 and 6.0 Volume 5C: ESA - Biophysical Technical Reports Volume 5D: ESA - Socio-Economic Technical Reports	Volume 8A: Marine Transportation • Section 4.2 Volume 8B: Technical Reports	---
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.	Volume 5A: ESA - Biophysical • Sections 5.0 and 6.0 Volume 5B: ESA - Socio-Economic • Sections 5.0 and 6.0 Volume 5C: ESA - Biophysical Technical Reports Volume 5D: ESA - Socio-Economic Technical Reports	Volume 8A: Marine Transportation • Section 4.2 Volume 8B: Technical Reports	---
3.	Provide supporting evidence (<i>e.g.</i> , 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.	Volume 5A: ESA - Biophysical • Sections 5.0 and 6.0 Volume 5B: ESA - Socio-Economic • Sections 5.0 and 6.0 Volume 5C: ESA - Biophysical Technical Reports Volume 5D: ESA - Socio-Economic Technical Reports	Volume 8A: Marine Transportation • Section 4.2 Volume 8B: Technical Reports	---
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.	Volume 5A: ESA - Biophysical • Sections 5.0 and 6.0 Volume 5B: ESA - Socio-Economic • Sections 5.0 and 6.0 Volume 5C: ESA - Biophysical Technical Reports Volume 5D: ESA - Socio-Economic Technical Reports	Volume 8A: Marine Transportation • Section 4.2 Volume 8B: Technical Reports	---
5.	Applicants must consult with other expert federal, provincial or territorial departments and other relevant authorities on requirements for baseline information and methods.	Volume 5A: ESA - Biophysical • Sections 3.0, 5.0 and 6.0 Volume 5B: ESA - Socio-Economic • Sections 3.0, 5.0 and 6.0 Volume 5C: ESA - Biophysical Technical Reports Volume 5D: ESA - Socio-Economic Technical Reports	Volume 8A: Marine Transportation • Sections 3.0 and 4.2 Volume 8B: Technical Reports	---

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
A.2.6 Effects Assessment				
Identification and Analysis of Effects				
1.	Describe the methods used to predict the effects of the project on the biophysical and socio-economic elements, and the effects of the environment on the project (<i>i.e.</i> , changes to the Project caused by the environment).	Volume 5A: ESA - Biophysical <ul style="list-style-type: none"> • Section 7.0 Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> • Section 7.0 Volume 7: Risk Assessment and Management of Pipeline and Facility Spills <ul style="list-style-type: none"> • Sections 6.0, 7.0 and 8.0 • Technical Reports 	Volume 8A: Marine Transportation <ul style="list-style-type: none"> • Sections 4.3, 5.5 and 5.6 	---
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.	Volume 5A: ESA - Biophysical <ul style="list-style-type: none"> • Section 7.0 Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> • Section 7.0 Volume 5C: ESA - Biophysical Technical Reports <ul style="list-style-type: none"> • Section 7.0 Volume 5D: ESA - Socio-Economic Technical Reports <ul style="list-style-type: none"> • Section 7.0 Volume 7: Risk Assessment and Management of Pipeline and Facility Spills <ul style="list-style-type: none"> • Sections 6.0, 7.0 and 8.0 • Technical Reports 	Volume 8A: Marine Transportation <ul style="list-style-type: none"> • Sections 4.3, 5.6 and 5.7 Volume 8B: Technical Reports	---
Mitigation Measures for Effects				
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.	Volume 5A: ESA - Biophysical <ul style="list-style-type: none"> • Section 7.0 Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> • Section 7.0 Volume 5C: ESA - Biophysical Technical Reports <ul style="list-style-type: none"> • Section 7.0 Volume 5D: ESA - Socio-Economic Technical Reports <ul style="list-style-type: none"> • Section 7.0 Volume 6B: Pipeline Environmental Protection Plan (EPP) <ul style="list-style-type: none"> • Section 7.0 Volume 6C: Facilities EPP <ul style="list-style-type: none"> • Section 7.0 Volume 6D: Westridge Marine Terminal EPP <ul style="list-style-type: none"> • Section 7.0 Volume 6E: Environmental Alignment Sheets <ul style="list-style-type: none"> • Section 7.0 Volume 7: Risk Assessment and Management of Pipeline and Facility Spills <ul style="list-style-type: none"> • Sections 2.0, 3.0, 4.0, 6.0, 7.0, and 8.0 • Technical Reports 	Volume 8A: Marine Transportation <ul style="list-style-type: none"> • Sections 4.3, 5.1, 5.3, 5.6 and 5.7 Volume 8B: Technical Reports	---
2.	Ensure that commitments about mitigative measures will be communicated to field staff for implementation through an Environmental Protection Plan.	Volume 5A: ESA - Biophysical <ul style="list-style-type: none"> • Section 7.0 Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> • Section 7.0 Volume 6A: Environmental Compliance <ul style="list-style-type: none"> • Section 7.0 Volume 6B: Pipeline EPP <ul style="list-style-type: none"> • Section 7.0 Volume 6C: Facilities EPP <ul style="list-style-type: none"> • Section 7.0 Volume 6D: Westridge Marine Terminal EPP <ul style="list-style-type: none"> • Section 7.0 Volume 6E: Environmental Alignment Sheets <ul style="list-style-type: none"> • Section 7.0 Volume 7: Risk Assessment and Management of Pipeline and Facility Spills <ul style="list-style-type: none"> • Sections 2.0, 3.0, 4.0, 6.0, 7.0 and 8.0 	Volume 8A: Marine Transportation <ul style="list-style-type: none"> • Sections 4.3, 5.1, 5.3, 5.6 and 5.7 	---

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
3.	Describe plans and measures to address potential effects of accidents and malfunctions during construction and operation of the project.	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0 Volume 6B: Pipeline EPP Volume 6C: Facilities EPP Volume 6D: Westridge Marine Terminal EPP Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 2.0, 4.0, 6.0, 7.0 and 8.0	Volume 8A: Marine Transportation • Sections 4.3, 5.1, 5.3, 5.6 and 5.7	---
Evaluation of Significance				
1.	After taking into account any appropriate mitigation measures, identify any remaining residual effects from the project.	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0	Volume 8A: Marine Transportation • Section 4.3	---
2.	Describe the methods and criteria used to determine the significance of remaining adverse effects, including defining the point at which any particular effect on a valued component is considered "significant".	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0	Volume 8A: Marine Transportation • Section 4.3	---
3.	Evaluate significance of residual adverse environmental and socio-economic effects against the defined criteria.	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0	Volume 8A: Marine Transportation • Section 4.3	---
4.	Evaluate the likelihood of significant, residual adverse environmental and socio-economic effects occurring and substantiate the conclusions made.	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0	Volume 8A: Marine Transportation • Section 4.3	---
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 results.	Volume 5A: ESA - Biophysical • Section 8.0 Volume 5B: ESA - Socio-Economic • Section 8.0	Volume 8A: Marine Transportation • Section 4.4	---
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.	Volume 5A: ESA - Biophysical • Section 8.0 Volume 5B: ESA - Socio-Economic • Section 8.0	Volume 8A: Marine Transportation • Section 4.4	---
3.	Identify other physical works or activities that have been or will be carried out within the identified spatial and temporal boundaries for the cumulative effects assessment.	Volume 5A: ESA - Biophysical • Section 8.0 Volume 5B: ESA - Socio-Economic • Section 8.0	Volume 8A: Marine Transportation • Section 4.4	---
4.	Identify whether the effects of those physical works 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.	Volume 5A: ESA - Biophysical • Section 8.0 Volume 5B: ESA - Socio-Economic • Section 8.0	Volume 8A: Marine Transportation • Section 4.4	---

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
5.	Where other physical works or activities may affect the valued components for which residual effects from the applicant's proposed project are predicted, continue the cumulative effects assessment, as follows: <ul style="list-style-type: none"> consider the various components, phases and activities associated with the applicant's project that could interact with other physical work or activities; provide a description of the extent of the cumulative effects on valued components; and 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. 	Volume 5A: ESA - Biophysical <ul style="list-style-type: none"> Section 8.0 Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> Section 8.0 	Volume 8A: Marine Transportation <ul style="list-style-type: none"> Section 4.4 	---
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.	Volume 5A: ESA - Biophysical <ul style="list-style-type: none"> Section 8.0 Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> Section 8.0 	Volume 8A: Marine Transportation <ul style="list-style-type: none"> Section 4.4 	---
Applicant's Evaluation of Significance of Cumulative Effects				
1.	After taking into account any appropriate mitigation measures for cumulative effects, identify any remaining residual cumulative effects.	Volume 5A: ESA - Biophysical <ul style="list-style-type: none"> Section 8.0 Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> Section 8.0 	Volume 8A: Marine Transportation <ul style="list-style-type: none"> Section 4.4 	---
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".	Volume 5A: ESA - Biophysical <ul style="list-style-type: none"> Section 8.0 Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> Section 8.0 	Volume 8A: Marine Transportation <ul style="list-style-type: none"> Section 4.4 	---
3.	Evaluate the significance of adverse residual cumulative effects against the defined criteria.	Volume 5A: ESA - Biophysical <ul style="list-style-type: none"> Section 8.0 Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> Section 8.0 	Volume 8A: Marine Transportation <ul style="list-style-type: none"> Section 4.4 	---
4.	Evaluate the likelihood of significant, residual adverse cumulative environmental and socio-economic effects occurring and substantiate the conclusions made.	Volume 5A: ESA - Biophysical <ul style="list-style-type: none"> Section 8.0 Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> Section 8.0 	Volume 8A: Marine Transportation <ul style="list-style-type: none"> Section 4.4 	---
A.2.8 Inspection, Monitoring and Follow-up				
1.	Describe inspection plans to ensure compliance with biophysical and socio-economic commitments, consistent with Sections 48, 53 and 54 of the <i>NEB Onshore Pipeline Regulations (OPR)</i> .	Volume 5A: ESA - Biophysical <ul style="list-style-type: none"> Section 7.0 Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> Section 7.0 Volume 6A: Environmental Compliance Volume 6B: Pipeline EPP Volume 6C: Facilities EPP Volume 6D: Westridge Marine Terminal EPP	Volume 8A: Marine Transportation <ul style="list-style-type: none"> Section 4.3 	---

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
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 <i>NEB OPR</i> .	Volume 5A: ESA - Biophysical • Section 7.0 Volume 5B: ESA - Socio-Economic • Section 7.0 Volume 6A: Environmental Compliance Volume 6B: Pipeline EPP Volume 6C: Facilities EPP Volume 6D: Westridge Marine Terminal EPP	Volume 8A: Marine Transportation • Section 4.3	---
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.	Volume 5A: ESA - Biophysical • Sections 9.0 and 10.0 Volume 5B: ESA - Socio-Economic • Sections 9.0 and 10.0 Volume 6A: Environmental Compliance Volume 6B: Pipeline EPP (Socio-Economic Management Plan of Appendix C)	Volume 8A: Marine Transportation • Section 4.5	---
4.	For <i>Canadian Environmental Assessment (CEA) Act, 2012</i> designated projects, identify which elements and monitoring procedures would constitute follow-up under the <i>CEA Act, 2012</i> .	Volume 5A: ESA - Biophysical • Section 10.0 Volume 5B: ESA - Socio-economic • Section 10.0	N/A	---

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
Table A-1 Circumstances and Interactions Requiring Detailed Biophysical and Socio-Economic Information				
	Physical and meteorological environment	Volume 5A: ESA - Biophysical • Sections 5.0, 6.0 and 7.0	N/A	---
	Soil and soil productivity	Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Soil Assessment Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Section 5.3, 6.0 and 7.0	N/A	---
	Water quality and quantity (onshore and marine)	Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Groundwater Technical Report • Fisheries (Alberta) Technical Report • Fisheries (British Columbia) Technical Report • Wetland Evaluation Technical Report • Marine Sediment and Water Quality – Westridge Marine Terminal Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Section 7.0 • Quality Ecological Risk Assessment of Pipeline Spills Technical Report	Volume 8A: Marine Transportation • Sections 4.2, 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports • Ecological Risk Assessment of Marine Transportation Spills Technical Report	---
	Air emissions (onshore and marine)	Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Marine Air Quality and Greenhouse Gas – Marine Transportation Technical Report • Air Quality and Greenhouse Gas Emissions Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Section 7.0	Volume 8A: Marine Transportation • Sections 4.2, 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports • Marine Air Quality and Greenhouse Gas Emissions	---
	Greenhouse gas emissions (onshore and marine)	Volume 5A: ESA - Biophysical • Sections 5.0, 6.0 and 7.0 Volume 5C: ESA - Biophysical Technical Reports • Air Quality and Greenhouse Gas Emissions Technical Report	Volume 8A: Marine Transportation • Sections 4.2 and 4.3 Volume 8B: Technical Reports • Marine Air Quality and Greenhouse Gas Emissions	---
	Acoustic environment (onshore and marine)	Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0, and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Acoustic Environment Technical Report	Volume 8A: Marine Transportation • Sections 4.2, 4.3 and 4.4 Volume 8B: Technical Reports • Marine Noise (Atmospheric)	---
	Fish and fish habitat (onshore and marine), including any fish habitat compensation required	Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Fisheries (Alberta) Technical Report • Fisheries (British Columbia) Technical Report • Marine Resources - Westridge Marine Terminal Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 6.0, 7.0 and 8.0 • Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report	Volume 8A: Marine Transportation • Sections 4.2, 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports • Marine Resources – Marine Transportation Technical Report • Ecological Risk Assessment of Westridge Marine Terminal Spills	---

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
	Wetlands	Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Wetland Evaluation Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 7.0 and 8.0 • Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report	N/A	---
	Vegetation	Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Vegetation Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 7.0 and 8.0 • Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report	N/A	---
	Wildlife and wildlife habitat (onshore and marine)	Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Wildlife and Wildlife Habitat Technical Report • Wildlife Modeling and Species Accounts Report • Marine Resources –Westridge Marine Terminal Technical Report • Marine Birds – Westridge Marine Terminal Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 6.0, 7.0 and 8.0 • Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report	Volume 8A: Marine Transportation • Sections 4.2, 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports • Marine Resources – Marine Transportation Technical Report • Marine Birds – Marine Transportation Technical Report • Ecological Risk Assessment of Westridge Marine Terminal Spills	---
	Species at Risk or Species of Special Status and related habitat (onshore and marine)	Volume 5A: ESA - Biophysical • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5C: ESA - Biophysical Technical Reports • Fisheries (Alberta) Technical Report • Fisheries (British Columbia) Technical Report • Vegetation Technical Report • Wildlife and Wildlife Habitat Technical Report • Wildlife Modeling and Species Accounts Report • Marine Resources –Westridge Marine Terminal Technical Report • Marine Birds – Westridge Marine Terminal Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 6.0, 7.0 and 8.0 • Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report	Volume 8A: Marine Transportation • Sections 4.2, 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports • Marine Resources – Marine Transportation Technical Report • Marine Birds – Marine Transportation Technical Report • Marine Transportation Spills Ecological Risk Assessment Technical Report	---

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
	Human occupancy and resource use (onshore and marine)	Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5D: ESA - Socio-Economic Technical Reports <ul style="list-style-type: none"> • Socio-Economic Technical Report • Managed Forest Areas Technical Report • Agricultural Assessment Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills <ul style="list-style-type: none"> • Sections 6.0, 7.0 and 8.0 	Volume 8A: Marine Transportation <ul style="list-style-type: none"> • Sections 4.2, 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports <ul style="list-style-type: none"> • Marine Commercial, Recreational and Tourism Use – Marine Transportation Technical Report 	---
	Heritage resources	Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> • Sections 5.0, 6.0 and 7.0 Volume 7: Risk Assessment and Management of Pipeline and Facility Spills <ul style="list-style-type: none"> • Section 6.3.3 	N/A	---
	Navigation and navigation safety	Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> • Sections 5.0, 6.0 and 7.0 Volume 5D: ESA - Socio-Economic Technical Reports <ul style="list-style-type: none"> • Socio-Economic Technical Report 	Volume 8A: Marine Transportation <ul style="list-style-type: none"> • Section 5.2 	---
	Traditional land and resource use	Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5D: ESA - Socio-Economic Technical Reports <ul style="list-style-type: none"> • Traditional Land and Resource Use Report • Pipeline and Facilities Human Health Risk Assessment Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills <ul style="list-style-type: none"> • Sections 6.0, 7.0 and 8.0 • Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report 	Volume 8A: Marine Transportation <ul style="list-style-type: none"> • Sections 4.2, 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports <ul style="list-style-type: none"> • Traditional Marine Use Report for Marine Transportation • Marine Transportation Human Health Risk Assessment Technical Report 	---
	Social and cultural well-being	Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5D: ESA - Socio-Economic Technical Reports <ul style="list-style-type: none"> • Socio-Economic Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills <ul style="list-style-type: none"> • Sections 6.0, 7.0 and 8.0 	N/A	---
	Human health and aesthetics	Volume 5B: ESA - Socio-Economic <ul style="list-style-type: none"> • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5D: ESA - Socio-Economic Technical Reports <ul style="list-style-type: none"> • Socio-Economic Technical Report • Community Health Technical Report • Viewshed Modelling Analysis Technical Report • Pipeline and Facilities Human Health Risk Assessment Technical Report Volume 7 Risk Assessment and Management of Pipeline and Facility Spills <ul style="list-style-type: none"> • Sections 6.0, 7.0 and 8.0 • Qualitative Ecological Risk Assessment of Pipeline Spills Technical Report 	Volume 7: Risk Assessment and Management of Pipeline and Facility Spills <ul style="list-style-type: none"> • Qualitative Human Health Risk Assessment of Westridge Marine Terminal Technical Report Volume 8A: Marine Transportation <ul style="list-style-type: none"> • Sections 4.2, 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports <ul style="list-style-type: none"> • Marine Transportation Human Health Risk Assessment Technical Report • Marine Transportation Spills Human Health Risk Assessment Technical Report 	---

Filing #	Filing Requirement	In Application? References	Applicable Marine Transportation Elements	Not in Application? Explanation
	Infrastructure and services	Volume 5B: ESA - Socio-Economic • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5D: ESA - Socio-Economic Technical Reports • Socio-Economic Technical Report • Community Health Technical Report Volume 7: Risk Assessment and Management of Pipeline and Facility Spills • Sections 6.0, 7.0 and 8.0	Volume 8A: Marine Transportation • Sections 4.2, 4.3, 4.4, 5.6 and 5.7 Volume 8B: Technical Reports • Marine Commercial, Recreational and Tourism Use – Marine Transportation Technical Report	---
	Employment and economy	Volume 5B: ESA - Socio-Economic • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5D: ESA - Socio-Economic Technical Reports • Socio-Economic Technical Report • Worker Expenditures Analysis Technical Report	N/A	---

GUIDE A – A.3 ECONOMICS

Filing #	Filing Requirement	In Application? References	Not in Application? Explanation
A.3.1 Supply			
1.	A description of each commodity.	Volume 2 Section 3.1.1	--
2.	A discussion of all potential supply sources.	Volume 2 Section 3.3.2	--
3.	Forecast of productive capacity over the economic life of the facility.	Volume 2 Sections 3.3.1, 3.4.1	
4.	For pipelines with contracted capacity, a discussion of the contractual arrangements underpinning supply.	Volume 2 Section 3.3.2	--
A.3.2 Transportation Matters			
Pipeline Capacity			
1.	In the case of expansion provide: <ul style="list-style-type: none"> • Pipeline capacity before and after and size of increment • Justification that size of expansion is appropriate 	Volume 2 Sections 1.1, 2.1, 3.5	--
2.	In case of new pipeline, justification that size of expansion is appropriate given available supply.	N/A – expansion	N/A
Throughput			
1.	For pipelines with contracted capacity, information on contractual arrangements.	Volume 2 Section 3.2.1	--
2.	For non-contract carrier pipelines, forecast of annual throughput volumes by commodity type, receipt location and delivery destination over facility life.	N/A	N/A
3.	If project results in an increase in throughput: <ul style="list-style-type: none"> • theoretical and sustainable capabilities of the existing and proposed facilities versus the forecasted requirements • flow formulae and flow calculations used to determine the capabilities of the proposed facilities and the underlying assumptions and parameters 	Volume 2 Section 3.1	--
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	N/A
A.3.3 Markets			
1.	Provide an analysis of the market in which each commodity is expected to be used or consumed.	Volume 2 Section 3.4.2	--
2.	Provide a discussion of the physical capability of upstream and downstream facilities to accept the incremental volumes that would be received and delivered.	Volume 2 Section 3.4.2	--
A.3.4 Financing			
1.	Evidence that the applicant has the ability to finance the proposed facilities.	Volume 2 Section 3.2.2	--
2.	Estimated toll impact for the first full year that facilities are expected to be in service.	Volume 2 Section 3.2.1	--
3.	Confirmation that shippers have been apprised of the project and toll impact, their concerns and plans to address them.	Volume 2 Section 3.2.1	--
4.	Additional toll details for applications with significant toll impacts.	Volume 2 Section 3.2.1	
A.3.5 Non-NEB Regulatory Approvals			
1.	Confirm that all non-NEB regulatory approvals required to allow the applicant to meet its construction schedule, planned in-service date and to allow the facilities to be used and useful are or will be in place.	Volume 2 Section 1.5	--
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.	Volume 2 Section 1.5	--

GUIDE A – A.4 LANDS INFORMATION

Filing #	Filing Requirement	In Application? References	Not in Application? Explanation
A.4.1 Land Areas			
1.	<ul style="list-style-type: none"> • Width of right-of-way and locations of any changes to width • Locations and dimensions of known temporary work space and drawings of typical dimensions • Locations and dimensions of any new lands for facilities 	Volume 2 Section 5.2	--
A.4.2 Land Rights			
1.	The type of lands rights proposed to be acquired for the project.	Volume 2 Section 5.3	--
2.	The relative proportions of land ownership along the route of the project.	Volume 2 Section 5.3.2	--
3.	Any existing land rights that will be required for the project.	Volume 2 Section 5.4	--
A.4.3 Lands Acquisition Process			
1.	The process for acquiring lands.	Volume 2 Section 5.4.1, 5.4.2	--
2.	The timing of acquisition and current status.	Volume 2 Section 5.4.3	--
3.	The status of service of section 87(1) notices.	Volume 2 Section 5.4.4	--
A.4.4 Land Acquisition Agreements			
1.	A sample copy of each form of agreement proposed to be used pursuant to section 86(2) of the NEB Act.	Volume 2 Section 5.4.2	--
2.	A sample copy of any proposed fee simple, work space, access or other land agreement.	Volume 2 Section 5.5.2	--
A.4.5 Section 87 Notices			
1.	A sample copy of the notice proposed to be served on all landowners pursuant to section 87(1) of the NEB Act.	Volume 2 Section 5.4.4, Appendix D	--
2.	Confirmation that all notices include a copy of Pipeline Regulation in Canada: A Guide for Landowners and the Public.	Volume 2 Section 5.4.4	--
A.4.6 Section 58 Application to Address a Complaint			
1.	The details of the complaint and describe how the proposed work will address the complaint.	N/A	N/A

CONCORDANCE TABLE WITH THE CEA ACT, 2012

CEA Act, 2012 Requirement	Section in CEA Act, 2012	Application Volume and Section
The environmental effects of the designated project, including:		
the environmental effects of malfunctions or accidents that may occur in connection with the designated project;	s.19.1(a)	Volume 5A ESA - Biophysical: <ul style="list-style-type: none"> • Section 7.0 Volume 5B ESA - Socio-economic: <ul style="list-style-type: none"> • Section 7.0 Volume 7 Risk Assessment and Management of Pipeline and Facility Spills Volume 8A Marine Transportation: <ul style="list-style-type: none"> • Sections 4.3 and 5.0
any cumulative environmental effects that are likely to result from the designated project in combination with other physical activities that have been or will be carried out;	s.19.1(a)	Volume 5A ESA - Biophysical: <ul style="list-style-type: none"> • Section 8.0 Volume 5B ESA - Socio-economic: <ul style="list-style-type: none"> • Section 8.0 Volume 8A Marine Transportation: <ul style="list-style-type: none"> • Section 4.4
the significance of the effects referred to in paragraph (a);	s.19.1(b)	Volume 5A ESA - Biophysical: <ul style="list-style-type: none"> • Sections 7.0 and 8.0 Volume 5B ESA - Socio-economic: <ul style="list-style-type: none"> • Sections 7.0 and 8.0 Volume 8A Marine Transportation: <ul style="list-style-type: none"> • Sections 4.3 and 4.4
comments from the public – or, with respect to a designated project that requires that a certificate be issued in accordance with an order made under section 54 of the <i>National Energy Board Act</i> , any interested party – that are received in accordance with this <i>act</i> ;	s.19.1(c)	Volume 3A Public Consultation Volume 3B Aboriginal Engagement Volume 3C Landowner Relations Volume 5A ESA - Biophysical: <ul style="list-style-type: none"> • Section 3.0 Volume 5B ESA - Socio-economic: <ul style="list-style-type: none"> • Section 3.0 Volume 8A Marine Transportation: <ul style="list-style-type: none"> • Section 3.0
mitigation measures that are technically and economically feasible and that would mitigate any significant adverse environmental effects of the designated project;	s.19.1(d)	Volume 5A ESA - Biophysical: <ul style="list-style-type: none"> • Sections 7.0 and 8.0 Volume 5B ESA - Socio-economic: <ul style="list-style-type: none"> • Sections 7.0 and 8.0 Volume 5C ESA – Biophysical Technical Reports Volume 5D ESA - Socio-economic Technical Reports Volume 6B Pipeline Environmental Protection Plan Volume 6C Facilities Environmental Protection Plan Volume 6D Westridge Marine Terminal Environmental Protection Plan Volume 6E Environmental Alignment Sheets Volume 8A Marine Transportation: <ul style="list-style-type: none"> • Sections 4.3, 4.4 and 5.0 Volume 8B Technical Reports
the requirements of the follow-up program in respect of the designated project;	s.19.1(e)	Volume 5A ESA - Biophysical: <ul style="list-style-type: none"> • Section 10.0 Volume 5B ESA - Socio-economic: <ul style="list-style-type: none"> • Section 10.0
the purpose of the designated project;	s.19.1(f)	Volume 5A ESA - Biophysical: <ul style="list-style-type: none"> • Section 2.0 Volume 5B ESA - Socio-economic: <ul style="list-style-type: none"> • Section 2.0 Volume 8A Marine Transportation: <ul style="list-style-type: none"> • Section 1.1

CONCORDANCE TABLE WITH THE CEA ACT, 2012

<i>CEA Act, 2012</i> Requirement	Section in <i>CEA Act, 2012</i>	Application Volume and Section
in a province other than the one in which the <i>act</i> or thing is done or where the physical activity, the designated project or the project is being carried out, or	s.5(1)(b)(ii)	N/A No changes are anticipated in provinces other than Alberta and BC in relation to the ESA.
outside Canada.	s.5(1)(b)(iii)	Volume 8A Marine Transportation: • Sections 4.3, 4.4 and 5.0
Subsection 5(1) of the <i>CEA Act, 2012</i> defines environmental effects as (c) with respect to aboriginal peoples, an effect occurring in Canada of any change that may be caused to the environment on:		
health and socio-economic conditions;	s.5(1)(c)(i)	Volume 5B ESA - Socio-economic: • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5D ESA - Socio-economic Technical Reports Volume 8A Marine Transportation: • Sections 4.3 and 4.4 Volume 8B Technical Reports
physical and cultural heritage;	s.5(1)(c)(ii)	Volume 5B ESA - Socio-economic: • Sections 5.0, 6.0 and 7.0
the current use of lands and resources for traditional purposes; or	s.5(1)(c)(iii)	Volume 5B ESA - Socio-economic: • Sections 5.0, 6.0, 7.0 and 8.0 Volume 5D ESA - Socio-economic Technical Reports Volume 8A Marine Transportation: • Sections 4.3 and 4.4 Volume 8B Technical Reports
any structure, site or thing that is of historical, archaeological, paleontological or architectural significance.	s.5(1)(c)(iv)	Volume 5B ESA - Socio-economic: • Sections 5.0, 6.0 and 7.0

1.0 INTRODUCTION

1.1 Project Overview

Trans Mountain Pipeline ULC (Trans Mountain) is a Canadian corporation with its head office located in Calgary, Alberta. Trans Mountain is a general partner of Trans Mountain Pipeline L.P., which is operated by Kinder Morgan Canada Inc. (KMC), and is fully owned by Kinder Morgan Energy Partners, L.P. Trans Mountain is the holder of the National Energy Board (NEB) certificates for the Trans Mountain pipeline system (TMPL system).

The TMPL system commenced operations 60 years ago and now transports a range of crude oil and petroleum products from Western Canada to locations in central and southwestern British Columbia (BC), Washington State and offshore. The TMPL system currently supplies much of the crude oil and refined products used in BC. The TMPL system is operated and maintained by staff located at Trans Mountain's regional and local offices in Alberta (Edmonton, Edson, and Jasper) and BC (Clearwater, Kamloops, Hope, Abbotsford, and Burnaby).

The TMPL system has an operating capacity of approximately 47,690 m³/d (300,000 barrels per day [bbl/d]) using 23 active pump stations and 40 petroleum storage tanks. The expansion will increase the capacity to 141,500 m³/d (890,000 bbl/d).

The proposed expansion will comprise the following:

- Pipeline segments that complete a twinning (or "looping") of the pipeline in Alberta and BC with about 987 km of new buried pipeline.
- New and modified facilities, including pump stations and tanks.
- Three new berths at the Westridge Marine Terminal in Burnaby, BC, each capable of handling Aframax class vessels.

The expansion has been developed in response to requests for service from Western Canadian oil producers and West Coast refiners for increased pipeline capacity in support of growing oil production and access to growing West Coast and offshore markets. NEB decision RH-001-2012 reinforces market support for the expansion and provides Trans Mountain the necessary economic conditions to proceed with design, consultation, and regulatory applications.

Application is being made pursuant to Section 52 of the *National Energy Board Act (NEB Act)* for the proposed Trans Mountain Expansion Project (referred to as "TMEP" or "the Project"). The NEB will undertake a detailed review and hold a Public Hearing to determine if it is in the public interest to recommend a Certificate of Public Convenience and Necessity (CPCN) for construction and operation of the Project. Subject to the outcome of the NEB Hearing process, Trans Mountain plans to begin construction in 2015/2016 and go into service in 2017.

Trans Mountain has embarked on an extensive program to engage Aboriginal communities and to consult with landowners, government agencies (e.g., regulators and municipalities), stakeholders, and the general public. Information on the Project is also available at www.transmountain.com.

1.2 Purpose of Volume 4B

This document is part of the Application to the NEB by Trans Mountain to be granted, under Section 52 of the *NEB Act*, a CPCN for the TMEP so that Trans Mountain can proceed with the detailed engineering design and construction of the TMEP.

Volume 4B provides an overview of the construction scope, execution strategy, resources, and schedule for:

- the mainline pipeline segments:
 - the new segments (in Line 2);
 - the segments to be reactivated (in Line 1); and
- the associated facilities:
 - the pump stations;
 - Edmonton, Burnaby, Sumas, and Westridge Marine Terminals; and
 - other miscellaneous facilities.

This volume includes all information required by the Filing Manual (NEB 2013) as illustrated in the preceding concordance table, page 4B-xx.

2.0 GENERAL

Section 2.0 provides an overview of the TMEP Master Project Schedule. Pipeline construction and facilities construction are described in Sections 3.0 and 4.0. Some of the planning elements that are common to both are presented here to avoid repetition.

2.1 Master Project Schedule

The Master Project Schedule (the Schedule; Figure 2.1.1) is intended to provide an overall view of the timing and duration of all of the classes and sub-classes of activities that will be required to complete the TMEP in order to set the construction activities in the broader context. Some of the construction activity classes and sub-classes are expanded upon in more detail in Sections 3.0 and 4.0.

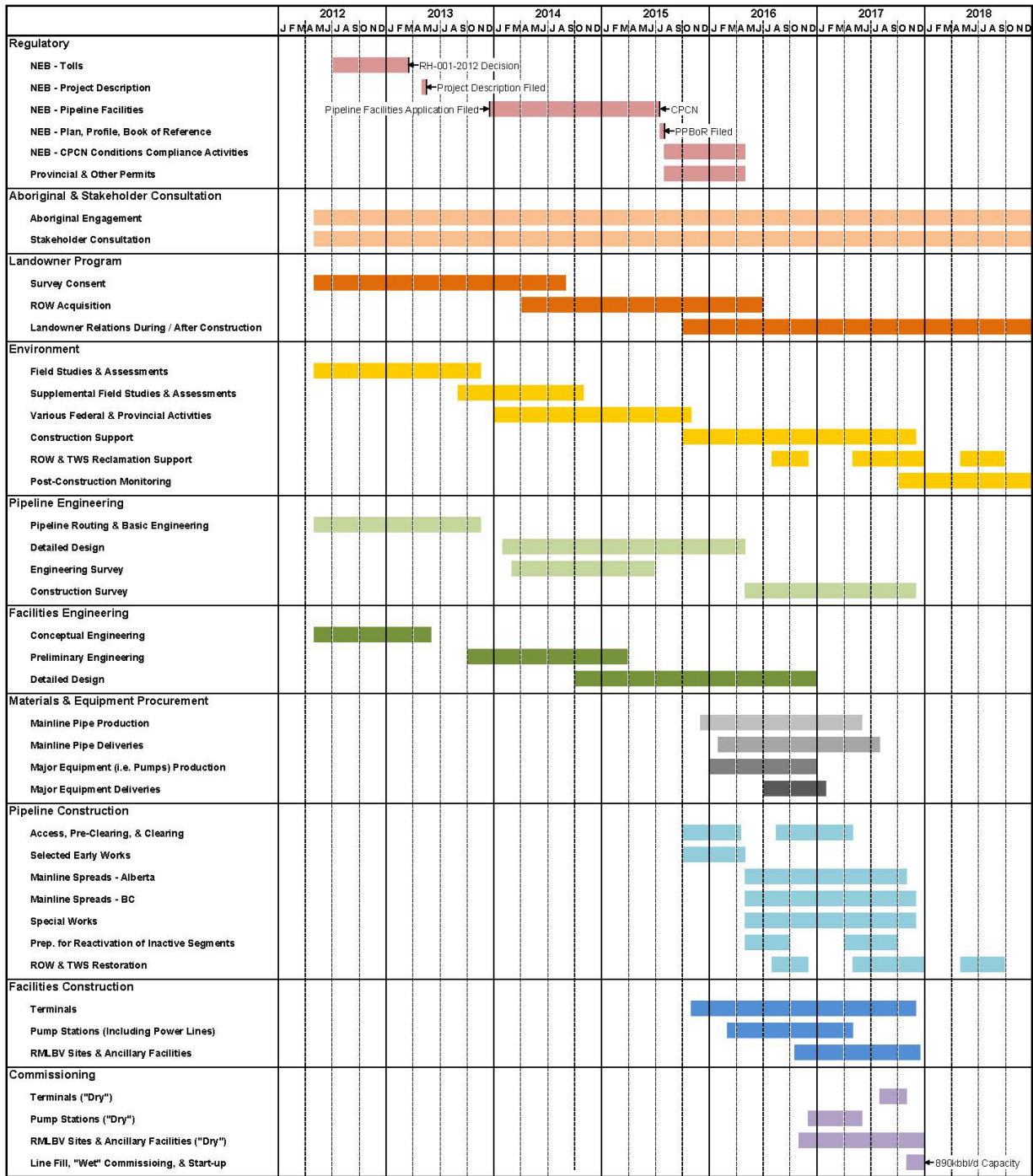


Figure 2.1.1 Master Project Schedule

Construction is scheduled to begin in October 2015, with access, clearing, and other selected early works both on the pipeline rights-of-way and at the terminal sites (Table 2.1.1). The peak period of construction will last from spring 2016 through to mid fall 2017. Construction will be generally continuous through the winter of 2016/2017, although construction on some pipeline segments will be suspended during this time due to anticipated poor weather conditions and heavy snow pack, which will make construction access and/or construction impractical or inefficient. All pipeline segments and most facilities elements will be substantially complete by October 2017. Line fill is expected to begin in November 2017 and full capacity is expected by the end of December 2017. Some terminal elements (*i.e.*, tanks) may be completed in 2018. Right-of-way restoration will begin in 2016 in some areas and will continue through to early fall of 2018.

TABLE 2.1.1

CONSTRUCTION PHASE KEY MILESTONE DATES

Activity	Key Milestones
Construction begins	October 2015
Construction is completed for all pipeline segments and most facilities elements	November 2017
Line fill begins	November 2017
Expanded system service begins	December 2017
Right-of-way restoration is completed	September 2018

The Schedule indicates reasonable start and finish dates and sequencing for all activities based on previous project experiences, established pipeline industry and construction industry practices, and various opportunities and constraints, both internally and externally influenced. However, as with all schedules, there is uncertainty about the duration of most construction activities due to the timing of the receipt of various approvals, weather conditions, which may affect productivity, other pipeline projects, which may affect resource availability, and other factors that are not in the direct control of the TMEP management team. In addition, many activities have close execution links with others in predecessor/successor relationships. Delay or advancement of a predecessor activity may result in the delay or possible advancement of one or more successor activities. A risk analysis will be undertaken during the detailed engineering and design phase to identify the need for adjustments to start dates, sequencing of activities, and the application of resources.

The ability to execute the schedule shown and have the expanded pipeline system in service by the end of December 2017 is highly dependent on the granting of the CPCN by mid-July 2015. The spring/summer/fall 2016 window must be fully utilized for pipeline construction given the very large scope of the work and the expected limitations on the availability of resources. Inability to use the full window is likely to delay the in-service date until late 2018. In order for the window to be fully utilized, the majority of clearing must be completed prior to the start of the spring 2016 migratory bird window and sufficient pipe must be stockpiled. These activities are, in turn, dependent on the acquisition of temporary work spaces and the creation of temporary accesses. These activities (as well as the mainline construction activities) are dependent on the receipt of provincial and local authorizations and permits. The durations and consecutive nature of these activities places them and the granting of the CPCN on the critical path. In addition, the procurement of long lead items, such as mainline pipe and major equipment (*i.e.*, pumps), which will have production release to first delivery durations of six months or more, and major contracts such as mainline pipeline construction, terminals heavy civil works, marine piling, and

tank construction, which can have award to mobilization durations of six months or more also place the granting of the CPCN on the critical path.

2.2 Resources

Labour and service requirements, and their associated influence on communities and infrastructure will occur during construction of the pipeline, pump stations, and terminals. Activities will proceed rapidly during the construction period, with peak employment for personnel and services occurring during the summer and winter months.

Table 7.1.1 in Appendix A summarizes the estimated numbers of construction personnel required to construct major TMEP components. Table 7.1.2 in Appendix A provides a breakdown of construction trades and skill sets, ranging from entry-level labourers to highly skilled trades.

2.3 Logistics

A combination of existing and project-specific new infrastructure will be required for the construction and reactivation of the pipelines and facilities. Construction logistics will involve moving equipment, personnel, materials, and supplies to locations along the pipeline right-of-way, to each pump station location, and to the terminals. Equipment, materials, camp facilities, water, food, fuel, and other project-related supplies will be transported from major distribution centres by rail or by truck using existing infrastructure.

Pipe will be primarily transported by rail to sidings near the pipeline corridor and then loaded onto trucks for delivery to stockpile sites that will be located as close as possible to the pipeline right-of-way. After commencement of right-of-way grading, the pipe will be transported by truck from stockpile sites to the right-of-way.

2.4 Infrastructure

Local existing commercial accommodations will house the workforces to the extent practical for the construction of the pipeline, pump stations, and terminals. Temporary construction camps will be deployed to house workers where local accommodation will not meet the need.

Preliminary plans currently recognize the possible need for three pipeline construction camps at the locations shown in Table 7.1.3 in Appendix A. Each construction camp will be approximately 3 to 5 ha in size and will be accommodating anywhere from 500 to 800 personnel. The pipeline spreads that require a construction camp are identified in Section 3.4.1.

The construction camps will be designed to provide living quarters, dining, and recreational facilities, and it is likely that construction site office, material and equipment storage, and maintenance areas will be located adjacently. Existing developed or pre-cleared areas will be selected for the camps where practical. Where commercial power is not readily available, diesel generators will provide the power for the camps. Water will be withdrawn as permitted from nearby sources or potable water will be brought in by truck. Liquid and solid waste treatment will be handled in accordance with local regulations, either on-site or hauled to an approved treatment facility.

Access to the pipeline right-of-way and facility sites will make maximum use of existing roads. Road upgrading and new access road construction will be needed in remote areas as will the use of shooflies to bypass steeper slopes to assure safety of personnel for pipeline construction activities and work crew transportation.

Access across watercourses will be mainly by temporary crossing structures, which will be constructed to meet applicable regulations and guidelines. Existing bridges across watercourses will be used where practical.

Preliminary pipe stockpile locations are shown in Table 7.1.4 in Appendix A and were selected based on their close proximity to rail sidings and pipeline right-of-way. Some may also be used as construction staging areas. Potential borrow pit locations will be selected during the detailed engineering and design phase when material quantities by location have been defined.

2.5 Traffic

The proposed pipeline corridor has about 100 km of its length within 30 m of highways, roads, and right-of-way boundaries in BC. Various physical restrictions such as steep side slopes, rivers, railways, and pipelines, other than the existing TMPL in some cases, will require that the Line 2 pipeline parallels roads within highway rights-of-way. In addition, there will be a significant number of road crossings, as listed in Table 5.1.14 in Appendix D of Volume 4A, and the pump stations and terminals will be located adjacent to major roads.

2.5.1 Traffic and Access Control Management Plans

To mitigate and manage impacts to the movement of traffic and access, a Traffic Management Plan (TMP) and an Access Control Management Plan (ACMP) that complies with BC Ministry of Transportation and Infrastructure (BC MoTI) and Alberta Ministry of Transportation (TRANS) guidelines, will be developed during the detailed engineering and design phase.

These management plans will address four key areas:

- the requirements of contractors to develop and implement detailed Traffic Control Plans (TCPs) for each construction spread;
- the requirements for safe use, construction and reclamation, as applicable, of access roads (Tables 7.1.6 to 7.1.10 in Appendix A);
- the development of a public information plan (PIP) when lane closures are involved in consultation with the BC MoTI, Alberta TRANS, and relevant municipalities; and
- the development of an incident response plan (IRP) when lane closures are involved in consultation with the BC MoTI, Alberta TRANS, and relevant municipalities.

2.5.2 Traffic Control Plans

Traffic control plans will be developed to ensure worker and public safety during construction. The TCPs will meet the requirements of BC MoTI and Alberta TRANS and other municipalities affected. TCPs will address the specific elements of the work, including location, signage, use of traffic control personnel, and other restrictions imposed by the appropriate regulatory authorities.

The TCPs will also deal with traffic control requirements that will be employed at all provincial primary and secondary highway crossing locations. In addition to the requirements of this plan, the pipeline construction contractor(s) will be required to meet with affected municipalities to ensure traffic control at municipal road crossings will be in accordance with their requirements

and industry-accepted safe practices (Section 5.2.4). Drawings of anticipated traffic control requirements, including road uses, road closures, detours, or the installation of temporary accesses (*i.e.*, new off-ramps), or equivalent rights-of-way, will be submitted to the appropriate provincial ministry sufficient in advance of their implementation to allow for permitting.

Traffic Control Plans will be the responsibility of the Prime Contractors and will be submitted to Trans Mountain in accompaniment with valid permits, at least 30 days prior to the start of construction.

3.0 PIPELINE CONSTRUCTION

3.1 Contractor's Construction Quality Management Program

The Prime Contractor for each mainline pipeline spread or pipeline facility will develop and implement a Construction Quality Management Plan (CQMP), which ensures that quality assurance and quality control is provided and maintained by the contractor during the performance of the work. The contractors' CQMPs are subject to the approval of Trans Mountain.

Guidelines for the development of the contractors' CQMP are provided in Section 2.7.3 of Volume 4A.

3.2 Construction Schedule

Figure 3.2.1 provides a summary level view of the preliminary pipeline construction schedule.

Construction of the TMEP Line 2 pipeline segments is scheduled for an approximately 24-month period to achieve the planned in-service date of late-Q4, 2017. Preliminary plans provide for the pipeline to be constructed using seven construction spreads, ranging from approximately 34.2 to 290.4 km in length. It is anticipated that all seven spreads will be constructed concurrently during the following consecutive construction seasons: summer 2016, winter 2016/2017 and summer 2017. The trenchless crossing of the Fraser River will be constructed during the summer of 2016. Early work activities such as clearing and access road construction will begin as soon as possible after the receipt of the CPCN. It is important that approvals and permits are received for early works and select clearing to proceed as proposed. Delays in obtaining approvals will result in the migratory bird restricted activity period (RAP) in 2016 being an impediment to commencing pipeline installation in May 2016 and could result in significant project delays.

The proposed schedule for the activities associated with reactivation is provided on Figure 3.2.2. Preparation for the in-line inspection (ILI) will take place in Q2 and Q3 2016 and the ILI will take place in Q3 2016. The excavation and repair program will take place in Q2 and Q3 2017 and the hydrostatic testing program will take place in Q3 2017. The schedule is subject to change after further detailed planning.

Pipeline Construction Schedule	2015												2016												2017											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Early Works																																				
1 Prepare pipe stockpile sites													[Orange bar: Sep 2015 - Mar 2016]																							
2 Upgrade & Develop Access Roads													[Orange bar: Sep 2015 - Mar 2016]																							
3 Prepare Sites for Offices & Camps													[Orange bar: Feb 2016 - Apr 2016]																							
4 Clearing in Advance of Migratory Bird RAP													[Green bar: Feb 2016 - Mar 2016]																							
Mainline Spreads*																																				
5 Clearing Outside Migratory Bird RAP													[Green bar: Aug 2016 - Dec 2016]																							
6 Spread A1 - RK 0 to 49													[Blue bar: Feb 2016 - Dec 2016]																							
7 Spread A2 - RK 49 to 339													[Blue bar: Apr 2016 - Dec 2016]																							
8 Spread BC1 - RK 489 to 769													[Blue bar: Feb 2016 - Dec 2016]																							
9 Spread BC2 - RK 812 to 1018													[Blue bar: Feb 2016 - Dec 2016]																							
10 Spread BC3 - RK 1018 to 1078													[Blue bar: Feb 2016 - Jun 2016]												[Blue bar: Aug 2016 - Dec 2016]											
11 Spread BC4 - RK 1078 to 1148													[Blue bar: Feb 2016 - Jun 2016]												[Blue bar: Aug 2016 - Dec 2016]											
12 Spread BC5 - RK 1148 to 1180													[Blue bar: Feb 2016 - Dec 2016]																							
Special Works																																				
13 Lower Fraser River Crossing RK 1168													[Blue bar: Apr 2016 - Jun 2016]																							
14 Ledgview Golf Course Crossing RK 1119																									[Blue bar: Aug 2016 - Sep 2016]											
15 Burnaby Terminal to Westridge Terminal													[Blue bar: Apr 2016 - Dec 2016]																							
16 Install RMLBVs between Pump Stations													[Blue bar: Aug 2016 - Dec 2016]																							
17 Prep for Reactivation of NPS 24 Segments													[Purple bar: Apr 2016 - Jun 2016]												[Purple bar: Aug 2016 - Dec 2016]											

* Local restricted activity zones or timing not shown

Figure 3.2.1 Preliminary Pipeline Construction Schedule

Pipeline Reactivation Schedule	2015												2016												2017											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
1 Preparation for In-Line Inspection Tool Runs													[Purple bar: Apr 2016 - Jun 2016]																							
2 In-Line Inspection Tool Runs																									[Purple bar: Aug 2016 - Sep 2016]											
3 Excavation and Repair																									[Purple bar: Aug 2016 - Dec 2016]											
4 Hydrostatic Testing																									[Purple bar: Dec 2016 - Jan 2017]											

Figure 3.2.2 Preliminary Reactivation Schedule

A comprehensive resource loaded and schedule constrained Pipeline Construction Execution Plan will be developed during the detailed engineering and design phase, taking into account factors such as:

- work force transportation and accommodations;
- limitations on right-of-way access and the minimization of multiple seasons of access;
- pipe transportation and stockpiling logistics;
- coordination with other development activities;
- restricted construction activity periods/windows;
- commitments and issues to be managed; and
- pipeline industry construction capability and capacity.

Materials and equipment will be delivered to the various contractors to coincide with the construction schedule.

This pipeline project schedule is based on the proposed pipeline route, and may be refined or modified based on a variety of factors including, but not limited to, field data collection, the regulatory approval process, the results of the on-going public and stakeholder consultation, and the Aboriginal engagement process.

3.3 Contracting Strategy

It is anticipated that each of the main pipeline installation contracts will have one to three construction spreads. It is anticipated that separate contracts will also be awarded for the many associated construction activities such as surveying, clearing, access road construction, pipe stockpiling, horizontal directional drills (HDDs) and other trenchless bore-type crossings, aerial structure crossings, if required, mainline valve installations, and restoration.

Construction management and inspection services, and non-destructive testing (NDT) will also be contracted separately by Trans Mountain.

Trans Mountain will develop training, employment, and contracting opportunities for participating Aboriginal groups and local communities, as further described in Volume 3B.

The contracting strategy will be refined during the detailed engineering and design phase and will be dependent on contractor availability and capability, and the timing of various activities.

3.4 Pipeline Construction

The pipeline will be constructed in accordance with the TMEP pipeline construction specifications and drawings to be developed during the detailed engineering and design phase. A series of typical right-of-way construction sketches are provided in Appendix B.

3.4.1 Spreads and Camps

The TMEP pipeline construction work will be segmented into manageable lengths or spreads during the seasonal construction periods to reduce the peak labour and equipment demands.

The reference kilometres (RKs) and the proposed length for each proposed construction spread are summarized in Table 7.1.5 in Appendix A. Map 7.1.2 in Appendix C illustrates the proposed construction spreads.

Preliminary construction planning indicates that up to three construction camps may be required. Spread A2 may be constructed using the Edson (RK 234) construction camp; Spread BC1 may be constructed using two construction camps, one at either Valemount (RK 519) or Blue River (RK 615) and the other at either Vavenby (RK 701) or Clearwater (RK 722).

3.4.1.1 *Spread A1 (RK 0 to 49.0)*

Spread A1, between Edmonton Terminal and Highway 60 in Alberta, is 49 km long, and is planned for the period between summer 2016 and fall 2017.

Approximately 40 km is within the Transportation and Utility Corridor that surrounds the city of Edmonton. Land use ranges from industrial at the start, to infrastructure corridor for the largest section, and to residential development and farmland at the west end. This section consists of generally flat to rolling land with an interspersed of small plots of trees.

3.4.1.2 *Spread A2 (RK 49.0 to 339.4)*

Spread A2, between Highway 60 and Hinton, AB, is 290.4 km long, and is planned for the period between summer 2016 and fall 2017.

The easterly section (Highway 60 to Wildwood) of this spread is primarily agricultural land, crossing several subdivisions and light industrial/commercial sections of Spruce Grove and Stony Plain. Most of the lands through this section are freehold with a few Crown land parcels also being crossed. Topography in this section is generally flat to rolling with vegetation ranging from cultivated crops on the east end, to hay and pasture, and forested land at the west end of the spread.

The central section (Wildwood to Edson) of this spread is predominately agricultural land (hay and pasture land) with some forested segments. Topography in this section is generally flat to rolling, and the land status is mostly freehold.

The westerly section (Edson to Hinton) of this spread traverses the north side of Edson within the town limits and continues west from Edson where forest lands become increasingly predominate. Land in this portion ranges from predominately freehold in the eastern half, to a predominance of Crown land in the western half. Topography of this section is generally rolling, with the occurrence of moderate slopes increasing toward the western end.

3.4.1.3 *Spread BC1 (RK 489.6 to 769.0)*

Spread BC1 is located in the BC Interior between the west boundary of Mount Robson Provincial Park at existing TMPL valve and trap facility at Hargreaves and Darfield Pump Station. This section is 279.4 km long, and is planned for the period between summer 2016 and fall 2017.

The terrain through the portion of the spread north of Vavenby is mountainous and characterized by a forested, steep sided river valley. The narrow valley bottom is shared with Highway 5, the Canadian National Railway (CNR) and other utilities. The route traverses steep slopes, extended side hill sections and many watercourses. Surface rock will be encountered.

The valley is wider in the vicinity of Valemount with freehold properties and some agricultural land use. There are some wetland areas along the North Thompson River.

Between Vavenby and Darfield, the character of the terrain changes to a wider, flatter valley, but does include some surface rock outcrops, steep slopes, and extended sections of side hill. The land is predominately freehold, and land cover is a mix of forested areas and cultivated fields. In a number of communities the pipeline right-of-way will be in close proximity to residential properties.

3.4.1.4 Spread BC2 (RK 811.8 to 1018.0)

Spread BC2, between Black Pines and the Coquihalla Summit, is 206.2 km long, and is planned for the period between summer 2016 and fall 2017.

From Black Pines to Kamloops, the land cover is a mix of forested areas, grasslands, and cultivated fields. For a portion of this section, the route climbs out of the North Thompson River valley and traverses along a higher bench. Within the City of Kamloops, the right-of-way is located primarily on light industrial and municipal park land.

Between Kamloops and Merritt, the route is predominantly ranch land with some mining and forestry land use. The majority of the land is freehold and Crown grazing leases. The topography is a high plateau with some rock outcrops, steep gullies, side hill, and local wetlands. Land cover is grasslands, forested areas, and cultivated fields. The route does not parallel a highway along this section.

From Merritt to the Coquihalla Summit the terrain transitions from arid rolling grassland to a mountainous river valley along the Coldwater River. This section is a mix of Crown and freehold lands with the majority of the Crown land under grazing lease. The right-of-way is in close proximity to residential properties on the south side of Merritt. Steep slopes and surface rock will be encountered on the climb to the summit area. The south portion of the spread is along the Coquihalla Highway corridor; here limited space is shared amongst the highway, numerous utilities and the Coldwater River.

3.4.1.5 Spread BC3 (RK 1018.0 to 1078.1)

Spread BC3, between the Coquihalla Summit and the Wahleach Pump Station near the Agassiz/Highway 1 interchange, is 60.1 km long, and is planned for the summers of 2016 and 2017.

The portion of this spread northeast of Hope is in mountainous terrain with extensive surface and ditch rock, very steep slopes and numerous watercourse crossings. The route will follow the Boston Bar Creek and Coquihalla River valleys. This is a transportation corridor shared with the Coquihalla Highway and other utilities. The majority of the land is owned by the Crown, but within the community of Hope, the right-of-way is in close proximity to both residential and commercial properties.

Southwest of Hope, the route is along the south side of the Fraser River. This section consists of a congested transportation corridor with the Trans-Canada Highway, CNR and other utilities positioned between the river and a steep valley wall. A number of rock bluffs project out nearly to the river's edge creating pinch points. In these areas talus debris, surface bedrock, and steep side hill will be encountered. Between the rock bluff areas there are sections of flat, freehold, flood plain with residential and commercial land use.

3.4.1.6 *Spread BC4 (RK 1078.1 to 1148.1)*

Spread BC4 extends from the Wahleach Pump station near the Agassiz/Highway 1 interchange to a point immediately west of the Belmont Golf Club near Walnut Grove, is 69.9 km long, and is planned for the summer/fall of 2016 and the summer/fall of 2017.

The proposed pipeline corridor generally follows the existing TMPL right-of-way and its western limit is the point at which the route starts to follow a new route. Land use is predominantly agricultural through the Fraser Valley with pockets of urban development in Chilliwack and Abbotsford. The corridor passes over Sumas Mountain through forested areas, a golf course and some housing developments.

3.4.1.7 *Spread BC5 (See Table 7.1.5 in Appendix A)*

Spread BC5 extends from Belmont Golf Club to Westridge Marine Terminal (excluding the Fraser River crossing), is 34.2 km long, and is planned for the summer/fall of 2016 and the summer/fall of 2017.

From the Belmont Golf Club to the south side of the Fraser River, this section initially encompasses agricultural land in the valley of the Salmon River and along the railway corridor as far as 200 Street in Langley. From there it passes through the industrial area of Port Kells and across mixed residential/light industrial areas as far as the CNR Intermodal terminal. This is bypassed on the north side through low lying land in Surrey Bend Park. From here to the Fraser River, crossing the corridor occupies land between the CNR and the South Fraser perimeter road.

From the north side of the Fraser River to Burnaby Terminal, the majority of this section is to be installed beneath the travelled lanes of United Boulevard and the Lougheed Highway. From its junction with Underhill Drive, the corridor passes through or adjacent to industrial land before entering Burnaby Terminal.

In the section from Burnaby Terminal to Westridge Marine Terminal, the corridor initially parallels the Burnaby Mountain Parkway and then follows streets and green areas to the western boundary of Westridge Marine Terminal.

3.4.1.8 *Spread T1*

Spread T1 extends from the south side of the Fraser River to the north side of the Fraser River, including the HDD across the Fraser River, is 1.1 km long, and is planned for the summer of 2016.

3.4.2 ***Right-of-way Clearing and Site Work Preparation***

The TMEP Line 2 pipeline segments will be constructed on a typical right-of-way width of 40 m, which includes a permanent right-of-way (easement) width of 18 m and 22 m of temporary workspace (TWS). Extra temporary work space (ETWS) is estimated to be required for an additional 20 per cent of the right-of-way at crossings of highways, roads, railways, watercourses, utilities, pipelines, and for steeper terrain, side bends, timber salvage, etc.

Greenfield clearing will occur for approximately 20 per cent of the total length of the pipeline right-of-way. The remaining 80 per cent of the right-of-way will be along the existing TMPL Line 1 pipeline easement, along other pipelines, and adjacent to existing power transmission lines, highways, and narrow work spaces in urban areas. Any clearing work on these portions of

the right-of-way will be approximately 25 to 30 m wide. ETWS will also be required on the previously cleared right-of-way and on the TMPL Line 1 pipeline easement.

Clearing operations will be guided by the TMEP Timber Salvage Plan (TSP), and the associated logging and clearing map sheets. The TSP will show the log decking and pile burning locations. In addition, the logging and clearing map sheets will highlight features to be protected, including riparian areas of streams, rare plants, archaeology sites, work timing windows, and other features. The TSP will be developed during the detailed engineering and design phase.

Clearing contractors will harvest timber, clear remaining brush, and grub the right-of-way in preparation for grading. In Alberta, the timber will be decked at storage sites or hauled directly to timber processing facilities. In BC, the timber will be hauled directly to timber mills. Other woody debris will be disposed of by grinding, mulching, or burning in compliance with the requirements of the regulatory authorities.

Clearing will commence as early as practical in late 2015 or early 2016 for pipeline segments to be installed in Spring/Summer 2016, subject to receipt of all necessary permits and approvals. This work is planned to be substantially completed, if possible, prior to the 2016 migratory bird RAP outlined in Volume 5A.

3.4.2.1 *Fire Response During Clearing Operations*

Any unintentional fires caused by activities related to access road construction, logging, or debris disposal will be reported to the appropriate regulators and controlled. Fire control efforts will be described in the TMEP Fire Response Contingency Plan (FRCP). The FRCP will be completed prior to the commencement of clearing operations. More information on fire prevention and response is provided in Sections 5.2.6 and 5.2.7.

3.4.3 **Access**

Pipeline construction will require the use of existing paved roads, gravel roads and trails, plus the construction of a limited number of new temporary and permanent access roads. In general, an access road is defined as any road that is required to access the pipeline right-of-way, staging areas, stockpile sites, etc.

In Alberta, existing roads are controlled by Alberta TRANS, the counties, the regional municipalities, and the forest industry. In BC, existing roads are controlled by the BC MoTI, the BC Ministry of Forests, Lands and Natural Resource Operations, and the Forest Industry. In all cases, permits and agreements will be obtained to use existing roads, construct new access roads, and maintain roads. Where required, road maintenance fees will be paid to the owners for the roads; or the roads will be maintained by the logging, clearing, and pipeline construction contractors.

At the end of construction, a limited number of roads will be maintained under a permit to access the pipeline right-of-way for pipeline maintenance. All road types and bridges will be finalized during the detailed engineering and design phase in the TMEP ACMP, prior to the commencement of any access construction.

3.4.3.1 *Existing Access*

Existing access will provide short-term construction access, long-term access for pipeline maintenance, and access to valve sites and pump stations. A summary of the existing primary

and secondary access roads for the TMPL Line 2 pipeline are summarized in Tables 7.1.6 and 7.1.7 in Appendix A.

3.4.3.2 *Proposed New Temporary and Permanent Access and New Permanent Bridges*

Although nearly all of the accesses required for pipeline construction currently exist, a number of proposed new temporary access roads will be required for logging, clearing, and pipeline construction and are summarized in Table 7.1.8 in Appendix A. After construction, the temporary access roads will continue to be used to facilitate restoration along the proposed right-of-way until vegetation has been satisfactorily re-established. This could require that they remain open for up to five years.

A small number of new permanent access roads will be required to access the proposed pipeline right-of-way. The new permanent access roads are required for any one or all of the phases of logging, clearing, pipeline installation, restoration, and for the maintenance of the pipeline. These are summarized in Table 7.1.9 in Appendix A.

Deactivated and Overgrown Access Roads (DOARs) are access roads that are not currently used by industry or other users and may be overgrown with scrubs or trees. Some DOARs in the project area are private roads and agreements will be required with landowners prior to their upgrading and use. Preparing DOARs to a condition suitable for logging and pipeline construction could involve the following activities: clearing or brushing, widening of the travel surface, the installation of temporary bridges, realignment, reconstruction across slopes and washouts, removing access control barriers, installation of culverts, or resurfacing. In both Alberta and BC, a Licence of Occupation will be required to upgrade the roads.

Where required, existing bridges will be assessed for weight restrictions and/or new permanent bridges will be constructed. Based on the type of use, any new bridges will be designed to the BC Forestry Service standard of either L-50 (45 tonnes) or L-75 (68 tonnes). All new bridges and open bottom culverts will be designed by a qualified professional engineer. A summary of the existing bridges and proposed new permanent bridges is provided in Table 7.1.11 in Appendix A.

All proposed new permanent accesses and new permanent bridge locations will be finalized during the detailed engineering and design phase and identified in the Engineered Road and Bridge Designs section of the ACMP.

3.4.3.3 *Vehicle and Equipment Crossings of Watercourses*

Vehicle and equipment crossings of watercourses will be required along the right-of-way during construction and operations.

The most suitable method for a vehicle and equipment crossing of a watercourse considers the following factors:

- frozen versus non-frozen conditions at the time of construction;
- fish and fish habitat sensitivity;
- approach gradient;
- width of crossing;

- temporary versus permanent use; and
- flow rate and volume.

The following methods will be used for vehicle and equipment crossings of watercourses:

- snow/ice bridges;
- closed culverts;
- open culverts;
- temporary and permanent bridges; and
- fording.

Drawings that provide typical access road crossing methods for a snow fill, culvert, and ice bridge are included in Appendix B.

Every access road crossing of a watercourse will be assessed for site-specific conditions anticipated at the time of construction. The crossing method selected, construction and corresponding mitigation measures will follow Fisheries and Oceans Canada operational requirements, any provincial guidelines and industry best practices, where practical. Where required, the appropriate federal and provincial agencies will be consulted beforehand for any necessary approvals or authorizations.

3.4.4 Surveys

The construction survey crews will survey and stake the limits of the construction right-of-way that includes the TWS and the ETWS as shown on alignment sheets and drawings, the approximate location of all known buried facilities that cross or encroach on the construction workspace, and the approximate location of adjacent pipelines. The survey crew will also provide chainage markers at approximately 100 m intervals or less as requested or required.

All construction field surveying will be carried out in accordance with the TMEP Engineering Survey Specification, which will be developed during the detailed engineering and design phase.

During construction, survey crews will stake the centreline of the proposed pipeline, certain engineering features such as change in pipe wall thicknesses, valve locations, buoyancy control devices, pipe protection measures, trench breakers, test leads, etc. All stakes will be colour coded in accordance with the Project survey colour code.

Survey crews will stake the centreline of the ditch prior to topsoil stripping operations and then re-stake the centreline to facilitate the trenching operation.

3.4.5 Grading and Soil Handling

The primary objective of grading is to provide a suitable ground surface for safe construction of the TMEP Line 2 pipeline segments. Grading of the right-of-way must therefore be sufficient to accommodate pipe stringing, field bending, welding, lowering-in, and safe movement of pipe, equipment, and personnel along the right-of-way. Grading along the right-of-way will vary from only topsoil stripping in some areas to extensive cuts and fills in other areas. Topsoil stripping

requirements will be detailed on the pipeline environmental alignment sheets. All right-of-way development will be in accordance with the TMEP Pipeline Construction Specification, and in accordance with the Environmental Protection Plan (EPP).

The grade and ditch rock along the route will be ripped mechanically using bulldozers and excavators, where practical. Otherwise, controlled blasting techniques, in accordance with the TMEP Blasting Specification, will be used for grade and ditch rock excavation. The Blasting Specification will be developed during the detailed engineering and design phase.

Where topsoil or organic materials are removed from the work area, these will be stockpiled separately at the edge of the right-of-way. Once construction is completed, the topsoil or organic material will be replaced.

3.4.6 Pipeline Installation

Dedicated crews will complete the stringing, bending, welding, NDT, joint coating, trenching, lowering-in, back-filling, and restoration activities. Specialized crews will also be employed for crossings and for construction in difficult terrain and restricted work areas.

Prior to lowering-in, where required, select backfill material will be used for bedding the pipe and for padding after lowering-in.

3.4.7 Fabricated Assemblies Installation

Remote mainline block valve (RMLBV) assemblies and check valve assemblies will be shop fabricated and then installed by the pipeline construction crews.

3.4.8 Inspection

3.4.8.1 Technical Inspection of Construction Activities

An inspection team of qualified and experienced personnel will inspect all phases of the pipeline construction activities to ensure compliance with procedures, specifications, and drawings. Responsibilities will also include checking for compliance with all applicable legislative requirements and approved permit conditions, and that construction activities are in conformance with the health, safety, security, and environmental plans and procedures of the Project.

Quality audits of the construction work will be undertaken to ensure that the work is being completed in accordance with the TMEP Pipeline Construction Specification and the TMEP Pipeline Quality Management Program.

3.4.8.2 Environmental Inspection

The main objective of the environmental inspection program will be to monitor compliance with environmental commitments, undertakings and conditions of authorization, and applicable environmental regulations. Environmental Inspectors will be responsible for:

- confirming that day-to-day construction activities are being implemented within the scope of environmental requirements;
- confirming that all environmental commitments, undertakings and conditions of authorization are met, and that work is completed in compliance with applicable environmental regulations;

- identifying if permit variances and/or new mitigation strategies are required based on changes to construction plans in the field, assisting in the development of those mitigation strategies and insuring receipt of NEB Approval for any substantial changes to mitigation;
- providing advice on major decisions, such as wet-weather shutdowns, or courses of action to deal with major unexpected environmental conditions (the environmental inspector will have the authority to shut down work that, if continued, would likely result in environmental damage or environmental non-compliance);
- reporting any environmental incidents, according to federal and provincial regulations, and advising Trans Mountain management about cleanup and disposal of the material and any affected soils or vegetation;
- preparing daily and weekly environmental reports;
- preparing, collecting, organizing, and disseminating all environmental information and documentation that arises during construction;
- supervising on-site environmental resource specialist staff required to support the Project and overseeing environmental orientation program;
- preparing environmental as-built documents using information collected from all relevant sources during project construction;
- tracking all environmental incidences and non-compliances; and
- organizing on-site meetings as requested by the Trans Mountain construction manager, and as the need arises, to address site-specific environmental issues.

3.4.9 Non-destructive Testing

In order to inspect and validate weld integrity, every welded joint to be subjected to fluid pressure will be examined by NDT method(s) appropriate to the type of weld. The NDT methods to be employed may include one or more the following methods or a combination of methods, depending on the type of weld:

- visual inspection;
- radiographic testing (gamma or x-ray);
- automated ultrasonic testing;
- manual ultrasonic testing;
- magnetic particle inspection; and
- liquid dye penetrant inspection.

Trans Mountain will retain contractors that employ only Canadian General Standards Board certified radiographers and ultrasonic technicians to operate the NDT inspection equipment, and provide the final interpretation of radiographic film and the results of the ultrasonic inspection.

Trans Mountain will have certified inspectors to monitor welding and NDT activities to ensure compliance to project specifications and procedures. Periodic audits will be performed by third-party welding and NDT specialists employed by Trans Mountain.

A complete set of governing NDT requirements will be specified in the TMEP Non-Destructive Testing Specification, which will be developed during the detailed engineering and design phase.

3.4.10 As-built Surveys

As-built surveys of the pipeline installation and the pipeline right-of-way will be carried out in a manner that allows for the survey data to be integrated into a Geographic Information System (GIS) database. The as-built surveys will be carried out in accordance with the TMEP Engineering Survey Specification, which will be developed during the detailed engineering design phase.

3.4.11 Hydrostatic Pressure Testing

Every component of the pipeline will be hydrostatically pressure tested before being commissioned to verify that its integrity is in compliance with the requirements of Canadian Standards Association (CSA) Z662, NEB Onshore Pipeline Regulations (OPR) and any other applicable legislation. Hydrostatic testing will be in accordance with KMC Standard MP 4121, Mainline Hydrostatic Test Standard, as may be amended during the detailed engineering and design phase.

All test heads used for hydrostatic pressure testing will be certified and will have the appropriate supporting certification documentation.

All test heads will be approved for use by Trans Mountain prior to installation for testing.

A preliminary list of hydrostatic test water sources and required volumes is provided in Table 7.1.12 in Appendix A, for the Line 2 pipeline segments to be constructed and in Table 7.1.13 in Appendix A for the Line 1 pipeline segments to be reactivated.

3.4.12 Pipeline Cleaning

After each section of the pipeline is completed, internal cleaning tools will be used to remove any construction debris. Each section of the pipeline will be cleaned in accordance with the TMEP Cleaning Specification, which will be developed during the detailed engineering and design phase. Debris will be collected and disposed of in accordance with applicable regulations.

3.4.13 Caliper In-line Inspection

Before or after hydrostatic pressure testing and completion of the drying operations for each pipeline section or spread, an in-line inspection will be run with a caliper tool in accordance with the TMEP Post-Construction Caliper ILI Specification, which will be developed during the detailed engineering and design phase.

Upon completion of the caliper tool runs, the ILLI service provider will submit a report identifying all anomalies such as ovality, dents and buckles complete with North American Datum 83 (Canadian Spatial Reference System) reference coordinates and the circumferential position on the pipe, thereby facilitating the accurate location of the anomaly for inspection and any necessary corrective action.

Any defects exceeding allowable limits of CSA Z662 will be cut out and replaced with pre-tested pipe.

3.4.14 Right-of-way Clean-up and Reclamation

After the completion of construction of each pipeline section or spread, general clean-up will be completed along the pipeline right-of-way.

The clean-up will include:

- removing construction equipment, materials and waste;
- installing or re-installing gates and fences;
- re-contouring work areas;
- relieving soil compaction, where required;
- topsoil spreading;
- installing temporary or permanent erosion control measures, as needed; and
- reclaiming temporary construction accesses.

Reclamation of the right-of-way will involve re-grading, where needed (e.g., areas having erosion gullies, vehicle ruts, or trench settlement). Where required, the right-of-way will be re-contoured as close to the pre-construction profile as practical, or to a stable angle of repose. Where practical, right-of-way drainage patterns will also be returned to as close to pre-construction contours as possible, and where required, final erosion control structures will be installed. Topsoil will be prepared for revegetation and, ultimately, the right-of-way will be reclaimed in accordance with the TMEP Restoration Plan, applicable legislation, permit conditions, commitments, and any landowner, stakeholder and Aboriginal community agreements.

Watercourse crossings will be reclaimed in accordance with project specifications. The right-of-way will be revegetated as necessary and as soon as is practical on completion of final cleanup.

3.4.15 Pre-commissioning

Immediately after construction and before commissioning, a temporary cathodic protection system will be connected to protect the pipeline from potential corrosion.

Pre-commissioning will also include stroke testing of the RMLBVs.

3.4.16 Pipeline Markers and Warning Signs

Signage for the Line 2 pipeline will be developed and installed in accordance with CSA Z662, the legislative requirements of other appropriate regulatory authorities, and the Trans Mountain specifications and drawings.

Pipeline markers and warning signs will be installed at specific locations including:

- highway and road crossings;
- navigable and major watercourse crossings;
- railway crossings;
- foreign facility crossings;
- wetlands; and
- fence lines.

Warning signs at watercourse crossings including rivers and other major streams will be installed in accordance with the *Navigable Waters Protection Act*, as amended.

Warning balls will be installed on overhead power lines at pipeline crossings, as required, for safe aerial inspections.

Flexible warning markers will generally be installed at intermediate “line of sight” intervals.

Pipeline reference aerial markers will be installed at RMLBVs and, where appropriate, at regular intervals of approximately 10 km to aid in aerial pipeline surveillance patrols.

3.4.17 Geographic Information System Database

The existing Trans Mountain GIS database will be updated with data for the new pipeline upon the commencement of pipeline operations. This GIS database will contain centrelines of pipeline segments, where each segment has a change in the value of one or more of its parameters along the length of the pipeline. Listed below is a short sample of the parameters to be recorded.

- permanent easement;
- pipe manufacturing specification;
- outside diameter;
- pipe wall thickness;
- maximum operating pressure;
- weld number and location;
- external coating;
- field-applied girth weld coating type; and

- field and induction bend data.

The locations and names of pump stations, terminals, custody transfer meters, pressure reduction facilities, sending/receiving traps, and RMLBVs will also be maintained in GIS.

4.0 FACILITIES CONSTRUCTION

Construction of the TMEP facilities (pump stations, terminals, and ancillary facilities) is expected to take 26 months to complete. Construction at Westridge Marine Terminal is expected to start in November 2015, with most other facilities commencing before the end of 2016, and it is anticipated that all facilities will be substantially complete by late 2017. The availability of resources and the complexity of site logistics may result in some storage tanks being completed in 2018.

Detailed engineering and design will be completed by engineering firms located in BC with the exception of that for Edmonton Terminal, which will be done by a firm located in Alberta. Detailed engineering and design will be completed by the end of 2016.

Trans Mountain will be the Prime Contractor for all facility sites. Health and safety management is described in Section 5.0.

4.1 Pump Stations

4.1.1 Construction Scope

In general, some or all of the following major tasks will be undertaken during pump station construction, as applicable to the individual pump stations:

- building additional construction accesses;
- clearing trees;
- stripping and storing top soil;
- rough grading;
- building permanent roads;
- installing fencing;
- installing concrete (pile or spread footing) and/or steel (pile) foundations;
- installing sump tanks;
- erecting pre-fabricated pump buildings;
- installing mainline pumps and motors, and other mechanical equipment;
- installing pre-fabricated steel pipe supports;
- installing largely pre-fabricated large bore piping systems, complete with valves;
- installing small bore piping systems;
- hydrostatically testing piping systems;
- installing pre-fabricated access platforms and stairways;

- installing electrical sub-station equipment (may be by the utility);
- installing the pre-outfitted electrical service buildings (ESBs) and variable frequency drive (VFD) buildings, if required;
- installing the pre-outfitted operator building;
- installing cable tray, and installing and terminating electrical and control cables;
- installing and terminating instrumentation;
- finish grading; and
- dry and wet commissioning.

4.1.2 Execution Strategy

It is anticipated that pump station construction will be broken down into four groups (Table 4.1.1).

TABLE 4.1.1

PUMP STATION CONSTRUCTION GROUPS

Group	Pump Station
1	Edmonton (5 × 5,000 hp)
1	Gainford (3 × 5,000 hp)
1	Wolf (2 × 5,000 hp)
2	Edson (3 × 5,000 hp)
2	Hinton (3 × 5,000 hp)
2	Rearguard (2 × 5,000 hp)
3	Blue River (3 × 5,000 hp)
3	Blackpool (3 × 5,000 hp)
3	Black Pines (2 × 5,000 hp)
3	Black Pines (2 × 2,500 hp)
4	Kamloops (4 × 5,000 hp)
4	Kingsvale (2 × 5,000 hp)
4	Sumas (1 × 2,500 hp to be added)

Each group will be awarded to a different general contractor, unless there are determined to be advantages to awarding more than one group to one or more of the general contractors. The pump station groupings are intended to provide manageable scopes of work within a maximum distance of 300 km. The buildings contracts will be awarded to one or two specialty contractors, different from the general contractors. Trans Mountain successfully managed the Trans Mountain Pump Station Expansion (TMPSE) Project in 2006/2007 using this approach.

4.1.3 Conceptual Schedule

Figure 4.1.1 indicates the proposed construction schedule for the pump stations. Comprehensive schedules for each group and pump station will be developed during the detailed engineering and design phase. Conceptually, the schedule is designed to allow for various general contractors, specialty contractors, and subcontractors to move small crews of

tradespeople (e.g., carpenters, concrete finishers, millwrights, welders, and building erectors) between sites while supporting continuous construction activity at each site. It is also anticipated that, due to manufacturing constraints, major equipment and pre-outfitted buildings (e.g., sump tanks, pumps, motors, ESBs) will be delivered on a staggered schedule roughly matching the construction schedule. The staggered schedule also allows two commissioning teams to complete their work at all sites while construction management and contracting resources are on-site. A similar approach was successfully used for TMPSE.

The schedule is also designed such that the majority of earthworks and foundations are completed in the spring, summer, and fall to avoid winter heating and hoarding. Most of the other work can be efficiently done year-round.

The commissioning indicated is largely dry commissioning (Section 4.4.12.2). Wet commissioning will be completed during initial pipeline fill.

Construction Schedule	2016												2017														
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D			
New Pump Stations																											
1 Edmonton (5 x 5000 hp)						EF	B	MPEI				C															
2 Gainford (3 x 5000 hp)							EF	B	MPEI			C															
3 Wolf (2 x 5000 hp)								EF	B	MPEI			C														
4 Edson (3 x 5000 hp)									EF	B	MPEI			C													
5 Hinton (3 x 5000 hp)											EF	B	MPEI									C					
6 Rearguard (2 x 5000 hp)													EF	B	MPEI								C				
7 Blue River (3 x 5000 hp)							EF	B	MPEI				C														
8 Blackpool (3 x 5000 hp)								EF	B	MPEI			C														
9A Black Pines (2 x 5000 hp)									EF	B	MPEI			C													
9B Black Pines (2 x 2500 hp)										EF	B	MPEI										C					
10 Kamloops (4 x 5000 hp)										EF	B	MPEI										C					
11 Kingsvale (2 x 5000 hp)													EF	B	MPEI								C				
Pump Station Modifications																											
12 Sumas (1 x 2500 hp added)																						EF	B	MPEI			C

Legend: EF - Earthworks & Foundations MPEI - Mech., Piping, Electr., & Instr.
 B - Pump Buildings C - Commissioning

Figure 4.1.1 Pump Station Conceptual Construction Schedule

4.2 Terminals

4.2.1 Construction Scope

In general, some or all of the following major tasks will be undertaken during construction at each of the four major terminals, Edmonton, Sumas, Burnaby, and the Westridge Marine Terminal, as applicable to the individual terminal:

- building additional construction accesses;
- clearing trees;

- stripping and storing top soil;
- rough grading;
- installing and compacting fill;
- building secondary containment areas;
- building storm-water retention areas and installing storm-water drainage systems;
- building permanent roads;
- installing fencing;
- installing marine steel pile foundation;
- installing concrete (piles, pile caps, and/or spread footings) and/or steel pile foundations;
- installing pre-fabricated concrete and/or steel trestles and/or bridges;
- building tank foundations;
- installing under-tank and/or secondary containment liners and leak detection systems;
- erecting large diameter storage tanks;
- hydrostatically testing storage tanks;
- coating storage tanks;
- installing auxiliary process tanks and/or vessels;
- installing sump tanks;
- installing pre-outfitted fire-water and foam buildings;
- installing booster pumps, motors, and other rotating equipment and mechanical equipment;
- installing pre-fabricated steel pipe supports;
- installing largely pre-fabricated large bore piping systems, complete with valves, in manifold, booster pump, and metering areas;
- installing large bore tank lines and interconnection lines, complete with valves;
- installing small bore (vent and drain) piping systems;
- installing fire-water and foam piping systems;
- hydrostatically testing piping systems;
- installing pre-fabricated access platforms and stairways;

- installing electrical sub-station equipment (may be by the utility);
- installing the pre-outfitted ESBs and VFD buildings;
- installing the pre-outfitted operator building, if required;
- installing cable tray, and installing and terminating electrical and control cables;
- installing and terminating instrumentation;
- finish grading; and
- dry and wet commissioning.

4.2.1.1 *Edmonton Terminal*

The primary scope elements at Edmonton Terminal will be in the west tank area and will include:

- removing existing interior secondary containment berms;
- modifying or replacing the existing perimeter secondary containment berms;
- re-grading the secondary containment area;
- constructing a remote impoundment annex;
- modifying the perimeter road system and adding a new interior road;
- cleaning and demolishing one existing tank (Tank 9);
- constructing five external floating roof tanks;
- installing tank lines for the new tanks and some of the existing tanks, largely below ground;
- installing a valve manifold, booster pumps, and a metering system;
- installing interconnecting piping between the manifold, booster, and metering areas, the Edmonton Terminal Expansion Project (ETEP), light, and heavy oil manifolds, and the Line 1 and Line 2 pump stations;
- installing a fire-water and foam distribution system;
- installing three ESBs and one VFD building; and
- installing one foam building.

Figure 4.2.1 indicates some of the key elements of the planned construction scope at Edmonton Terminal (identified in green). Items 3 and 4 are part of the Edmonton Pump Station scope (Section 4.1).

Recent experience in the Edmonton Terminal East Tank Area suggests that the tank foundations will be compacted crushed gravel over soil-cement mix columns.

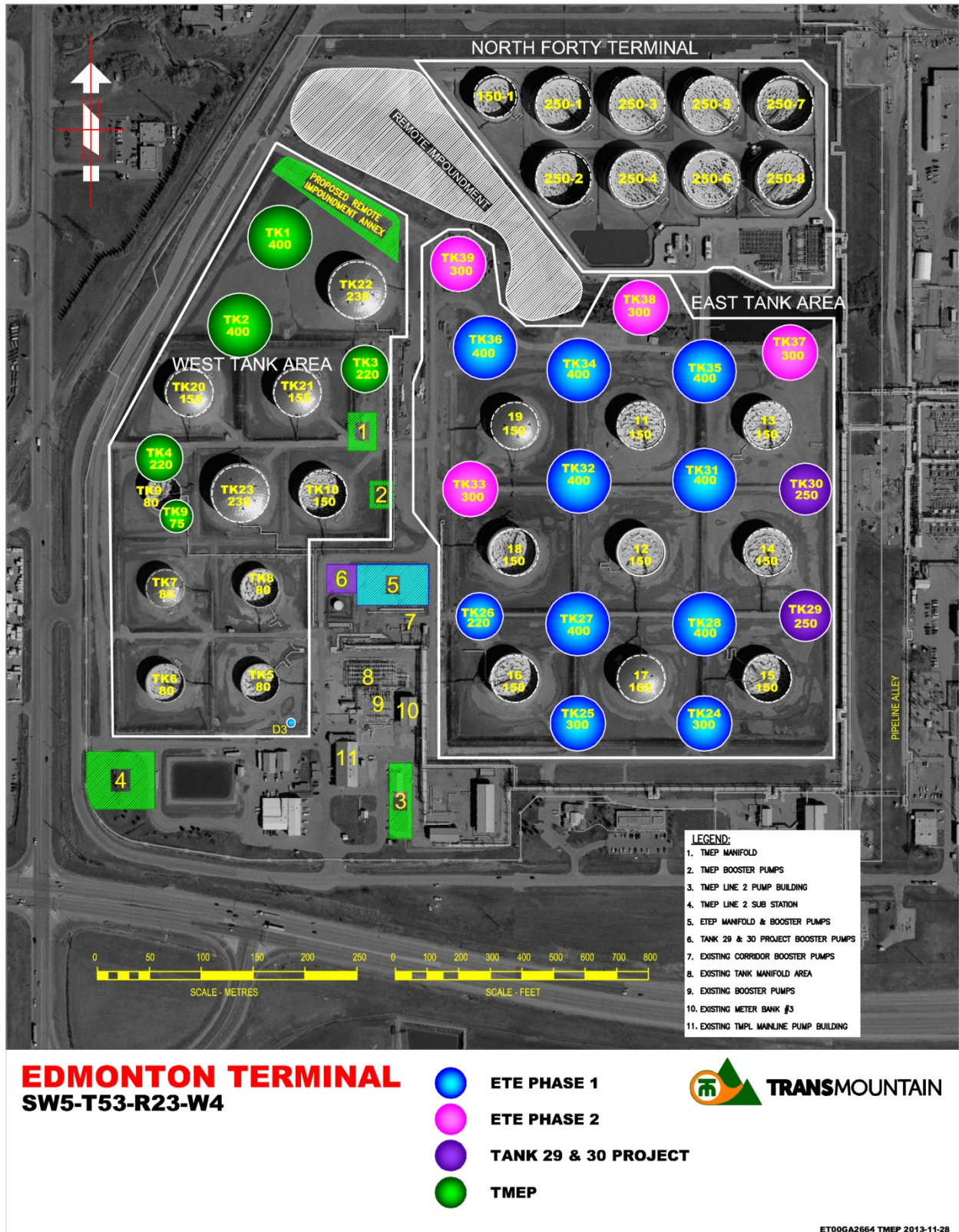


Figure 4.2.1 Edmonton Terminal Construction Scope Elements

4.2.1.2 *Sumas Terminal*

The primary scope elements at Sumas Terminal will be in the lower tank area and will include:

- removing part of the existing interior secondary containment berm between Tanks 103 and 104;
- modifying or replacing the existing interior secondary containment berms;
- re-grading part of the Tanks 103 and 104 secondary containment areas;
- installing a synthetic liner in the Tanks 103 and 104 secondary containment areas;
- adding a new perimeter road north of Tanks 103 and 104;
- constructing one internal floating roof (IFR) storage tank, complete with a tank vapour adsorption unit (TVAU);
- installing a tank line for the new tank, largely above ground;
- modifying the existing valve manifold;
- installing a receipt facility for the Sumas Terminal Line 2 take-off;
- extending the fire-water/foam distribution system to the new tank; and
- installing one ESB for the new tank.

Figure 4.2.2 indicates some of the key elements of the planned construction scope at Sumas Terminal.

It is expected that the tank foundation will be compacted gravel with a concrete ring wall.

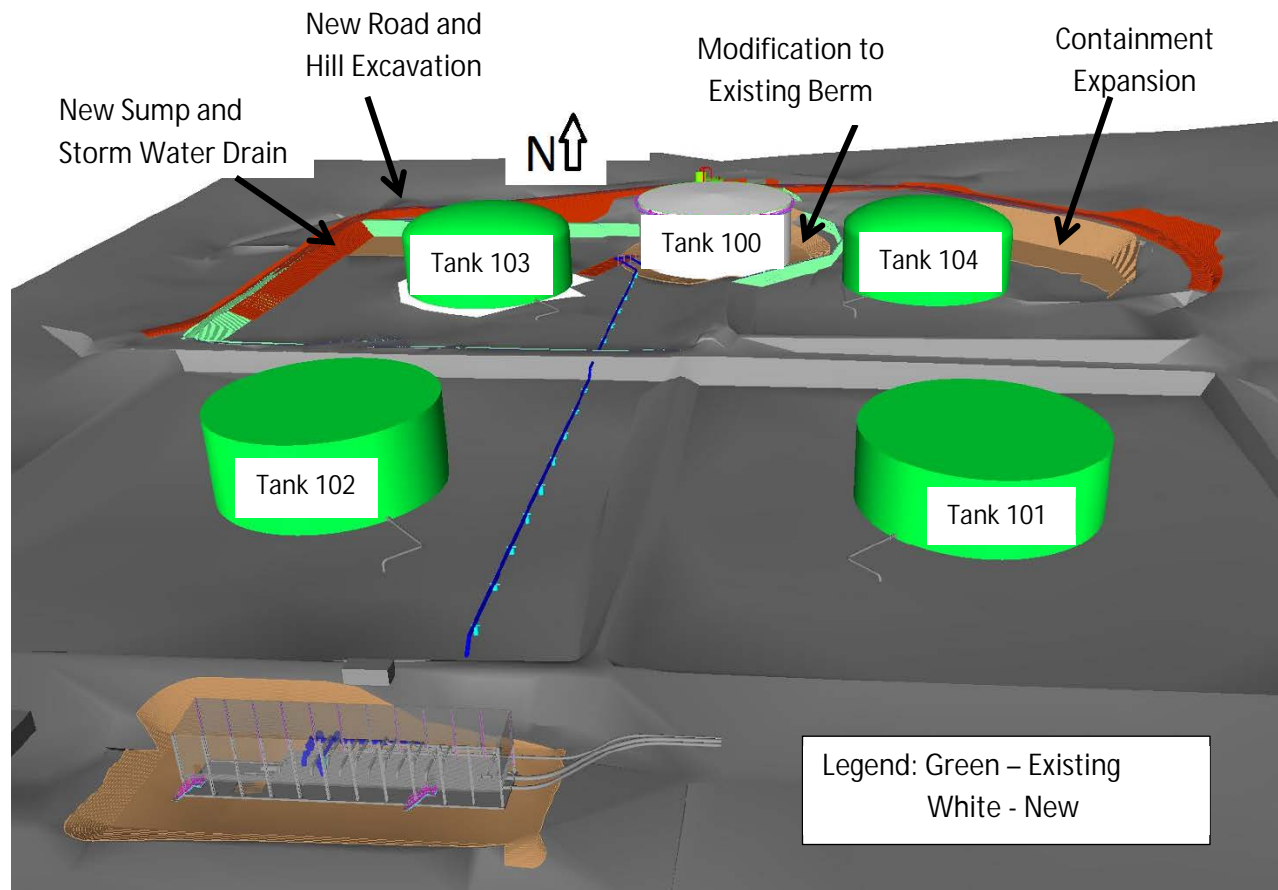


Figure 4.2.2 Sumas Terminal Construction Scope Elements

4.2.1.3 Burnaby Terminal

The primary scope elements at Burnaby Terminal will include:

- clearing the trees from around Eagle Creek and its tributaries, and permanently diverting their flows into culverts or new open channels (if practical);
- removing part of the existing secondary containment berms around Tanks 85, 71, and 73 in the middle of Terrace 1 and around Tank 86 in the middle of Terrace 2, and constructing new secondary containment berms to create common impoundment areas;
- excavating to create eastern extensions to Terraces 1 and 2, and constructing new secondary containment berms to create common impoundment areas;
- excavating to create Terraces 3 and 4, and constructing new secondary containment berms to create common impoundment areas and a partial remote impoundment area;

- installing synthetic liners in the new secondary containment areas;
- constructing new terrace and tank access roads;
- constructing an intermediate storm-water retention area;
- cleaning and demolishing one existing tank (Tank 74);
- constructing 14 IFR storage tanks, complete with TVAUs;
- installing tank lines for the new tanks, largely above ground;
- installing a sending/receiving trap area, valve manifold, booster pumps, and metering system;
- installing the terminating and originating segments of the incoming nominal pipe size (NPS) 36 pipeline and the two outgoing NPS 30 pipelines;
- installing interconnection piping between the new manifold and the existing manifold, largely above ground;
- installing one fire-water pump building and one foam building;
- installing a fire-water/foam distribution system;
- installing a storm-water collection and treatment system;
- installing a new electrical sub-station; and
- installing three ESBs and one VFD building.

Figure 4.2.3 indicates some of the key elements of the planned construction scope at Burnaby Terminal.

It is expected that the tank foundations will be compacted gravel with concrete ring walls.

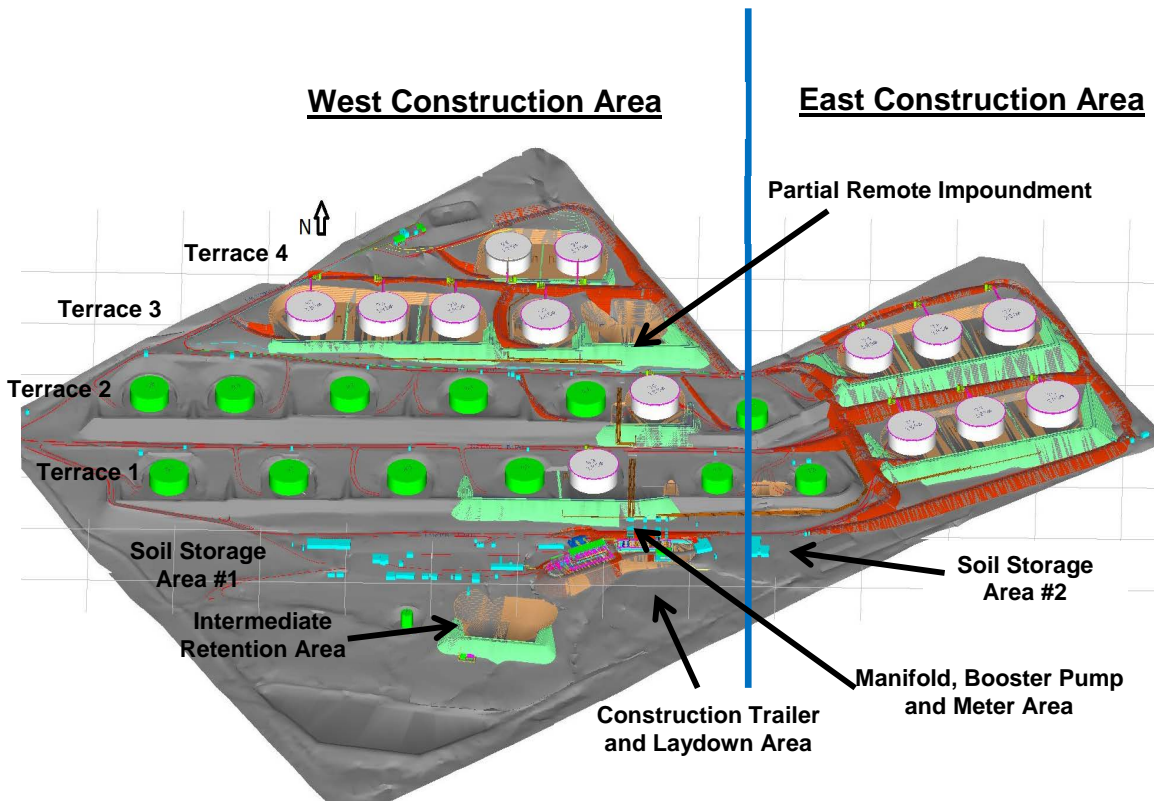


Figure 4.2.3 Burnaby Terminal Construction Scope Elements

4.2.1.4 Westridge Marine Terminal

The primary scope elements at Westridge Marine Terminal will be in two areas, the foreshore area and the dock area, and will include:

Foreshore area:

- excavating unsuitable materials and installing infill materials;
- densification of the portions of existing foreshore and the infill areas;
- excavating to create a terrace for the vapour recovery unit (VRU) process tanks;
- constructing secondary containment walls for the pipeline pressure relief tank and the VRU process tanks;
- installing synthetic liners in the new secondary containment areas;
- constructing concrete containment and storm-water collection in process equipment areas;
- constructing an access road system;

- constructing three IFR tanks, complete with TVAUs, one for pipeline pressure relief and two for VRU processes;
- installing tank lines for the new tanks, largely above ground;
- installing a receiving trap area, valve manifold, and metering system, complete with a prover;
- installing the terminating segments of the incoming NPS 24 and NPS 30 pipelines;
- installing interconnection process piping between the manifold area and the dock complex, largely above ground;
- installing two VRU systems, including process vessels, pumps, and vapour and process piping;
- installing one vapour combustion unit (VCU) skid, including a fuel source and vapour piping;
- installing a nitrogen (purge) system;
- installing interconnection vapour piping between the VRU/VCU area and the dock complex, largely above ground;
- installing one fire-water pump building and one foam building;
- installing a fire-water/foam distribution system;
- installing a storm-water collection and treatment system;
- installing a new electrical sub-station; and
- installing ESBs and a standby generator building.

Dock area:

- demolishing the existing utility dock;
- installing approximately 200 piles (driven and/or socketed);
- installing cast-in-place and/or pre-cast pile caps;
- installing pre-cast and/or pre-fabricated trestle, and loading platform decking structures;
- installing breasting and mooring dolphins;
- installing gangways, catwalks, and other structural components;
- installing loading arms, and other mechanical components;
- installing interconnection process and vapour piping from the foreshore to the berths (above water);

- installing a fire-water/foam distribution system;
- installing a contained storm-water collection and return system; and
- demolishing the existing loading/unloading dock and its associated infrastructure, after new Berth 1 is in service.

There may also be some improvements made to the existing main access road and the addition of a second access road for emergency response purposes.

Figure 4.2.4 indicates some of the key elements of the planned construction scope at Westridge Marine Terminal. Figure 4.2.5 shows the planned dock complex configuration.

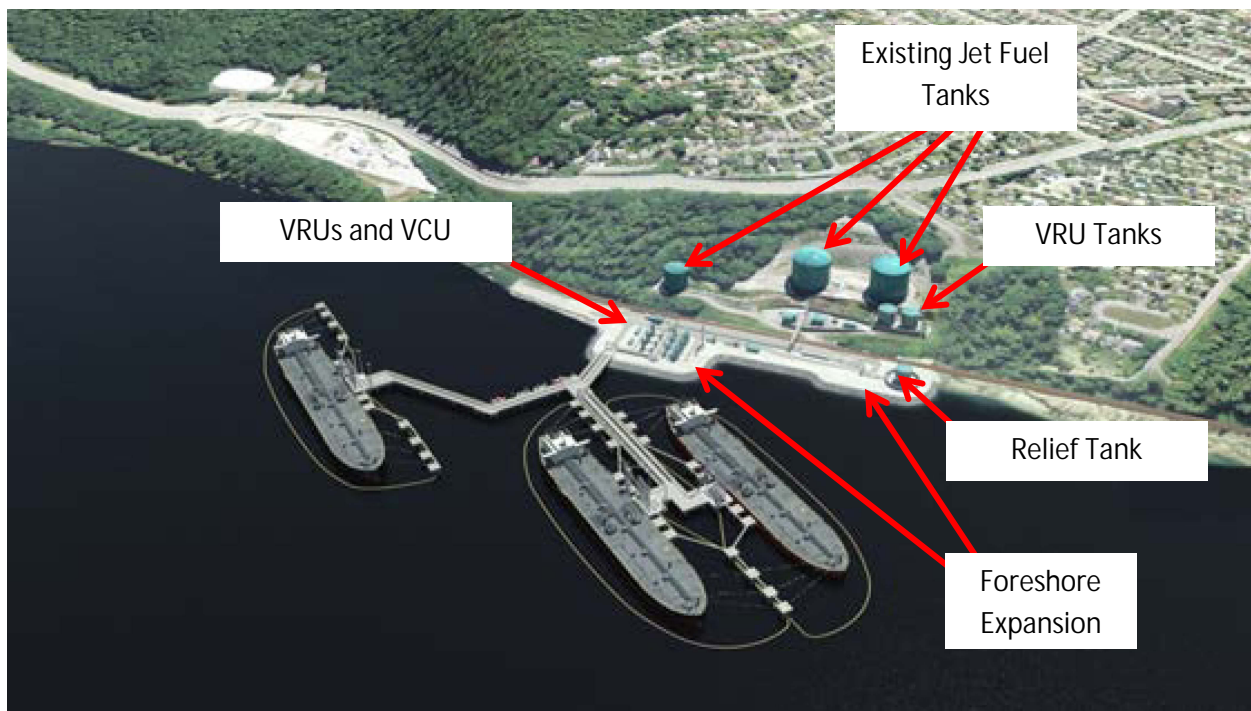


Figure 4.2.4 Westridge Marine Terminal Construction Scope Elements

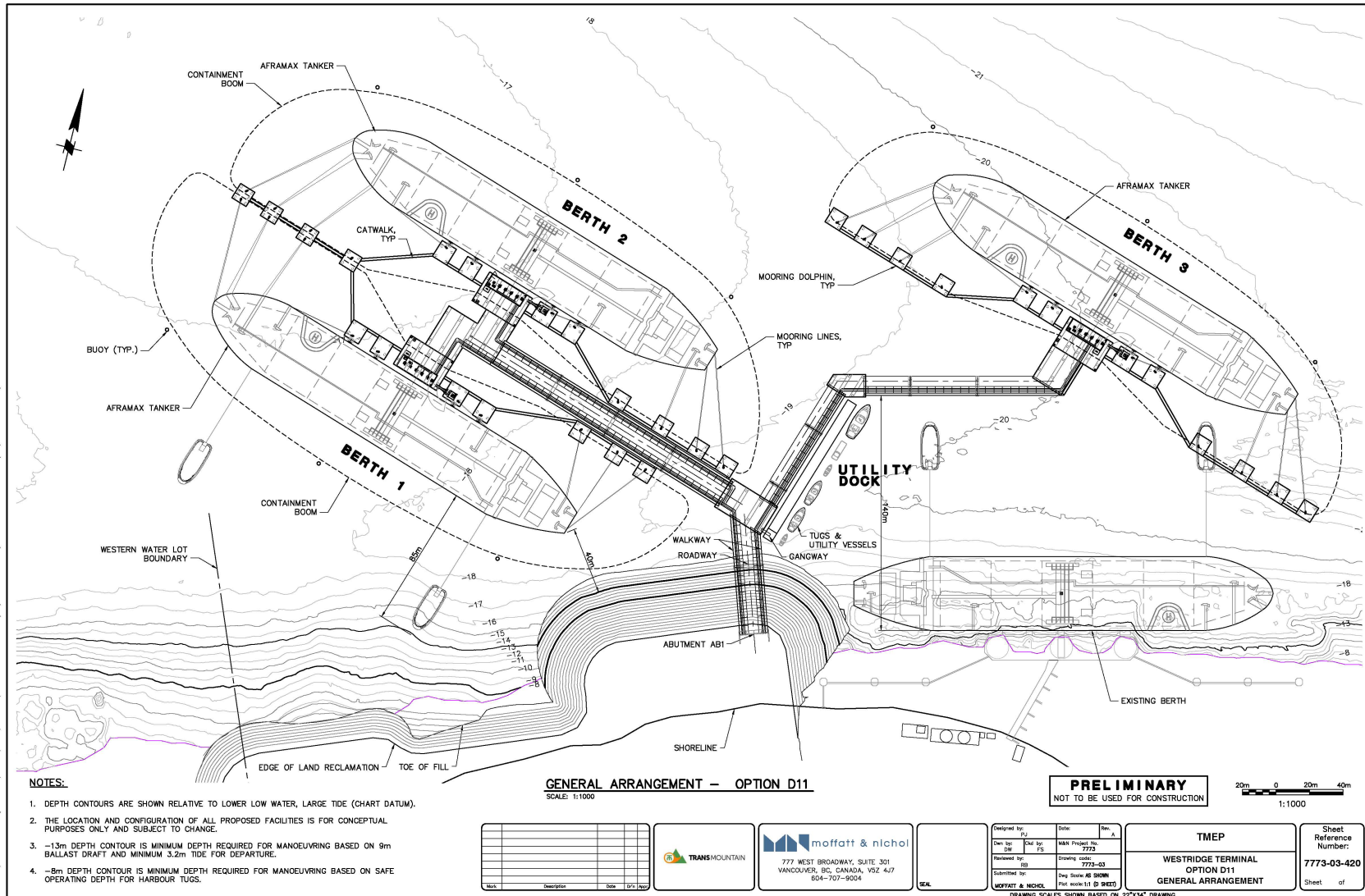


Figure 4.2.5 Westridge Marine Terminal Dock Configuration

4.2.2 Execution Strategy

Each of the four terminals will be managed separately, although some construction contracts may extend between Sumas, Burnaby, and Westridge.

It is anticipated that Trans Mountain will directly contract with fabrication and construction companies that provide services in the following areas:

- site services (dewatering, dust control, snow removal, etc.);
- terrestrial piling;
- marine piling;
- pre-cast concrete fabrication;
- civil (general earthwork and concrete foundations);
- specialty earthworks (*i.e.*, soil densification);
- specialty tank foundations (*i.e.*, soil-cement mixing);
- field erected tanks;
- tank hydrotesting;
- tank coating;
- structural fabrication;
- structural/mechanical/piping installation;
- pre-fabricated/pre-outfitted ESBs, and VFD, fire-water, foam and operator buildings; and
- electrical and instrumentation.

In some cases, general contractors (*i.e.*, general civil/structural/mechanical/piping) or specialty contractors (*i.e.*, structural fabrication/installation, structural/piping installation, etc.) may be utilized to provide multiple services.

4.2.2.1 Edmonton Terminal

The removal of the interior berms, the excavation of the remote impoundment annex, and the re-grading of the secondary containment area, will generate a large volume of surplus material. As the site is relatively flat and very congested, the majority of the surplus material will be hauled off-site for storage or disposal.

4.2.2.2 Sumas Terminal

No significant execution strategy issues are expected at Sumas Terminal.

4.2.2.3 *Burnaby Terminal*

Due to the creation of the new terraces and the partial remote impoundment, a large volume of material will be generated. Suitable material will be used to create containment berms, roads, and the intermediate storm-water retention area. Surplus material will be stockpiled on-site to the extent practical. Some surplus material may need to be hauled off-site for storage or disposal.

Tank area earthworks, tank foundations, tank construction, and tank completions (hydrostatic testing and coating) will be the critical path activities at Burnaby. To achieve the earliest start possible on these critical path activities, detailed design may be phased so that contracted packages for these elements are available before the remainder of the detailed design is complete. Contracting strategies will focus on ensuring that these critical path activities can be managed as efficiently as possible. Large volume specialty work (e.g., tank construction) may be split between two or more contractors to ensure that sufficient resources are available.

4.2.2.4 *Westridge Marine Terminal*

The existing dock at Westridge Marine Terminal must remain in service during construction of the new dock complex. The arrangement of Berth 3 is such that the eastern mooring dolphins cannot be constructed until the existing dock ceases operations. Once Berth 1 is constructed and commissioned, along with the shore facilities that support them, the existing dock will be removed from service and the Berth 3 eastern mooring dolphins will be constructed. Ideally, one of the new Burnaby-Westridge Marine Terminal pipelines will be ready for service coincident with Berth 1. If this is not feasible, the existing pipeline within Westridge Marine Terminal will be temporarily re-routed to connect to Berth 1. After the existing dock is removed from service it will be demolished.

Access to Westridge Marine Terminal is somewhat restricted by the narrow, winding access road. It is anticipated that delivery of materials, equipment, and pre-fabricated elements will be primarily by barge. If practical, barges will also be used for construction management and inspection offices, and construction laydown areas. Improvement of the access road and/or the construction of a new access road will be considered during the detailed engineering and design phase.

Marine piling, foreshore fill and stabilization (densification), and dock completion (pile caps and decking) will be the critical path activities at Westridge Marine Terminal, particularly since there may be in-water or over-water work restrictions. To achieve the earliest start possible on these critical path activities, detailed design may be phased so that contracted packages for these elements are available before the remainder of the detailed design is complete. Contracting strategies will focus on ensuring that these critical path activities can be managed as efficiently as possible. Large volume specialty work (e.g., marine piling) may be split between two or more contractors to ensure that sufficient resources are available. Emphasis will be placed on pre-fabricated dock components (i.e., trestle sections) to minimize work over water.

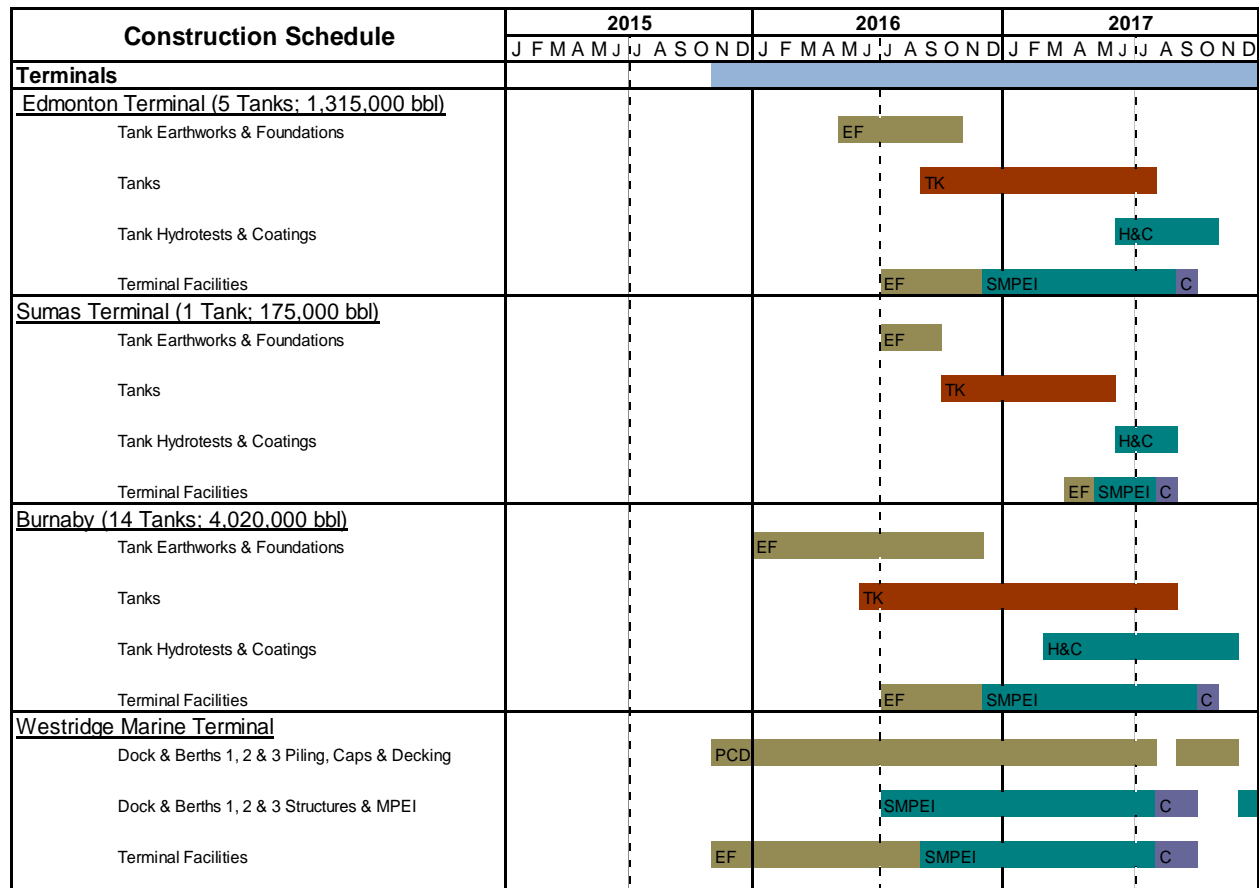
4.2.3 **Conceptual Schedule**

Figure 4.2.6 indicates the proposed construction schedule for the terminals. Comprehensive schedules for each terminal will be developed during the detailed engineering and design phase.

Conceptually, site grading in the areas near the tanks, tank foundation construction, tank erection, hydrostatic testing, and coating will proceed sequentially, with groups of two or three

tanks starting and progressing simultaneously. Subsequent groups of tanks will start four to six weeks after the preceding group. The schedule is designed to allow for the contractors engaged in these activities to move crews of tradespeople and equipment (e.g., soil/cement mix rigs) between groups of tanks. It also allows for the transfer of hydrostatic test water from tank to tank as groups of tanks are completed. A similar approach was used for the construction of the 14 tanks for ETEP.

The schedule is also designed such that the majority of earthworks, foundation work, tank hydrostatic testing, and coating will be executed in the spring, summer, and fall to avoid winter hoarding and heating, and wet or snowy conditions. Most of the other types of work can be efficiently done year-round. However, the magnitude of the work in Burnaby will require earthworks and tank foundations to proceed almost year-round in 2016. In addition, the majority of piling and other in-water work at Westridge Marine Terminal may be restricted to the fall and winter months for environmental reasons. Warmer winter temperatures will be more favorable to winter earthworks and foundation work at Burnaby and Westridge Marine Terminal.



Legend: EF - Earthworks & Foundations SMPEI - Structural, Mech., Piping, Electr., & Instr.
 TK - Tank Construction H&C - Hydrotesting & Coating
 PCD - Piling, Caps & Decking C - Commissioning

Figure 4.2.6 Terminals Conceptual Construction Schedule

4.2.3.1 *Edmonton Terminal*

Work at Edmonton Terminal is expected to take about 18 months from May 2016 through October 2017. Starting earlier in Edmonton is less desirable due to frozen ground conditions.

4.2.3.2 *Sumas Terminal*

Work at Sumas Terminal is expected to take about 14 months from July 2016 through August 2017. The smaller magnitude of the work in Sumas provides more schedule flexibility than at the other locations and work may be shifted several months earlier or later than shown.

4.2.3.3 *Burnaby Terminal*

Work at Burnaby Terminal is expected to take about 23 months from January 2016 through November 2017. The magnitude of the earthworks and the number of tanks at Burnaby are the primary reason for the extended schedule. Work may be started earlier than shown, as early as October 2015, to maximize the construction period available. Even so, detailed construction planning may indicate that site congestion or lack of construction resources will make the schedule difficult to achieve and there is the possibility that some tanks will be completed in 2018. However, the terminal facilities (piping, manifolds, booster pumps, meters, and electrical and control systems) will enter service in late 2017.

4.2.3.4 *Westridge Marine Terminal*

Work on the new facilities at Westridge Marine Terminal is expected to take about 26 months from November 2015 through December 2017. The November 2015 start is intended to take advantage of the winter 2015/2016 in-water work window for piling and foreshore fill. Berths 1 and 2 will enter service in about September 2017 to allow time for the Berth 3 mooring dolphins (that cannot be constructed while the existing dock is in service) to be constructed and commissioned by late 2017. Once Berth 1 is in-service, the existing dock will be demolished and any in-water habitat compensation will be installed (not shown on the schedule). These activities may continue until the end of winter 2017/2018 in-water work window.

4.3 **Other Facilities**

4.3.1 ***Sending and Receiving Traps***

Sending and receiving traps will generally be constructed as part of the pump station construction activities and managed as such. The exceptions are the demolition of the Hargreaves traps, the reconfiguration of the Darfield traps, and the construction of the US Border traps. These will be managed and constructed in conjunction with the closest pump station sites, Rearguard, Black Pines (or Blackpool), and Sumas (Station), respectively.

4.3.2 ***Remote Main Line Block Valve Sites***

There will be approximately 67 RMLBV sites to be added on Lines 1 and 2 with the exact number and location to be determined during the detailed engineering and design phase.

One or more contractors will be retained to complete the RMLBV sites after the pipeline contractors have welded the valve assemblies into the pipeline. If multiple contractors are selected, their scopes of work may be divided by groups of RMLBV sites or by task (e.g., civil/structural or electrical/instrumentation).

The completion of the RMLBV sites will include the following activities:

- site preparation and rough grading;
- installation of screw piles or other foundations;
- installation of perimeter fences and gates;
- setting of the pre-fabricated and pre-outfitted electrical/control cabinet;
- installing instruments;
- installing cable tray, and installing and terminating power and control cables;
- connecting of utility power; and
- finish grading.

The contractor(s) may also be required to install utility power lines from the nearest distribution power line, in coordination with the utility.

Completion of each RMLBV sites will take one to two weeks.

Construction management and inspection will be by a dedicated RMLBV team or by the closest teams managing pump station construction.

4.3.3 Pressure Control Stations

Pressure control stations, if required, will be located in the Hope, BC, area and will be included in the scope of the construction management teams and contractor(s) constructing the pump station at Kingsvale. The scope of the construction work will be similar to that at the pump station except on a much smaller scale.

4.3.4 Sumas Terminal Line 2 Take-off

The Sumas Terminal (Tank Farm) Line 2 take-off will be managed in conjunction with the work at Sumas Terminal. The scope of the work will be similar to a RMLBV site, except that it may include the installation of a concrete vault.

4.3.5 Power Lines

Power line construction in Alberta (Edmonton and Edson) will be managed directly by the electrical utilities. Power line construction in BC (Black Pines and Kingsvale) will be managed by Trans Mountain. The plans for power line construction will be developed during the detailed engineering and design phase. Transmission (deep) system upgrades will be managed by the electrical utilities in both BC and Alberta. Power lines and transmission system upgrades will need to be completed approximately one month before the start of commissioning.

4.4 General Construction Considerations and Elements

4.4.1 Construction Management and Inspection

Construction will be managed by a construction management team with some staff in the Calgary head office and the majority of the staff at the site offices. Construction management

personnel will include construction managers, contract administrators, cost controllers, construction/operations liaisons, safety coordinators, and administrative personnel.

Quality assurance will be achieved through inspection. Inspection will be carried out by an inspection team reporting to the construction management team. The inspection team will include chief inspectors, resident inspectors, and craft (trade) inspectors. Some craft inspectors may be specialists (*i.e.*, for rotating equipment) that travel from site to site.

It is anticipated that the combined construction management and inspection teams at the Edmonton, Burnaby, and Westridge Marine Terminal sites will have 10 to 25 staff. Each pump station site will have no less than one resident inspector, and it is anticipated that there will be a combined construction management and inspection team of five to ten staff for each group of three or four pump stations, and for the Sumas Terminal site. The pump station inspection groups may also be assigned responsibilities for pump station modification work, pressure relief facility work, or RMLBV work at locations nearby.

In most cases, Trans Mountain will contract directly with construction management or inspection staff or with small firms that provide self-practitioners under umbrella arrangements. In some cases, elements of construction management and inspection may be contracted to full service engineering, procurement, and construction management firms, or larger construction management and inspection firms. In those cases, the firms will be required to follow Trans Mountain's construction management and inspection philosophies.

4.4.2 Traffic Management

All sites, with the exception of Sumas, will have limited parking. It will also be desirable to keep construction related traffic to a minimum to reduce community impacts to the lowest practical level. The site-specific TCPs will consider the use of off-site parking and busing (or ferrying at Westridge Marine Terminal) as a parking and traffic mitigation measure.

4.4.3 Hours of Work

Hours of work will be determined after review of local bylaws, consideration of community input, consultation with contractors, assessment of critical path activities, and other factors. Typical construction schedules will be 10 to 12 hours per day, 5 to 6 days per week, in the day-time hours. Night-time activities will generally be limited to those that produce very low noise (*e.g.*, NDT, dewatering). In special circumstances (*i.e.*, critical tie-ins or critical crane lifts, where work cannot be stopped until complete), somewhat more significant night-time or weekend activity may be required. Additional information on hours of work is included in Volume 6.

4.4.4 Work within Existing Operating Facility Sites

The new construction areas at each existing pump station or terminal site will be isolated from the operating areas with temporary fencing to the extent practical. Where fencing is not practical, strict protocols for the demarcation and integrity of the operating areas will be developed as part of the TMEP Health & Safety Management Plan (Section 5). Special permission from Trans Mountain Operations will be required for any work required inside of the isolated area. Trans Mountain has significant experience in safely and efficiently managing large scopes of work within existing operating facility sites.

4.4.5 Earthworks and Foundations

Any trees located in the construction area will be removed, and topsoil will be stripped and stored in piles on or adjacent to the sites, in accordance with the EPP applicable to the site.

Rough grading will generally be to an elevation of 200 to 300 mm below final grade. Surplus material will be permanently stored on-site or disposed of after rough grading has been completed.

Once rough grading has been completed, foundations, containment berms, and permanent roads will be constructed. Foundations will be concrete spread footings or concrete or driven steel piles, depending on the geotechnical requirements of each site. Berms will be earthen or concrete.

Tank foundations will either be constructed of compacted granular material. In some cases, tank foundations will include concrete ring walls, soil-cement mix columns, or other elements to increase the bearing capacity of the soil.

After the majority of the heavy construction work has been completed gravel and other materials will be added and compacted as appropriate to achieve final grade. Any temporary fencing will be replaced by permanent fencing.

4.4.6 Structural

Pipe supports, and structural steel platforms and stairways will be largely pre-fabricated and coated (painted) in shops prior to installation on-site. Some structural elements may be galvanized or made from composite materials.

4.4.7 Tanks

Large diameter storage tanks will be field erected (welded) from pre-fabricated components, such as rolled shell plates, floating roof pontoons, platform sections, etc. (in place, on their foundations). Each tank will take between six and ten months to reach mechanical completion (readiness for hydro-testing), depending on the size and location of the tank.

Tank welds will be non-destructively tested in accordance with the requirements of API Standard 650.

Each tank will be filled with water for hydrostatic testing, in accordance with the requirements of API Standard 650, to verify the structural integrity of the tank and to ensure that foundation settlement is within prescribed limits. Hydrostatic testing will take one to two weeks, depending on the size of the tank. Ideally, water used for hydrostatic testing will be pumped from the tested tank to the next tank ready for testing, to avoid intermediate storage of water.

After hydrostatic testing the top surface of the floor, the interior surface of the lower 1 m of the shell, and the external surfaces of the shell and roof (either the fixed roof or the floating roof, if there is no fixed roof) will be coated. Coating will take three to six weeks, depending on the size of the tank.

Piping connections, cable tray installation, and power and control cable installation and terminations will be done after hydrostatic testing but generally coincident with coating.

Small diameter tanks, capable of being transported in one piece, will be prefabricated, hydrostatically tested, and coated in fabrication shops.

4.4.8 Buildings

Pump building structural components will be pre-fabricated and coated in shops, and erected and connected on-site (in place, on their foundations). Pump buildings will be cladded on-site. Pump building erection will take approximately four weeks. ESBs, VFD buildings, and operator buildings will be completely pre-fabricated, outfitted with equipment and wiring, and tested prior to being delivered to site for setting on their foundations.

4.4.9 Piping

Where practical, large bore piping in process areas (*i.e.*, manifold, pump, and meter areas) will be fabricated into spools in shops, hydrostatically tested, and externally coated before shipment to site. Site assembly of pipe spools will consist of bolting to valves and other mechanical equipment, and bolting or tie-in welding to other spools. Large bore tank lines and interconnection lines will generally be fabricated on-site into segments with final welding being done on the pipe racks (supports) or in the pipe trenches. Tank lines and interconnection lines will generally be hydrostatically tested in place, although some segments may be pre-tested before assembly. Some pre-tested large bore piping spools may be hydrostatically tested again as part of final assemblies. Small bore piping (*i.e.*, drain piping) will be largely fabricated and tested on-site. All process piping in areas that have large numbers of bolted connections and/or drain/instrument branch connections will be tested with low-pressure air or nitrogen prior to wet commissioning.

All large bore piping welds will be non-destructively tested, either in the fabrication shops or at site, using radiographic or ultrasonic methods, in accordance with the requirements of CSA Z 662.

4.4.10 Electrical and Instrumentation

Substation work will be contracted to firms specializing in high voltage electrical facilities. In Alberta, the electrical utilities having jurisdiction will contract the work. In BC, Trans Mountain will contract the work. The sequencing of construction will be similar to other aspects of the pump stations and terminals. After the foundations have been constructed and structural steel fabrication has been completed, head-end structures, transformers, tap changer(s), breakers, switches, and bus systems will be installed, and interconnection power and control cables will be installed and terminated. At appropriate times, access by the facilities contractor(s) will be allowed.

The electrical/instrumentation contractor or subcontractor will install all electrical equipment, conduits, cable tray, and cable from the secondary side of the transformer at the designated point of connection to the main breaker feeding the pump station or terminal.

Instruments will be pre-calibrated by the vendors and be installed following the vendors' recommended practices and KMC/Trans Mountain standard installation details.

4.4.11 Control Systems

Trans Mountain will contract with a firm specializing in control systems to integrate the new equipment into a control scheme for each facility. The control scheme will utilize existing approved control philosophies and practices, and will be developed under the supervision of Trans Mountain operating staff.

4.4.12 Pre-commissioning, Commissioning, and Start-up

Pre-commissioning and commissioning will be carried out in accordance with KMC Standard PM-3611, Commissioning of Pipeline Facilities. Commissioning will be the responsibility of the TMEP facilities project team, who will organize one or more commissioning teams comprised of Trans Mountain operations staff and contract staff familiar with commissioning activities. The commissioning team(s) will develop a Commissioning and Start-up Plan for each facility. Typical content will include commissioning roles and responsibilities, custody and care jurisdiction (between the construction team, the commissioning team, and operations), the management of work logistics, the approach to verifying mechanical completion, the intended treatment of deficiencies, the methodology for the introduction of process fluids (*i.e.*, crude oil), and the sequencing of start-up activities. The commissioning team(s) will also develop a Commissioning Manual for each facility, which will include check sheets, deficiency lists, and declarations.

4.4.12.1 Pre-commissioning

While a facility is under construction, there may be opportunities for commissioning team members to conduct some pre-commissioning checks. Examples are pump/motor alignment checks, which are required for mechanical completion. When the state of overall mechanical completion for a facility is imminent, the construction management team and the commissioning team will work closely together to ensure the best sequence for the turn-over of systems to the commissioning team. High-priority systems, such as high-voltage power systems and primary communications systems, may be pre-commissioned early and in isolation to facilitate readiness for commissioning of other systems.

4.4.12.2 Dry Commissioning

Dry commissioning involves the systematic inspection and testing (guided by check sheets) of mechanical, piping, electrical, instrumentation, control, and communications systems, prior to the introduction of process fluids, to ensure that they are ready for the introduction of fluids and are expected to function as intended.

4.4.12.3 Wet Commissioning and Start-up

Wet commissioning involves the systematic inspection and testing (guided by check sheets) of mechanical equipment, motors, instrumentation, and control systems, after the introduction of process fluids, to ensure that they are ready for sustained operations. The full function of some equipment and their control systems cannot be verified until process fluids are introduced. The commissioning team, working closely with operations, will carefully introduce process fluids into the dry commissioned systems so that wet commissioning can begin. During wet commissioning pump motors and VFDs will be started and begin to experience increasing loads.

In some case, for example for the Line 2 pump stations, there will be a delay between the completion of dry commissioning and the start of wet commissioning as the pipeline will not have been filled when dry commissioning is completed. Wet commissioning of pump stations will typically be done sequentially in conjunction with pipeline line fill with newly wet commissioned stations supplying the pumping to fill segments of the line downstream of their locations.

5.0 HEALTH AND SAFETY, SECURITY AND EMERGENCY MANAGEMENT

5.1 Health and Safety Management Program

The KMC Environment, Health and Safety (EH&S) Policy (Section 4.2.2 of Volume 7), adopted by Trans Mountain, provides the underlying principles for management of all Trans Mountain projects including TMEP.

A Health and Safety Management Plan (HSMP) will be developed for TMEP during the detailed engineering and design phase prior to the start of construction. The HSMP will conform to the NEB OPR, the Canada Labour Code Part II Occupational Health and Safety, and the Canada Occupational Health and Safety Regulations. Where appropriate, other applicable jurisdictional requirements such as the Alberta and BC Occupational Health and Safety (OH&S) Regulations may be incorporated into the HSMP, in particular, where provincial requirements support a higher standard of safety than the federal requirements.

The HSMP will be guided by KMC Standard PM-3201, Construction Health and Safety Management. This standard is currently under development and will identify the fundamental requirements for project-specific Health and Safety Plans.

5.1.1 Purpose and Structure of the Health and Safety Management Plan

The TMEP HSMP will be designed to reduce risk to and otherwise protect the health and safety of workers and the public. It will meet and incorporate the existing KMC Health and Safety requirements, including those identified in the KMC Health and Safety Standards Manual (HSSM) and the KMC Contractor Environmental/Safety Manual, and set the minimum standards all contractors must follow for the provision of services in respect of the construction of the TMEP pipelines and facilities pursuant to Sections 18 to 20 of the NEB OPR. In addition to reducing risk and protecting the health and safety of workers and the public, implementation of a HSMP will allow for continuous improvement throughout the construction life-cycle.



The HSMP will promote a systematic and documented approach to the management of health and safety. The use of a management system will allow for continuous improvement. The management system will be based on the ISO 18001, CSA Z1000 and ANSI Z10 systems, and will incorporate the elements of Section 6.5, Management System Processes, of the NEB OPR.

Generally, the elements to be considered will include:

- general requirements;
- OH&S Policy and commitment;
- planning:
 - hazard identification, risk assessment and control;
 - legal and other requirements;
 - objectives; and
 - OH&S management programs;
- implementation and operation:
 - structure and responsibility;
 - training, awareness and competence;
 - consultation and communication;
 - documentation;
 - document and data control; and
 - emergency preparedness and response;
- checking and corrective action:
 - performance measurement and monitoring;
 - accidents, incidents, non-conformances, and corrective and preventative action;
 - records and records management;
 - audit; and
 - management review.

5.1.2 Contractor's Project Specific Safety Plan and Risk Assessment

As noted in Section 5.1.1, the TMEP HSMP will incorporate the requirements of the current KMC HSSM, which include a standardized process for effectively selecting and managing contractors. This program is divided into three components, which include:

- selecting;
- informing; and
- monitoring.

It also incorporates the following criteria:

- approves only qualified contractors;
- ensures contractors operate in a manner that protects the health and safety of the public and workers;
- establishes an understanding of the minimum requirements expected and required by the contractor;
- formalizes training and communication programs to ensure adequate instruction and coordination prior to, and during, work activities; and
- requires formal audit procedures to monitor and evaluate contractor performance.

The above items are currently monitored and evaluated in a coordinated manner using the ISNetworld registration process.

A prime contractor will be assigned to each mainline pipeline spread in conformance with BC and Alberta OH&S Regulations. For pump stations, terminals, and other facilities, Trans Mountain will be the prime contractor. The prime contractor will be responsible for conducting a risk assessment (RA) of their work as part of the development of a Project Specific Safety Plan (PSSP). In addition to the RA, the prime contractor will develop and implement their PSSP to meet all of the requirements of the HSMP.

The prime contractor will submit their PSSP to Trans Mountain for approval a minimum of 60 days prior to the commencement of construction.

5.1.3 Subcontractors

It is expected that the prime contractor will employ subcontractors. All prime contractors, within their PSSP, must develop a subcontractor qualification and monitoring process, which meets the requirements of the HSMP.

5.1.4 Health and Safety General Orientation

The prime contractor will be responsible for ensuring that all personnel attend and participate in a formal, Health and Safety Orientation prior to allowing them to access the work sites. The Health and Safety Orientation will include, as a minimum:

- an introduction to TMEP;
- roles, responsibilities, and accountabilities of all those at the work site;
- a comprehensive review of the known hazards and the controls that have been implemented;
- a review of the site EH&S Rules;
- a review of the site Emergency Response Plan (ERP); and
- expectations of workers as visitors in the communities.

All visitors and short duration workers, usually those workers that will be present on the work site for less than 48 hours, will require a Visitor's EH&S Orientation, which will be an abbreviated version of the full EH&S Orientation. It will incorporate, as a minimum, a general review of the hazards and controls at the work site, as well as a review of the ERP.

5.1.5 Worker Code of Conduct

All workers will be expected to accept and adhere to a Worker Code of Conduct (WCC), which will be presented in the Health and Safety Orientation. The WCC will require all workers to follow the KMC Health and Safety Policy, Part 126, Duties of Employees, of the Canada Labour Code, the *Canadian Human Rights Act* as it pertains to construction worksite, as well as KMC's Workplace Violence and Harassment Policies. In addition, the WCC will provide guidelines for behaviour during off-work hours in communities where workers are visitors.

5.1.6 Safety Training

All workers on TMEP will receive appropriate training to meet legislative requirements and to reduce the potential of hazards causing injury to themselves or others. Training records will be kept by the contractors and will be subject to review by Trans Mountain as part of the inspection and audit process outlined within the TMEP HSMP.

5.1.7 Work Place Health and Safety Committees

All construction sites with 20 or more workers will be required to establish a Work Place (Joint Worksite) Health and Safety (JWH&S) committee. The purpose of the committee is to review significant incidents and provide feedback on potential corrective actions as well as ensure that issues pertaining to work place health and safety are addressed with worker input. JWH&S committees will be made up of worker, supervisor, safety, and management representatives pursuant to the Canada Labour Code, Part II, Section 135.

It is expected that each mainline spread and each pump station or terminal site will have a JWH&S committee comprised of TMEP and/or prime contractor management personnel, TMEP and prime contractor safety inspectors, and prime contractor/subcontractor supervisors and workers in accordance with the applicable legislation. Meetings will occur on a regular basis and will address health and safety concerns, including those brought up by workers to their JWH&S committee designate. A process for systematic feedback to all workers to facilitate continuous improvement will be developed.

5.1.8 Inspections and Audits

Inspections and audits will be conducted in accordance with Section 53 of the NEB OPR. Formal audits will be conducted by Trans Mountain or prime contractors at least once per calendar year.

Other types of inspections will be carried out, as a minimum:

- daily inspections by all workers of their tools and equipment;
- weekly inspections by contractor supervision of the work areas they are responsible for;
- weekly inspections by contractor safety personnel of the work areas they are responsible for;

- weekly inspections by Trans Mountain safety inspectors of the work areas they are responsible for;
- monthly inspections by contractor management of the work areas they are responsible for;
- quarterly inspections by Trans Mountain management of selected work areas; and
- periodic site visits by Trans Mountain senior management.

Corrective actions identified will be assigned to the appropriate responsible party for follow-up in a timely manner.

5.1.9 Incident Investigations

All incidents involving a recordable personal injury (*i.e.*, a medical aid or a lost time incident), property/equipment damage (above a threshold loss level to be determined), or a near miss with significant potential for injury or property damage, will be investigated. Prime contractors will be responsible for investigating all incidents within their jurisdiction, with final sign-off of incident reports by TMEP management to ensure that appropriate, and comprehensive corrective actions have been identified, communicated, and implemented. Serious incidents may be investigated directly by a multi-discipline committee appointed by KMC management.

In the event of an incident that is reportable in accordance with the requirements of the NEB OPR, the NEB's Detailed Incident Report will be completed and filed.

5.2 Health and Safety Plans and Programs

Various plans and programs will form parts of the HSMP, some of which are described in the subsections below.

5.2.1 Fatigue Management Plan

Contractors will be required to provide a Fatigue Management Plan prior to starting construction to ensure that all workers are adequately rested between shifts and between shift cycles. In the absence of specific federal standards or BC standards, contractors will follow the Alberta Employment Standards Code, which include the requirement for one day of rest per week or a maximum of 24 consecutive days of work followed by four consecutive days off.

5.2.2 Drug and Alcohol Policies

Contractors will develop and enforce policies that prohibit the possession, distribution, promotion, manufacture, sale, use, and abuse of illegal drugs, drug paraphernalia, and alcoholic beverages by workers while on the work sites. The policies must also ensure that workers are free from the effects of legal drugs that may affect worker safety. Contractors must include probable cause testing criteria in their policies.

The contractors' drug and alcohol policies should follow the Canadian Model for Providing a Safe Workplace, Alcohol and Drug Guidelines and Work Rule, a best practice of the Construction Owner's Association of Alberta.

5.2.3 Traffic Management and Control Plans

Interaction with public traffic, and inter and intra-site traffic management will be a Project construction hazard. As such traffic safety will be a high priority and the TMPs and TCPs discussed in Section 2.5 and the ACMP discussed in Section 3.4.3 will be developed. The plans will include, as a minimum, the following elements:

- criteria for public traffic controls and access limitations to and around construction areas;
- restrictions of construction traffic to the approved access roads, rights-of-way, temporary workspaces, and pump station and terminal sites;
- the requirement to adhere to all applicable traffic, road-use, and vehicle safety laws;
- the prohibition of distracted driving, in accordance with provincial regulations and the KMC Cell Phone Use Policy, which also prohibits the use of hands-free devices; and
- the use of multi-passenger vehicles for the transport of construction crews to and from work sites, where practical, to lessen the potential for incidents due to fatigue and traffic volume.

5.2.4 Safe Work Permit Plan

Safe Work Permits will be used to document the identification of hazards and controls. Permits will be issued for higher risk activities, wherever required by legislation, and where work takes place within existing Trans Mountain operating facilities. Activities which will require Safe Work Permits may include

- ground disturbance;
- blasting;
- confined space entry;
- hot work (welding or spark producing work);
- work above 6 m in height; and
- working alone under higher risk conditions.

A Safe Work Permit process will be included within the HSMP. Prime contractors will be responsible for documenting specific Safe Work Permit planning within their PSSPs and to communicate that planning to all workers during the orientation.

5.2.5 Blasting Management Plan

Blasting will be required for pipeline construction. A Blasting Management Plan (BMP) will be developed and implemented to ensure worker and public safety, and to prevent unintended damage to equipment and adjacent pipelines or facilities.

5.2.6 Fire Prevention Plan

The prime contractors will develop and implement Fire Prevention Plans (FPPs) based on minimum guidelines provided by the HSMP. The prime contractors will also be responsible for ensuring that legislation (*i.e.*, the *BC Wildfire Act General Regulation*) restricting work during extreme fire hazard periods are enforced. The prime contractor will obtain all permits and exemptions.

5.2.7 Fire Contingency Planning

In addition to the mitigation factors identified in the FPPs, appropriate contingency planning by the prime contractors will also be required. TMEP construction managers or environmental inspectors will notify the NEB and appropriate provincial and municipal authorities, as soon as practical, that contingency measures have been implemented in the event of a fire.

As part of the contingency planning, the following standard measures will be followed on the rights-of-way and associated construction areas (*i.e.*, borrow sites):

- Prior to commencement of construction, contractors will designate one of their staff as fire boss. The fire boss will be familiar with fire suppression techniques, equipment, and procedures.
- All TMEP inspector and contractor vehicles will carry fire-fighting equipment such as Pulaskis, shovels, and backpack pumps or components of a water delivery system (*i.e.*, pumps and hoses) in sufficient quantities so that each worker will have access to, at minimum, one hand tool with which to carry out fire suppression work. In addition, all motorized equipment will carry a fully charged fire extinguisher.
- The fire boss will ensure that fire-fighting equipment is adequate and in working order.
- The fire boss will ensure that construction equipment is cleaned periodically to reduce the build-up of debris in areas which could pose a fire hazard (*i.e.*, the belly pans of crawler tractors).
- In the event of wildfire, the following response measures, as a minimum, will be implemented:
 - immediate fire suppression, provided that the fire's behaviour allows it to be done safely;
 - reporting to the fire boss of the location and size of the fire, as well as the wind direction, types of fuels burning, and the immediate values at risk;
 - reporting by the fire boss of general fire information to the appropriate federal, provincial, and municipal responding agencies;
 - inspection of the fire scene and control of the suppression measures by the fire boss, as soon as possible;
 - transport of all available fire suppression equipment and personnel to the fire scene, subject to consideration by the fire boss of the fire's behaviour,

- the safety, training, and fitness of personnel, and the availability of equipment;
- removal of explosive or flammable materials, vehicles, etc. to a safe location;
- continuation of fire suppression efforts until the fire is extinguished or until otherwise notified by the agency having jurisdiction; and
- ensuring that all burning embers are extinguished and monitoring the burn area for smouldering material, using available scanning equipment to detect any residual hot spots.

During orientation, basic information will be made available to all workers on the initial steps to take in case of a wildfire, including reporting.

5.2.8 *Noise Control Plan*

Some activities will occur in populated urban areas. In order to minimize nuisance noise and the effects of noise on worker and public health, mitigation factors will be applied where applicable, including:

- adherence to applicable federal, provincial, and municipal regulations and guidelines for noise management;
- scheduling of construction to avoid work at noise-sensitive locations during noise-sensitive times, where practical;
- enforcement of speed limits and prohibition of engine retarder braking in noise-sensitive areas;
- selection of equipment that meets current industrial and regulatory acoustic standards;
- maintenance of equipment in good working condition in accordance with manufacturer guidelines;
- enclosure of noisy equipment and the use of baffles, where practical;
- selection of tools of not greater than the appropriate size and power, where practical; and
- location of stationary equipment, such as compressors and generators, as far as practical from noise receptors.

5.2.9 *Ground Disturbance Plan*

Disturbance of the ground, generally accepted to be any disturbance with mechanical equipment, disturbance with non-mechanical methods to a depth of greater than 300 mm, or the crossing of underground infrastructure with equipment will be a common construction activity.

A Ground Disturbance Plan (GDP) will be developed for use on all pipeline and facilities work sites, and will include mitigation measures such as:

- use of the Alberta and BC One Call systems for primary identification of underground infrastructure;
- use of “blind, 4-way sweeps” to identify underground infrastructure not identified through the one call process;
- following all requirements of the utilities that own or control the identified underground infrastructure, including hydro-excavation and/or hand-exposing, where applicable;
- marking and maintaining markings of identified underground infrastructure so that it is protected from unintended or unauthorized excavation or traffic;
- marking and maintaining markings of the existing Trans Mountain pipeline where TMEP pipeline construction is within the 30 m safety zone; and
- using internal permits for ground disturbance, which have copies of identification documentation, and utility authorizations and work requirements attached.

5.2.10 Overhead Utilities Plan

Work under and near overhead utilities will be a common construction activity. The guidelines provided by the Alberta OH&S and the Worksafe BC OHS Regulations, as indicated in the Tables 5.2.1 and 5.2.2, will be followed.

TABLE 5.2.1

GUIDELINES FOR WORK UNDER OR NEAR OVERHEAD UTILITIES - ALBERTA

Operating Voltage Between Conductors of Overhead Transmission Line	Safe Limit of Approach Distance for Persons and Equipment	
	Metres	Feet
Up to 750 V Insulated or polyethylene-covered conductors	0.3	1
Up to 750 V Bare, uninsulated	1.0	3
Above 750 V Insulated conductors	1.0	3
750 V to 40 kV	3.0	10
69 kV, 72 kV	3.5	12
138 kV, 144 kV	4.0	13
230 kV, 260 kV	5.0	16
500 kV	7.0	23

TABLE 5.2.2

GUIDELINES FOR WORK UNDER OR NEAR OVERHEAD UTILITIES – BC

Minimum Distance		
Voltage Phase To Phase	Metres	Feet
Over 750 V to 75 kV	3	10
Over 75 kV to 250 kV	4.5	15
Over 250 kV to 550 kV	6	20

Safe limits of approach will be further identified by using goal-posts, which will be installed on paths or roads on both sides of an overhead utility to provide a physical indicator of when a load is too high to pass safely.

5.3 Security

The security of the construction areas where TMEP materials, equipment, or workers will be present and where the general public may be in close proximity is of high importance. Although operations facility security planning (identified in Section 11.0 of Volume 4C) exists, additional construction areas will be required for TMEP.

All construction areas, including those within existing Trans Mountain rights-of-way, pump stations, terminals, and other facilities will undergo a Security Risk Assessment (SRA) and appropriate controls will be implemented prior to the start of construction. Such measures may include on-site security personnel, additional on-site security personnel to those that may already be employed, fencing, or other similar physical barriers or signage. Contractors will also be required to conduct daily inspections of construction areas, equipment, and tools.

5.3.1 Security Management Program

A Security Management Program (SMP) will be developed for TMEP as required by Section 47.1 of the NEB OPR. Security concerns will be addressed through identification of risks, and determination and implementation of appropriate controls. Regular inspections and audits will be conducted on the SMP and its implementation to provide assurance that the SMP is functioning effectively. The SMP will be complementary to the existing Trans Mountain SMP (as identified in Section 11.0 of Volume 4C).

5.4 Emergency Preparedness and Response

5.4.1 Policy Statement

Trans Mountain's emergency preparedness and response measures are designed to ensure timely and appropriate responses to emergencies in compliance with applicable federal, provincial, and municipal legislation, and recognized industry standards of practice.

5.4.2 Emergency Response Plans

To comply with the systematic Safety Management Program approach as required by Section 47 of the NEB OPR, an ERP will be developed and implemented for TMEP construction. The TMEP ERP for construction will be separate from, and complementary to, the

Trans Mountain operations ERP and will lay out the guidelines for the development of the prime contractors' detailed site-specific ERPs. The TMEP ERP for construction will address legislative requirements and be based on recognized industry standards of practice.

The site-specific ERPs will address potential construction emergency situations requiring response by TMEP construction resources (as supplied by the prime contractors), Trans Mountain operations resources, or external resources, in keeping with the philosophy of using the most immediately available resources. It is expected that the site-specific ERPs will address personal injury or health incidents, environmental damage, fires, floods, earthquakes, rock slides, avalanches, sabotage, trespass, and other emergency situations that may arise in the context of construction. The site-specific ERPs will consider the contractors' risk assessments (Section 5.1.2 of Volume 4B) completed as part of the Hazard Prevention Program required by Part XIX, Section 19.1 of the Canada Labour Code. The site-specific ERPs will identify emergency response roles and responsibilities and the detailed procedures, including notifications, to be followed in the event of various types of emergencies.

Regular audits will be conducted on the site-specific ERPs to provide assurance that they will function effectively in case of emergencies.

6.0 REFERENCES

6.1 Literature Cited

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7.0 APPENDICES

Appendix A Tables

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TABLE 7.1.1

ESTIMATED NUMBERS OF CONSTRUCTION PERSONNEL

Project Component	Approximate Number of Personnel
Pipeline	500 to 800 for larger spreads 150 to 400 for smaller spreads
Pump Stations	40 to 50 for each pump station
Terminals	600 to 800 for the four terminals

TABLE 7.1.2

CONSTRUCTION TRADES AND SKILL SETS

Construction Trades and Skill Sets	Pipeline	Pump Stations	Tank Terminals	Marine Terminal
Boilermakers			X	
Carpenters		X	X	X
Electricians		X	X	X
Ironworkers		X	X	X
Labourers	X	X	X	X
Millwrights		X	X	X
Operating Engineers	X	X	X	X
Pipefitters	X	X	X	X
Welders	X	X	X	X
Mariners/Deckhands				X
Others	X	X	X	X

TABLE 7.1.3

PRELIMINARY CAMP SITE LOCATIONS

Camp Site Location	Nearest Reference Kilometre (RK)
Edson	234
Valemount or Blue River	519 or 615
Vavenby or Clearwater	701 or 722

TABLE 7.1.4

PRELIMINARY PIPE STOCKPILE LOCATIONS

Pipe Stockpile Location	Nearest Reference Kilometre (RK)
Edmonton	47
Wildwood	150
Edson	234
Obed/Hinton	288
Valemount	528
Blue River	615
Vavenby	701
Kamloops	840
Merritt	930
Hope	1050
Abbotsford	1125
Surrey	1169

TABLE 7.1.5

PROPOSED PIPELINE CONSTRUCTION SPREADS

Construction Spread	Reference Kilometre (RK)	Proposed Spread Lengths (km)	Construction Season
A1	0 to 49.0	49.0	Summer 2016, Winter 2016/2017 and Summer 2017
A2	49.0 to 339.4	290.4	Summer 2016, Winter 2016/2017 and Summer 2017
BC1	489.6 to 769.0	279.4	Summer 2016, Winter 2016/2017 and Summer 2017
BC2	811.8 to 1018.0	206.2	Summer 2016, Winter 2016/2017 and Summer 2017
BC3	1018.0 to 1078.1	60.1	Summer 2016 and Summer 2017
BC4	1078.1 to 1148.0	69.9	Summer 2016 and Summer 2017
BC5	1,148.0 to 1,168.4 + 1,169.5 to 1,179.7 + 0 to 3.6 (Burnaby Terminal to Westridge)	34.2	Summer 2016 and Summer 2017
T1	1168.4-1169.5	1.1	Summer 2016

TABLE 7.1.6
EXISTING PRIMARY ACCESS

Reference (RK)	Name	Length (km)	Owner	Access Type
0.0	102 Avenue	0.03	Alberta Government	Public
0.0	Burnaby Mountain Parkway	1.95	BC Government	Public
0.1	101A Avenue	1.03	Alberta Government	Public
2.0	Hastings Street	0.54	BC Government	Public
2.0	Hastings Street	0.55	BC Government	Public
2.3	216 Highway Off-Ramp	1.07	Alberta Government	Public
2.6	Hastings Street	0.02	BC Government	Public
2.6	Hastings Street	0.28	BC Government	Public
2.6	Cliff Avenue	0.54	BC Government	Public
2.6	Hastings Street	0.20	BC Government	Public
3.6	Inlet Drive	0.79	BC Government	Public
3.6	Inlet Drive	0.77	BC Government	Public
3.8	Extension Highway 216 Service Road	0.71	Trans Mountain	Private
3.8	Highway 216 Service Road	0.81	Alberta Government	Public
4.6	Township Road 524A	0.65	Alberta Government	Public
4.6	Highway 216 Service Road	1.11	Alberta Government	Public
5.2	Fir Street	0.30	Alberta Government	Public
5.2	Ordze Road	0.15	Alberta Government	Public
5.3	Ordze Road	0.03	Alberta Government	Public
5.3	Sherwood Park Freeway Off-Ramp	0.05	Alberta Government	Public
5.4	Wye Road	0.59	Alberta Government	Public
5.4	Ordze Road	0.01	Alberta Government	Public
5.4	Wye Road	0.03	Alberta Government	Public
5.4	Wye Road	0.04	Alberta Government	Public
5.4	Sherwood Park Freeway Off-Ramp	0.05	Alberta Government	Public
5.4	Wye Road	0.09	Alberta Government	Public
5.4	Wye Road	0.59	Alberta Government	Public
5.4	Ordze Road	0.02	Alberta Government	Public
5.4	Wye Road	0.00	Alberta Government	Public
5.4	Wye Road	0.03	Alberta Government	Public
5.4	Ordze Road	0.02	Alberta Government	Public
5.4	Ordze Road	0.04	Alberta Government	Public
5.4	Sherwood Park Freeway Off-Ramp	0.04	Alberta Government	Public
5.4	Wye Road	0.02	Alberta Government	Public
5.4	Wye Road	0.10	Alberta Government	Public
5.4	Ordze Road	0.02	Alberta Government	Public
5.4	Sherwood Park Freeway Off-Ramp	0.03	Alberta Government	Public
5.4	Ordze Road	0.06	Alberta Government	Public
5.5	23333 Wye Road	0.45	Alberta Government	Public
7.2	Range Road 233	1.46	Alberta Government	Public
7.2	Township Road 523	1.57	Alberta Government	Public
8.6	628 Highway	1.00	Alberta Government	Public
8.7	628 Highway	0.59	Alberta Government	Public
8.7	Whitemud Drive	0.59	Alberta Government	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
10.6	23 Avenue North-west	2.58	Alberta Government	Public
10.8	Highway 14 Off-Ramp	0.15	City of Edmonton	Public
11.8	Range Road 234	1.42	Alberta Government	Public
12.0	14 Highway	1.08	Alberta Government	Public
12.1	14 Highway	0.76	Alberta Government	Public
14.4	17 Street North-west	0.60	Alberta Government	Public
14.4	Anthony Henday Drive North-west	0.79	Alberta Government	Public
14.6	17 Street North-west	0.59	Alberta Government	Public
16.1	34 Street North-west	0.37	City of Edmonton	Public
16.2	34 Street North-west	0.93	City of Edmonton	Public
17.1	50 Street North-west Off-Ramp	0.72	Alberta Government	Public
17.8	50 Street North-west Off-Ramp	0.47	Alberta Government	Public
17.8	50 Street North-west	0.67	Alberta Government	Public
17.8	50 Street North-west	0.67	Alberta Government	Public
19.2	66 Street North-west	0.97	Alberta Government	Public
20.4	91 Street North-west Off-Ramp	0.63	Alberta Government	Public
21.0	91 Street North-west	1.34	Alberta Government	Public
21.0	91 Street North-west	1.33	Alberta Government	Public
21.3	Parsons Road North-west Off-Ramp	0.78	Alberta Government	Public
22.1	Parsons Road North-west	1.51	Alberta Government	Public
22.3	Parsons Road North-west Off-Ramp	0.15	Alberta Government	Public
22.3	Parsons Road North-west Off-Ramp	0.14	Alberta Government	Public
22.3	Parsons Road North-west Off-Ramp	0.06	Alberta Government	Public
23.0	Access to MPD	0.25	Alberta Government	Public
24.6	111 Street North-west Off-Ramp	0.13	Alberta Government	Public
24.6	111 Street North-west	1.16	Alberta Government	Public
24.6	111 Street South-west	1.16	Alberta Government	Public
26.2	119 Street North-west	0.25	Alberta Government	Public
26.2	119 Street North-west Off-Ramp	0.03	Alberta Government	Public
26.3	127 Street North-west Off-Ramp	0.03	Alberta Government	Public
26.3	127 Street North-west Off-Ramp	0.26	Alberta Government	Public
26.3	127 Street South-west	0.94	Alberta Government	Public
27.7	Anthony Henday Drive North-west	0.15	Alberta Government	Public
27.7	Anthony Henday Drive North-west	0.15	Alberta Government	Public
29.0	Rabbit Hill Road North-west	0.56	City of Edmonton	Public
29.2	Rabbit Hill Road North-west	0.55	City of Edmonton	Public
29.2	Rabbit Hill Road North-west	0.55	City of Edmonton	Public
31.4	Terwillegar Drive North-west	0.41	Alberta Government	Public
31.4	Terwillegar Drive North-west Off-Ramp	0.60	Trans Mountain	Private
31.4	Terwillegar Drive North-west	0.48	Alberta Government	Public
31.4	Terwillegar Drive North-west	0.49	Alberta Government	Public
31.5	Terwillegar Drive North-west	0.52	Alberta Government	Public
31.6	Terwillegar Drive North-west	0.53	Alberta Government	Public
34.1	Anthony Henday Drive North-west	2.10	City of Edmonton	Public
34.6	Anthony Henday Drive North-west	0.32	City of Edmonton	Public
35.1	Anthony Henday Drive North-west	0.45	City of Edmonton	Public
35.5	184 Street North-west	0.08	City of Edmonton	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
35.9	184 Street North-west	1.07	City of Edmonton	Public
38.0	199 Street North-west	1.14	Alberta Government	Public
38.0	199 Street North-west	0.01	Alberta Government	Public
38.4	Lessard Road North-west	0.47	City of Edmonton	Public
38.4	Lessard Road North-west	0.47	City of Edmonton	Public
38.6	45 Avenue North-west	0.27	Alberta Government	Public
38.6	199 Street North-west	0.47	Alberta Government	Public
39.8	62 Avenue North-west	0.51	Alberta Government	Public
39.8	Anthony Henday Drive North-west	0.05	City of Edmonton	Public
39.8	62 Avenue North-west	0.57	Alberta Government	Public
39.8	62 Avenue North-west	0.38	City of Edmonton	Public
39.8	62 Avenue North-west	0.31	City of Edmonton	Public
39.9	Callingwood Road North-west	0.21	City of Edmonton	Public
39.9	Anthony Henday Drive North-west	0.03	City of Edmonton	Public
39.9	Callingwood Road North-west	0.21	City of Edmonton	Public
42.2	Guardian Road North-west	0.88	Alberta Government	Public
42.9	Whitemud Drive North-west	0.57	Alberta Government	Public
43.4	Winterburn Road North-west	0.25	Alberta Government	Public
43.4	Winterburn Road North-west	0.25	Alberta Government	Public
43.4	Winterburn Road North-west	0.44	Alberta Government	Public
43.5	Whitemud Drive North-west	1.63	Alberta Government	Public
43.5	Winterburn Road North-west	0.35	Alberta Government	Public
43.5	Winterburn Road North-west	0.28	Alberta Government	Public
45.1	Range Road 261	1.03	Alberta Government	Public
45.1	628 Highway	0.57	Alberta Government	Public
45.5	628 Highway	1.07	Alberta Government	Public
45.9	231 Street North-west	3.24	Alberta Government	Public
47.1	Range Road 262	1.04	Federal Government	Public
47.2	628 Highway	1.63	Alberta Government	Public
48.5	628 Highway	1.64	Alberta Government	Public
48.9	60 Highway	1.33	Alberta Government	Public
48.9	60 Highway	1.33	Alberta Government	Public
48.9	Extension Highway 60	0.59	Alberta Government	Public
50.3	628 Highway	1.63	Alberta Government	Public
50.6	Range Road 264	1.66	Federal Government	Public
51.9	628 Highway	1.63	Alberta Government	Public
52.4	Range Road 265	2.47	Federal Government	Public
54.1	Range Road 270	3.51	Alberta Government	Public
55.6	Range Road 271	2.80	Federal Government	Public
57.3	Century Road	2.45	Alberta Government	Public
58.7	Golden Spike Road South	1.05	Federal Government	Public
58.8	Golden Spike Road South	0.11	Federal Government	Public
58.8	Golden Spike Road South	0.11	Federal Government	Public
58.8	Golden Spike Road South	0.33	Federal Government	Public
58.8	Golden Spike Road South	0.12	Federal Government	Public
58.8	Golden Spike Road South	0.12	Federal Government	Public
58.9	Diamond Avenue	0.97	Federal Government	Public
58.9	Golden Spike Road	0.65	Federal Government	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
58.9	Oswald Drive	0.69	Federal Government	Public
58.9	Golden Spike Road	0.65	Federal Government	Public
58.9	Golden Spike Road	0.17	Federal Government	Public
58.9	Calahoo Road	0.05	Federal Government	Public
58.9	Golden Spike Road	0.17	Federal Government	Public
58.9	Calahoo Road	0.06	Federal Government	Public
59.8	Madison Crescent	0.14	Federal Government	Public
59.8	Madison Crescent	0.88	Federal Government	Public
60.5	Campsite Road South	0.73	Federal Government	Public
60.5	Campsite Road	0.46	Federal Government	Public
61.7	16A Highway	0.82	Alberta Government	Public
61.7	16A Highway	0.82	Alberta Government	Public
63.3	Range Road 275	1.95	Federal Government	Public
63.6	35 Street	0.13	Alberta Government	Public
63.7	Boulder Boulevard	0.32	Alberta Government	Public
64.4	Golf Course Road	0.97	Alberta Government	Public
64.4	Boulder Boulevard	0.99	Alberta Government	Public
64.7	Range Road 280	1.98	Alberta Government	Public
64.7	Highway 779 Off-Ramp	1.48	Alberta Government	Public
65.4	Wood Avenue	0.52	Federal Government	Public
65.8	779 Highway	0.79	Alberta Government	Public
65.9	Extension Highway 779	0.35	Federal Government	Public
65.9	Extension Highway 779	0.06	Trans Mountain	Private
65.9	48 Street	0.01	Alberta Government	Public
65.9	48 Street	0.32	Alberta Government	Public
65.9	48 Street	0.32	Alberta Government	Public
65.9	48 Street	0.51	Alberta Government	Public
65.9	48 Street	0.93	Alberta Government	Public
65.9	779 Highway	0.94	Alberta Government	Public
65.9	Highway 779 Off-Ramp	2.00	Federal Government	Public
67.3	Range Road 11	1.49	Federal Government	Public
67.5	Glory Hills Road	1.62	Federal Government	Public
68.8	Range Road 12	3.22	Federal Government	Public
71.2	Range Road 13	3.46	Federal Government	Public
72.9	Range Road 14	2.98	Federal Government	Public
73.9	Range Road 15 Off-Ramp	0.29	Alberta Government	Public
73.9	Range Road 15	0.02	Alberta Government	Public
74.2	Range Road 15	1.81	Alberta Government	Public
75.9	Range Road 20	2.38	Federal Government	Public
75.9	Extension Range Road 20	1.77	Federal Government	Public
76.0	Range Road 20	0.65	Federal Government	Public
77.6	Range Road 21	1.62	Federal Government	Public
77.6	Extension Range Road 20	1.64	Federal Government	Public
79.0	Range Road 22	0.08	Federal Government	Public
79.0	Range Road 22	2.51	Federal Government	Public
80.5	43 Highway	0.23	Alberta Government	Public
80.5	43 Highway	0.23	Alberta Government	Public
80.5	Highway 43 Off-Ramp	0.24	Alberta Government	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
80.7	Range Road 23	0.46	Federal Government	Public
80.8	770 Highway	2.14	Alberta Government	Public
80.8	Parkland Drive	1.92	Federal Government	Public
80.8	Highway 770	0.58	Alberta Government	Public
80.9	770 Highway	0.60	Alberta Government	Public
82.3	Range Road 24	1.43	Federal Government	Public
82.3	Parkland Drive	1.81	Federal Government	Public
84.0	Parkland Drive	3.19	Federal Government	Public
84.1	Range Road 25	1.10	Federal Government	Public
87.4	Range Road 31	1.80	Alberta Government	Public
89.0	Range Road 32	1.23	Federal Government	Public
90.6	Range Road 33	1.88	Federal Government	Public
92.3	Range Road 34	1.20	Federal Government	Public
93.5	Highway 16 Off-Ramp	0.48	Alberta Government	Public
93.6	Range Road 35 Off-Ramp	0.46	Alberta Government	Public
94.1	Range Road 40 Off-Ramp	0.12	Alberta Government	Public
94.2	Range Road 35	0.21	Federal Government	Public
94.2	Range Road 35 Off-Ramp	0.77	Federal Government	Public
94.2	Range Road 35	0.25	Federal Government	Public
94.2	Range Road 40	0.74	Federal Government	Public
97.2	Range Road 41	1.06	Federal Government	Public
100.3	Extension Highway 16	0.15	Federal Government	Public
101.5	Range Road 43	1.73	Federal Government	Public
101.7	Lakeshore Road	1.66	Federal Government	Public
104.6	Range Road 44	2.18	Federal Government	Public
109.1	Range Road 51	0.64	Federal Government	Public
109.5	Extension Range Road 52	1.57	Federal Government	Public
110.6	Range Road 52	0.91	Federal Government	Public
112.4	Range Road 53	0.40	Alberta Government	Public
114.0	Range Road 54	0.65	Federal Government	Public
115.6	Range Road 55	1.29	Federal Government	Public
116.7	Highway 31 Off-Ramp	0.48	Alberta Government	Public
116.9	Highway 31 Off-Ramp	0.34	Alberta Government	Public
117.1	31 Highway	0.83	Alberta Government	Public
119.0	Range Road 61	1.97	Alberta Government	Public
120.5	Range Road 62	0.89	Federal Government	Public
123.8	Township Road 533	1.34	Federal Government	Public
125.4	Range Road 65	1.27	Federal Government	Public
127.2	Range Road 70	0.59	Federal Government	Public
128.8	Range Road 71	1.72	Federal Government	Public
130.4	Range Road 72	2.49	Alberta Government	Public
132.0	Range Road 73	1.77	Federal Government	Public
132.1	Township Road 532	1.62	Alberta Government	Public
133.5	Highway 22 Off-Ramp	0.46	Alberta Government	Public
133.6	22 Highway	1.42	Alberta Government	Public
133.7	Highway 22 Off-Ramp	0.45	Alberta Government	Public
133.7	22 Highway	0.21	Alberta Government	Public
133.7	22 Highway	0.58	Alberta Government	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
133.7	22 Highway	0.57	Alberta Government	Public
133.8	Highway 22 Off-Ramp	0.39	Alberta Government	Public
134.0	16A Highway	0.17	Alberta Government	Public
134.0	50 Street	0.04	Alberta Government	Public
134.0	49 Street	0.48	Federal Government	Public
134.0	45 Avenue	0.54	Federal Government	Public
134.0	16A Highway	0.17	Alberta Government	Public
134.4	47 Avenue Off-Ramp	0.03	Federal Government	Public
134.4	47 Avenue	0.10	Federal Government	Public
134.7	46 Avenue	0.36	Federal Government	Public
136.6	Range Road 75A	0.76	Federal Government	Public
136.7	Township Road 533	0.56	Federal Government	Public
136.7	Township Road 533	0.35	Federal Government	Public
136.9	Township Road 533	0.48	Alberta Government	Public
137.2	Range Road 80	0.63	Federal Government	Public
140.5	Range Road 82	0.67	Federal Government	Public
142.1	Range Road 83	1.42	Federal Government	Public
143.8	Range Road 84	1.16	Federal Government	Public
145.0	Range Road 85	2.18	Federal Government	Public
147.2	Range Road 90	3.57	Federal Government	Public
148.7	Range Road 91	1.15	Federal Government	Public
148.7	Township Road 534	1.63	Federal Government	Public
148.8	Range Road 91	1.09	Federal Government	Public
150.3	Range Road 92	1.11	Federal Government	Public
150.3	Township Road 534	0.37	Federal Government	Public
150.6	Range Road 92A	0.55	Federal Government	Public
151.9	Range Road 93	1.42	Federal Government	Public
153.1	Range Road 94	1.33	Federal Government	Public
155.1	Township Road 533	1.63	Federal Government	Public
155.4	Range Road 95	2.41	Alberta Government	Public
156.9	Range Road 100	0.82	Federal Government	Public
156.9	Township Road 533	1.64	Federal Government	Public
158.4	Range Road 101	1.46	Federal Government	Public
158.4	Range Road 101	1.63	Federal Government	Public
158.4	Township Road 534	1.63	Federal Government	Public
160.3	Range Road 102	0.81	Federal Government	Public
160.3	Township Road 534	1.63	Federal Government	Public
161.9	Range Road 103	1.04	Federal Government	Public
162.0	Range Road 103	0.60	Federal Government	Public
163.5	Township Road 534	0.34	Federal Government	Public
163.8	753 Highway	3.30	Alberta Government	Public
165.3	Range Road 105	2.86	Federal Government	Public
166.9	Range Road 110	2.38	Federal Government	Public
168.6	Range Road 111	2.67	Alberta Government	Public
170.2	Range Road 112	2.42	Federal Government	Public
171.9	Range Road 113	2.54	Federal Government	Public
173.4	Township Road 534A	0.35	Federal Government	Public
173.5	Range Road 114	1.42	Federal Government	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
174.2	Extension Township Road 534A	0.68	Alberta Government	Public
174.2	Township Road 534A	0.19	Alberta Government	Public
174.2	751 Highway	0.24	Alberta Government	Public
176.7	Range Road 120	0.40	Federal Government	Public
178.2	Range Road 121	1.08	Federal Government	Public
180.7	Extension Highway 16	0.61	Trans Mountain	Private
184.9	Range Road 125	2.11	Federal Government	Public
186.6	Range Road 130	0.33	Federal Government	Public
188.3	Range Road 131	0.39	Alberta Government	Public
191.5	Range Road 133	0.64	Federal Government	Public
192.4	Range Road 133A	0.26	Federal Government	Public
192.4	Township Road 535	4.15	Federal Government	Public
193.2	Range Road 134	0.52	Federal Government	Public
196.5	Range Road 140	1.34	Federal Government	Public
198.0	Range Road 141	0.89	Federal Government	Public
198.4	Township Road 534A	0.66	Federal Government	Public
199.6	32 Highway	1.30	Alberta Government	Public
201.7	Range Road 143	0.57	Federal Government	Public
205.1	Range Road 145	0.40	Alberta Government	Public
205.1	Township Road 533A	1.63	Alberta Government	Public
206.8	Township Road 534	1.63	Alberta Government	Public
206.8	Range Road 150	0.82	Federal Government	Public
208.5	Township Road 534	1.63	Alberta Government	Public
208.6	Range Road 151	1.62	Federal Government	Public
210.2	Township Road 534	1.62	Alberta Government	Public
210.7	Range Road 152	3.21	Federal Government	Public
211.8	Range Road 153	0.80	Federal Government	Public
211.9	Township Road 534	1.60	Alberta Government	Public
213.3	Range Road 154	1.00	Federal Government	Public
213.5	Township Road 534	1.66	Alberta Government	Public
215.1	Range Road 155	0.36	Federal Government	Public
216.8	Range Road 160	0.99	Alberta Government	Public
217.6	Township Road 534	0.77	Federal Government	Public
218.6	Range Road 161	0.35	Alberta Government	Public
221.8	Range Road 163	0.81	Federal Government	Public
224.0	Range Road 164	1.61	Federal Government	Public
224.0	Township Road 534	1.39	Federal Government	Public
225.5	Range Road 165	0.77	Federal Government	Public
228.8	25 Street	0.34	Alberta Government	Public
230.5	40 Street	0.79	Federal Government	Public
232.1	Edson Drive	0.45	Alberta Government	Public
233.7	63 Street	0.62	Federal Government	Public
236.8	Range Road 180	1.83	Alberta Government	Public
239.0	Range Road 181	0.76	Alberta Government	Public
240.6	Range Road 182	0.29	Alberta Government	Public
242.4	47 Highway	0.21	Alberta Government	Public
242.5	Range Road 183	1.18	Alberta Government	Public
244.7	Range Road 184	0.48	Federal Government	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
246.1	Range Road 185	1.29	Alberta Government	Public
247.1	Range Road 185A	0.70	Federal Government	Public
247.3	Township Road 532	0.76	Federal Government	Public
252.2	Range Road 192	2.04	Federal Government	Public
252.5	Township Road 530A	0.89	Federal Government	Public
256.5	Range Road 194	2.06	Federal Government	Public
256.5	Range Road 194	0.15	Federal Government	Public
266.7	Extension Highway 16	1.30	Federal Government	Public
270.8	Range Road 210A	0.90	Federal Government	Public
274.6	Extension Highway 16	1.32	Federal Government	Public
284.0	Extension Highway 16	0.15	Federal Government	Public
288.0	Extension Highway 16	0.41	Federal Government	Public
292.2	16 Highway	0.70	Alberta Government	Public
292.2	16 Highway	0.70	Alberta Government	Public
298.5	Extension Highway 16	0.90	Federal Government	Public
302.6	23518 Highway 16 West	0.82	Federal Government	Public
307.2	Range Road 242	2.25	Alberta Government	Public
307.4	East River Road	5.56	Alberta Government	Public
312.0	16 Highway	1.02	Alberta Government	Public
312.0	16 Highway	1.02	Alberta Government	Public
320.7	Extension Robb Road	1.22	Federal Government	Public
320.9	Robb Road Off-Ramp	0.29	Alberta Government	Public
321.0	Robb Road Off-Ramp	0.07	Federal Government	Public
321.0	Robb Road	1.26	Federal Government	Public
321.0	Robb Road	0.19	Alberta Government	Public
321.4	Robb Road	1.34	Alberta Government	Public
326.3	40 Highway	1.00	Alberta Government	Public
328.1	40 Highway	0.37	Alberta Government	Public
328.3	50511 Highway 16	0.28	Federal Government	Public
333.4	Airport Road	1.34	Federal Government	Public
339.4	Extension Highway 16	0.44	Federal Government	Public
498.3	MT594-G Mainline	0.98	BC Government	Public
517.7	Loseth Road	4.74	BC Government	Public
522.0	Yellowhead Highway	0.74	BC Government	Public
522.5	Yellowhead Highway	0.55	BC Government	Public
523.0	Pine Road	1.89	BC Government	Public
523.6	Cranberry Lake Road	1.20	BC Government	Public
526.9	Cranberry Lake Road	0.85	BC Government	Public
527.3	Cranberry Lake Road	0.64	BC Government	Public
527.3	Westridge Forest Service Road	1.06	BC Government	Public
527.3	Cranberry Lake Road	0.03	BC Government	Public
528.6	Westridge Forest Service Road	1.79	BC Government	Public
528.6	Whiskeyfill Road	1.41	BC Government	Public
529.0	Yellowhead Highway	5.63	BC Government	Public
531.4	Bear Road	0.14	BC Government	Public
531.6	Bear Road	0.36	BC Government	Public
531.9	Sunnyview Road	0.66	BC Government	Public
533.6	25-1 Access	2.02	BC Government	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
545.5	Yellowhead Highway	0.14	BC Government	Public
545.6	Yellowhead Highway	0.22	BC Government	Public
545.7	Yellowhead Highway	0.45	BC Government	Public
552.5	Yellowhead Highway	0.43	BC Government	Public
566.5	Yellowhead Highway	0.35	BC Government	Public
581.6	Yellowhead Highway	2.13	BC Government	Public
614.3	Hardwood Drive	0.62	BC Government	Public
614.5	Angus Horne Street	0.30	BC Government	Public
614.7	Angus Horne Street	0.39	BC Government	Public
615.5	Blue River West Frontage Road	0.24	BC Government	Public
615.7	Stewart Street	0.25	BC Government	Public
625.6	Yellowhead Highway	0.54	BC Government	Public
650.2	Yellowhead Highway	1.70	BC Government	Public
652.9	Messiter Station Road	0.58	BC Government	Public
653.7	Messiter Station Road	1.91	BC Government	Public
655.5	Messiter Station Road	0.02	BC Government	Public
655.5	Diamond Drive	0.26	BC Government	Public
655.5	Avola East Frontage Road	0.22	BC Government	Public
655.7	Avola East Frontage Road	1.11	BC Government	Public
655.8	Diamond Drive	0.50	BC Government	Public
655.8	Avola Village Road	0.21	BC Government	Public
655.8	Avola Village Road	0.17	BC Government	Public
656.1	Diamond Drive Cul-de-sac	0.14	BC Government	Public
660.5	Yellowhead Highway	0.75	BC Government	Public
686.6	Yellowhead Highway	0.05	BC Government	Public
688.9	Yellowhead Highway	0.32	BC Government	Public
690.8	Hoirup Road	2.17	BC Government	Public
692.2	Yellowhead Highway	0.65	BC Government	Public
694.9	Yellowhead Highway	0.27	BC Government	Public
697.8	Vavenby Bridge Road Off-Ramp	0.07	BC Government	Public
697.9	Vavenby Bridge Road	0.78	BC Government	Public
697.9	Vavenby Bridge Road Off-Ramp	0.08	BC Government	Public
704.0	Yellowhead Highway	0.13	BC Government	Public
707.5	Yellowhead Highway	1.14	BC Government	Public
709.4	Yellowhead Highway	1.22	BC Government	Public
713.1	Yellowhead Highway	1.00	BC Government	Public
714.1	Yellowhead Highway	0.45	BC Government	Public
718.6	Yellowhead Highway	0.87	BC Government	Public
721.0	Park Drive	1.35	BC Government	Public
722.4	Clearwater Valley Road	0.21	BC Government	Public
722.4	Clearwater Valley Road	0.15	BC Government	Public
722.4	Robson Street	0.51	BC Government	Public
722.9	Murtle Road	0.24	BC Government	Public
723.0	Clearwater Village Road	0.63	BC Government	Public
726.1	Yellowhead Highway	1.75	BC Government	Public
729.4	Jenkins Road	0.60	BC Government	Public
730.8	Old North Thompson Highway	0.61	BC Government	Public
731.2	Ferry Road	0.38	BC Government	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
731.4	Old North Thompson Highway	1.98	BC Government	Public
733.2	Old North Thompson Highway	0.39	BC Government	Public
737.0	Yellowhead Highway	0.21	BC Government	Public
747.8	Lemieux Creek Road	4.53	BC Government	Public
752.4	24 Highway	1.19	BC Government	Public
752.7	Highway 24	0.31	BC Government	Public
752.7	Lemieux Creek Road	0.28	BC Government	Public
755.7	93 Mile-Little Fort Highway No 24	0.54	BC Government	Public
757.8	Yellowhead Highway	0.25	BC Government	Public
759.8	Yellowhead Highway	0.41	BC Government	Public
760.9	Yellowhead Highway	0.14	BC Government	Public
762.2	Yellowhead Highway	0.37	BC Government	Public
764.2	Yellowhead Highway	0.87	BC Government	Public
767.7	Yellowhead Highway	0.93	BC Government	Public
769.0	Jamieson Creek FSR	57.94	BC Government	Public
811.8	Westsyde Road	6.11	BC Government	Public
813.2	Westsyde Road	3.08	BC Government	Public
816.1	Westsyde Road	4.46	BC Government	Public
824.2	O'Conner Lake Forest Service Road	2.58	BC Government	Public
825.3	Inskip Road	2.27	BC Government	Public
826.9	Noble Lake Road	3.67	BC Government	Public
841.1	Lac Du Bois Road	0.74	BC Government	Public
844.9	Tranquille Road	1.14	BC Government	Public
846.2	Aviation Way	1.21	BC Government	Public
847.5	Mission Flats Road	1.35	BC Government	Public
848.5	Mission Flats Road	2.89	BC Government	Public
850.6	Frontage Road	0.65	BC Government	Public
851.1	Hillside Drive	1.60	BC Government	Public
857.0	Lac Le Jeune Road	1.46	BC Government	Public
857.0	Lac Le Jeune Road	0.08	BC Government	Public
857.0	Lac Le Jeune Road	1.20	BC Government	Public
857.3	Lac Le Jeune Road	0.48	BC Government	Public
861.4	Goose Lake Road	6.95	BC Government	Public
914.6	Coyote Valley Road	0.96	BC Government	Public
924.8	Extension Highway 5A	2.10	Trans Mountain	Private
926.2	Extension Highway 5	0.78	BC Government	Public
926.5	Extension Highway 5A	0.17	BC Government	Public
926.7	Extension Highway 5	1.20	BC Government	Public
930.7	Coldwater Road	3.06	BC Government	Public
930.7	Merritt-Princeton Highway	0.29	BC Government	Public
930.7	Merritt-Princeton Highway	0.29	BC Government	Public
930.8	Merritt-Princeton Highway	1.15	BC Government	Public
932.8	Midday Valley	1.85	BC Government	Public
933.1	Coldwater Road	0.30	BC Government	Public
933.8	Coldwater Road	1.75	BC Government	Public
934.6	Midday Valley	7.43	BC Government	Public
934.9	Coquihalla Highway	5.46	BC Government	Public
934.9	Coquihalla Highway	9.71	BC Government	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
935.5	Coldwater Road	5.44	BC Government	Public
940.7	Comstock Road	4.51	BC Government	Public
942.4	Coldwater Road	8.72	BC Government	Public
943.4	Midday Valley Road	3.93	BC Government	Public
949.1	Coldwater Road	1.73	BC Government	Public
950.9	Coldwater Road	4.14	BC Government	Public
954.9	Coldwater Road	0.83	BC Government	Public
955.8	Coldwater Road	2.94	BC Government	Public
966.2	Coquihalla Highway	2.38	BC Government	Public
966.2	Coquihalla Highway	2.40	BC Government	Public
979.9	Juliet Road	0.81	BC Government	Public
980.2	Juliet Road	0.79	BC Government	Public
1000.0	Coquihalla Highway	1.28	BC Government	Public
1000.0	Yellowhead Highway	1.28	BC Government	Public
1008.1	Coquihalla Highway	4.41	BC Government	Public
1008.1	Yellowhead Highway	4.40	BC Government	Public
1017.7	Yellowhead Highway	0.53	BC Government	Public
1017.8	Yellowhead Highway	0.54	BC Government	Public
1018.4	Yellowhead Highway	0.55	BC Government	Public
1018.4	Yellowhead Highway	0.55	BC Government	Public
1020.6	Coquihalla Highway	2.90	BC Government	Public
1020.6	Coquihalla Highway	3.06	BC Government	Public
1025.7	Yellowhead Highway	0.55	BC Government	Public
1026.2	Yellowhead Highway	0.58	BC Government	Public
1026.3	Coquihalla Highway	2.65	BC Government	Public
1026.3	Coquihalla Highway	2.65	BC Government	Public
1041.9	Kettle Valley Road	0.74	BC Government	Public
1042.3	Kettle Valley Road	0.45	BC Government	Public
1043.1	Old Hope Princeton Way	0.62	BC Government	Public
1043.1	Coquihalla Highway	1.83	BC Government	Public
1043.1	3 Highway	1.82	BC Government	Public
1045.0	Flood Hope Road	0.34	BC Government	Public
1045.0	Water Avenue	0.46	BC Government	Public
1045.6	Trans-Canada Highway	1.50	BC Government	Public
1045.6	Trans-Canada Highway	1.46	BC Government	Public
1046.1	Flood Hope Road	0.81	BC Government	Public
1047.8	Tobina Road	0.35	BC Government	Public
1048.0	Tobina Road	0.15	BC Government	Public
1048.0	Flood Hope Road	0.32	BC Government	Public
1048.1	Tobina Road	0.24	BC Government	Public
1048.4	Flood Hope Road	2.10	BC Government	Public
1051.0	Trans-Canada Highway	0.22	BC Government	Public
1051.0	Trans-Canada Highway	0.22	BC Government	Public
1051.1	Flood Hope Road	0.93	BC Government	Public
1051.2	Trans-Canada Highway	0.29	BC Government	Public
1051.2	Trans-Canada Highway	0.42	BC Government	Public
1051.4	Trans-Canada Highway	0.15	BC Government	Public
1052.6	Trans-Canada Highway	2.53	BC Government	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
1052.6	Trans-Canada Highway	0.55	BC Government	Public
1053.1	Trans-Canada Highway	1.96	BC Government	Public
1055.8	Laidlaw	0.78	BC Government	Public
1056.6	Laidlaw Road	3.46	BC Government	Public
1060.0	Laidlaw Road	0.91	BC Government	Public
1062.2	Trans-Canada Highway	1.61	BC Government	Public
1062.2	Trans-Canada Highway	1.62	BC Government	Public
1062.2	Laidlaw Road	1.41	BC Government	Public
1063.6	Peters Road	1.91	BC Government	Public
1063.8	Trans-Canada Highway	0.55	BC Government	Public
1063.8	Trans-Canada Highway	0.56	BC Government	Public
1064.4	Peters Road	0.23	BC Government	Public
1064.4	Peters Road	0.06	BC Government	Public
1069.2	Trans-Canada Highway	0.76	BC Government	Public
1077.2	Bridal Falls Road	0.54	BC Government	Public
1077.7	Bridal Falls Road	1.03	BC Government	Public
1078.0	Popkum Road North	0.67	BC Government	Public
1078.7	Popkum Road South	0.19	BC Government	Public
1078.8	Popkum Road South	0.21	BC Government	Public
1078.8	Bridal Falls Road	0.27	BC Government	Public
1078.9	Yale Road East	1.91	BC Government	Public
1078.9	Bridal Falls Road	1.25	BC Government	Public
1080.6	Yale Road East	0.28	BC Government	Public
1080.9	Agassiz-Rosedale Highway	0.03	BC Government	Public
1081.0	Yale Road East	0.02	BC Government	Public
1081.0	Yale Road East	0.02	BC Government	Public
1081.0	Agassiz-Rosedale Highway	0.70	BC Government	Public
1081.0	Agassiz-Rosedale Highway	0.03	BC Government	Public
1081.0	Yale Road East	0.52	BC Government	Public
1081.7	Thompson Road	0.70	BC Government	Public
1081.7	Yale Road East	2.74	BC Government	Public
1082.7	Mercer Road	0.33	BC Government	Public
1083.0	Nevin Road	0.81	BC Government	Public
1083.0	McMillan Road	0.10	BC Government	Public
1083.0	McMillan Road	0.44	BC Government	Public
1083.6	Nevin Road	0.80	BC Government	Public
1083.6	McElwee Road	1.43	BC Government	Public
1084.1	Ford Road	0.50	BC Government	Public
1084.4	Ford Road	1.61	BC Government	Public
1085.1	Chilliwack Central Road	1.61	BC Government	Public
1086.2	Annis Road	1.81	BC Government	Public
1086.6	Annis Road	0.79	BC Government	Public
1087.2	Trans-Canada Highway	2.89	BC Government	Public
1087.3	Trans-Canada Highway	2.74	BC Government	Public
1088.0	Upper Prairie Road	0.68	BC Government	Public
1089.8	Gibson Road	2.48	BC Government	Public
1091.0	Banford Road	2.38	BC Government	Public
1092.2	Prest Road	2.50	BC Government	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
1092.4	Banford Road	1.35	BC Government	Public
1092.4	McGuire Road	1.57	BC Government	Public
1093.8	Prest Road	1.60	BC Government	Public
1095.1	Chilliwack River Road	2.18	BC Government	Public
1096.1	Vedder Road	2.90	BC Government	Public
1098.5	Tyson Road	1.28	BC Government	Public
1099.5	Canterbury Drive	0.81	BC Government	Public
1099.6	Unsworth Road	1.48	BC Government	Public
1099.8	Keith Wilson Road	0.72	BC Government	Public
1100.3	Keith Wilson Road	0.72	BC Government	Public
1100.4	Lickman Road	1.61	BC Government	Public
1101.1	Keith Wilson Road	1.52	BC Government	Public
1101.3	Extension Bergman Road	1.67	BC Government	Public
1103.1	Bergman Road	0.42	BC Government	Public
1103.2	Lumsden Road	0.81	BC Government	Public
1103.2	Vedder Mountain Road	1.81	BC Government	Public
1104.7	Yarrow Central Road	0.43	BC Government	Public
1105.0	Yarrow Central Road	0.80	BC Government	Public
1105.0	Wilson Road	0.67	BC Government	Public
1106.2	Eckert Street	0.92	BC Government	Public
1106.2	Yarrow Central Road	0.80	BC Government	Public
1106.9	Stewart Road	1.58	BC Government	Public
1106.9	Yarrow Central Road	0.93	BC Government	Public
1107.9	Boundary Road	0.80	BC Government	Public
1108.0	Boundary Road	1.60	BC Government	Public
1108.0	No. 4 Road	1.06	BC Government	Public
1108.2	No. 5 Road	1.07	BC Government	Public
1109.0	Tolmie Road	1.61	BC Government	Public
1109.0	No. 4 Road	1.06	BC Government	Public
1110.0	Inter Provincial Highway	1.61	BC Government	Public
1110.0	No. 4 Road	1.11	BC Government	Public
1110.3	No. 5 Road	1.06	BC Government	Public
1110.3	No. 5 Road	1.11	BC Government	Public
1111.1	Dixon Road	1.60	BC Government	Public
1111.1	No. 4 Road	1.04	BC Government	Public
1111.4	No. 5 Road	1.04	BC Government	Public
1112.2	Marion Road	1.60	BC Government	Public
1112.2	No. 4 Road	0.57	BC Government	Public
1112.4	No. 5 Road	1.58	BC Government	Public
1113.7	Trans-Canada Highway	1.71	BC Government	Public
1113.8	Trans-Canada Highway	1.18	BC Government	Public
1113.9	McDermott Road	0.42	BC Government	Public
1113.9	McDermott Road	0.25	BC Government	Public
1113.9	Atkinson Road	0.43	BC Government	Public
1113.9	North Parallel Road	0.85	BC Government	Public
1113.9	South Parallel Road	0.57	BC Government	Public
1114.3	South Parallel Road	1.01	BC Government	Public
1114.7	Eldridge Road	1.59	BC Government	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
1114.9	Trans-Canada Highway Off-Ramp	0.12	BC Government	Public
1115.9	Sumas Mountain Road	2.71	BC Government	Public
1115.9	Lower Sumas Mountain	2.00	BC Government	Public
1117.5	Sumas Mountain Road	0.08	BC Government	Public
1117.5	McKee Road	1.30	BC Government	Public
1118.6	McKee Road	0.55	BC Government	Public
1118.6	McKee Road	0.54	BC Government	Public
1118.8	Golf Course Drive	0.48	BC Government	Public
1119.1	McKee Road	0.03	BC Government	Public
1119.1	McKee Road	3.62	BC Government	Public
1120.8	Old Clayburn Road	0.95	BC Government	Public
1120.8	Old Clayburn Road	0.82	BC Government	Public
1121.2	Clayburn Road	0.59	BC Government	Public
1122.0	Wright Street	1.23	BC Government	Public
1122.0	Clayburn Road	1.70	BC Government	Public
1123.5	Extension Abbotsford Mission Highway	0.07	BC Government	Public
1123.5	Clayburn Road	0.05	BC Government	Public
1123.5	Abbotsford-Mission Highway	0.10	BC Government	Public
1123.5	Abbotsford Mission Highway	0.10	BC Government	Public
1123.6	Extension Abbotsford Mission Highway	0.08	BC Government	Public
1124.0	Abbotsford-Mission Highway	0.78	BC Government	Public
1124.0	Abbotsford Mission Highway	0.78	BC Government	Public
1124.0	Townshipline Road	1.68	BC Government	Public
1124.5	Townshipline Road	0.46	BC Government	Public
1126.0	Gladwin Road	0.76	BC Government	Public
1126.5	Gladwin Road	1.61	BC Government	Public
1126.5	Harris Road	1.60	BC Government	Public
1128.1	Harris Road	1.29	BC Government	Public
1129.1	Harris Road	2.41	BC Government	Public
1132.8	Ross Road	0.41	BC Government	Public
1133.1	Ross Road	1.01	BC Government	Public
1134.7	Bradner Road	1.61	BC Government	Public
1135.3	Bradner Road	1.62	BC Government	Public
1136.7	Lefevre Road	1.14	BC Government	Public
1136.9	Lefevre Road	0.46	BC Government	Public
1139.8	72 Avenue	1.20	BC Government	Public
1139.8	264 Street	2.10	BC Government	Public
1140.3	264 Street	0.86	BC Government	Public
1141.4	258 Street	1.38	BC Government	Public
1144.9	240 Street	1.61	BC Government	Public
1145.1	240 Street	0.88	BC Government	Public
1146.6	Rawlison Crescent	0.70	BC Government	Public
1146.6	232 Street	1.88	BC Government	Public
1147.8	Glover Road	1.29	BC Government	Public
1147.9	82 Avenue	0.24	BC Government	Public
1148.9	88 Avenue	2.66	BC Government	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
1149.3	216 Street	0.86	BC Government	Public
1149.5	88 Avenue	1.74	BC Government	Public
1149.5	216 Street	0.16	BC Government	Public
1149.5	216 Street	0.16	BC Government	Public
1150.4	96 Avenue	1.96	BC Government	Public
1153.1	208 Street	0.33	BC Government	Public
1153.1	88 Avenue	1.74	BC Government	Public
1153.1	208 Street	0.33	BC Government	Public
1154.9	201 Street	0.46	BC Government	Public
1154.9	201 Street	0.46	BC Government	Public
1154.9	Golden Ears Way	0.66	BC Government	Public
1155.0	201 Street	0.11	BC Government	Public
1155.0	Golden Ears Way	0.16	BC Government	Public
1155.0	100a Avenue	0.05	BC Government	Public
1155.0	201 Street	0.14	BC Government	Public
1155.0	201 Street	0.06	BC Government	Public
1155.0	201 Street	0.37	BC Government	Public
1155.0	199a Street	0.04	BC Government	Public
1155.0	201 Street	0.07	BC Government	Public
1155.0	199a Street	0.01	BC Government	Public
1155.0	199a Street	0.02	BC Government	Public
1155.0	201 Street	0.18	BC Government	Public
1155.0	Golden Ears Way	0.35	BC Government	Public
1155.0	201 Street	0.34	BC Government	Public
1155.0	201 Street	0.36	BC Government	Public
1155.0	201 Street	0.32	BC Government	Public
1155.0	199a Street	0.41	BC Government	Public
1155.1	199a Street	0.29	BC Government	Public
1155.1	Golden Ears Way	0.30	BC Government	Public
1155.3	199a Street	0.21	BC Government	Public
1155.4	199a Street	0.06	BC Government	Public
1155.4	199a Street	0.17	BC Government	Public
1155.4	199a Street	0.03	BC Government	Public
1155.4	199a Street	0.15	BC Government	Public
1155.4	199a Street	0.15	BC Government	Public
1155.4	199a Street	0.29	BC Government	Public
1155.9	197 Street	0.27	BC Government	Public
1155.9	98a Avenue	0.89	BC Government	Public
1156.6	Trans-Canada Highway	0.54	BC Government	Public
1156.6	Trans-Canada Highway	0.56	BC Government	Public
1156.8	98a Avenue	0.07	BC Government	Public
1156.8	98a Avenue	0.07	BC Government	Public
1156.9	192 Street	0.51	BC Government	Public
1156.9	192 Street	0.52	BC Government	Public
1157.0	192 Street	0.46	BC Government	Public
1157.0	192 Street	0.46	BC Government	Public
1157.0	192 Street	0.06	BC Government	Public
1157.0	Trans-Canada Highway Off-Ramp	0.44	BC Government	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
1157.0	192 Street	0.30	BC Government	Public
1157.0	Trans-Canada Highway	0.27	BC Government	Public
1157.0	Trans-Canada Highway	1.82	BC Government	Public
1157.3	Trans-Canada Highway	1.55	BC Government	Public
1158.3	96 Avenue	0.34	BC Government	Public
1158.3	96 Avenue	0.33	BC Government	Public
1158.3	Golden Ears Way	0.25	BC Government	Public
1158.3	Golden Ears Way	0.29	BC Government	Public
1158.6	Golden Ears Way	0.23	BC Government	Public
1158.6	Golden Ears Way	0.31	BC Government	Public
1158.6	Golden Ears Way	0.07	BC Government	Public
1158.6	Golden Ears Way Off-Ramp	0.07	BC Government	Public
1158.6	Golden Ears Way Off-Ramp	0.06	BC Government	Public
1158.6	Golden Ears Way	0.02	BC Government	Public
1158.6	Golden Ears Way	0.02	BC Government	Public
1158.6	Golden Ears Way	0.03	BC Government	Public
1158.6	96 Avenue	0.05	BC Government	Public
1158.6	96 Avenue	0.05	BC Government	Public
1159.8	176 Street	0.50	BC Government	Public
1160.1	104 Avenue	0.67	BC Government	Public
1160.1	Barnston	0.26	BC Government	Public
1160.1	176 Street	0.65	BC Government	Public
1160.2	100 Avenue	0.61	BC Government	Public
1160.4	Barnston Drive West	0.85	BC Government	Public
1161.5	168 Street	0.15	BC Government	Public
1162.0	164 Street	0.74	BC Government	Public
1162.9	160 Street	1.06	BC Government	Public
1163.9	Extension South Fraser Perimeter Road	1.30	Trans Mountain	Public
1165.2	South Fraser Perimeter Road	1.67	BC Government	Public
1165.4	110 Avenue	0.35	BC Government	Public
1165.4	110 Avenue	0.36	BC Government	Public
1165.7	Trans Canada Off-Ramp	0.51	BC Government	Public
1165.7	152 Street	0.48	BC Government	Public
1166.7	Mary Hill	0.83	BC Government	Public
1166.7	Mary Hill	0.90	BC Government	Public
1169.2	Fawcett Road	0.31	BC Government	Public
1169.6	Mary Hill By-pass	0.18	BC Government	Public
1169.6	Mary Hill By-pass	0.24	BC Government	Public
1169.6	United Boulevard Off-Ramp	0.29	BC Government	Public
1169.6	United Boulevard Off-Ramp	0.26	BC Government	Public
1169.6	United Boulevard	0.09	BC Government	Public
1169.6	United Boulevard	0.09	BC Government	Public
1169.6	United Boulevard	0.85	BC Government	Public
1169.6	United Boulevard	0.13	BC Government	Public
1169.6	United Boulevard	0.96	BC Government	Public
1169.6	United Boulevard	0.12	BC Government	Public
1169.6	United Boulevard	0.12	BC Government	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
1169.6	United Boulevard	0.46	BC Government	Public
1169.6	United Boulevard	0.50	BC Government	Public
1169.6	Lougheed Highway	0.61	BC Government	Public
1169.6	Lougheed Highway	0.62	BC Government	Public
1169.6	Golden Drive	0.62	BC Government	Public
1169.6	Glacier Street	0.30	BC Government	Public
1169.6	Golden Drive	0.09	BC Government	Public
1169.6	Glacier Street	0.19	BC Government	Public
1169.7	Hartley Avenue	0.43	BC Government	Public
1169.7	Fawcett Road	0.31	BC Government	Public
1170.3	Schooner Street	0.21	BC Government	Public
1170.3	United Boulevard	1.15	BC Government	Public
1170.3	United Boulevard	1.15	BC Government	Public
1171.5	United Boulevard	0.66	BC Government	Public
1172.0	King Edward Street	0.31	BC Government	Public
1172.0	Trans-Canada Highway	1.11	BC Government	Public
1172.0	King Edward Street	0.25	BC Government	Public
1172.0	Trans-Canada Highway	1.22	BC Government	Public
1172.2	United Boulevard	0.94	BC Government	Public
1172.7	Tupper Avenue	0.33	BC Government	Public
1173.1	Blue Mountain Street	0.59	BC Government	Public
1173.2	Lougheed Highway	0.67	BC Government	Public
1173.2	Lougheed Highway	0.50	BC Government	Public
1173.2	Brunette Avenue	0.34	BC Government	Public
1173.2	Woolridge Street	0.15	BC Government	Public
1173.2	Brunette Avenue	0.35	BC Government	Public
1174.1	Lougheed Highway	0.07	BC Government	Public
1174.1	Alderson Avenue	0.61	BC Government	Public
1174.1	Lougheed Highway	0.07	BC Government	Public
1174.1	Lougheed Highway	0.84	BC Government	Public
1175.0	Lougheed Highway	0.18	BC Government	Public
1175.0	Lougheed Highway	0.17	BC Government	Public
1175.0	North Road	0.20	BC Government	Public
1175.1	North Road	0.15	BC Government	Public
1175.1	Lougheed Highway	0.45	BC Government	Public
1175.1	North Road	0.16	BC Government	Public
1175.2	Lougheed Highway	0.43	BC Government	Public
1175.4	North Road	0.36	BC Government	Public
1175.4	North Road	0.35	BC Government	Public
1175.4	Austin Road	0.35	BC Government	Public
1175.4	Austin Road	0.36	BC Government	Public
1175.6	Government Street	0.13	BC Government	Public
1175.6	Lougheed Highway	0.58	BC Government	Public
1175.6	Government Street	0.13	BC Government	Public
1175.6	Lougheed Highway	0.56	BC Government	Public
1176.2	Noel Drive	0.47	BC Government	Public
1176.5	Trans-Canada Highway	0.81	BC Government	Public
1176.5	Trans-Canada Highway	0.62	BC Government	Public

TABLE 7.1.6

EXISTING PRIMARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
1176.8	Gaglardi Way	1.05	BC Government	Public
1176.8	Gaglardi Way	0.75	BC Government	Public
1176.9	Gaglardi Way	0.75	BC Government	Public
1176.9	Eastlake Drive	1.13	BC Government	Public
1178.2	Underhill Avenue	0.17	BC Government	Public
1179.5	Underhill Avenue	0.94	BC Government	Public
1179.5	Shellmont Street	0.67	BC Government	Public
0.0	Burnaby Mountain Parkway	2.06	BC Government	Public

TABLE 7.1.7

EXISTING SECONDARY ACCESS

Reference (RK)	Name	Length (km)	Owner	Access Type
0.9	Extension 17 Street	0.43	Trans Mountain	Private
33.9	Extension Anthony Henday Drive North-west	0.25	Trans Mountain	Private
45.6	Extension Highway 628	0.17	Alberta Government	Public
46.1	Extension Highway 628	0.31	Trans Mountain	Private
134.7	Range Road 74A	1.35	Federal Government	Public
163.7	Extension Township Road 534	0.12	Trans Mountain	Private
194.3	Extension Township Road 535	0.38	Trans Mountain	Private
203.9	Extension Township Road 533A	1.52	Alberta Government	Public
217.6	Extension Township Road 534	0.46	Federal Government	Public
219.9	Extension Township Road 534	0.64	Trans Mountain	Private
247.5	Extension Township Road 532B	0.59	Trans Mountain	Private
255.2	Extension Township Road 194	1.20	Federal Government	Public
259.0	Range Road 195A	1.55	Federal Government	Public
259.0	Township Road 530A	0.54	Federal Government	Public
259.0	Range Road 195A	0.23	Federal Government	Public
259.8	Range Road 200	0.14	Federal Government	Public
260.9	Extension Highway 16	0.67	Federal Government	Public
265.4	Extension Highway 16	1.96	Federal Government	Public
276.7	Extension Highway 16	1.46	Trans Mountain	Private
277.9	Extension Highway 16	0.11	Federal Government	Public
277.9	Extension Highway 16	1.57	Federal Government	Public
278.5	Extension Highway 16	0.13	Federal Government	Public
278.6	Extension Highway 16	0.64	Federal Government	Public
281.6	Extension Highway 16	0.42	Alberta Government	Public
282.0	Extension Highway 16	3.41	Trans Mountain	Private
282.6	Extension Highway 16	1.51	Alberta Government	Public
284.1	Extension Highway 16	0.77	Trans Mountain	Private
307.5	Extension East River Road	1.55	Trans Mountain	Private
307.6	Extension East River Road	1.82	Trans Mountain	Private
310.4	Extension Highway 16	1.81	Trans Mountain	Private
313.3	Extension Highway 16	2.87	Trans Mountain	Private
315.5	Extension Highway 16	0.10	Alberta Government	Public
329.3	Extension Highway 16	0.39	Federal Government	Public
329.3	Extension Highway 16	0.27	Trans Mountain	Private
332.2	Extension Highway 16	0.87	Trans Mountain	Private
489.6	Extension CN Rail	0.28	Trans Mountain	Private
498.3	MT594-G Mainline	0.22	BC Government	Public
502.8	MT101 Spur 5	2.16	BC Government	Public
505.2	MT596-11 Mainline	3.20	BC Government	Public
505.2	MT596-11 Spur D	0.14	BC Government	Public
505.2	MT596-11 Spur C	0.11	BC Government	Public
505.4	MT594-20 Mainline	2.71	BC Government	Public
506.6	Jackman Forest Service Road	0.33	BC Government	Public
506.7	Jackman Forest Service Road	1.01	BC Government	Public
507.8	MT595-8 Spur 2	1.06	BC Government	Public

TABLE 7.1.7

EXISTING SECONDARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
508.9	MT595-8 Mainline	0.88	Alberta Government	Public
509.4	Jackman Forest Service Road	3.20	BC Government	Public
512.3	Extension Highway 5	0.20	Trans Mountain	Private
515.2	Extension Highway 5	0.42	Trans Mountain	Private
516.3	Mttinsleys Pit Road	0.82	BC Government	Public
519.2	Extension Loseth Road	0.07	Trans Mountain	Private
526.3	Extension Cranberry Lake Road	0.27	Trans Mountain	Private
527.9	Extension Westridge Forest Service Road	0.44	BC Government	Public
529.1	Upper Canoe Mainline	1.16	BC Government	Public
530.4	Extension Highway 5	0.10	Trans Mountain	Private
539.5	24-1 Access1	0.11	BC Government	Public
540.5	Extension Highway 5	0.37	Trans Mountain	Private
541.8	42-A80 Access	1.10	BC Government	Public
542.5	Extension Highway 5	0.34	Trans Mountain	Private
545.4	Albreda Station Access Road	0.23	BC Government	Public
545.5	Extension Highway 5	0.20	Trans Mountain	Private
550.1	Albreda River Forest Service Road	6.78	BC Government	Private
551.1	Extension Albreda River Forest Service Road	0.17	Trans Mountain	Private
552.2	Extension Albreda River Forest Service Road	0.37	Trans Mountain	Private
552.8	Extension Highway 5	0.23	Trans Mountain	Private
553.4	CL10666.01 Forest Service Road	0.17	BC Government	Public
554.0	CL820.01 Forest Service Road	2.58	BC Government	Public
557.6	Extension Highway 5	0.49	Trans Mountain	Private
558.1	Extension Highway 5	0.51	Trans Mountain	Private
558.2	Extension Highway 5	0.51	Trans Mountain	Private
562.0	Extension Highway 5	1.73	Trans Mountain	Private
563.6	Extension Highway 5	0.16	Trans Mountain	Private
565.9	Extension Highway 5	0.06	Trans Mountain	Private
566.8	Extension Highway 5	0.06	Trans Mountain	Private
567.6	Dominion Creek Forest Service Road	0.94	BC Government	Public
570.6	Serpentine-Dominion Forest Service Road	2.51	BC Government	Public
571.8	Serpentine Creek Forest Service Road	4.70	BC Government	Public
576.2	Pyramid Forest Service Road	4.76	BC Government	Public
580.7	Pyramid Forest Service Road	0.83	BC Government	Public
582.4	Extension Highway 5	0.40	Trans Mountain	Private
587.9	Extension Highway 5	0.11	BC Government	Public
592.2	300 Forest Service Road	0.42	BC Government	Public
594.8	Miledge Creek Forest Service Road	1.31	BC Government	Public
596.0	Miledge Creek Forest Service Road	1.93	BC Government	Public
600.0	Mount Saint Anne Forest Service Road	0.22	BC Government	Public
600.2	Thunder River Road	0.13	BC Government	Public

TABLE 7.1.7

EXISTING SECONDARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
600.2	Mount Saint Anne Forest Service Road	0.21	BC Government	Public
601.0	Thunder River Forest Service Road	2.17	BC Government	Public
602.8	Extension Thunder River Forest Service Road	0.20	BC Government	Public
607.5	White Water CRK-BR 1 Forest Service Road	0.64	BC Government	Public
611.7	Mudd Lake Forest Service Road	0.11	BC Government	Public
614.5	Pyramid Road	2.75	Trans Mountain	Private
614.8	Cedar Street	0.81	BC Government	Public
615.7	Stewart Street	0.36	BC Government	Public
615.7	Access Road	0.84	BC Government	Public
615.7	Cedar Street	0.90	BC Government	Public
616.5	Dairy Road	0.37	BC Government	Public
616.5	Dairy Road	0.01	BC Government	Public
620.5	Smoke Creek Forest Service Road	5.21	BC Government	Public
626.6	Froth Creek Forest Service Road	2.99	BC Government	Public
629.0	Extension North Foam Forest Service Road	0.83	Trans Mountain	Private
633.9	Foam Creek Forest Service Road	6.62	BC Government	Public
634.5	North Foam Forest Service Road	1.28	BC Government	Public
637.7	East Messiter Forest Service Road	0.15	BC Government	Public
639.1	Finn Creek Forest Service Road	1.23	BC Government	Public
655.5	Diamond Drive	0.02	BC Government	Public
656.1	Coach Road	0.23	BC Government	Public
666.3	Extension Highway 5	0.96	Trans Mountain	Private
668.0	Extension Highway 5	0.09	Trans Mountain	Private
671.6	Utility Access Road	0.11	BC Government	Public
675.8	Skinner Road	1.76	BC Government	Public
677.8	East Mad River Forest Service Road	0.66	BC Government	Public
680.4	Extension Highway 5	0.04	Trans Mountain	Private
682.5	Extension Highway 5	0.03	Trans Mountain	Private
683.0	KMC Access	0.17	Trans Mountain	Private
683.5	Extension Highway 5	0.29	Trans Mountain	Private
683.6	Extension Highway 5	0.26	Trans Mountain	Private
686.6	Martin Creek Forest Service Road	0.48	BC Government	Public
687.3	Extension Highway 5	1.04	Trans Mountain	Private
688.2	Extension Highway 5	0.05	Trans Mountain	Private
689.4	Extension Highway 5	0.11	Trans Mountain	Private
692.5	Extension Highway 5	0.27	Trans Mountain	Private
694.9	Extension Highway 5	0.08	Trans Mountain	Private
695.4	Allingham Way	0.22	BC Government	Public
698.5	Harmon Road	2.27	BC Government	Public
700.4	Extension Harmon Road	0.12	Trans Mountain	Private
701.8	Extension Highway 5	0.41	Trans Mountain	Private
702.6	Extension Highway 5	0.12	Trans Mountain	Private
704.1	Lloyd Road	1.63	BC Government	Public
707.4	McCorvie Lake FSR	0.46	BC Government	Public

TABLE 7.1.7

EXISTING SECONDARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
709.4	Extension Highway 5	0.40	Trans Mountain	Private
710.6	Extension Highway 5	0.21	BC Government	Public
712.0	Extension Highway 5	0.44	Trans Mountain	Private
713.7	Norris Road	0.38	BC Government	Public
714.0	Extension Highway 5	0.12	Trans Mountain	Private
714.1	Extension Highway 5	0.09	Trans Mountain	Private
715.4	Extension Highway 5	0.09	Trans Mountain	Private
716.4	Deeg Road	0.58	BC Government	Public
717.0	Bain Road	0.32	BC Government	Public
718.2	Raft West Forest Road	0.05	BC Government	Public
718.2	Raft-Raft River Forest Service Road	0.14	BC Government	Public
718.4	Raft River Forest Service Road	1.74	BC Government	Public
718.7	Raft River Road	0.75	BC Government	Public
720.4	Candle Creek Road	0.72	BC Government	Public
720.8	Norfolk Road	0.47	BC Government	Public
724.4	Extension Highway 5	0.23	Trans Mountain	Private
725.1	Swanson Road	0.65	BC Government	Public
725.2	Highway 5 Off-Ramp	0.21	BC Government	Public
725.8	Extension Highway 5	0.07	Trans Mountain	Private
726.9	Extension Highway 5	0.89	Trans Mountain	Private
728.6	Ray Road	0.38	BC Government	Public
730.2	Johnston Road	0.80	BC Government	Public
733.2	Mann Road	0.41	BC Government	Public
733.6	Extension Mann Road	0.52	BC Government	Public
736.9	Utility Access Road	0.23	BC Government	Public
741.6	CP889	5.03	BC Government	Public
742.1	Extension Highway 5	0.82	BC Hydro	Public
742.6	Extension CP889	1.41	BC Government	Public
755.4	Lawrence Road	0.76	BC Government	Public
756.2	Extension Highway 5	0.55	Trans Mountain	Private
757.0	Extension Highway 5	0.15	Trans Mountain	Public
757.9	Extension Highway 5	0.16	Trans Mountain	Private
758.1	Extension Highway 5	0.03	Trans Mountain	Private
760.0	Extension Highway 5	0.07	Trans Mountain	Private
760.9	Thuya Creek Road	0.82	BC Government	Public
761.4	Extension Thuya Creek Road	0.04	Trans Mountain	Private
762.4	Extension Thuya Creek Road	0.04	Trans Mountain	Private
763.3	Extension Highway 5	0.04	Trans Mountain	Private
764.1	Extension Highway 5	0.13	Trans Mountain	Private
764.9	Extension Highway 5	0.18	BC Government	Private
766.0	Allen-Meeker Road	0.50	BC Government	Public
766.7	Extension Highway 5	0.41	Trans Mountain	Private
767.7	Bowden Road	0.42	BC Government	Public
769.0	Extension Highway 5	0.19	BC Government	Public
816.4	Extension Westsyde Road	0.51	Trans Mountain	Private
841.5	Lac Du Bois Road	0.68	BC Government	Public
843.8	Ord Road	1.09	BC Government	Public
845.0	Extension Tranquille Road	0.13	Trans Mountain	Private

TABLE 7.1.7

EXISTING SECONDARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
845.8	Extension Tranquille Road	0.10	Trans Mountain	Private
846.2	Access Road	0.12	BC Government	Public
850.8	Ext Frontage Road	0.42	Trans Mountain	Private
856.4	Extension Lac Le Jeune Road	2.43	Trans Mountain	Private
856.6	Extension Lac Le Jeune Road	1.91	Trans Mountain	Private
857.0	Pullout	0.11	BC Government	Public
857.3	Extension Lac Le Jeune Road	0.37	Trans Mountain	Private
857.3	Extension Lac Le Jeune Road	0.23	Trans Mountain	Private
862.5	Extension Goose Lake Road	0.83	Trans Mountain	Public
871.6	Extension Long Lake Road	2.17	Trans Mountain	Private
874.3	Extension 8600.00	0.57	BC Government	Public
875.1	Long Lake Road	2.64	BC Government	Public
875.7	Long Lake Road	4.55	BC Government	Public
875.7	Extension Long Lake Forest Service Road	3.06	BC Government	Public
878.4	Extension KA9480.02	0.48	BC Government	Public
878.4	KA 9480.02	0.87	BC Government	Public
886.9	Extension Highway 5A	2.80	Trans Mountain	Private
887.9	Extension Highway 5A	9.15	Trans Mountain	Private
892.4	Extension Highway 5A	4.82	Trans Mountain	Private
898.4	Extension Highway 5A	2.26	Trans Mountain	Private
900.5	Extension North Nicola Lake Road	2.81	Trans Mountain	Private
902.4	Extension North Nicola Lake Road	2.14	Trans Mountain	Private
905.0	Extension Mill Creek	0.71	Trans Mountain	Private
905.6	Mill Creek	0.16	BC Government	Public
905.7	Extension Mill Creek	1.08	Trans Mountain	Private
906.7	Extension Mill Creek	0.67	Trans Mountain	Private
906.7	Mill Creek	1.05	BC Government	Public
907.5	Extension Mill Creek	1.56	Trans Mountain	Private
911.4	Mill Creek Road	1.73	BC Government	Public
911.5	Extension Coyote Valley Road	2.26	Trans Mountain	Private
915.2	Extension Coquihalla Highway	2.36	BC Government	Public
915.5	Coyote Valley Road	2.37	BC Government	Public
927.6	Extension Coquihalla Highway	0.16	Trans Mountain	Private
927.7	Extension Coquihalla Highway	0.57	Trans Mountain	Private
927.8	Extension Coquihalla Highway	1.30	BC Government	Public
927.9	Extension Coquihalla Highway	1.66	Trans Mountain	Public
928.6	Extension Coquihalla Highway	1.07	BC Government	Public
929.1	Extension Coquihalla Highway	0.35	Trans Mountain	Public
929.4	Extension Coquihalla Highway	0.74	Trans Mountain	Public
931.3	Neilson Street	0.47	BC Government	Public
931.8	Extension Neilson Street	1.65	Trans Mountain	Private
933.0	Extension Coldwater Road	0.56	Trans Mountain	Private
933.0	Extension Neilson Street	1.59	Trans Mountain	Private
934.6	Extension Midday Valley Road	0.53	Trans Mountain	Private
935.5	Veale Road	6.13	BC Government	Public
949.1	Paul's Basin Reserve Road	0.59	BC Government	Public
950.8	Suttie Road	1.36	BC Government	Public

TABLE 7.1.7

EXISTING SECONDARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
952.2	Extension Coquihalla Highway	3.20	Trans Mountain	Private
955.5	Utility Access Road	0.39	BC Government	Public
958.4	Gillis Road	0.58	BC Government	Public
958.7	Maka-Murray Forest Service Road	1.88	BC Government	Public
966.1	Extension Highway 5	0.94	Trans Mountain	Private
966.2	Extension Highway 5	0.73	Trans Mountain	Private
967.7	Extension Brodie Siding Road	1.11	Trans Mountain	Private
968.4	Fig Lake Road	0.31	BC Government	Public
968.4	Brodie Siding Road	0.67	BC Government	Public
969.8	Extension Brodie Siding Road	0.90	Trans Mountain	Private
976.9	Extension Coquihalla Highway	0.69	Trans Mountain	Private
980.2	Coquihalla Highway Off-Ramp	0.53	BC Government	Public
980.8	Extension Coquihalla Highway	0.42	Trans Mountain	Private
981.2	Extension Coquihalla Highway	3.80	Trans Mountain	Private
981.2	Extension Coquihalla Highway	0.13	Trans Mountain	Private
987.0	Mine Creek Pit Road	1.26	BC Government	Public
987.1	Mine Creek Pit Road	0.32	BC Government	Public
987.1	Mine Creek Forest Service Road	0.48	BC Government	Public
990.5	Upper Coldwater Road	1.44	BC Government	Public
997.1	park access road	0.95	BC Government	Public
999.7	Extension Coquihalla Highway	1.05	Trans Mountain	Private
1008.0	Extension Coquihalla Highway	3.08	BC Government	Public
1012.7	Extension Coquihalla Highway	0.18	BC Government	Public
1016.6	Extension Highway 5	0.55	BC Government	Public
1016.7	Extension Highway 5	1.24	Trans Mountain	Private
1017.7	Shylock Road	0.45	BC Government	Public
1018.3	Extension Shylock Road	1.27	BC Government	Public
1018.3	Shylock Road	0.12	BC Government	Public
1021.8	Dewdney Creek Forest Service Road	0.90	BC Government	Public
1022.5	Extension Dewdney Creek Forest Service Road	0.40	Trans Mountain	Private
1022.8	Karen Creek Forest Service Road	1.17	BC Government	Public
1023.7	Extension Karen Creek Forest Service Road	0.15	Trans Mountain	Private
1026.2	Coquihalla Highway Off-Ramp	0.34	BC Government	Public
1026.3	Sowaqua Creek Forest Service Road	0.12	BC Government	Public
1026.3	Extension Coquihalla Highway	0.08	BC Government	Public
1032.4	Extension Coquihalla Highway	2.66	BC Government	Public
1034.6	Othello Road	0.41	BC Government	Public
1034.9	Coquihalla Highway Off-Ramp	0.06	BC Government	Public
1034.9	Othello Road	0.05	BC Government	Public
1035.0	Othello Road	0.35	BC Government	Public
1035.0	Coquihalla Highway Off-Ramp	0.07	BC Government	Public
1035.0	Coquihalla Highway Off-Ramp	0.11	BC Government	Public
1037.7	Fish Camp Road	0.51	BC Government	Public
1038.9	Othello Road	3.11	BC Government	Public

TABLE 7.1.7

EXISTING SECONDARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
1038.9	Extension Othello Road	3.24	Trans Mountain	Private
1041.2	Kawkawa Lake Road	1.03	BC Government	Public
1042.3	Kawkawa Lake Road	0.39	BC Government	Public
1042.6	Mount Hope Road	0.35	BC Government	Public
1042.7	Acacia Drive	0.46	BC Government	Public
1043.5	7 Avenue	0.56	BC Government	Public
1043.5	7 Avenue	0.11	BC Government	Public
1045.5	Coquihalla Highway Off-Ramp	0.31	BC Government	Public
1047.4	Elder Road	0.34	BC Government	Public
1047.8	Yale Road East	0.09	BC Government	Public
1050.4	Floods Road	0.40	BC Government	Public
1054.8	Hunter Creek	0.94	BC Government	Public
1055.8	Hunter Creek Road	0.15	BC Government	Public
1055.8	St. Elmo Road	0.07	BC Government	Public
1056.4	Extension Laidlaw	0.27	BC Government	Public
1057.4	Extension Laidlaw Road	0.31	Trans Mountain	Private
1059.4	McKay Road	0.79	BC Government	Public
1060.0	McKay Road	0.28	BC Government	Public
1064.5	Peters Road	0.09	BC Government	Public
1064.6	Highway 1 Off-Ramp	0.34	BC Government	Public
1064.6	Peters Road	0.16	BC Government	Public
1066.3	Extension Trans-Canada Highway	0.07	Trans Mountain	Private
1071.9	Extension Trans-Canada Highway	0.30	Trans Mountain	Private
1072.8	Extension Trans-Canada Highway	0.19	Trans Mountain	Private
1072.8	Extension Trans-Canada Highway	0.17	Trans Mountain	Private
1075.6	Extension Trans-Canada Highway	0.30	Trans Mountain	Private
1077.8	Extension Yale Road East	0.15	Trans Mountain	Private
1078.6	Bridal Veil Falls Forest Service Road	0.26	BC Government	Public
1088.3	Extension Upper Prairie Road	0.07	Trans Mountain	Private
1103.7	Simmons Road	0.71	BC Government	Public
1114.7	Atkinson Road	0.33	BC Government	Public
1115.1	Industrial Access Road	0.29	BC Government	Public
1115.1	Extension Industrial Access Road	0.49	Trans Mountain	Private
1116.4	Ward Road	0.12	BC Government	Public
1124.5	Extension Townshipline Road	0.28	Trans Mountain	Private
1127.3	Hallert Road	0.66	BC Government	Public
1128.1	Glenmore Road	0.81	BC Government	Public
1129.1	Bates Road	1.63	BC Government	Public
1131.2	Mt Lehman Road	0.81	BC Government	Public
1131.4	Burgess Avenue	1.14	BC Government	Public
1131.7	Mt Lehman Road	0.81	BC Government	Public
1134.4	Starr Road	0.34	BC Government	Public
1136.7	Hesslea Crescent	0.48	BC Government	Public
1137.1	Joanita Place	0.26	BC Government	Public
1138.2	272 Street	2.64	BC Government	Public
1138.5	267 Street	1.58	BC Government	Public
1141.8	254 Street	0.63	BC Government	Public
1141.8	252A Crescent	0.56	BC Government	Public

TABLE 7.1.7

EXISTING SECONDARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
1142.1	72 Avenue	0.88	BC Government	Public
1142.9	Telegraph Trail	2.06	BC Government	Public
1142.9	72 Avenue	1.61	BC Government	Public
1144.4	80 Avenue	0.61	BC Government	Public
1152.3	216 Street	1.58	BC Government	Public
1152.4	Extension 96 Avenue	0.38	Trans Mountain	Public
1153.0	208 Street	0.26	BC Government	Public
1153.2	208 Street	1.85	BC Government	Public
1153.5	208 Street	1.73	BC Government	Public
1153.6	208 Street	0.28	BC Government	Public
1153.7	208 Street	0.91	BC Government	Public
1156.9	98a Avenue	0.65	BC Government	Public
1160.4	104 Avenue	0.43	BC Government	Public
1167.0	South Fraser Perimeter Road	1.55	BC Government	Public
1169.2	Leeder Avenue	0.52	BC Government	Public
1169.6	Colony Farm Road	0.30	BC Government	Public
1172.2	Extension United Boulevard	0.82	Trans Mountain	Public

TABLE 7.1.8

PROPOSED NEW TEMPORARY ACCESS

Reference (RK)	Name	Length (km)	Owner	Access Type
4.6	Extension Township Road 524A	0.06	Trans Mountain	Private
12.2	Extension 23 Avenue North-west	0.03	Trans Mountain	Private
48.8	Extension Highway 60	0.06	Trans Mountain	Private
99.0	Extension Highway 16	1.06	Trans Mountain	Private
100.1	Extension Highway 16	0.82	Trans Mountain	Private
105.8	Extension Highway 16	0.70	Trans Mountain	Private
107.4	Extension Highway 765	0.85	Trans Mountain	Private
122.2	Extension Township Road 533	0.14	Trans Mountain	Private
123.8	Extension Township Road 533	0.23	Trans Mountain	Private
138.8	Extension Highway 16	0.39	Trans Mountain	Private
156.9	Extension Range Road 100	0.13	Trans Mountain	Private
181.6	Extension Highway 16	0.31	Trans Mountain	Private
183.3	Extension Highway 16	0.92	Trans Mountain	Private
189.9	Extension Highway 16	0.46	Trans Mountain	Private
201.9	Extension Range Road 143	0.76	Trans Mountain	Private
203.8	Extension Township Road 533A	0.23	Trans Mountain	Private
220.2	Extension Township Road 534	0.51	Trans Mountain	Private
221.9	Extension Range Road 163	0.12	Trans Mountain	Private
227.2	Extension Township Road 534	0.30	Trans Mountain	Private
235.2	Extension Township Road 534	0.83	Trans Mountain	Private
239.0	Extension Township Road 181	0.47	Trans Mountain	Private
242.8	Extension Township Road 183	0.46	Alberta Government	Public
244.2	Extension Township Road 184	0.91	Trans Mountain	Private
255.0	Extension Township Road 194	0.31	Trans Mountain	Private
262.2	Extension Highway 16	0.29	Trans Mountain	Private
263.2	Extension Highway 16	0.16	Trans Mountain	Private
265.4	Extension Highway 16	0.19	Trans Mountain	Private
268.5	Extension Highway 16	0.46	Trans Mountain	Private
273.1	Extension Highway 16	0.45	Trans Mountain	Private
276.5	Extension Highway 16	0.41	Trans Mountain	Private
288.0	Extension Highway 16	0.87	Trans Mountain	Private
291.1	Extension Highway 16	0.96	Trans Mountain	Private
315.5	Extension Highway 16	1.24	Trans Mountain	Private
330.0	Extension Highway 16	1.04	Trans Mountain	Private
336.0	Extension Highway 16	0.41	Trans Mountain	Private
337.5	Extension Highway 16	0.19	Trans Mountain	Private
500.5	Extension CN Rail	0.16	Trans Mountain	Public
501.3	Shoofly Access RK 501.6	0.56	Trans Mountain	Private
507.8	Jackman Forest Service Road	0.11	BC Government	Public
510.7	Extension Highway 5	0.22	BC Government	Public
536.8	Extension Highway 5	1.11	Trans Mountain	Private
537.6	Extension Highway 5	0.73	Trans Mountain	Private
541.1	Extension Highway 5	0.55	Trans Mountain	Private
543.2	13617 Road	1.25	BC Government	Public
558.5	Extension Highway 5	0.36	Trans Mountain	Private
558.7	Extension Highway 5	0.75	Trans Mountain	Private

TABLE 7.1.8

PROPOSED NEW TEMPORARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
562.4	Extension Highway 5	0.12	Trans Mountain	Private
564.3	Extension Highway 5	0.23	Trans Mountain	Private
565.2	Extension Highway 5	0.25	Trans Mountain	Private
580.7	Shoofly Access RK 580.7	0.22	Trans Mountain	Private
580.8	Shoofly Access RK 580.7	0.30	Trans Mountain	Private
585.8	Extension Highway 5	0.73	Trans Mountain	Private
588.8	Extension Highway 5	0.27	Trans Mountain	Private
589.4	Extension Highway 5	0.66	Trans Mountain	Private
589.5	Extension Highway 5	0.16	Trans Mountain	Private
589.9	Extension Highway 5	0.13	Trans Mountain	Private
590.8	Extension Highway 5	0.19	Trans Mountain	Private
593.4	Extension Highway 5	0.19	BC Government	Public
594.8	Extension Miledge Creek Forest Service Road	0.07	Trans Mountain	Private
595.9	Extension Miledge Creek Forest Service Road	0.18	Trans Mountain	Private
602.8	Extension Thunder River Forest Service Road	0.13	Trans Mountain	Private
604.9	Extension Highway 5	0.14	Trans Mountain	Private
605.3	Extension Highway 5	0.25	Trans Mountain	Private
613.5	Extension Highway 5	0.22	Trans Mountain	Private
613.7	Extension Highway 5	0.14	Trans Mountain	Private
635.5	Extension Foam Creek FSR	1.40	Trans Mountain	Private
637.2	Extension Little Hells Gate Park Access Road	0.09	Trans Mountain	Private
642.6	Blackrock Forest Service Road	0.05	Trans Mountain	Private
643.5	Extension Highway 5	0.04	Trans Mountain	Private
645.9	Boulder Forest Service Road	0.10	Trans Mountain	Private
646.9	Extension Liberty	0.40	Trans Mountain	Private
647.3	Liberty	0.05	BC Government	Public
664.3	Extension Highway 5	0.32	BC Government	Public
670.4	Extension Highway 5	0.06	Trans Mountain	Private
688.2	Extension Highway 5	0.04	Trans Mountain	Private
725.8	Extension Highway 5	0.08	Trans Mountain	Private
733.9	Extension Mann Road	0.70	Trans Mountain	Public
737.1	Extension Highway 5	2.09	Trans Mountain	Private
737.1	Extension Highway 5	0.51	Trans Mountain	Private
738.0	Extension Highway 5	0.65	Trans Mountain	Private
743.3	Extension CP889	0.17	BC Government	Public
750.9	Extension Lemieux Creek Road	0.55	Trans Mountain	Private
753.4	Extension Highway 24	0.51	Trans Mountain	Public
837.5	Extension Aggassiz Road	0.18	Trans Mountain	Public
927.2	HDD Access	0.26	BC Government	Public
937.0	Extension Midday Valley Road	0.31	Trans Mountain	Private
954.0	Spectra Access	1.09	Trans Mountain	Private
957.9	Extension Coldwater Road	1.19	BC Government	Public
971.6	Extension Coquihalla Highway	3.88	BC Government	Public
1003.0	Extension Coquihalla Highway	3.63	Trans Mountain	Private
1029.5	Extension Coquihalla Highway	2.91	BC Government	Public
1032.4	Extension Coquihalla Highway	0.06	Trans Mountain	Private

TABLE 7.1.8

PROPOSED NEW TEMPORARY ACCESS (continued)

Reference (RK)	Name	Length (km)	Owner	Access Type
1037.9	Extension Othello Road	0.75	Trans Mountain	Private
1047.8	Yale Road East	0.03	BC Government	Public
1053.1	Extension Trans-Canada Highway	0.08	Trans Mountain	Private
1054.8	Extension Hunter Creek	0.04	BC Government	Private
1060.9	Extension Laidlaw Road	0.18	Trans Mountain	Private
1064.8	Extension Peters Road	0.07	Trans Mountain	Private
1134.1	Extension Starr Road	0.31	Trans Mountain	Private
1141.9	Extension 254 Street	0.08	Trans Mountain	Private

TABLE 7.1.9

PROPOSED NEW PERMANENT ACCESS

Reference (RK)	Name	Length (km)	Access Type
581.3	Extension Highway 5	0.41	Private

TABLE 7.1.10
DEACTIVATED AND OVERGROWN ACCESS

Reference (RK)	Name	Length (km)	Access Type
289.6	Extension	0.07	Private
291.1	Extension Highway 16	1.55	Private
489.6	Extension CN Rail	6.74	Private
500.4	Extension CN Rail	0.69	Private
503.6	MT594-20 Mainline	2.36	Public
505.2	Shoofly Access RK 505.2	0.20	Private
505.7	MT650-10A Mainline	1.06	Public
531.4	Extension Bear Road	0.29	Private
533.6	Extension Highway 5	0.94	Private
547.8	Extension Highway 5	0.47	Public
561.6	Extension Highway 5	0.77	Public
568.7	Extension Serpentine-Dominion Forest Service Road	1.92	Private
584.2	West Pyramid Forest Service Road	0.53	Public
587.1	Extension Highway 5	0.57	Private
587.7	Extension Highway 5	1.22	Private
605.3	Kelter Creek Access	1.30	Public
628.4	Froth Creek Forest Service Road	0.27	Public
628.4	Extension Froth Creek Forest Service Road	0.50	Private
629.8	Extension North Foam Forest Service Road	2.69	Private
636.7	Extension Foam Creek FSR	0.99	Public
636.8	Extension Foam Creek FSR	0.23	Public
636.8	Extension V3450.00	0.52	Private
637.3	V3450.00	0.56	Public
640.8	Extension Highway 5	0.27	Public
648.2	Sundt Creek Forest Service Road	0.10	Private
652.6	Messiter Station Road	1.88	Public
658.3	Extension Highway 5	0.42	Private
658.8	Extension Highway 5	0.17	Private
662.9	Extension Highway 5	0.28	Private
674.4	Extension Highway 5	0.48	Private
737.9	Extension CP 889	4.21	Private
747.1	Extension Lemieux Creek Road	0.75	Private
752.4	Extension Highway 24	0.13	Private
827.6	Extension West Syde Road	3.76	Private
829.2	McQueen Creek Road	0.85	Private
829.6	McQueen Creek Road	8.20	Private
837.5	Extension Lac Du Bois Road	4.26	Private
841.3	McQueen Creek Road	3.10	Private
841.6	Extension Lac Du Bois Road	0.89	Public
842.1	Lac Du Bois Road	0.34	Public
842.3	Extension Ord Road	2.78	Public
847.5	Extension Hillside Road	3.68	Public
852.8	Wallender Lake Road	1.90	Private
868.3	Extension Long Lake Road	3.73	Private
872.0	Extension Long Lake Road	3.22	Private
881.9	Long Lake Road	3.00	Public

TABLE 7.1.10

DEACTIVATED AND OVERGROWN ACCESS (continued)

Reference (RK)	Name	Length (km)	Access Type
882.1	Extension Long Lake Road	3.74	Private
882.3	Extension Long Lake Road	1.02	Private
897.4	Extension Highway 5A	2.01	Private
898.4	Extension Highway 5A	5.61	Private
902.4	Extension North Nicola Lake Road	1.76	Public
903.5	Extension Mill Creek	1.05	Private
904.7	Extension Mill Creek	0.40	Private
917.5	Coyote Valley Road	2.62	Public
919.5	Mill Creek Road	1.14	Public
944.9	Extension Highway 5	2.01	Private
949.2	Extension Coldwater Road	1.22	Private
953.4	Extension Coquihalla Highway	0.38	Private
975.7	Extension Coquihalla Highway	0.20	Public
986.1	Extension Coquihalla Lakes Road	4.84	Private
1036.9	Extension Othello Road	0.73	Private
1044.6	Extension Highway 5	0.38	Private
1074.5	Extension Trans-Canada Highway	0.46	Private

TABLE 7.1.11

NEW AND EXISTING BRIDGES

Access Location	Status	Load Rating	Tonnage (Metric)	Width (m)	Northing	Easting	UTM Zone
MT594-20 Mainline	Existing	Unknown	Unknown	3.5	5870036	339457	11
Ext Albreda River FSR	Existing	L-45	41	4	5831860	354793	11
Ext Hwy 5 (RK 559)	Existing	Unknown	Unknown	3.5	5826069	357759	11
Ext Hwy 5 (RK 560)	Existing	L-100	91	4	5825698	357632	11
Dominion Creek FSR	Existing	BCL-625	64	4	5818091	356814	11
Serpentine FSR	Existing	BCL-625	64	4.5	5814353	355265	11
Pyramid FSR	Existing	L-75	68	3.5	5810327	354026	11
CL8420.01 FSR	Existing	Unknown	Unknown	4.5	5828707	357688	11
Anderson Creek (RK 865.5)	New	N/A	TBD	TBD	5603818	684933	10
Ext North Nicola Lake Road	New	N/A	TBD	TBD	5571039	679343	10

Note: N/A = not applicable; TBD = to be determined.

TABLE 7.1.12

**PRELIMINARY LIST OF HYDROSTATIC TEST SECTIONS, REQUIRED VOLUMES,
 AND WATER SOURCES, TMPL LINE 2 PIPELINE**

Hydrostatic Test Section Details			Water Source		Direction of Water Reuse
Start (RK)	End (RK)	Section Volume (m ³)	Name	RK	
0+000	15+500	9,666	North Saskatchewan River *	33.5	
15+500	33+500	11,224	North Saskatchewan River	33.5	↑
33+500	58+500	15,587	North Saskatchewan River	33.5	
58+500	83+500	15,587	North Saskatchewan River *	33.5	↓
83+500	108+500	15,587	Pembina River *	135.0	
108+500	135+000	16,522	Pembina River	135.0	↑
135+000	158+000	14,341	Pembina River	135.0	
158+000	179+000	13,094	Pembina River *	135.0	↓
179+000	198+000	11,848	Pembina River *	135.0	
198+000	215+000	10,601	Pembina River *	135.0	↓
215+000	223+800	5,491	McLeod River	223.8	↓
223+800	251+000	16,958	McLeod River	223.8	
251+000	276+000	15,587	McLeod River *	223.8	↓
276+000	299+000	14,341	McLeod River *	223.8	↓
299+000	320+000	13,094	McLeod River *	223.8	↓
320+000	339+425	12,113	McLeod River *	223.8	↓
489+644	499+800	6,336	Fraser River	499.8	
499+800	504+300	2,811	Fraser River	499.8	
504+300	531+200	16,771	Canoe River	531.2	
531+200	556+200	15,587	Canoe River	531.2	
556+200	581+100	15,525	North Thompson River	581.1	
581+100	601+100	12,471	North Thompson River	581.1	
601+100	619+900	11,723	North Thompson River	619.9	
619+900	638+000	11,287	North Thompson River	619.9	
638+000	651+600	8,482	North Thompson River	651.6	
651+600	674+600	14,341	North Thompson River	651.6	↓
674+600	694+000	12,097	North Thompson River *	651.6	
694+000	713+000	11,848	North Thompson River *	736.8	
713+000	736+850	14,870	North Thompson River	736.8	↑
736+850	757+000	12,564	North Thompson River	736.8	
757+000	769+034	7,506	North Thompson River *	736.8	↓
811+845	828+000	10,075	Thompson River *	846.8	
828+000	846+797	11,721	Thompson River	846.8	↑
846+797	872+187	15,830	Thompson River	846.8	
872+187	896+587	15,213	Thompson River *	846.8	↓
896+587	912+587	9,978	Coldwater River *	957.9	
912+587	933+037	12,751	Coldwater River *	957.9	↑
933+037	957+887	15,494	Coldwater River	957.9	↑
957+887	970+212	7,688	Coldwater River	970.3	
970+212	990+162	12,440	Coldwater River	990.0	
990+162	1009+437	12,019	Coldwater River	990.0	
1009+437	1028+637	11,972	Coquihalla River	1028.6	
1028+637	1043+237	9,105	Coquihalla River	1028.6	
1043+237	1068+437	15,712	Coquihalla River	1043.3	
1068+437	1089+437	13,094	Sumas River *	1114.6	
1089+437	1114+637	15,712	Sumas River	1114.6	↑
1114+637	1134+637	12,471	Sumas River	1114.6	
1134+637	1143+837	5,740	Sumas River *	1114.6	↓
1143+837	1168+837	15,587	Fraser River	1168.9	
1168+837	1179+770	6,820	Fraser River	1168.9	
0+000	3+625	3,148	Fraser River *	1168.9	↓

Note: * indicates section will likely be filled from adjacent section and not directly from the water source.

TABLE 7.1.13

PRELIMINARY LIST OF HYDROSTATIC TEST SECTIONS, REQUIRED WATER VOLUMES AND WATER SOURCES, TMPL LINE 1 PIPELINE (REACTIVATED SEGMENTS)

Hydrostatic Test Section Details			Water Source		Direction of Water Reuse
Start (KP)	End (KP)	Required Volume (m ³)	Name	KP	
NPS 24 Hinton To Hargreaves Segment					
317+595	337+461	5,575	Athabasca River	337.5	
337+461	360+183	6,321	Athabasca River	337.5	
360+183	381+200	5,828	Snaring River	360.2	
381+200	405+485	6,723	Miette River	405.5	
405+485	431+325	7,188	Fraser River	431.3	
431+325	455+325	6,664	Fraser River*	431.3	↓
455+325	468+024	3,543	Fraser River*	431.3	↓
NPS 24 Darfield To Black Pines Segment					
741+920	765+500	6,562	North Thompson River	741.9	
765+500	784+869	5,382	North Thompson River	784.9	

Note: * indicates section will likely be filled from adjacent section and not directly from the water source.

Appendix B Drawings

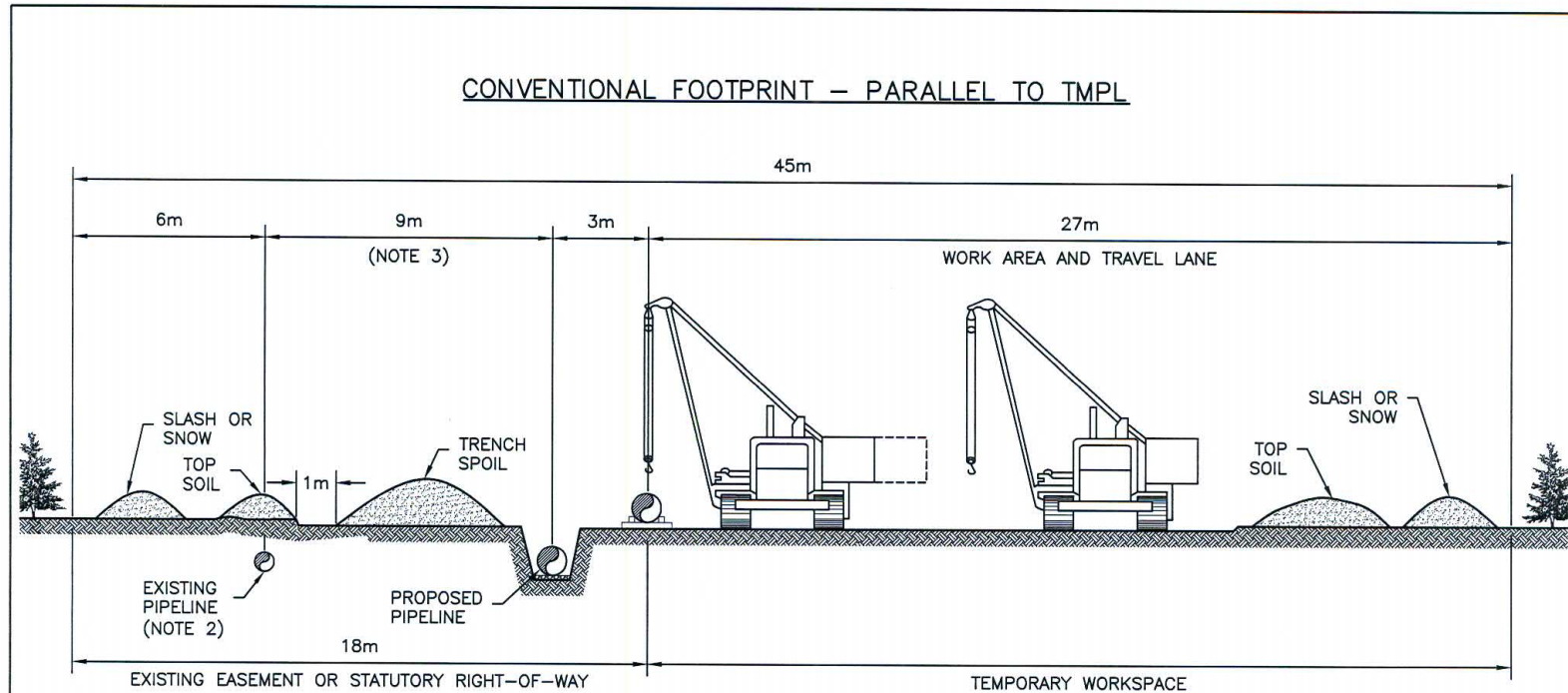
Typical Right-of-Way Construction Sketches

- TMEP – PT-9000 – Right-of-way Configuration #00, Conventional Footprint – Parallel to TMPL
- TMEP – PT-9001 – Installation Method #01, Work Over Existing Line
- TMEP – PT-9002 – Installation Method #02, Steep Side Hill/Over Existing Line
- TMEP – PT-9003 – Installation Method #3, Rock Cuts in Steep Slopes
- TMEP – PT-9004 – Right-of-way Configuration #4, Conventional Footprint
- TMEP – PT-9010 – Installation Method #10, Adjacent to Tracks in Cut & Fill Scenario
- TMEP – PT-9014 – Installation Method #14, Steep Side Hill Cut Along Hwy Ltd. Workside
- TMEP – PT-9016 – Installation Method #16, Special Installation Under Hwy Shoulder
- TMEP – PT-9017 – Installation Method #17, Steep Side Hill Cut Along Hwy
- TMEP – PT-1000 – Equipment Crossing Ramp Over Existing Pipeline (NPS 6 & Smaller)
- TMEP – PT-1001 – Equipment Crossing Ramp Over Existing Pipeline Using Rig Mats (NPS 8 & Smaller)
- TMEP – PT-1003 – Installation Method #08, Existing Pipeline Protection (Dead Air Space)
- TMEP – PT-1100 – Equipment Crossing Single Span Bridge
- TMEP – PT-1101 – Equipment Crossing Multi-span Bridge
- TMEP – PT-1102 – Equipment Crossing Snow Fill
- TMEP – PT-1103 – Equipment Crossing Culvert
- TMEP – PT-1105 – Equipment Crossing Ice Bridge

Preliminary Hydrostatic Test Profiles - TMPL Line 2 Pipeline

- TMEP – PH-0001 – Edmonton to Hinton, TMPL Line 2 Pipeline (Preliminary Layout)
- TMEP – PH-0002 – Hargreaves to Darfield, TMPL Line 2 Pipeline (Preliminary Layout)
- TMEP – PH-0003 – Black Pines to Burnaby, TMPL Line 2 Pipeline (Preliminary Layout)
- TMEP – PH-0004 – Burnaby to Westridge, TMPL Line 2 Pipeline (Preliminary Layout)

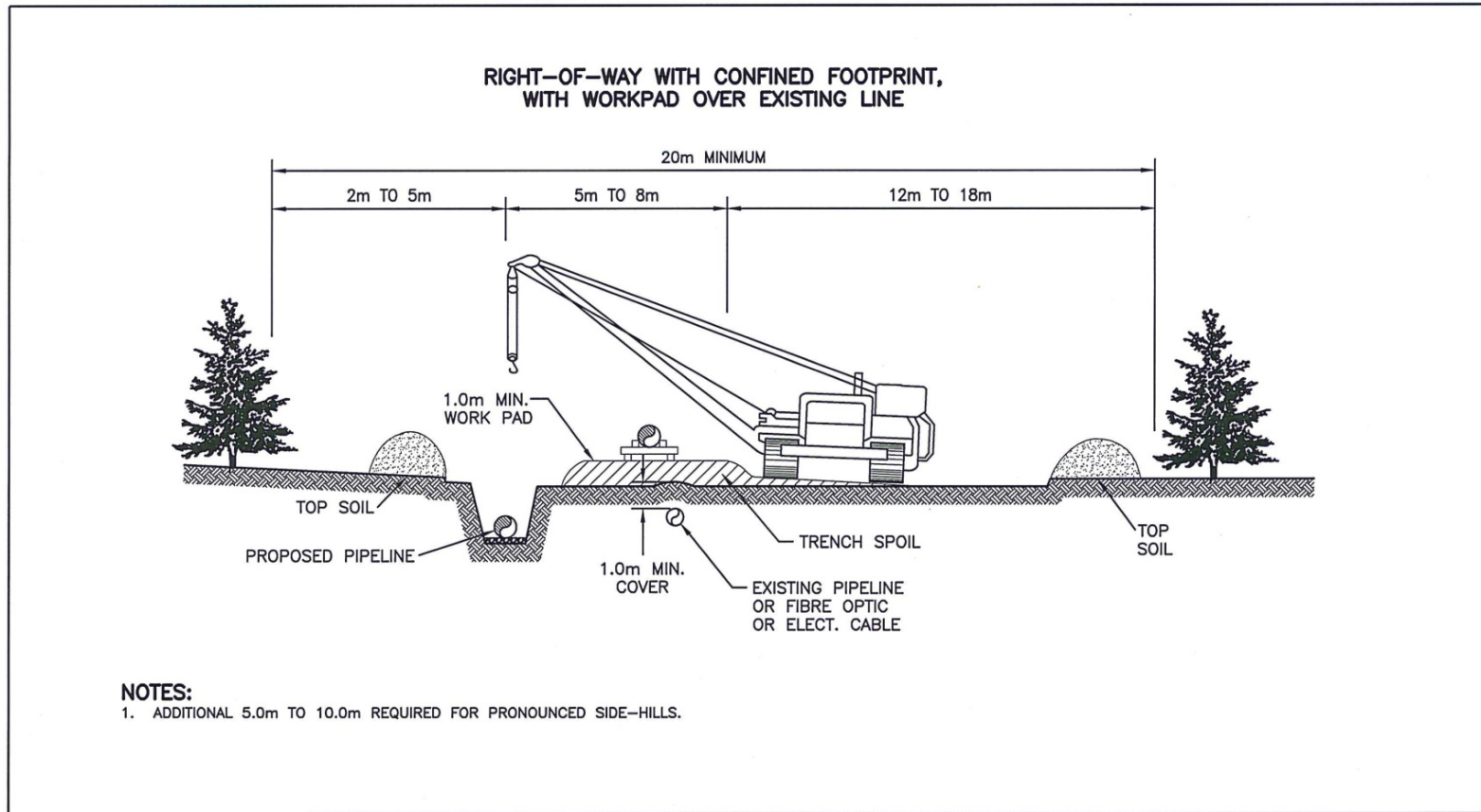
TYPICAL RIGHT-OF-WAY CONSTRUCTION SKETCHES



NOTES:

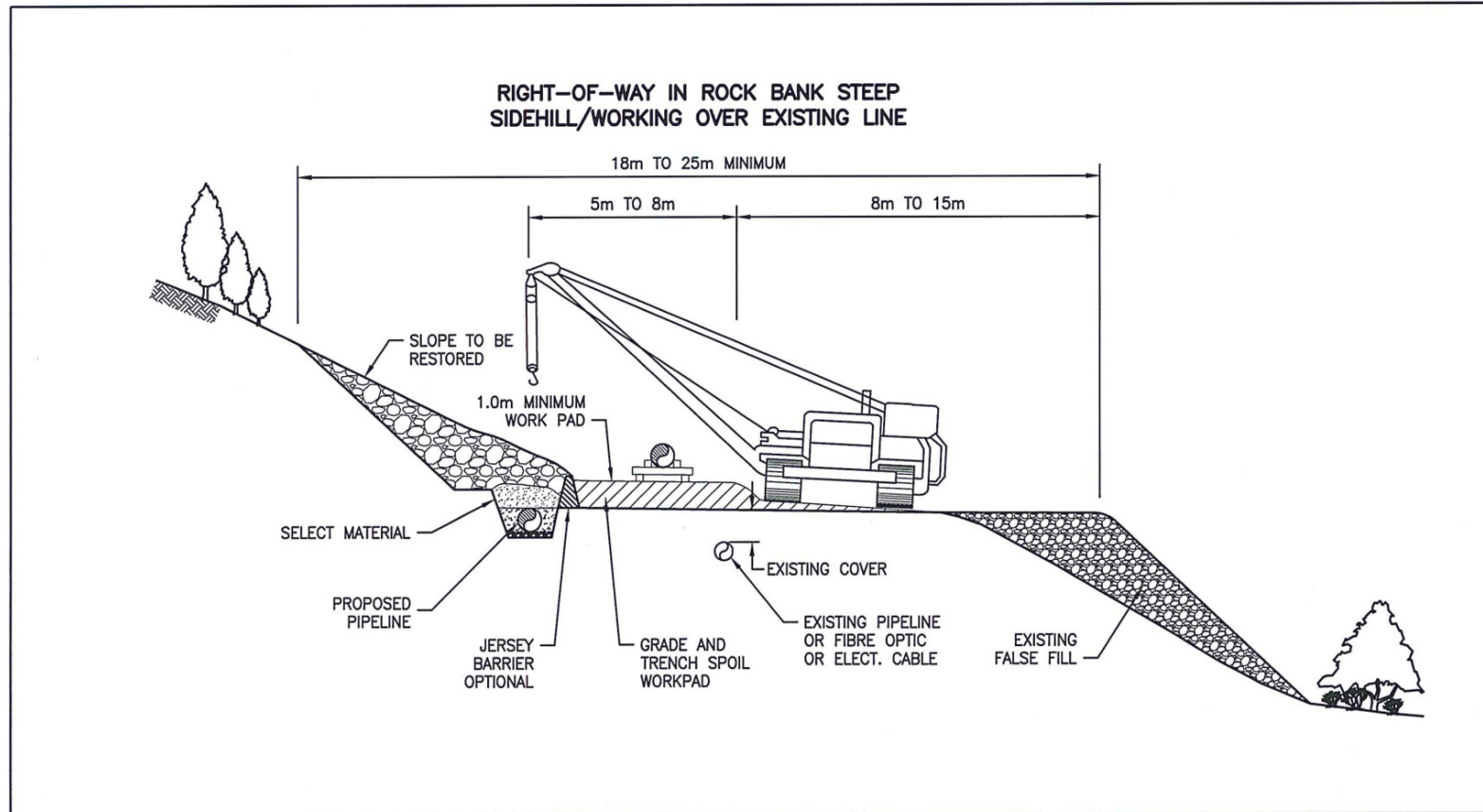
1. ADDITIONAL EXTRA TEMPORARY WORKSPACE REQUIRED FOR AREAS TO BE GRADED (eg. SIDEHILLS, ETC.) AND CROSSINGS.
2. ACTUAL LOCATION OF THE EXISTING PIPELINE IS TO BE CONFIRMED PRIOR TO CONSTRUCTION.
3. THE TYPICAL SEPARATION DISTANCE IS 9 METRES. HOWEVER, IN SOME LOCATIONS IT IS EXPECTED TO BE NARROWER, RANGING BETWEEN 5m–9m.

THIS DRAWING IS PREPARED SOLELY FOR THE USE OF TRANS MOUNTAIN PIPELINE ULC. UPI PROJECTS CANADA LTD. ASSUMES NO LIABILITY TO ANY OTHER PARTY FOR ANY REPRESENTATIONS CONTAINED IN THIS DRAWING.	Integrated Pipeline Projects Canada Ltd. APEGA PERMIT TO PRACTICE UPI PROJECTS CANADA LTD. PERMIT NUMBER P10585 UPI DWG. No.: 19731-505-TYP-09000	KINDER MORGAN CANADA	TRANS MOUNTAIN
DRAWN BY DRF CHECKED BY WGS APPROVED BY MS		TRANS MOUNTAIN EXPANSION PROJECT TYPICAL DRAWING RIGHT-OF-WAY CONFIGURATION #00 CONVENTIONAL FOOTPRINT PARALLEL TO TMPL	
F 2013-11-19 ISSUED FOR REVIEW RGR E 2013-09-12 ISSUED FOR REVIEW RGR D 2013-08-19 ISSUED FOR REVIEW RGR C 2013-07-19 ISSUED FOR REVIEW RGR B 2012-10-30 ISSUED FOR REVIEW RMR		SHEET SIZE 8.5x11 SCALE NTS DATE 12/09/25	
NO. DATE REVISION	DRN CHK ENG /APPR	PROJECT CODING AFE FACILITY ID TMEP DRAWING NUMBER PT-9000	DOCUMENT NO SHT NO REV F

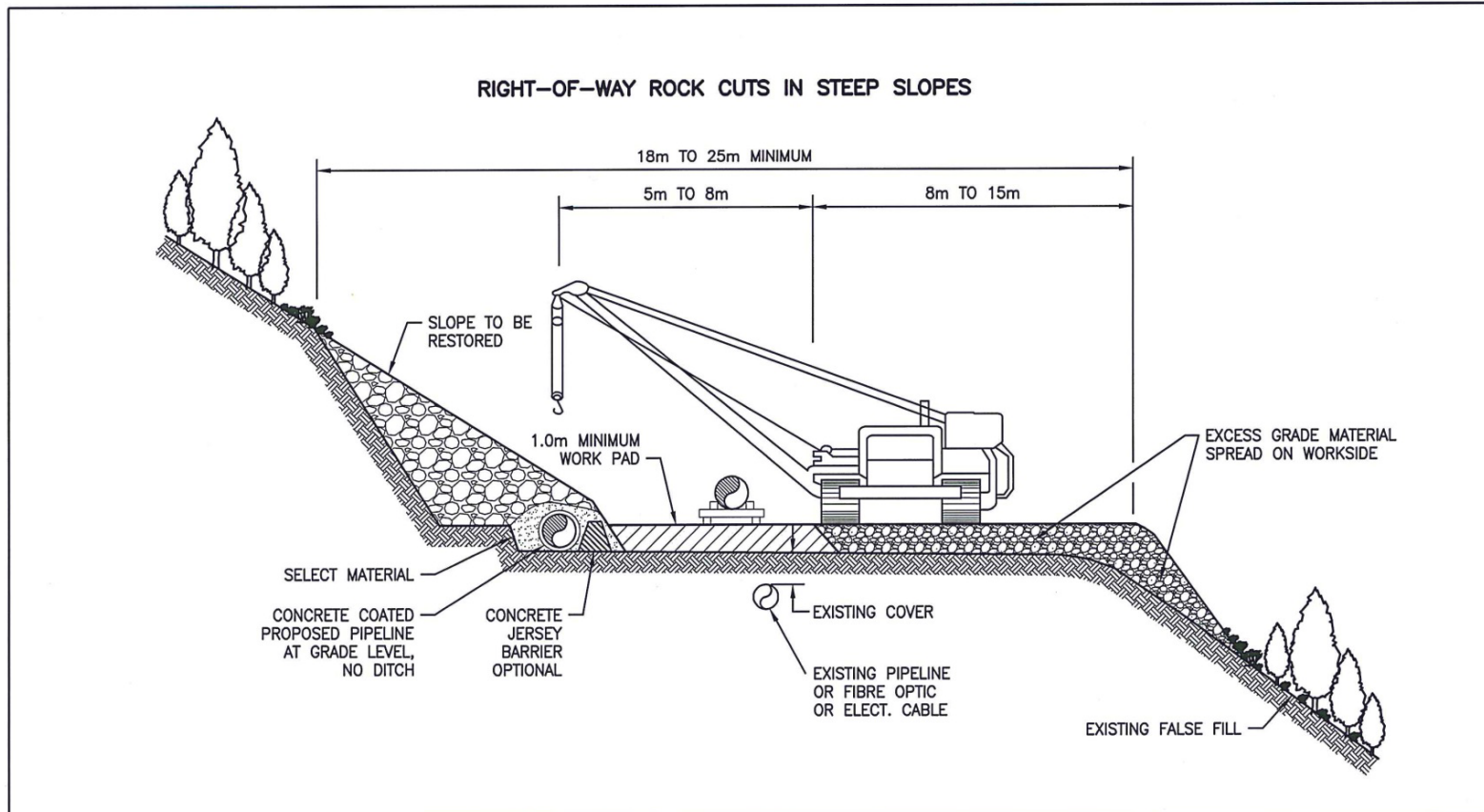


NOTES:
 1. ADDITIONAL 5.0m TO 10.0m REQUIRED FOR PRONOUNCED SIDE-HILLS.

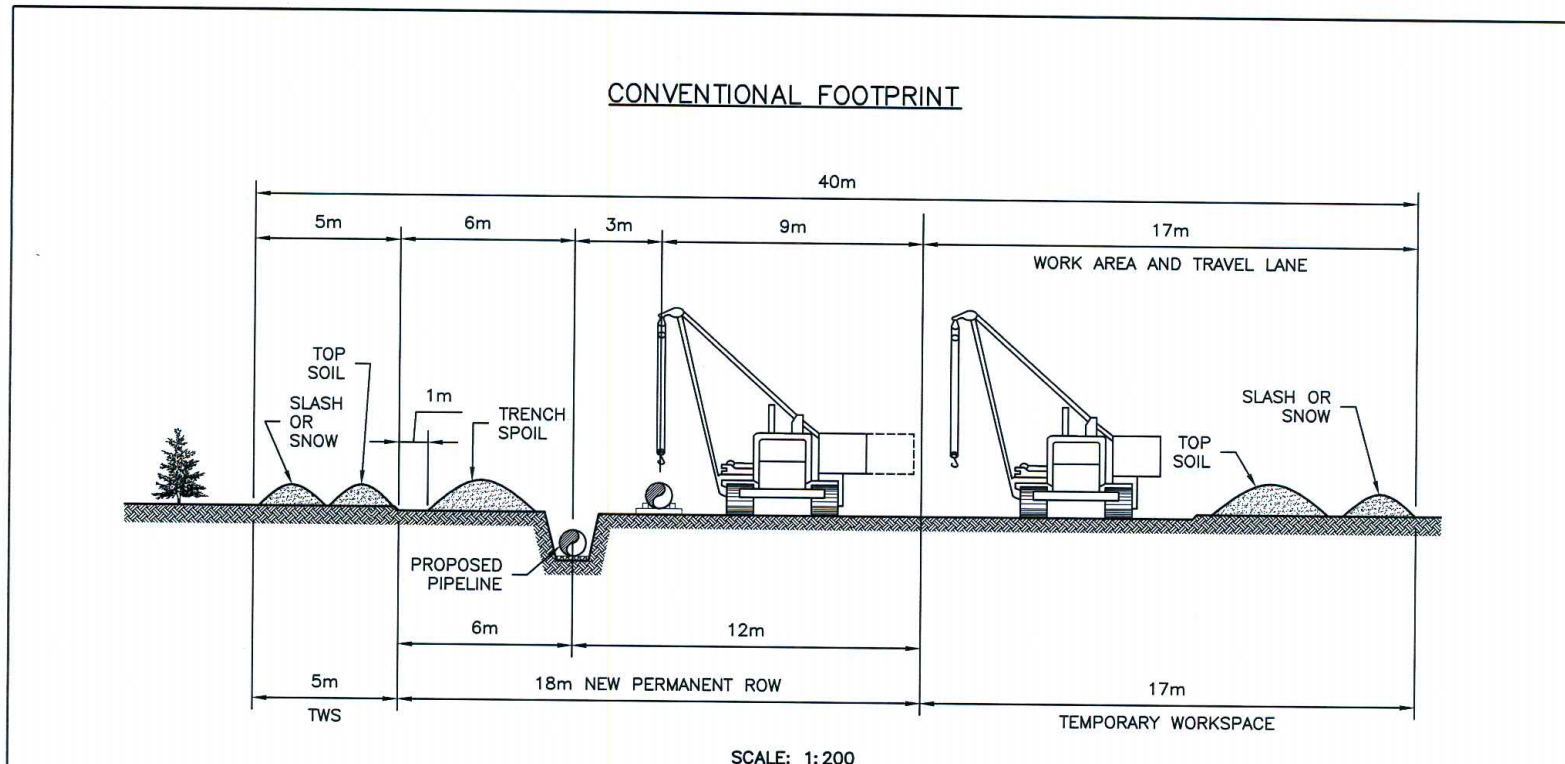
THIS DRAWING IS PREPARED SOLELY FOR THE USE OF TRANS MOUNTAIN PIPELINE ULC. INTEGRATED PIPELINE PROJECTS CANADA LTD. ASSUMES NO LIABILITY TO ANY OTHER PARTY FOR ANY REPRESENTATIONS CONTAINED IN THIS DRAWING.	Integrated Pipeline Projects Canada Ltd. APEGA PERMIT TO PRACTICE INTEGRATED PIPELINE PROJECTS CANADA LTD. PERMIT NUMBER P10585 UPI DWG. No.: 19731-505-TYP-09001		DRAWN BY DRF CHECKED BY WGS APPROVED BY MS PROJECT CODING AFE TRANS MOUNTAIN EXPANSION PROJECT TYPICAL DRAWING INSTALLATION METHOD #01 WORK OVER EXISTING LINE	SHEET SIZE 8.5x11 SCALE NTS DATE 12/09/25																																						
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">B</td> <td style="width: 40%;">2012-10-30</td> <td style="width: 40%;">ISSUED FOR REVIEW</td> <td style="width: 10%;">RMR</td> </tr> <tr> <td>A</td> <td>2012-09-25</td> <td>ISSUED FOR REVIEW</td> <td>DRF</td> </tr> </table>	B	2012-10-30	ISSUED FOR REVIEW	RMR	A	2012-09-25	ISSUED FOR REVIEW	DRF	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 5%;">NO.</th> <th style="width: 10%;">DATE</th> <th style="width: 40%;">REVISION</th> <th style="width: 5%;">DRN</th> <th style="width: 5%;">CHK</th> <th style="width: 5%;">ENG</th> <th style="width: 5%;">APPR</th> </tr> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </table>	NO.	DATE	REVISION	DRN	CHK	ENG	APPR								<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 20%;">PROJECT CODING</th> <th colspan="3" style="width: 60%;">DRAWING NUMBER</th> <th style="width: 10%;">SHT NO</th> <th style="width: 5%;">REV</th> </tr> <tr> <td>AFE</td> <td style="width: 15%;">FACILITY ID</td> <td style="width: 15%;">DOCUMENT NO</td> <td style="width: 30%;"> </td> <td> </td> <td> </td> </tr> <tr> <td> </td> <td>TMEP</td> <td>PT-9001</td> <td> </td> <td>1</td> <td>B</td> </tr> </table>	PROJECT CODING	DRAWING NUMBER			SHT NO	REV	AFE	FACILITY ID	DOCUMENT NO					TMEP	PT-9001		1	B
B	2012-10-30	ISSUED FOR REVIEW	RMR																																							
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AFE	FACILITY ID	DOCUMENT NO																																								
	TMEP	PT-9001		1	B																																					



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						DRF				8.5x11	
				CHECKED BY		PROJECT CODING AFE		FACILITY ID		DRAWING NUMBER	
				WGS				TMEP		PT-9002	
				APPROVED BY						REV	
				MS						1 B	
B 2012-10-30		ISSUED FOR REVIEW		RMR							
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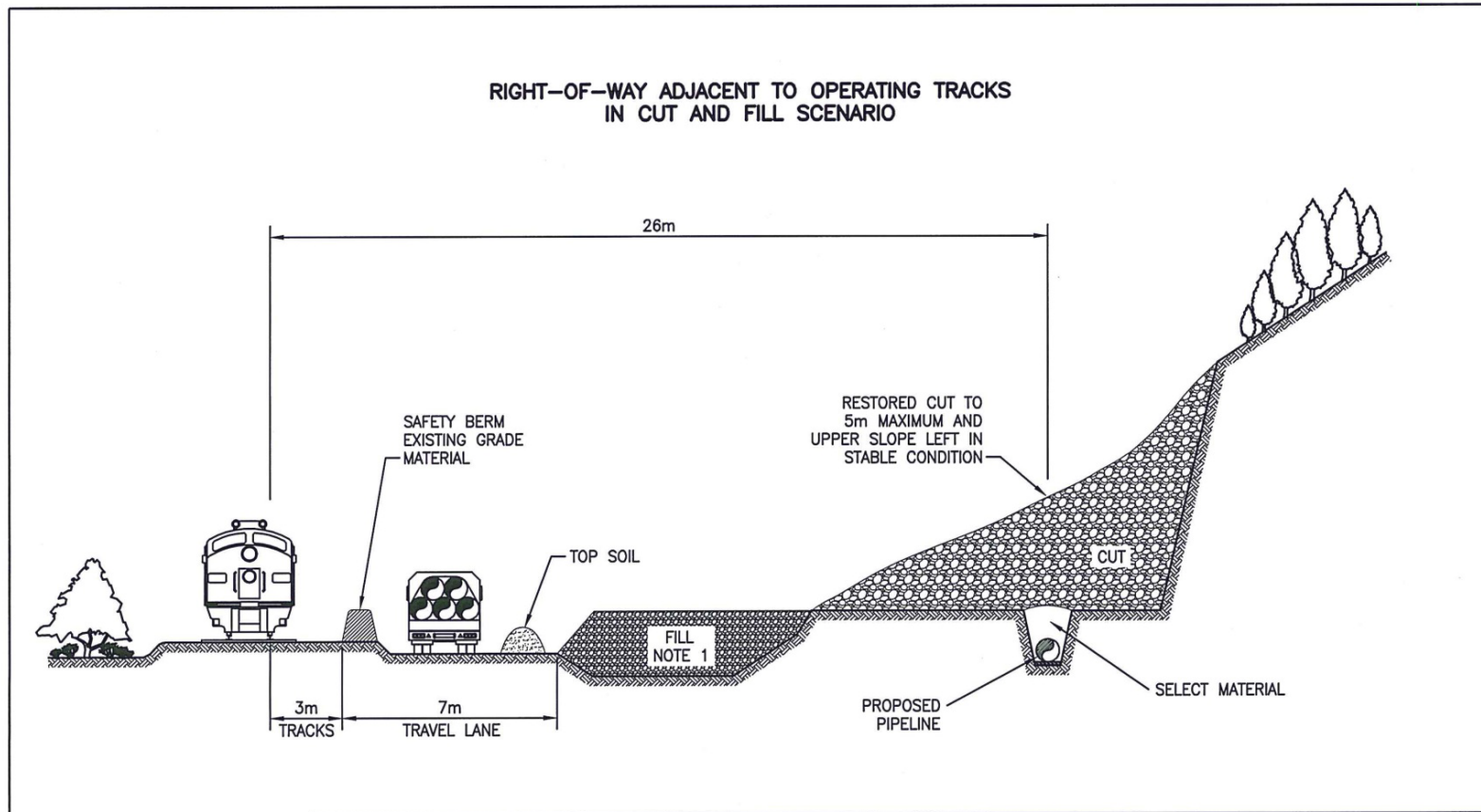
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								DRAWN BY DRF
				CHECKED BY WGS				SCALE NTS
				APPROVED BY MS				DATE 12/09/25
				PROJECT CODING AFE		DRAWING NUMBER FACILITY ID DOCUMENT NO		SHT NO
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A	2012-09-25	ISSUED FOR REVIEW			DRF			



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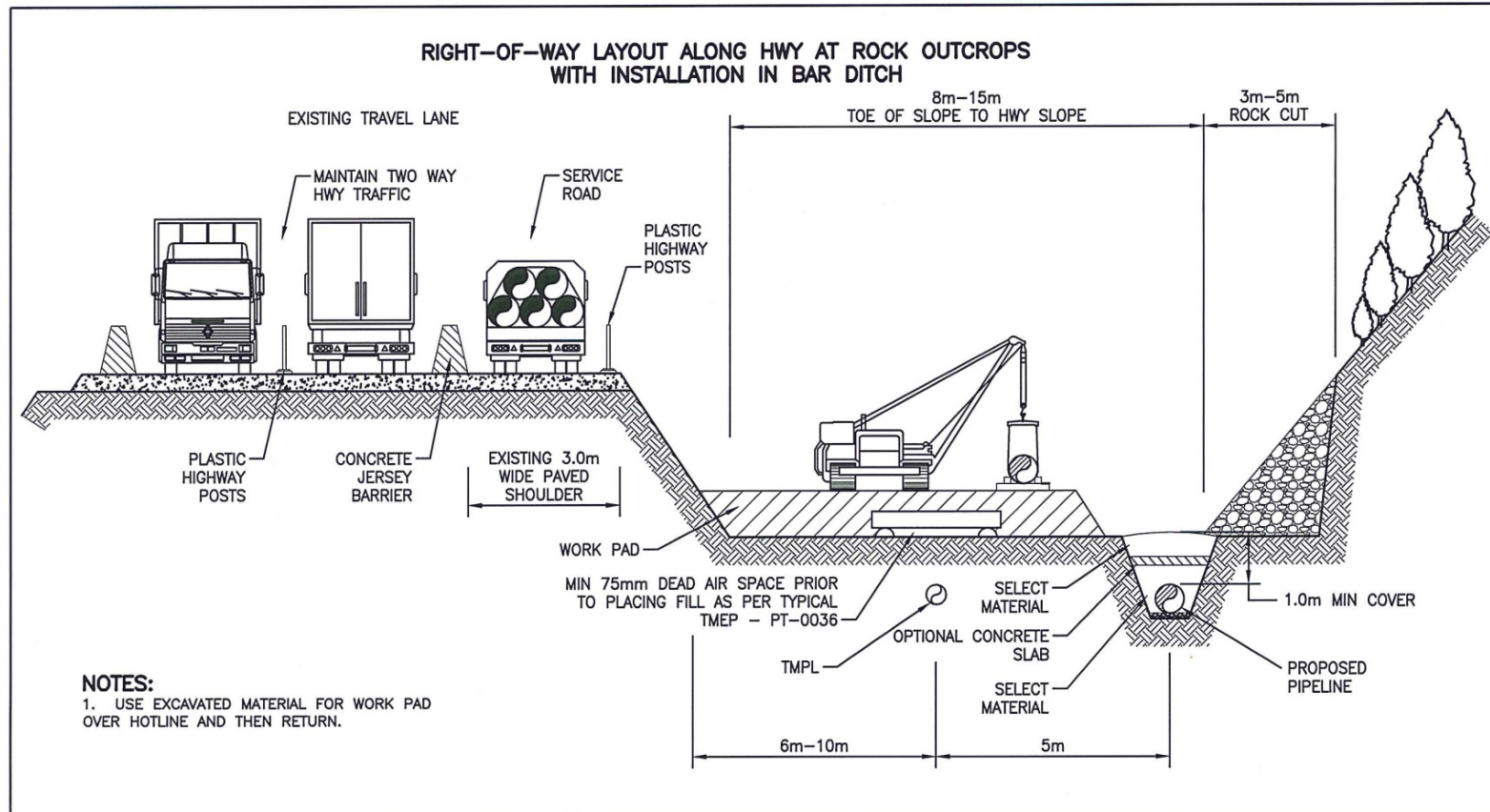
1. ADDITIONAL EXTRA TEMPORARY WORKSPACE REQUIRED FOR AREAS TO BE GRADED (eg. SIDEHILLS, ETC.) AND CROSSINGS.

THIS DRAWING IS PREPARED SOLELY FOR THE USE OF TRANS MOUNTAIN PIPELINE ULC. UPI PROJECTS CANADA LTD. ASSUMES NO LIABILITY TO ANY OTHER PARTY FOR ANY REPRESENTATIONS CONTAINED IN THIS DRAWING.	Integrated Pipeline Projects Canada Ltd. APEGA PERMIT TO PRACTICE UPI PROJECTS CANADA LTD. PERMIT NUMBER P10585 UPI DWG. No.: 19731-505-TYP-09004	TRANS MOUNTAIN EXPANSION PROJECT TYPICAL DRAWING RIGHT-OF-WAY CONFIGURATION #04 CONVENTIONAL FOOTPRINT	SHEET SIZE 8.5x11 SCALE AS SHOWN DATE 2013/11/19
DRAWN BY RGR CHECKED BY APPROVED BY	PROJECT CODING AFE		DRAWING NUMBER FACILITY ID DOCUMENT NO SHT NO REV
A 2013-11-19 ISSUED FOR REVIEW NO. DATE REVISION	DRN CHK ENG APPR	TMEP - PT-9004	A



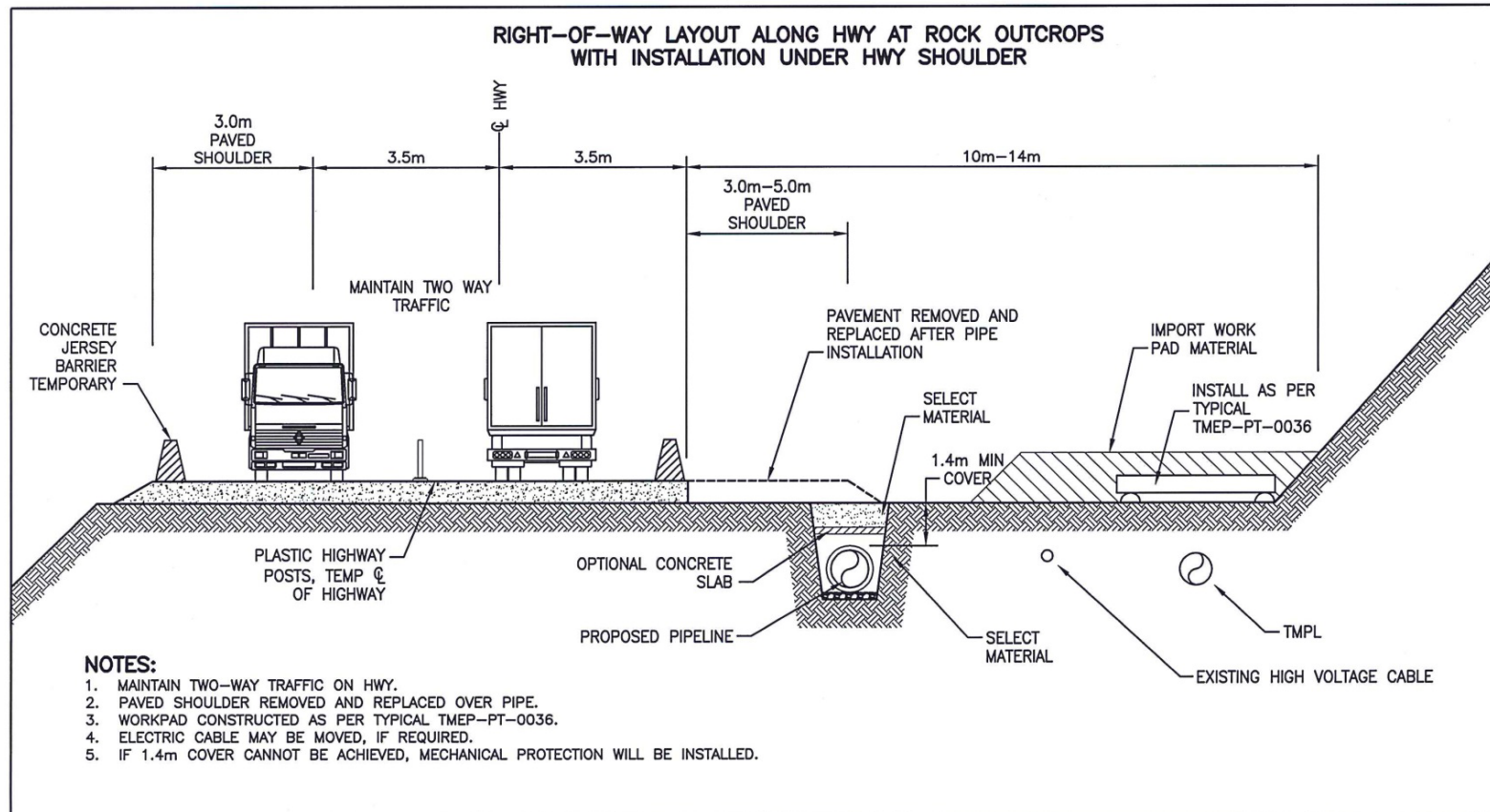
NOTES:
 1. TEMPORARY FILL REQUIRED FOR CONSTRUCTION.

THIS DRAWING IS PREPARED SOLELY FOR THE USE OF TRANS MOUNTAIN PIPELINE ULC. INTEGRATED PIPELINE PROJECTS CANADA LTD. ASSUMES NO LIABILITY TO ANY OTHER PARTY FOR ANY REPRESENTATIONS CONTAINED IN THIS DRAWING.					
	APEGA PERMIT TO PRACTICE INTEGRATED PIPELINE PROJECTS CANADA LTD. PERMIT NUMBER P10585 UPI DWG. No.: 19731-505-TYP-09010		DRAWN BY DRF	TRANS MOUNTAIN EXPANSION PROJECT TYPICAL DRAWING INSTALLATION METHOD #010 ADJACENT TO TRACKS IN CUT & FILL SCENARIO	SHEET SIZE 8.5x11 SCALE NTS DATE 12/09/25
			CHECKED BY WGS		
			APPROVED BY MS		
			PROJECT CODING AFE	DRAWING NUMBER FACILITY ID DOCUMENT NO SHT NO REV	
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B 2012-10-30 ISSUED FOR REVIEW RMR					
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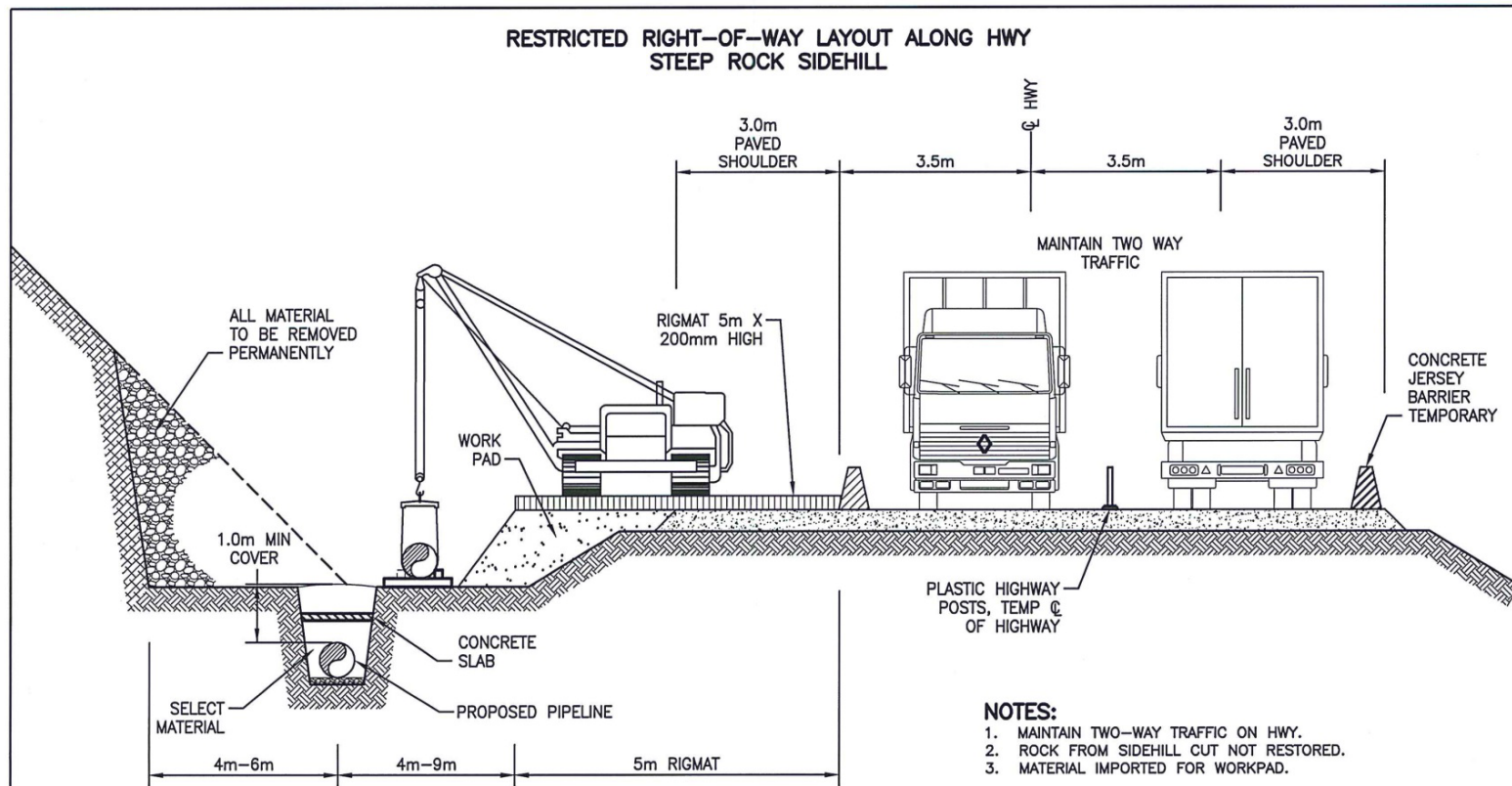
NOTES:
 1. USE EXCAVATED MATERIAL FOR WORK PAD OVER HOTLINE AND THEN RETURN.

THIS DRAWING IS PREPARED SOLELY FOR THE USE OF TRANS MOUNTAIN PIPELINE ULC. INTEGRATED PIPELINE PROJECTS CANADA LTD. ASSUMES NO LIABILITY TO ANY OTHER PARTY FOR ANY REPRESENTATIONS CONTAINED IN THIS DRAWING.		Integrated Pipeline Projects Canada Ltd. APEGA PERMIT TO PRACTICE INTEGRATED PIPELINE PROJECTS CANADA LTD. PERMIT NUMBER P10585 UPI DWG. No.: 19731-505-TYP-09014		KINDER MORGAN CANADA TRANS MOUNTAIN		DRAWN BY DRF	TRANS MOUNTAIN EXPANSION PROJECT TYPICAL DRAWING INSTALLATION METHOD #14 STEEP SIDE HILL CUT ALONG HWY LTD. WORKSIDE			SHEET SIZE 8.5x11
						CHECKED BY WGS				DATE 12/09/25
				APPROVED BY MS		PROJECT CODING AFE		DRAWING NUMBER FACILITY ID DOCUMENT NO SHT NO REV		
						TMEP - PT-9014		1 B		
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NO. DATE REVISION										

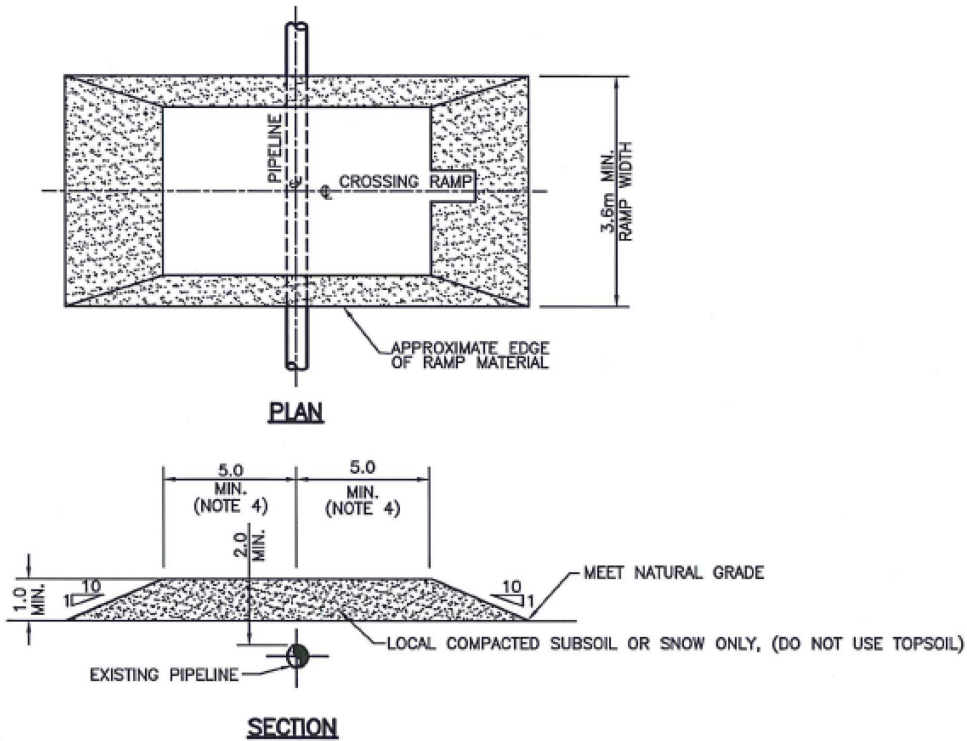


- NOTES:**
1. MAINTAIN TWO-WAY TRAFFIC ON HWY.
 2. PAVED SHOULDER REMOVED AND REPLACED OVER PIPE.
 3. WORKPAD CONSTRUCTED AS PER TYPICAL TMEP-PT-0036.
 4. ELECTRIC CABLE MAY BE MOVED, IF REQUIRED.
 5. IF 1.4m COVER CANNOT BE ACHIEVED, MECHANICAL PROTECTION WILL BE INSTALLED.

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B 2012-10-30 ISSUED FOR REVIEW RMR				PROJECT CODING AFE		DRAWING NUMBER	
A 2012-09-25 ISSUED FOR REVIEW DRF				FACILITY ID		DOCUMENT NO	
NO. DATE REVISION		DRN CHK ENG APPR		TMEP - PT-9016		SHT NO 1 REV B	



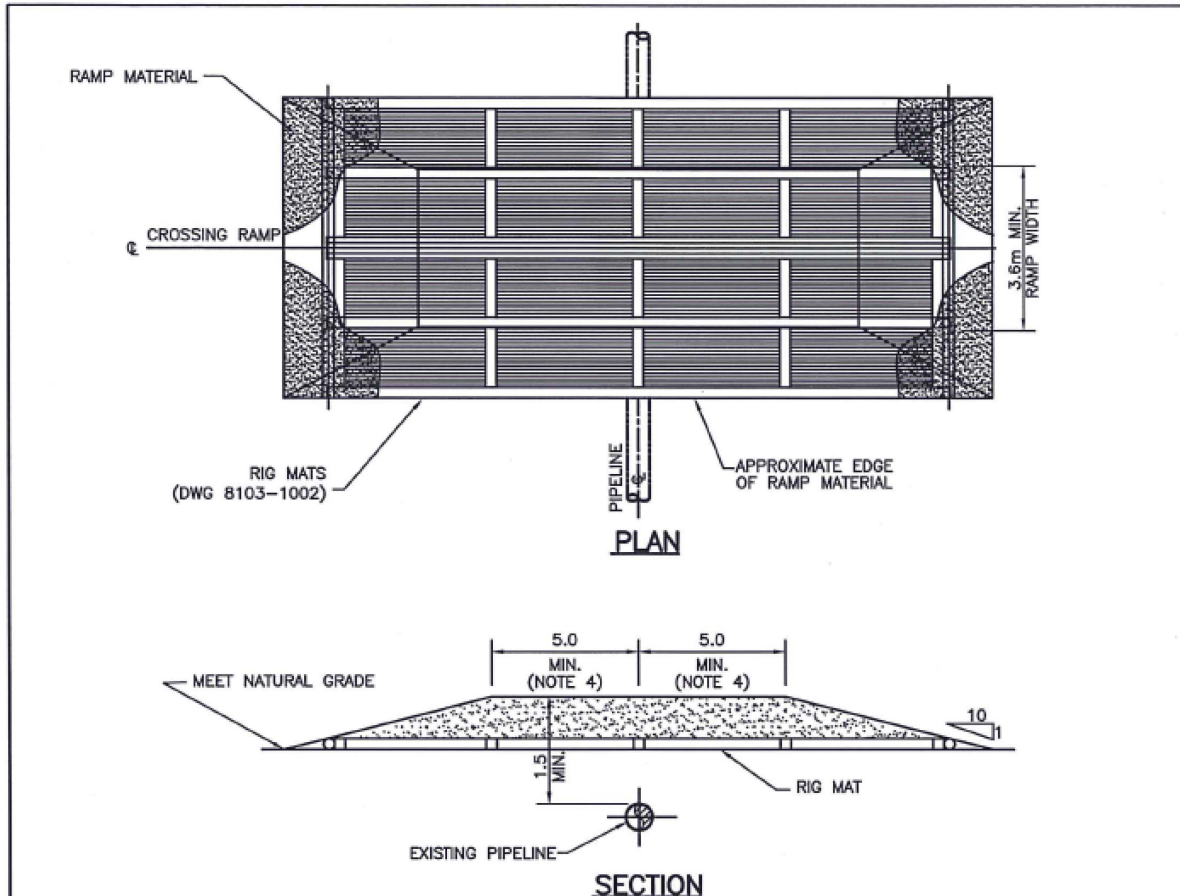
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						SCALE NTS	
		DRAWN BY DRF		CHECKED BY WGS		DATE 12/09/25	
		APPROVED BY MS		PROJECT CODING AFE		DRAWING NUMBER DOCUMENT NO	
B 2012-10-30 ISSUED FOR REVIEW		RMR		FACILITY ID		SHT NO	
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NO.	DATE	REVISION	DRN	CHK	ENG	APPR	



NOTES:

1. SHOULD CROSSING AGREEMENTS CONFLICT WITH THIS DRAWING, THE MORE STRINGENT DESIGN, AS DETERMINED BY MANAGER, SHALL TAKE PRECEDENCE.
2. WHERE ROCK EXISTS OR BOULDERS PRESENT, CONTRACTOR SHALL EXPOSE THE TOP HALF OF THE UTILITY AND BACKFILL WITH COMPACTED SAND OR APPROVED FILL, OR USE A BRIDGE INSTALLATION AS APPROVED BY MANAGER.
3. WHERE CROSSING MORE THAN ONE EXISTING PIPELINE, ONE CONTINUOUS RAMP SHALL BE CONSTRUCTED. WHEN THE SEPARATION BETWEEN EXISTING PIPELINES EXCEEDS 12m, SEPARATE RAMPS MAY BE CONSTRUCTED.
4. LENGTH OF RAMP SHALL VARY IN ACCORDANCE WITH CROSSING ANGLE. DISTANCE SHOWN MEASURED PERPENDICULAR TO EXISTING PIPELINE. THE MINIMUM CROSSING ANGLE SHALL BE 45 DEGREES.
5. VEHICLES OR EQUIPMENT USING CROSSING SHALL PROCEED SLOWLY AND WITH CAUTION TO MINIMIZE IMPACT LOADING TO BURIED UTILITY. ONLY ONE VEHICLE SHALL USE RAMP AT A TIME.
6. ON COMPLETION OF CONSTRUCTION, CONTRACTOR SHALL REMOVE RAMP AND RESTORE AREA TO THE SATISFACTION OF MANAGER AND EXISTING CABLE OR UTILITY OWNERS REPRESENTATIVE.
7. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
8. COPY OF CROSSING PERMIT MUST BE AVAILABLE ON SITE.

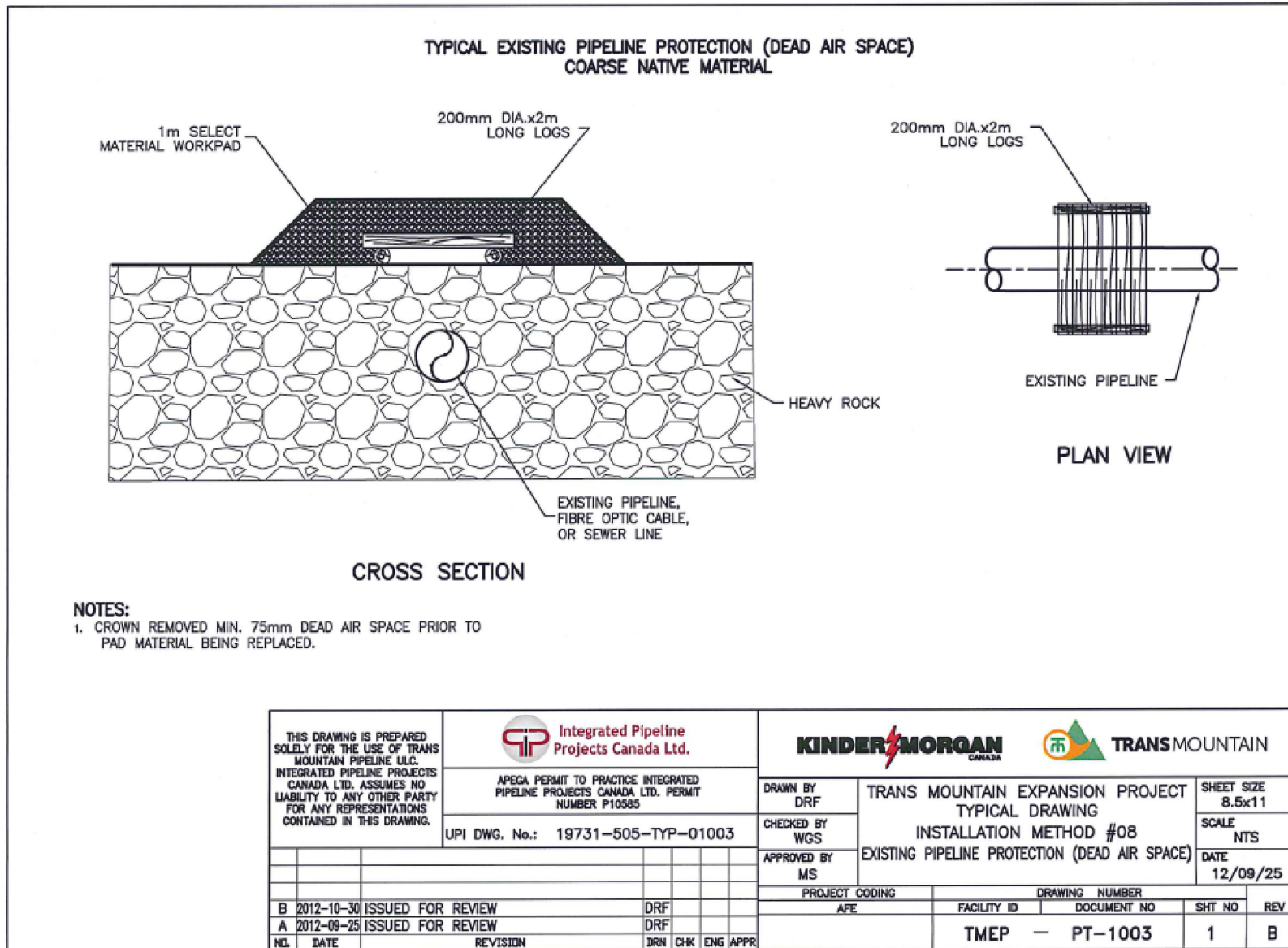
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DRAWN BY		TRANS MOUNTAIN EXPANSION PROJECT				SHEET SIZE	
CHECKED BY		EQUIPMENT CROSSING RAMP OVER				8.5x11	
APPROVED BY		EXISTING PIPELINE (NPS 6 & SMALLER)				SCALE	
						NTS	
						DATE	
						2012-11-01	
		PROJECT CODING		DRAWING NUMBER			
		AFE		FACILITY ID		DOCUMENT NO	
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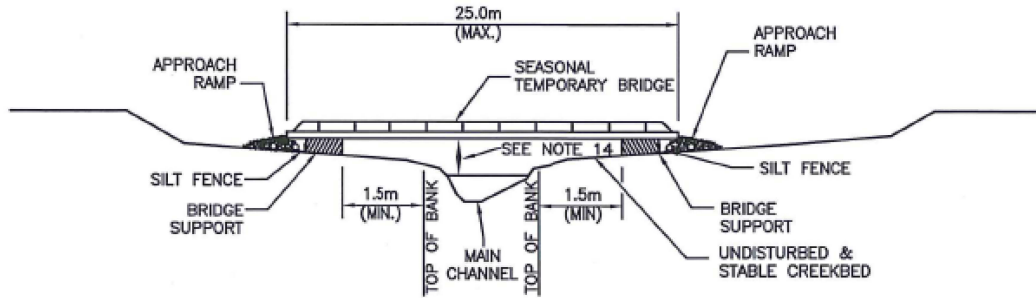


NOTES:

1. SHOULD CROSSING AGREEMENTS CONFLICT WITH THIS DRAWING, THE MORE STRINGENT REQUIREMENTS AS DETERMINED BY MANAGER SHALL TAKE PRECEDENCE.
2. WHERE ROCK EXISTS OR BOULDERS PRESENT, CONTRACTOR SHALL EXPOSE THE TOP HALF OF THE PIPE AND BACKFILL WITH COMPACTED SAND OR APPROVED FILL, OR LEAVE A 'DEAD AIR' SPACE ABOVE THE PIPELINE.
3. WHERE CROSSING MORE THAN ONE EXISTING PIPELINE, ONE CONTINUOUS RIG MATTING SHALL BE CONSTRUCTED. WHEN THE SEPARATION BETWEEN EXISTING PIPELINES EXCEED 12m, SEPARATE RIG MATTING MAY BE USED.
4. LENGTH OF RIG MATTING SHALL VARY IN ACCORDANCE WITH CROSSING ANGLE. MINIMUM CROSSING ANGLE SHALL BE 45 DEGREES. DISTANCE SHOWN MEASURED PERPENDICULAR TO EXISTING PIPELINE.
5. VEHICLES OR EQUIPMENT USING CROSSING SHALL PROCEED SLOWLY AND WITH CAUTION TO MINIMIZE IMPACT LOADING TO PIPE. ONLY ONE VEHICLE SHALL USE RAMP AT A TIME.
6. ON COMPLETION OF CONSTRUCTION, CONTRACTOR SHALL REMOVE RAMP AND RIG MATTING AND RESTORE AREA TO THE SATISFACTION OF MANAGER AND EXISTING PIPELINE OWNER'S REPRESENTATIVE.
7. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.
8. COPY OF CROSSING PERMIT MUST BE AVAILABLE ON SITE.

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APEGA PERMIT TO PRACTICE INTEGRATED PIPELINE PROJECTS CANADA LTD. PERMIT NUMBER P10585 UPI DWG. No.: 19731-505-TYP-01001		DRAWN BY CHECKED BY APPROVED BY		TRANS MOUNTAIN EXPANSION PROJECT TYPICAL DRAWING EQUIPMENT CROSSING RAMP OVER EXISTING PIPELINE USING RIG MATS (NPS 8 & SMALLER)		SHEET SIZE 8.5x11 SCALE NTS DATE 2012-11-01	
PROJECT CODING AFE		DRAWING NUMBER FACILITY ID DOCUMENT NO SHT NO REV		TMEP - PT-1001		1 A	
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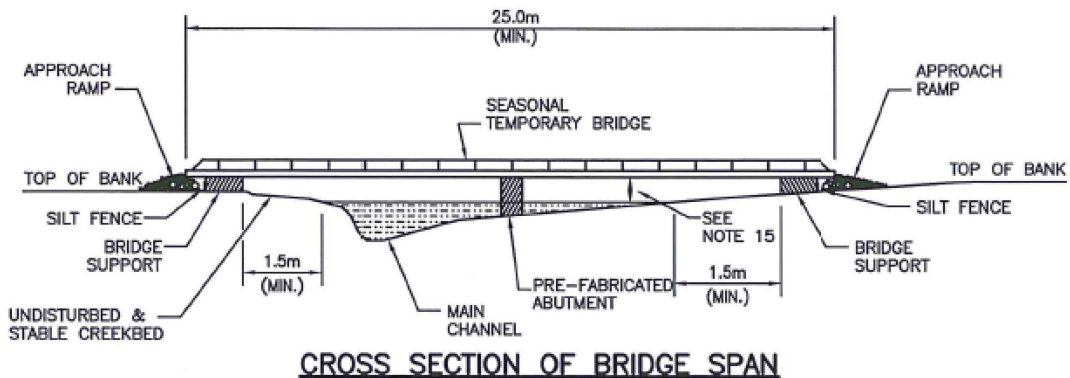


CROSS SECTION OF BRIDGE SPAN

NOTES:

1. BRIDGE DESIGN TO BE SUITABLE TO SAFELY ACCOMMODATE CONTRACTOR'S EQUIPMENT.
2. THIS SINGLE SPAN TEMPORARY BRIDGE IS TO BE CONSTRUCTED AND INSTALLED OUTSIDE THE WETTED PERIMETER OF THE STREAM CROSSING.
3. THE APPROACH RAMP TO THE BRIDGE SHOULD BE CONSTRUCTED OF LOCAL MATERIAL (IF SUITABLE).
4. THE BRIDGE SUPPORTS SHALL BE CONSTRUCTED OF TIMBERS, SWAMP MATS, CONCRETE BLOCKS, STEEL FRAMES, OR ACCEPTABLE EQUIVALENT.
5. IF THE BRIDGE IS INSTALLED BETWEEN HIGH WATER BANKS THEN FILL SHOULD BE USED FOR THE APPROACH RAMP. AVOID GRADING OR CUTTING OF THE FLOOD BANKS WHENEVER PRACTICAL.
6. TO AVOID DAMAGING THE DEFINED BANK OF THE CREEK, THE SUPPORTS OF THE BRIDGE SHALL BE PLACED A MINIMUM OF 1.5 METERS AWAY FROM THE TOP OF THE CREEK BANK OR THE WETTED PERIMETER ALLOWING FOR SEASONAL FLOW VARIATIONS.
7. SILT FENCE SHALL BE PLACED ACROSS THE INTERFACE OF THE APPROACH FILL MATERIAL WHERE IT MEETS THE BRIDGE.
8. GEO-TEXTILE FABRIC SHALL BE INSTALLED UNDER THE BRIDGE AND UP THE SIDES TO TRAP SOIL PARTICLES FROM THE BRIDGE TRAFFIC FROM ENTERING THE WATERCOURSE.
9. THE BRIDGES SHALL BE MAINTAINED TO ENSURE SAFETY, REMOVAL OF EXCESS SOIL AND REPAIR TO THE FABRIC OR SILT FENCE.
10. ALL BRIDGE MATERIAL SHALL BE REMOVED UPON COMPLETION OF THE PROJECT AND PRIOR TO HIGH WATER SEASON OR SPRING BREAKUP. SHORELINES AND BANKS SHALL BE RESTORED AND PROTECTED ON CLEANUP AND FINAL RESTORATION.
11. WHERE ROAD SURFACES ON APPROACHES CONTAIN A PREDOMINANCE OF FINE-TEXTURED MATERIALS (E.G., SILT, CLAY) OR ORGANICS, THE SURFACE OF THE BRIDGE WILL BE SOLID RATHER THAN GRATED OR WILL BE EQUIPPED WITH A SUBLAYER OF FILTER CLOTH TO PREVENT SEDIMENT INTRODUCTIONS INTO THE STREAM FROM EQUIPMENT TRAFFIC.
12. APPROACH FILLS (COMPRISED OF CLEAN GRANULAR MATERIAL) RATHER THAN CUTS IN STREAM BANKS WILL BE USED TO THE EXTENT PRACTICAL TO PROVIDE ACCESS TO THE BRIDGE DECK TO REDUCE BANK DISTURBANCE AND EROSION POTENTIAL.
13. TO PREVENT APPROACH FILL FROM SLUMPING INTO THE STREAM CHANNEL, ALL BRIDGES WILL BE EQUIPPED WITH WING WALLS LINED WITH GEOTEXTILE FABRIC.
14. THE FREE BOARD HEIGHT SHALL BE A MINIMUM OF 1m OR AS REQUIRED BY TRANSPORT CANADA PERMITS, WHICHEVER IS GREATER.

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PROJECT CODING AFE				DRAWING NUMBER FACILITY ID DOCUMENT NO SHT NO REV TMEP - PT-1100			
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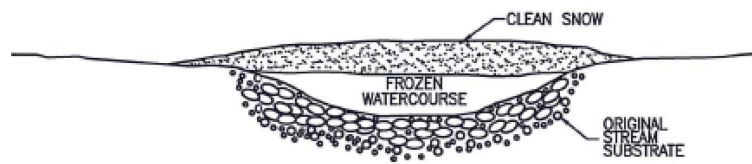
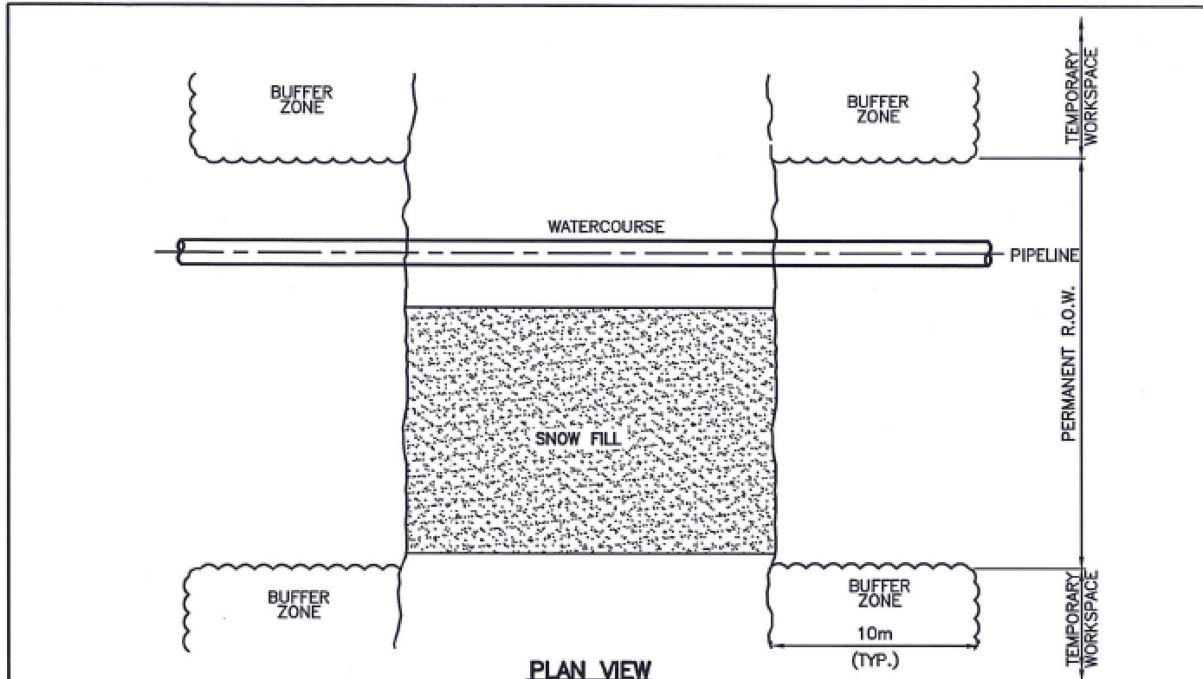


CROSS SECTION OF BRIDGE SPAN

NOTES:




1. BRIDGE DESIGN TO BE SUITABLE TO SAFELY ACCOMMODATE CONTRACTOR'S EQUIPMENT.
2. THIS MULTI-SPAN TEMPORARY BRIDGE IS DESIGNED TO BE CONSTRUCTED AND INSTALLED WITH AT LEAST ONE PRE-FABRICATED ABUTMENT PLACED INSIDE THE WETTED PERIMETER OF THE WATERCOURSE CROSSING.
3. THE APPROACH LANES TO THE BRIDGE SHOULD BE CONSTRUCTED OF LOCAL MATERIAL (IF SUITABLE).
4. THE BRIDGE SUPPORTS SHALL BE CONSTRUCTED OF TIMBERS, SWAMP MATS, CONCRETE BLOCKS, STEEL FRAMES, OR ACCEPTABLE EQUIVALENT.
5. IF THE BRIDGE IS INSTALLED BETWEEN HIGH WATER BANKS THEN FILL SHOULD BE USED FOR THE APPROACH RAMPS. AVOID GRADING OR CUTTING OF THE FLOOD BANKS WHENEVER PRACTICAL.
6. THE INSTREAM PRE-FABRICATED SUPPORT STRUCTURE WILL BE PLACED USING APPROVED EQUIPMENT WITH MINIMUM DISTURBANCE TO THE STREAMBED.
7. TO AVOID DAMAGING THE DEFINED BANK OF THE CREEK, THE SUPPORTS OF THE BRIDGE SHALL BE PLACED A MINIMUM OF 1.5 METERS AWAY FROM THE TOP OF THE CREEK BANK OR THE WETTED PERIMETER ALLOWING FOR SEASONAL FLOW VARIATIONS.
8. SILT FENCE SHALL BE PLACED ACROSS THE INTERFACE OF THE APPROACH FILL MATERIAL WHERE IT MEETS THE BRIDGE.
9. GEO-TEXTILE FABRIC SHALL BE INSTALLED UNDER THE BRIDGE AND UP THE SIDES TO TRAP SOIL PARTICLES FROM THE BRIDGE TRAFFIC FROM ENTERING THE WATERCOURSE.
10. THE BRIDGES SHALL BE MAINTAINED TO ENSURE SAFETY, REMOVAL OF EXCESS SOIL AND REPAIR TO THE FABRIC OR SILT FENCE.
11. ALL BRIDGE MATERIAL SHALL BE REMOVED UPON COMPLETION OF THE PROJECT AND PRIOR TO HIGH WATER SEASON OR SPRING BREAKUP. SHORELINES AND BANKS SHALL BE RESTORED AND PROTECTED ON CLEANUP AND FINAL RESTORATION.
12. WHERE ROAD SURFACES ON APPROACHES CONTAIN A PREDOMINANCE OF FINE-TEXTURED MATERIALS (E.G., SILT, CLAY) OR ORGANICS, THE SURFACE OF THE BRIDGE WILL BE SOLID RATHER THAN GRATED OR WILL BE EQUIPPED WITH A SUBLAYER OF FILTER CLOTH TO PREVENT SEDIMENT INTRODUCTIONS INTO THE STREAM FROM EQUIPMENT TRAFFIC.
13. APPROACH FILLS (COMPRISED OF CLEAN GRANULAR MATERIAL) RATHER THAN CUTS IN STREAM BANKS WILL BE USED TO THE EXTENT PRACTICAL TO PROVIDE ACCESS TO THE BRIDGE DECK TO REDUCE BANK DISTURBANCE AND EROSION POTENTIAL.
14. TO PREVENT APPROACH FILL FROM SLUMPING INTO THE STREAM CHANNEL, ALL BRIDGES WILL BE EQUIPPED WITH WING WALLS LINED WITH GEOTEXTILE FABRIC. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.
15. THE FREE BOARD HEIGHT SHALL BE A MINIMUM OF 1m OR AS REQUIRED BY TRANSPORT CANADA PERMIT, WHICHEVER IS GREATER.

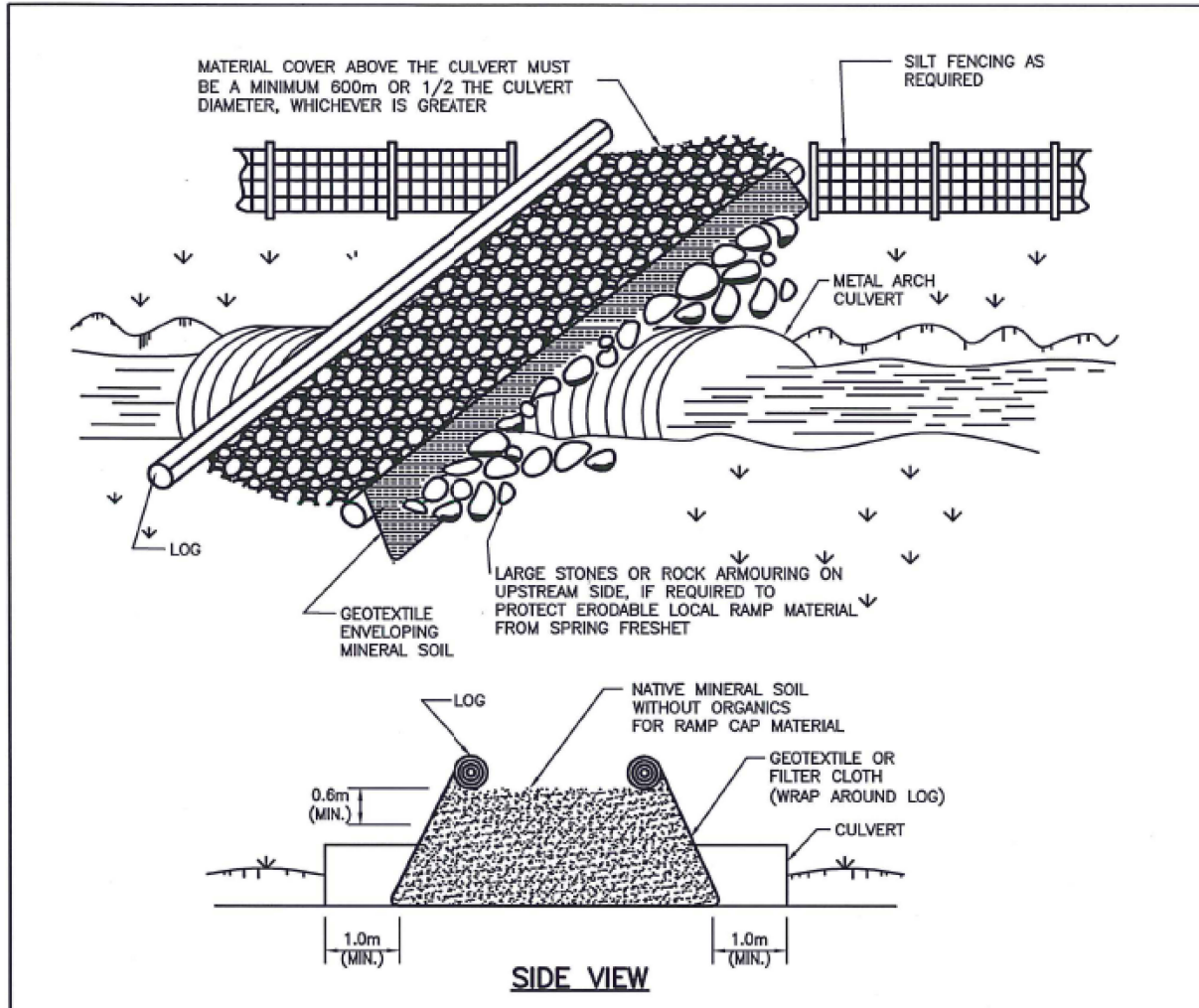
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APEGA PERMIT TO PRACTICE INTEGRATED PIPELINE PROJECTS CANADA LTD. PERMIT NUMBER P10585 UPI DWG. No.: 19731-505-TYP-01101		DRAWN BY CHECKED BY APPROVED BY		TRANS MOUNTAIN EXPANSION PROJECT TYPICAL DRAWING EQUIPMENT CROSSING MULTI-SPAN BRIDGE		SHEET SIZE 8.5x11 SCALE NTS DATE 2012-11-01	
PROJECT CODING AFE		DRAWING NUMBER FACILITY ID DOCUMENT NO SHT NO REV		TMEP - PT-1101		1 A	
A 2012-11-01 ISSUED FOR REVIEW	RMR	DRN CHK ENG APPR					



NOTES:

1. USE CLEAN SNOW FILL TO PROVIDE VEHICULAR ACCESS ACROSS RELATIVELY SHALLOW AND NARROW WATERCOURSES FROZEN TO THE BOTTOM OR WATER COURSES WITH SUFFICIENT ICE COVER TO SUPPORT THE CROSSING.
2. MINIMIZE GRADING IN PROXIMITY TO WATERCOURSE. GRADE AND GRUB ONLY ALONG THE TRENCHLINE AND AN AREA IMMEDIATELY ADJACENT TO THE TRENCHLINE. IF BANKS REQUIRE SLOPING, PULL DIRT AND DEBRIS AWAY FROM WATERCOURSE.
3. REMOVE SNOW FROM CHANNEL AT COMPLETION OF CONSTRUCTION.
4. MAINTAIN 10m BUFFER ZONE ON STREAM BANKS IN THE TEMPORARY WORKSPACE AS SHOWN.
5. MARK BOUNDARIES OF SNOW BRIDGE USING LATH & FLAGGING ON BOTH SIDES OF CROSSING TO CONFINE ALL VEHICLE TRAFFIC TO BRIDGE.

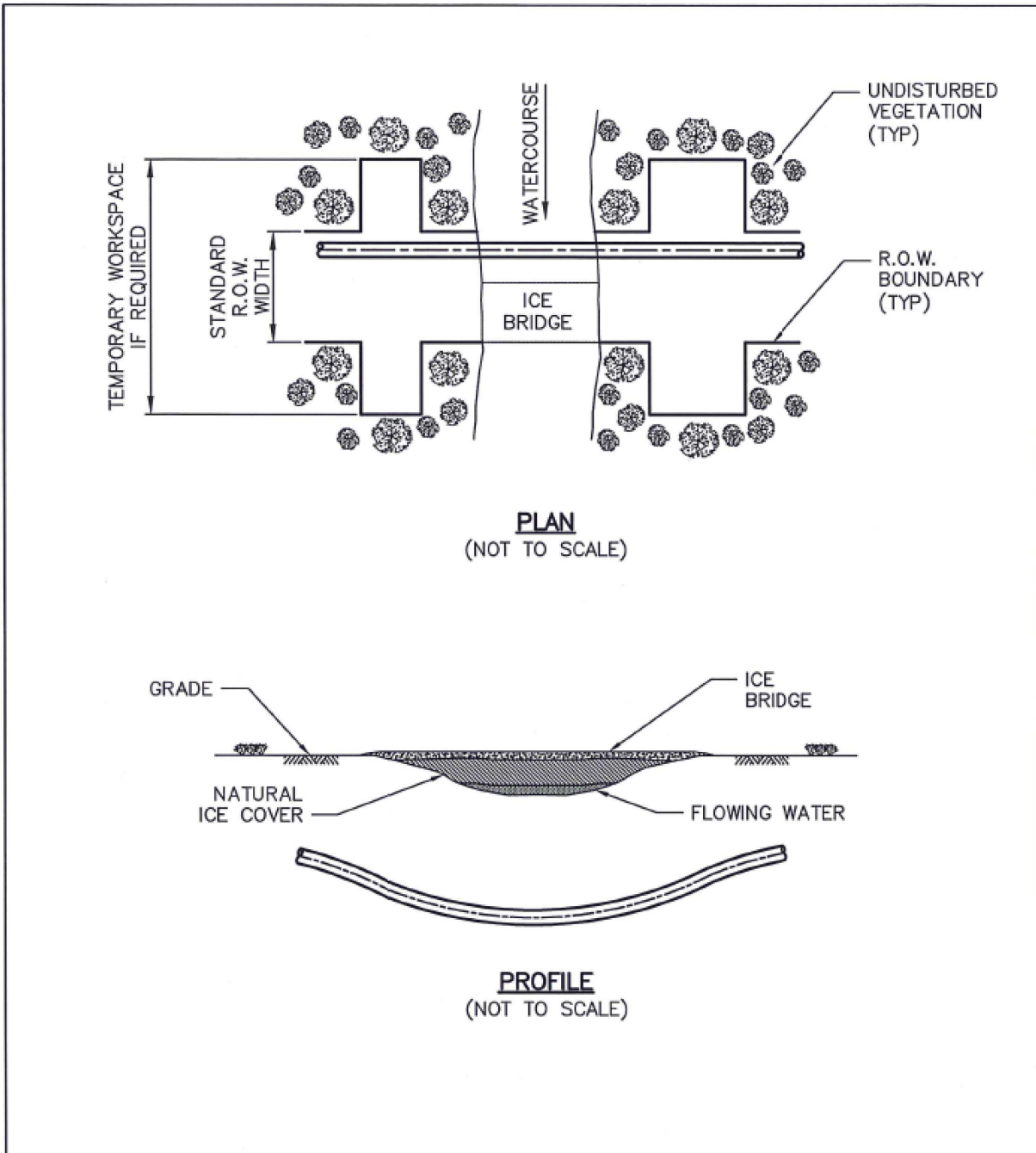
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<p>APEGA PERMIT TO PRACTICE INTEGRATED PIPELINE PROJECTS CANADA LTD. PERMIT NUMBER P10585</p> <p>UPI DWG. No.: 19731-505-TYP-01102</p>	<p>DRAWN BY</p> <p>CHECKED BY</p> <p>APPROVED BY</p>	<p>TRANS MOUNTAIN EXPANSION PROJECT</p> <p>TYPICAL DRAWING</p> <p>EQUIPMENT CROSSING SNOW FILL</p>	
		<p>SHEET SIZE 8.5x11</p> <p>SCALE NTS</p> <p>DATE 2012-11-01</p>	
		<p>PROJECT CODING</p> <p>AFE</p>	<p>DRAWING NUMBER</p> <p>FACILITY ID DOCUMENT NO SHT NO REV</p> <p>TMEP — PT-1102 1 A</p>
<p>A 2012-11-01 ISSUED FOR REVIEW</p>	<p>RMR</p>		
<p>NDL DATE</p>	<p>REVISION</p>	<p>DRN CHK ENG APPR</p>	



NOTES:

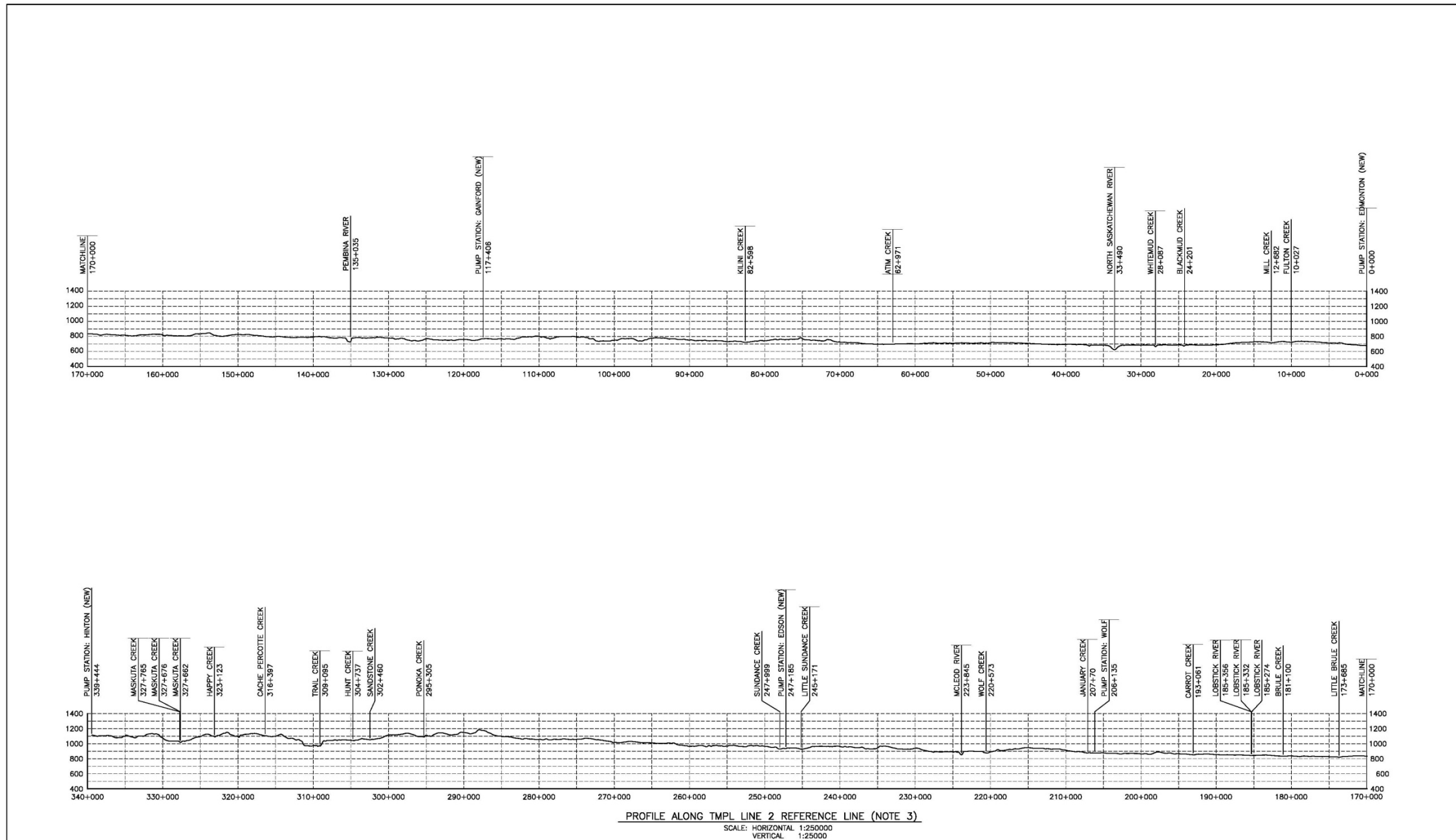
1. CARE MUST BE TAKEN TO MINIMIZE DISTURBANCE TO CREEK BANK AND VEGETATION WHEN INSTALLING, USING, AND REMOVING THE CULVERT AND RAMP.
2. WATERCOURSE (IF FLOWING) MUST BE ISOLATED.
3. CULVERT MUST BE SIZED TO ACCOMMODATE FLOWS EXPECTED DURING THE PERIOD OF USE. MINIMUM CULVERT SIZE FOR SUMMER APPLICATION IS 0.6m. MINIMUM CULVERT SIZE FOR WINTER APPLICATION IS 0.9m. MAXIMUM CULVERT SIZE IS 1.5m FOR ANY SEASON.
4. INSTALL SILT FENCING AS REQUIRED TO PREVENT SEDIMENT FROM ENTERING WATERCOURSE, IN ACCORDANCE WITH TYPICAL DRAWING 8103-1200.

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		DRAWN BY CHECKED BY APPROVED BY	TRANS MOUNTAIN EXPANSION PROJECT TYPICAL DRAWING EQUIPMENT CROSSING CULVERT	SHEET SIZE 8.5x11 SCALE NTS DATE 2012-11-01	
		PROJECT CODING AFE		DRAWING NUMBER FACILITY ID DOCUMENT NO SH1 NO REV	
A 2012-11-01 ISSUED FOR REVIEW RMR		TMEP - PT-1103		1 A	
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				CHECKED BY			SCALE NTS
				APPROVED BY			DATE 2013-06-26
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				AFE	FACILITY ID	DOCUMENT NO	SHT NO
				TMEP - PT-1105			REV
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NO.	DATE	REVISION	DRN	CHK	ENG	APPR	

PRELIMINARY HYDROSTATIC TEST PROFILES
TMPL LINE 2 PIPELINE



PROFILE ALONG TMPL LINE 2 REFERENCE LINE (NOTE 3)
 SCALE: HORIZONTAL 1:250000
 VERTICAL 1:25000

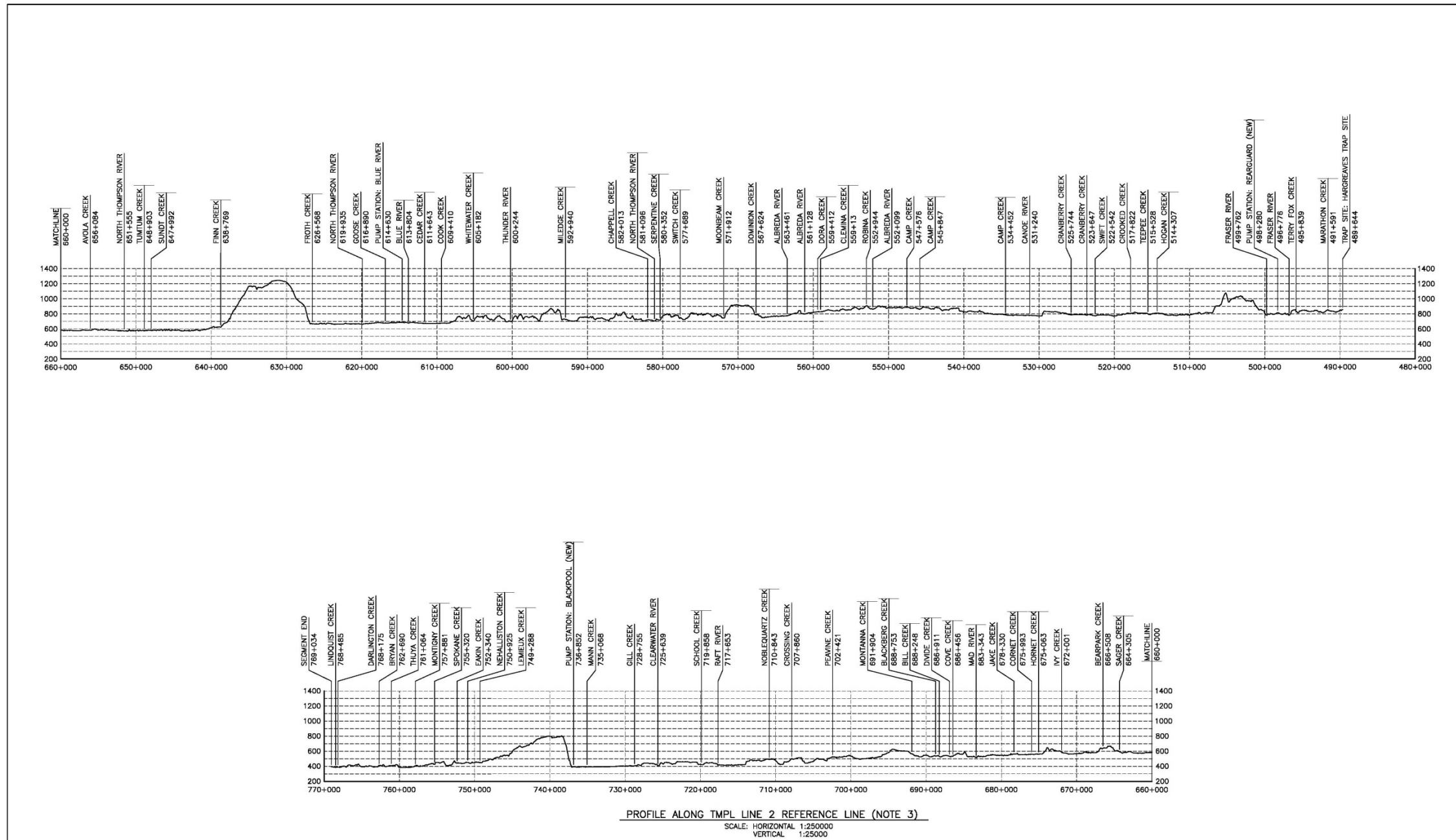
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PRELIMINARY FOR DISCUSSION ONLY

NOTES:

1. ALL CHAINAGES AND ELEVATIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.
2. ELEVATIONS ARE TAKEN FROM DEM BASED ON CDED 1:50,000 SCALE.
3. ALL CHAINAGES CORRESPOND TO REFERENCE KILOMETRE (RK) ALONG THE TMPL LINE 2 REFERENCE LINE (SSCID 1003) IN THE P1-V6 ROUTING CORRIDOR.

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<small>FROM PERMITS TO PRACTICE INTEGRATED PIPELINE PROJECTS UNDER ULC PERMITS NUMBER P1000</small>		<small>SPR 0001 No. 19731-510-110-00001</small>		DRAWN BY SB		TRANS MOUNTAIN EXPANSION PROJECT HYDROSTATIC TEST PROFILE EDMONTON TO HINTON TMPL LINE 2 PIPELINE (PRELIMINARY LAYOUT)		SHEET SIZE A1	
				CHECKED BY GB				SCALE AS SHOWN	
				APPROVED BY RF				DATE 2013-07-17	
				PROJECT CODING ATE		DRAWING NUMBER FACILITY ID TMEP - PH-0001		SHEET NO. -	
				DRN -		CHK -		ENG -	
				APPR -				REV B	
NO.	REFERENCE DRAWING TITLE	REFERENCE DRAWING NO.	NO.	DATE	REVISION				

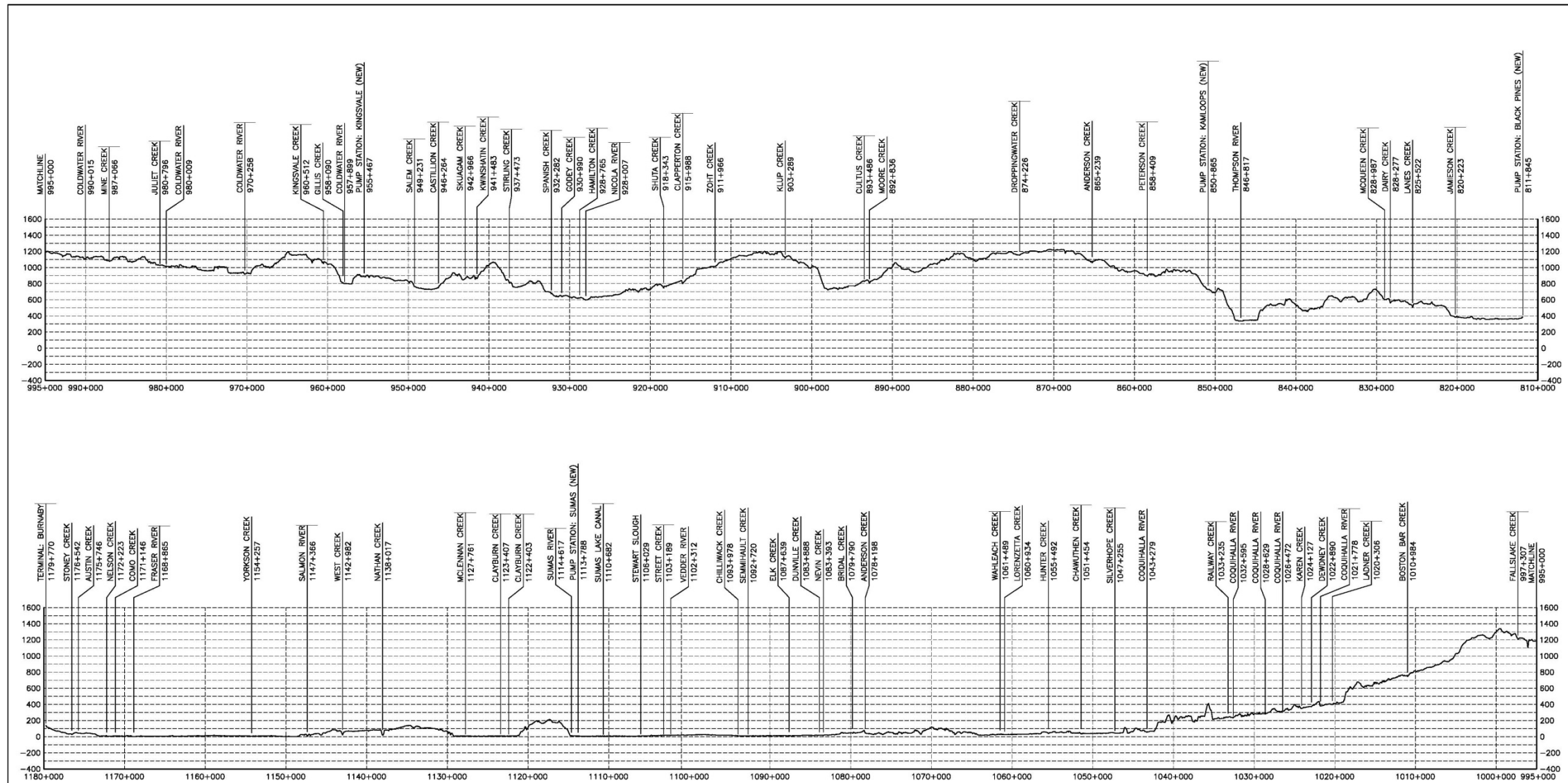


- NOTES:**
1. ALL CHAINAGES AND ELEVATIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.
 2. ELEVATIONS ARE TAKEN FROM DEM BASED ON CDED 1:50,000 SCALE.
 3. ALL CHAINAGES CORRESPOND TO REFERENCE KILOMETRE (RK) ALONG THE TMPL LINE 2 REFERENCE LINE (SSEID 2002) IN THE P1-V6 ROUTING CORRIDOR.

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<small>APPROVED FOR PRACTICE BY TRANS MOUNTAIN PIPELINE PROJECTS (CHINA) LTD. PROJECT NUMBER P1000</small>				<small>SP 000 - Rev. 19731-510-HYD-00002</small>		DRAWN BY: SB CHECKED BY: GB APPROVED BY: RF		TRANS MOUNTAIN EXPANSION PROJECT HYDROSTATIC TEST PROFILE HARGREAVES TO DARFIELD TMPL LINE 2 PIPELINE (PRELIMINARY LAYOUT)		SHEET SIZE: A1 SCALE: AS SHOWN DATE: 2013-07-17
PROJECT CODING: AFE				FACILITY ID: TMPE		DRAWING NUMBER: PH-0002		SHEET NO: B		
NO.	REFERENCE DRAWING TITLE	REFERENCE DRAWING NO.	NO.	DATE	REVISION	DRN	CHK	ENG	APPR	
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			A	2013-07-17	ISSUED FOR REVIEW		SB	-	-	



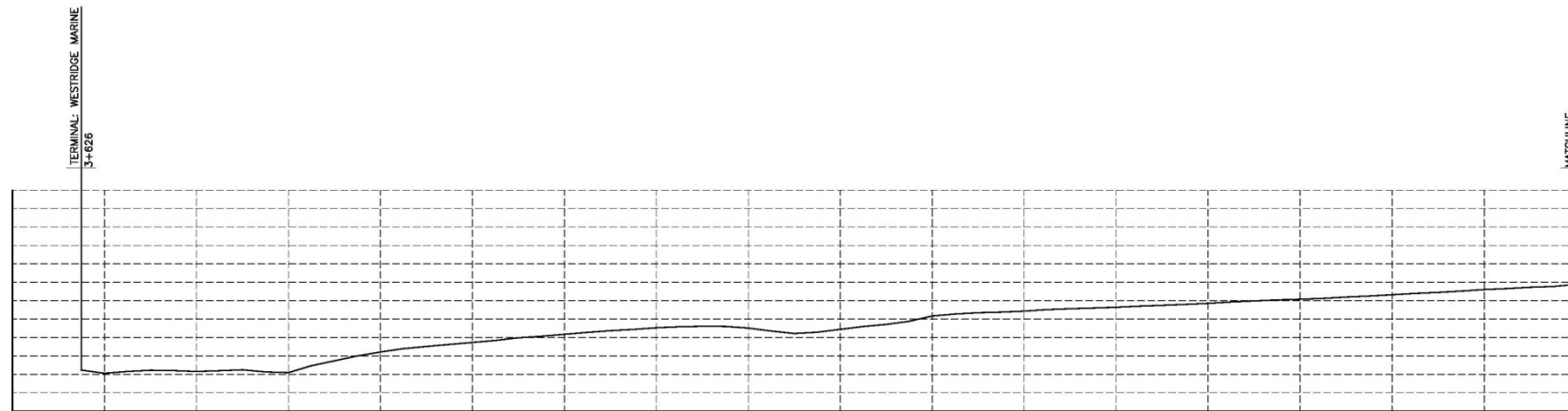
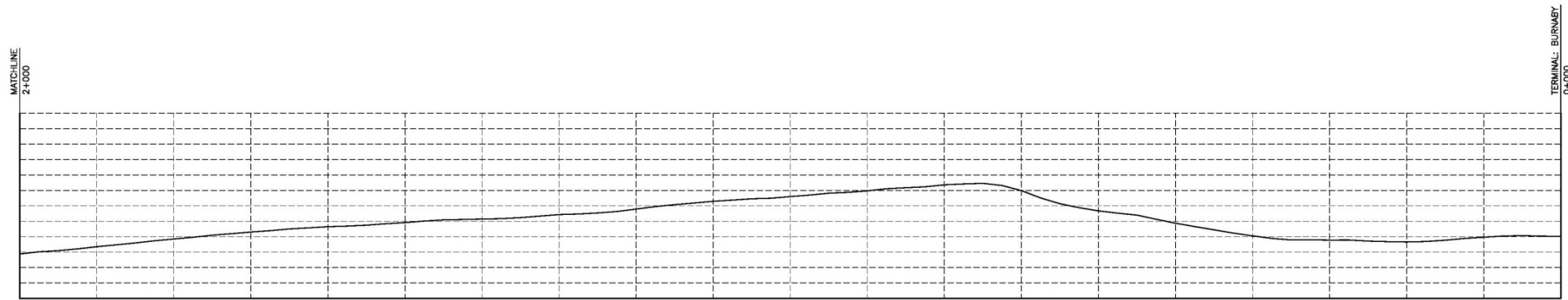
PROFILE ALONG TMPL LINE 2 REFERENCE LINE (NOTE 3)
 SCALE: HORIZONTAL 1:250000
 VERTICAL 1:25000

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PRELIMINARY FOR DISCUSSION ONLY

- NOTES:
1. ALL CHAINAGES AND ELEVATIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.
 2. ELEVATIONS ARE TAKEN FROM DEM BASED ON CD1:50,000 SCALE.
 3. ALL CHAINAGES CORRESPOND TO REFERENCE KILOMETRE (RK) ALONG THE TMPL LINE 2 REFERENCE LINE (SSEID 3004) IN THE P1-V6 ROUTING CORRIDOR.

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TRANS MOUNTAIN EXPANSION PROJECT HYDROSTATIC TEST PROFILE BLACK PINES TO BURNABY TMPL LINE 2 PIPELINE (PRELIMINARY LAYOUT)				SHEET SIZE A1 SCALE AS SHOWN DATE 2013-07-18					
DRAWN BY SB CHECKED BY GB APPROVED BY RF		PROJECT CODING AFE		DRAWING NUMBER TMEP - PH-0003		SHEET NO. - REV. B			
NO.	REFERENCE DRAWING TITLE	REFERENCE DRAWING NO.	NO.	DATE	REVISION	DRN	CHK	ENG	APPR
			B	2013-06-19	ISSUED FOR REVIEW	SB	GB	RF	
			A	2013-07-17	ISSUED FOR REVIEW	SB			



PROFILE ALONG TMPL LINE 2 REFERENCE LINE (NOTE 3)
 SCALE: HORIZONTAL 1:3000
 VERTICAL 1:3000

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PRELIMINARY
 FOR DISCUSSION ONLY

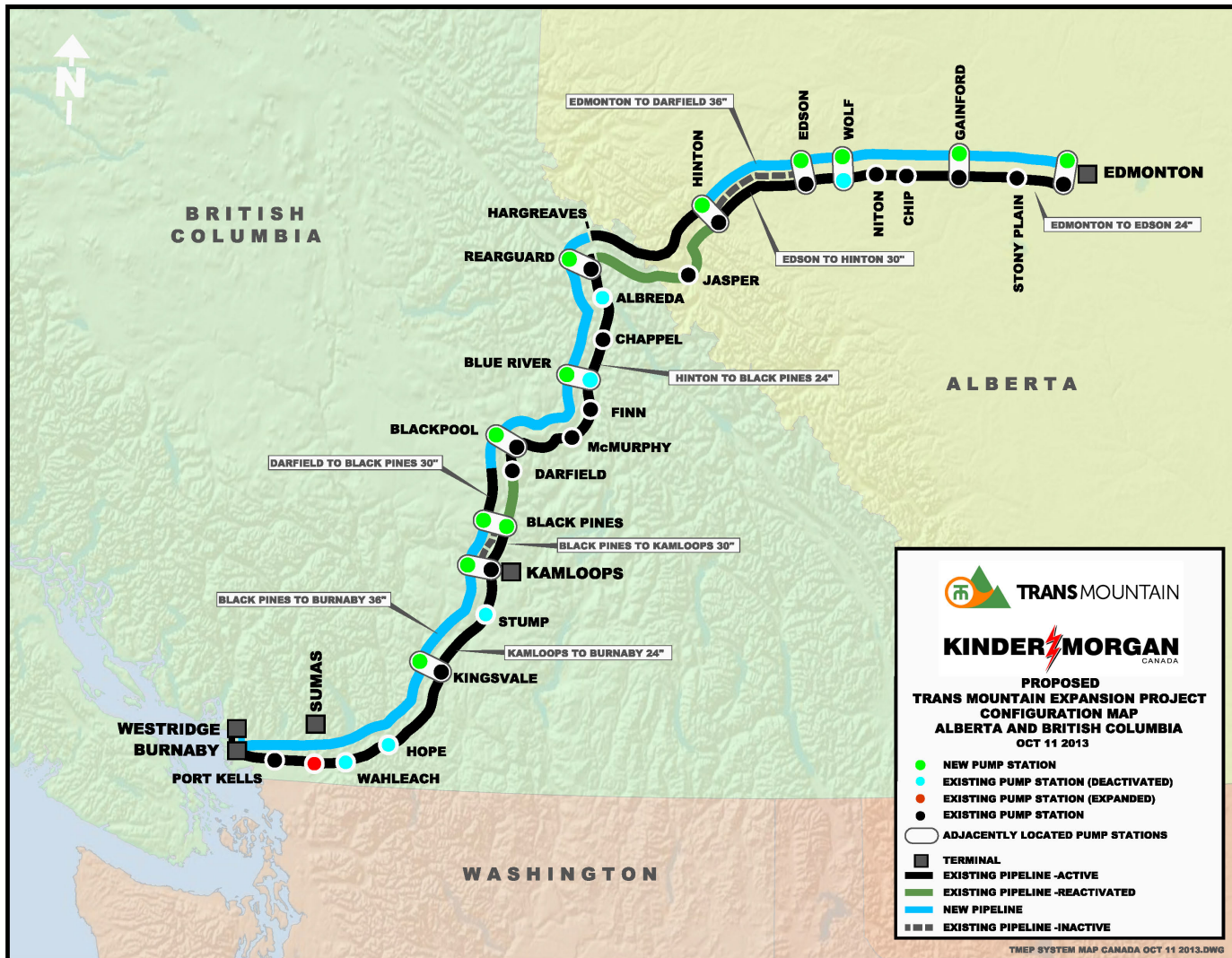
- NOTES:
1. ALL CHAINAGES AND ELEVATIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.
 2. ELEVATIONS ARE TAKEN FROM DEM BASED ON CDSD 1:50,000 SCALE.
 3. ALL CHAINAGES CORRESPOND TO REFERENCE KILOMETRE (RK) ALONG THE TMPL LINE 2 REFERENCE LINE (SSEID 4002) IN THE P1-V6 ROUTING CORRIDOR.

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<small>APSDA PERMIT TO PRACTICE REGISTERED PIPELINE PROJECTS (CANADA L.P. PERMIT NUMBER P1000)</small>		<small>SP 1000 No. 19731-510-HYD-0004</small>	DRAWN BY SB	TRANS MOUNTAIN EXPANSION PROJECT HYDROSTATIC TEST PROFILE BURNABY TO WESTRIDGE TMPL LINE 2 PIPELINE (PRELIMINARY LAYOUT)	SHEET SIZE A1 SCALE AS SHOWN DATE 2013-07-18
			CHECKED BY GB		
			APPROVED BY RF		
			PROJECT CODING AFC	FACILITY ID TMEP	DRAWING NUMBER PH-0004
			DRN DRN	CHK CHK	ENG ENG
			APPR APPR		REV B

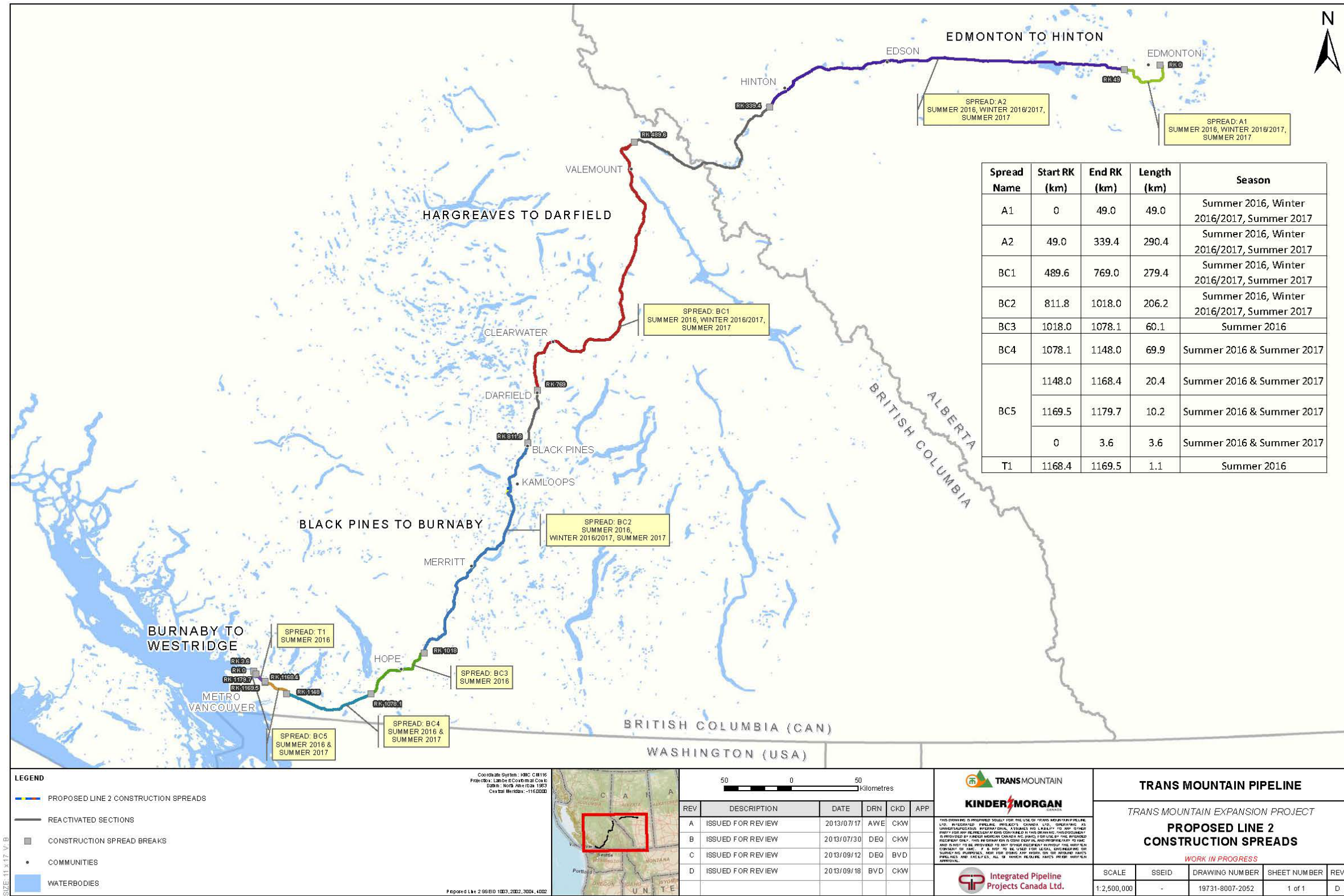
NO.	REFERENCE DRAWING TITLE	REFERENCE DRAWING NO.	NO	DATE	REVISION
			B	2013-06-19	ISSUED FOR REVIEW
			A	2013-07-17	ISSUED FOR REVIEW

Appendix C Maps

- Map 7.1.1 Project Configuration Map
- Map 7.1.2 TMPL Line 2 Construction Spreads



Map 7.1.1 Project Configuration Map



Map 7.1.2 TMPL Line 2 Construction Spreads

Appendix D Key Construction Specifications and Plans to be Developed for TMEP

Pipeline Construction Specifications:

- Pipeline Construction (Supplementary to KMC MP3120);
- Engineering Survey;
- Blasting (Supplementary to KMC MP3120C);
- Horizontal Directional Drills;
- SAW and Mechanized Welding (Supplementary to the KMC S and TD Series Specifications);
- Fabrication Welding (Supplementary to the KMC S and TD Series Specifications);
- Cold Bends;
- Non-Destructive Testing;
- Pipeline Cleaning; and
- Post-Construction Caliper ILL.

Construction Plans:

- Construction Execution Plan;
- Traffic Management Plan;
- Access Control Management Plan;
- Traffic Control Plan(s);
- Timber Salvage Plan;
- Fire Response Contingency Plan;
- Quality Management Program; and
- Restoration Plan.