FRASER VALLEY REGIONAL DISTRICT

TEMPORARY USE PERMIT

Permit No. 2018-01 Folio No. 732-06208.000

Issued to: Trans Mountain Pipeline ULC

Address: 2700 – 300 - 5th Avenue SW, Calgary, AB T2P 5J2

Applicant: Michael Catt

Site Address: 57951 Laidlaw Road, Electoral Area "B"

The lands affected by this permit are shown on "Schedule "B": Permit Area" which schedule is attached hereto and which forms an integral part of this permit. The lands are a portion of the property legally described as:

SECTION 19, TOWNSHIP 4, RANGE 27, MERIDIAN 6, PARCEL ONE, MERIDIAN W6, SRW PL 6465 S 1/2 SEC 19, PARCEL 2, SECTION 16, TOWNSHIP 4, RANGE 27, MERIDIAN W6, YALE DIV OF YALE LAND DISTRICT, SRW PL 6465 S 1/2 OF SW 1/4 SEC 19, PART S 1/2 OF SW 1/4, SECTION 19, TOWNSHIP 4, RANGE 27, MERIDIAN W6, NEW WESTMINSTER LAND DISTRICT, EXCEPT PLAN
PID: 013-110-578, 001-549-103, 013-110-616

LIST OF ATTACHMENTS:

Schedule "A": Location Map
Schedule "B": Permit Area
Schedule "C": Technical Submission

LAND USE REGULATIONS

Zoning: Park Reserve (P-2) and Campground Holiday park (CHP)

Official Community Plan Designation: Resort (RT) and Limited Use (L)

AUTHORITY TO ISSUE

This Temporary Permit is issued pursuant to Part 14 – Division 8 of the *Local Government Act*

Official Community Plan policy: This permit is issued in accordance with Section 10.00.02(b) TEMPORARY USE PERMITS.

LAND USE PERMITTED FOR THE DURATION OF THIS PERMIT

1. This permit is valid for three years from the date of issue.

2. This permit is issued for short term industrial activity associated with the construction of the Trans Mountain Pipeline. Specifically, this permit the storage of pipe, equipment and materials; the placement and use of a small construction trailer as a temporary office; portable toilets for workers; and, fencing, lighting and security infrastructure as required.

3. The short term industrial activities authorized by this permit must occur only within the Permit Area shown Schedule "B" attached hereto.

BUILDINGS OR STRUCTURES AUTHORIZED BY THIS PERMIT

No permanent buildings are authorized by this permit.

SPECIAL TERMS AND CONDITIONS

1. Hours of work at the site and vehicle access to the site shall be limited to 6:00 AM to 7:00 PM Monday through Saturday.

2. Use and development of the site must be in accordance with the technical reports attached hereto as Schedule "C": Technical Submission, including:
    a) the installation of drainage and sediment control works;
    b) all activity authorized by this permit must take place at least 35 meters from the high water mark of Jones Creek and Wahleach Creek;
    c) there must be two points of access/egress from Laidlaw Road;
    d) traffic associated with the temporary industrial use shall be directed to and from the adjacent Highway 1 interchange;
    e) dust controls must be applied to avoid the emission of nuisance dust to adjoining parcels; and,
    f) traffic to and from the site shall be managed through the use of traffic signage and flag persons as required.

3. Prior to the initiation of works and activities authorized by this permit, the permit holder shall retain a qualified professional to assess the property and document pre-development conditions of the site.

4. Immediately upon completion of the activities or the expiry of the permit, which ever happens first, the permit holder shall return the site and the lands to its pre-existing condition or an improved condition acceptable to both the FVRD Director of Planning & Development and the property owner. At a minimum, the site and lands must be regraded with native topsoil and hydro-seeded with local vegetation species to generally match the pre-construction condition of the lands. All equipment, materials, facilities and infrastructure shall be removed.

5. All reclamation works will be completed under the supervision of a certified Environmental Inspector. A report by the certified Environmental Inspector documenting completion of the reclamation and landscaping works shall be submitted to FVRD not later than three months after the expiry of this permit.

GENERAL TERMS AND CONDITIONS

1. This Permit is issued pursuant to Part 14 – Division 8 of the *Local Government Act*.

2. Nothing in this permit shall waive the developer's obligation to ensure that the development proposal complies in every way with statutes, regulations, requirements, covenants and licenses applicable to the undertaking?

3. Nothing in this permit shall in any way relieve the developer's obligation to comply with all setback regulations for construction of structures or provision of on-site services pursuant to the Health Act, the Fire Services Act, the Electrical Energy Inspection Act and any other applicable provincial and federal statutes.

4. The owner of the subject property shall provide the general contractor and all professionals associated with this project with copies of this permit as issued by the Regional Board.

5. The owner of the subject property shall notify the Fraser Valley Regional District in writing of any intention to excavate, construct or alter the subject property or building site thereon.

6. No alteration to the natural drainage, construction or excavation shall be undertaken which might cause or contribute to hazardous conditions on the site or on adjacent lands.

SECURITY DEPOSIT

As a condition of the issuance of this permit, and pursuant to Section 502 of the *Local Government Act*, the Regional Board is holding the security specified in the permit to ensure that development is carried out in accordance with the terms and conditions of this permit.

Should the holder of this permit:

a) fail to complete the works required to satisfy reclamation and landscaping contained herein;
b) contravene a condition of the permit in such a way as to create an unsafe condition;

The Regional Board may undertake and complete the works required to satisfy the reclamation and landscaping conditions, or carry out any construction required to correct an unsafe condition at the cost of the holder of the permit and may apply the security in payment of the costs of the works, with any excess to be returned to the holder of the permit.

In addition, the Regional Board is holding the security specified in the permit, pursuant to Section 496 of the *Local Government Act*, to generate the performance of the terms of the permit. Pursuant to Section 496 of the *Local Government Act*, the Regional Board shall determine by resolution when there is a default under this permit. The entire amount of the security posted pursuant to Section 496 shall be forfeited to the Regional District in the event of a default unless otherwise specified in this permit or otherwise determined by resolution of the Regional Board.

Security Posted:
(a) an irrevocable letter of credit in the amount of $ N/A .
(b) the deposit of the following specified security: $ 75,000.00

Note: The Regional District shall file a notice of this permit in the Land Title Office stating that the land described in the notice is subject to Temporary Use Permit Number 2018-01. The notice shall take the form of Appendix I attached hereto.

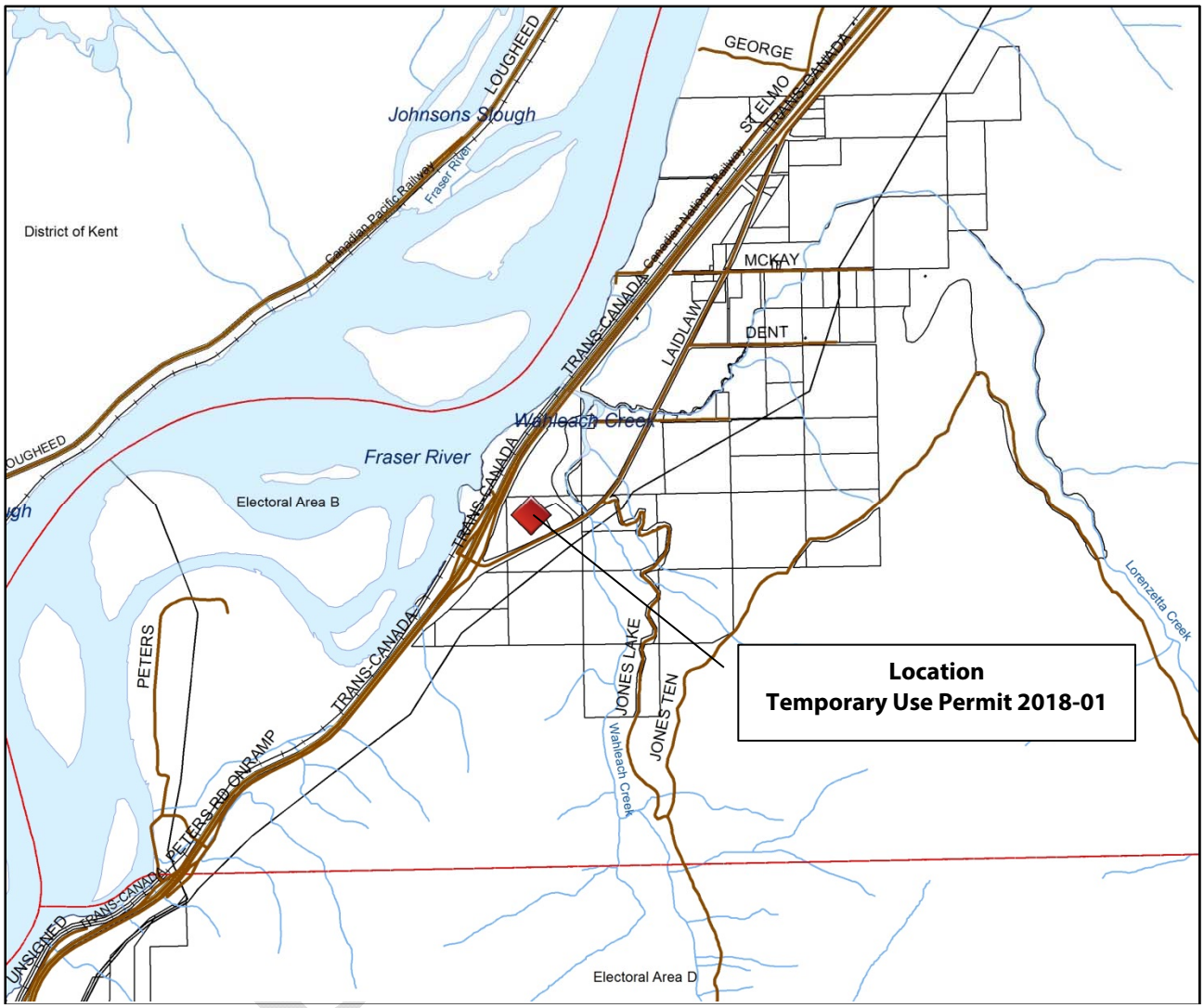
_____

AUTHORIZING RESOLUTION PASSED BY THE BOARD OF DIRECTORS OF THE FRASER VALLEY REGIONAL DISTRICT ON THE _____ TH DAY OF _____ 2018.

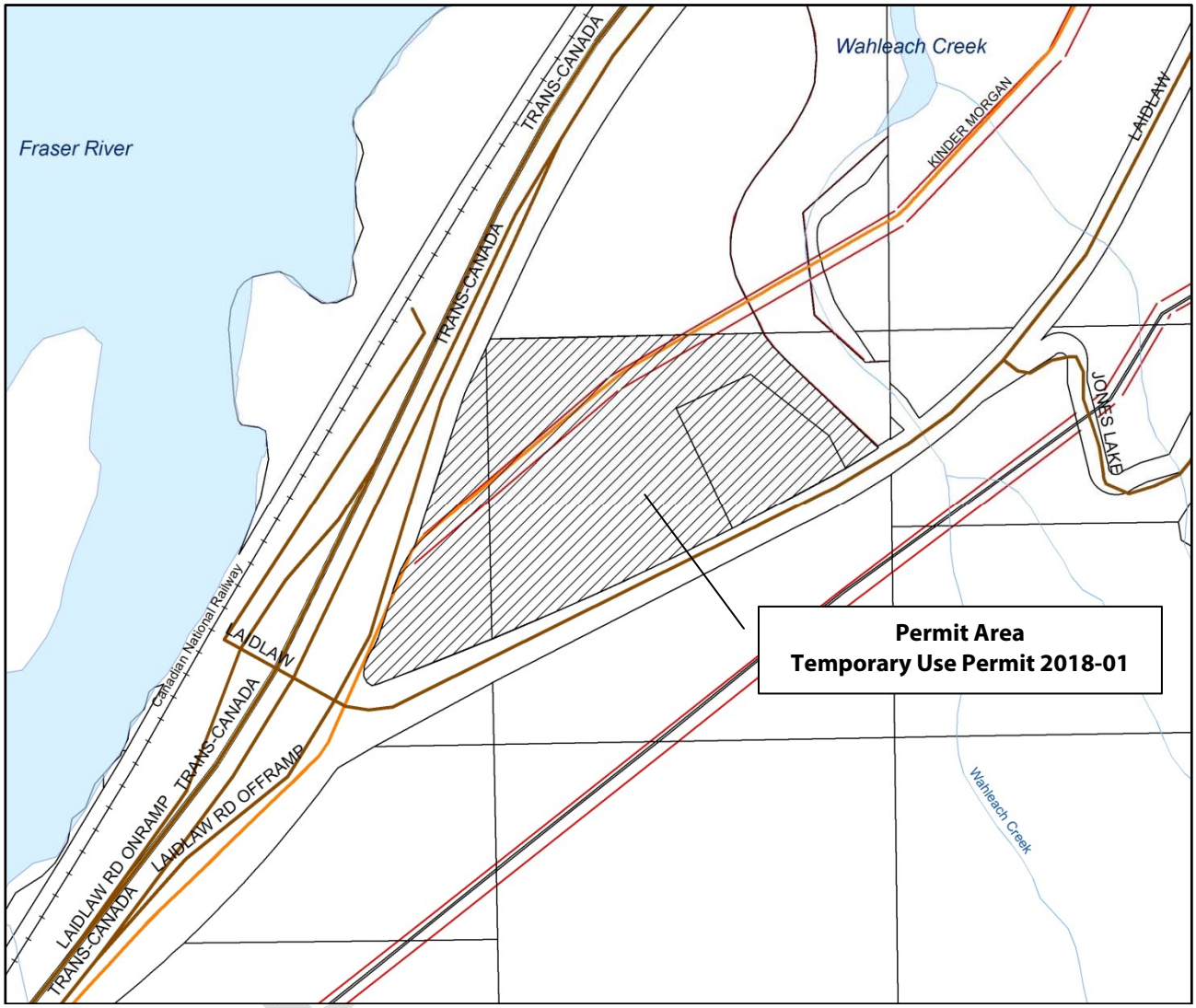
_____
Chief Administrative Officer/
Deputy Secretary

THIS IS NOT A BUILDING PERMIT

TEMPORARY USE PERMIT 2018-01
SCHEDULE "A"
Location Map



TEMPORARY USE PERMIT 2018-01
SCHEDULE "B"
Permit Area



TEMPORARY USE PERMIT 2018-01
SCHEDULE "C"
Technical Submission

Margaret Thornton

From:	Pountney, Bronwyn <Bronwyn_Pountney@transmountain.com>
Sent:	July-29-18 12:07 PM
To:	Margaret Thornton
Cc:	Graham Daneluz; Stebbings, Kate; Renaud, Louis; Catt, Michael S (Mike); Carranza, Ben
Subject:	Documents to Support TUP & DP Application for HOP052 Site
Attachments:	Summary of the Archaeological Impact Assessment for HOP052.pdf; Resource Specific Management Table for HOP052_Figure.pdf; Summary of HOP052.pdf; Resource Specific Management Table for HOP052.pdf; Dust Suppression Mitigation for HOP052.pdf; Civil and Grading Plans for HOP052.pdf; Geohazard Assessment for HOP052.pdf; Topographic Survey Plan for HOP052.pdf; Traffic Assessment for HOP052.pdf

Hi Margaret,

In support of **Application for a Development Permit for the property located at 57951 Laidlaw Road** (File No. 3060-20 2018-12 DP001466) and **Application for a Temporary Use Permit for the property located at 57951 Laidlaw Road** (File No. 3095-20 2018-01).

Please find Attached:

- Site Specific Archaeological Summary
- Site Specific Environment Information
- Description of Dust Suppression Measure
- Topographic Survey Plan
- Civil and Grading Plan
- Geohazard Assessment
- Traffic Management Information

Site-Specific Traffic Management

The Traffic Management Plan for this property was completed by TMEP and submitted to the NEB for review and approval.

Traffic to and from the property will be managed through the use of traffic signage and flag persons as required. Vehicles travelling to and from the property will use Highway 1 on-ramps and off-ramps to access Laidlaw Road. Vehicles entering the site from Highway 1 in either direction will turn onto Laidlaw Road and then will then make a left turn to access the property. Vehicles leaving the site will make a right turn from the property onto Laidlaw Road and then a right turn from Laidlaw onto Highway 1 to travel east, or proceed under the highway overpass to make a left turn for travel west. Public access to Laidlaw Road will be maintained during Project activities.

During normal operations, vehicles will access the site between **6:00am and 7:00 pm.** hours Monday to Saturday. Following the initial transportation of pipe to the stockpile site traffic volume will be reduced significantly until the start of construction in 2019.

A number of different types of vehicles will access the property during Project activities. The anticipated volume of each vehicle type is described in the table below. Traffic assessment indicates Project-related traffic will have negligible impacts when assessed against background traffic volumes.

Vehicle Type	Average Construction Activities	Peak Construction Activities

Light Vehicles	5 trips during AM 5 trips during PM	20 trips during AM 20 trips during PM
Transport Trucks	20 loads per day	30 loads per day

The use of Laidlaw Road will be managed under MoTI permit restrictions to ensure load restrictions are appropriate for the road surface. Any repairs related to Project activity will be completed by Trans Mountain.

Modular buildings details.

One 12x60 construction office and a male and female washcar will be installed on the property. These units will be self sufficient with temporary power, communications and holding tanks for potable water and sewer. All water will be trucked in and sewage trucked out and disposed of at an approved disposal facility.

Site Reclamation

Prior to development, an independent third party consultant will assess the property and document the pre-construction conditions of the site. Following use, the property will be returned to its pre-construction condition (or better). The property will be regraded and then hydroseeded with local species vegetation to match the pre-construction condition. All reclamation work will be completed under the supervision of a certified Environmental Inspector and with the approval of the land owner

Site Development Information

Trans Mountain obtained a lease agreement with the landowner which commenced September 1, 2017.Under the lease Trans Mountain secured landowner consent to act as the agent for site development which included;

- Clearing and grubbing
- Stripping and stockpiling of organic material
- Site grading, enhancing drainage and sediment control system and gravel placement
- Installation of security fencing
- Installation of temporary offices and washcar facilities
- Reclamation after the project is complete

Please don't hesitate to contact me should you have any questions or require any further information.

Thanks,

Bronwyn

Bronwyn Pountney, M.Env.Man., EP
Permitting Specialist
Trans Mountain Expansion Project

TRANSMOUNTAIN

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bronwyn_pountney@transmountain.com

7.0 TRAFFIC ASSESSMENT OF KEY CONSTRUCTION LOCATIONS - STOCKPILES, CAMPS, OFFICE/CONSTRUCTION YARDS AND BORROW PITS

7.1 Overview of Temporary Facilities

This section provides a traffic assessment of temporary construction sites and infrastructure including stockpile sites, camps, office/construction yards and borrow pits in AB and BC along the TMEP corridor. Table 7-1 provides a list of these locations by spread. Finalization of these sites will be completed based on discussions with site owners, review of commercial terms, as well as final planning and traffic management considerations. Consultation and engagement regarding temporary construction sites and infrastructure will be completed with Appropriate Government Authorities, impacted landowners/tenants, and Aboriginal groups.

TABLE 7-1

STOCKPILE, CAMP AND OFFICE/CONSTRUCTION YARD LOCATIONS BY SPREAD

Spread	Stockpile		Camp				Offices/Yard		
1 & 2A	Enoch	North Gate					Acheson		
2B & 2C	Edson Industrial						Edson Industrial	Edson – Range Rd 180	Hinton
3	Valemount – Slocan Access Rd	Valemount – Yellowhead	Valemount -17th Ave	Valemount – Yellowhead	Valemount – Whiskey Fill	Blue River	Valemount – Yellowhead	Valemount – 17th Ave	Blue River
4	Vavenby		Clearwater – Camp 2 Road	Clearwater – Old Mill		Clearwater – McMahon	Clearwater – McMahon		
5A - North	Kamloops – Domtar Old Mill	Kamloops KIB3					Kamloops		
5A - South	Merritt – Chutter Ranch		Merritt	Merritt – Chutter Ranch			Merritt –Chutter Ranch		
5B & 6	Hope – St. Elmo Rd	Chilliwack 7581 Cannor Road	Hope	Hope – St. Elmo Rd			Hope	Abbotsford Brandy Farms	Chilliwack 7582 Cannor Road
7							Surrey 98A Ave	Barnet Hwy	Canfor Ave.

Camp site selection considered minimizing disruption to the extent possible of local roadways. Camps will be located in close proximity to towns, within a reasonable distance, to ensure that local businesses can engage in business to supply the commercial needs of the camp residents.

Pipe stockpile sites are necessary to store the pipe near the pipeline ROW in advance of construction. The pipe for the Project will be primarily delivered to rail sidings by train and then transported by the pipe vendor to the selected, strategically located stockpile sites. Pipe will be transported from the stockpiles using flat-bed, pipe trucks or highway tractors with pole trailers carrying an average of 75 total metre (m) lengths of pipe per truck load (which is a rough estimate as pipe length carried by pipe truck will vary depending upon road conditions, diameter of pipe, wall thickness, and individual pipe lengths). In general, pipe transportation will be north and south on major transportation corridors and enter onto the Project ROW via access points and access roads (see Appendix A-3). An average area of 6 hectares (ha) is required for 100 km of pipe storage.

The Construction Yards are necessary for a number of functions including:

1. housing spread office buildings where personnel are engaged in the management and administration of the Project;
2. acting as early day and late day gathering areas for senior personnel to conduct planning activities;

3. providing necessary facilities for supply chain management for the movement of consumable and permanent goods (not pipe) to and from the ROW;
4. providing necessary facilities for moderate light-duty and heavy equipment repairs (minor repairs are typically done on-ROW and major repairs are often taken to an original equipment manufacturer or Contractor, off-site facility);
5. providing a location for mobilization and demobilization of some equipment to ensure that pre-delivery safety inspections are done on equipment before being taken to the field; and
6. providing parking areas and marshalling point for some workers arriving to the work area for subsequent transportation to the ROW.

Gravel pits with an existing commercial aggregate material production capacity may be used. It is likely that some established, localized gravel pits will be sourced from where specific aggregate materials are required for the construction of off-ROW facilities such as access approaches to the ROW, construction yards, stockpile yards or camp sites. In the event that gravel trucks and public roads are required to haul material from gravel pits, the Contractor will ensure that appropriate planning, including traffic management planning, is conducted prior to the start of this activity and that all required authorizations and permits are in place.

Borrow Pits are required to gather dirt-type material, typically aggregates (sand, gravel), for use on the ROW in pipeline construction. Specific borrow pits have not yet been identified. Trans Mountain plans to use commercial borrow pits to the extent feasible. Mitigation measures provided in the Temporary Construction Lands and Infrastructure EPP are designed to ensure that any adverse interactions resulting from the construction and use of borrow pits are either avoided or reduced to acceptable levels. Existing commercial borrow pit or material locations within the construction footprint or in direct proximity to the footprint, will be used to the extent practical, although it may be necessary to truck in material to or from the ROW on occasion using public roads. Planning is being conducted to limit the movement of any and all such earthen material intra-ROW, not using public roads. The intent is to reduce hauling distances and effects on roads by moving material around site, on the ROW, using 20 tonne to 40 tonne off-highway rock trucks. Sands and aggregates are intended to be produced on-ROW as well using in situ material and on-ROW crushing and screening activities. Using gravel trucks on public roads to haul material back and forth to the ROW from off-ROW areas is a possible, secondary method for aggregate material sourcing. In the event that borrow pits are required, Trans Mountain intends to first work with land or existing facility owners which may have suitable material, and are in direct proximity to the ROW to continue to use off-highway rock trucks. In the event that gravel trucks and public roads are required to haul material from gravel pits off ROW and not in proximity to the ROW, the Contractor will ensure that appropriate planning, including traffic management planning, is conducted prior to the start of this activity and that all required authorizations and permits are in place.

7.2 Introduction to Traffic Management associated with Temporary Facilities

The following sub-sections to Section 7 of this TACMP present an overview of each temporary facility location, associated construction schedule as well as the planned activities. The current traffic in the vicinity of each facility is derived from various sources including AT, BC MoTI, and Municipalities websites where traffic count stations have provided recent counts. In order to normalize the traffic data, the base year of 2015 was used. The analysis is based on an annual growth rate of 1% (linear) to normalize data that were collected prior to the base year. The anticipated traffic is the sum of the current traffic and the anticipated traffic generated as the result of the construction activities.

The traffic assessment utilizes a conservative approach by using a peak hour traffic number. The peak hour traffic number is typically derived by using 10% of the Average Summer Daily Traffic (ASDT). The ASDT, where not available, are derived by adding 5% to Average Annual Daily Traffic (AADT).

The construction roadway impact analysis for each facility is developed based on the anticipated traffic additional pressure on the adjacent network elements including intersections as well as the likelihood interaction between the construction traffic with road users including cyclists and pedestrians were applicable. The analysis reviews the construction effects on public service elements including parking stalls and transit, where applicable.

7.3 Stockpiles – General

7.3.1 General Work Scope

Stockpiles will store pipe lengths brought to spread areas via rail and off-loaded at rail sidings. The pipe supplier is responsible for off-loading trains at the rail sidings and delivering the pipe via truck to pipe stockpile yard, (stockpiles) with public roadway effects being considered. Pipe delivery from rail sidings is currently scheduled to take place from fall 2017 through early summer 2018 and will be primarily via commercial trucking routes, as practical, to reduce traffic effects to public roadways.

Effects to roads, including access points and access roads (Appendix A-1 and A-3), from stockpiles to the work site have been considered for traffic management in this section.

The general, the work scope at each stockpile will have flat-bed transport trucks or highway tractors with pole trailers arriving at the stockpile sites and picking up pipe for transportation to the Project ROW. Pipe will be loaded onto the truck at the secure stockpile yard and loaded using hoisting equipment, typically using a vacuum attachment. Each truck, depending upon road bands, will carry approximately 75 m of pipe (as an estimate for traffic volume effects) and travel to the Project ROW (Appendix A-1 and A-3. Trucks are off-loaded on the ROW using hoisting equipment and the truck will proceed back to the stockpile yard for another load. This is done in a cyclical manner, during daylight hours, until enough pipe is "strung" onto the ROW for placement, welding, and eventual lowering in to the pipeline trench in the immediate future.

7.3.2 Stockpile Selection

Final stockpile sites are still to be determined (TBD) but have been narrowed down to the locations identified in Table 7-2. Traffic management considerations have been given to all potential stockpile sites.

TABLE 7-2

STOCKPILE LOCATIONS

Stockpile Site Selection and Priority			
Spreads & Area		**Stockpile Selection Criteria**	
Spreads	**Site Locations**	**Site Area Consideration >20 ACRES**	**Close to Row (km)**
Spread 1 & 2A	Enoch	>20 A	2.6
	North Gate	>20 A	6.3
Spread 2B/2C	Edson Industrial	<20 A	2.0
Spread 3	Valemount - Slocan Access Road	>20 A	2.5
	Valemount - Yellowhead	>20 A	2.3
Spread 4	Vavenby	>20 A	2.6
Spread 5A - North	Kamloops - Domtar Old Mill	>20 A	2.8
	Kamloops - KIB3	>20 A	9.2
Spread 5A - South	Merritt - Chutter Ranch	>20 A	3.8
Spread 5B, 6	Hope - St Elmo Rd	>20 A	1.8
	Chilliwack 7581 Cannor Road	>20 A	9.5

7.3.3 Schedule

The schedule for transportation from the stockpile locations to the ROW is provided in Table 7-3.

TABLE 7-3

STOCKPILE SCHEDULE BY SPREAD

Contractor	Province / Location	Spreads		KP Start--See Appendix A	KP Finish-See Appendix A	Length-km	Stockpile Site	Stringing Timing
#1	Alberta--Edmonton	1	1	0	48.949	48.949	Enoch, North Gate	October 2018 to January 2019
	Alberta--Sherwood Park to Hinton	2	2A	48.949	147.557	98.608		October/November 2018
			2B	147.557	245.87 (Less 10 Kms)	98.313	Edson Industrial	August /September 2018
			2C Part 1	245.87 (less 10 Kms)	Approx. 291	92.005		November 2017 to February 2018
			2C Part 2	Approx. 291	337.875			December 2018 to January 2019
Reactivation AB Jasper National Park (JNP) / BC Mount Robson Provincial Park (MRPP)								
#2	BC Interior--Valemount to Kamloops	3	3A	488.989	502.274	13.285	Valemount - Slocan Access Rd or Valemount - Yellowhead	January 2018
			3B	502.274	525.436	23.162		February/March 2018
			3C	525.436	610.55	85.114		March 2018 to July 2018
		4	4A	610.55	690.494	79.944	Vavenby	June 2018 to December 2018
			4B	690.494	764.434	73.94		September 2018 to December 2018
Reactivation North of Kamloops								
#3	BC Interior Kamloops to Hope	5A	5A Part 1	806.344	Approx. 920	183.749	Kamloops - Domtar Old Mill or Kamloops - KIB 3	July 2018 to December 2018
			5A Part 2	Approx. 920	990.093		Merritt - Chutter Ranch	December 2018 to January 2018 & June/July 2019
#4		5B	5B Part 1	990.093	1015.449	84.814	Hope - St Elmo Rd, Chilliwack 7581 Cannor Rd	June 2018 to September 2018
	BC LMD Hope to Langley		5B Part 2	1015.449	1074.907			October 2018 to August 2019
#3		6	6	1074.907	1144.442	69.535		April 2018 to July 2018
				1078.519	1144.442			

7.3.4 Construction Vehicles Road Usage

The construction vehicle traffic to and from the pipeline stockpiles, with respect to traffic effects, will be almost exclusively stringing trucks. The number of trucks traveling to and from the site on a daily basis is dependent on the total pipe to be stockpiled in a given location for use in a linear section of the pipeline construction, and the total duration (number of weeks or months) during which stringing activities will be conducted from the stockpile.

Except as otherwise noted, general construction traffic volumes to each of these stockpiles can be expected to be as noted in Table 7-4.

TABLE 7-4

NUMBER OF TRIPS/LOADS FROM EACH STOCKPILE LOCATION TO SPREAD

Contractor	Province / Location	Spreads		KP Start--See Appendix A	KP Finish--See Appendix A	Stringing Length-km	Stockpile Site	Stringing Schedule	# of months	# of Truck Loads (Total Kms / 75m per truck) *	Practical # Loads / day average (25 wk days/mos)
#1	Alberta--Edmonton	1	1	0	48.949	48.949	Enoch, North Gate	October 2018 to January 2019	4	650	7-12
	Alberta--Sherwood Park to Hinton	2	2A	48.949	147.557	98.608		October /November 2018	2	1300	25-35
			2B	147.557	245.87 (Less 10 Kms)	98.313	Edson Industrial	August /September 2018	2	1300	25-35
			2C Part 1	245.87 (less 10 Kms)	Approx. 291	92.005		November 2017 to February 2018	4	1250	15-25
			2C Part 2	Approx. 291	337.875			December 2018 to January 2019	2		
Reactivation AB Jasper National Park (JNP) / BC Mount Robson Provincial Park (MRPP)											
#2	BC Interior--Valemount to Kamloops	3	3A	488.989	502.274	13.285	Valemount - Slocan Access Rd or Valemount - Yellowhead	January 2018	1	1600	15-20
			3B	502.274	525.436	23.162		February/March 2018	2		
			3C	525.436	610.55	85.114		March 2018 to July 2018	5 (-1 overlap)		
		4	4A	610.55	690.494	79.944	Vavenby	June 2018 to December 2018	7	2050	15
			4B	690.494	764.434	73.94		September 2018 to December 2018	4 (-4 overlap)		15
Reactivation North of Kamloops											
#3	BC Interior Kamloops to Hope	5A	5A North	806.344	Approx. 920	183.749	Kamloops - Domtar Old Mill or Kamloops - KIB 3	July 2018 to December 2018	6	1837	20-25
			5A South	Approx. 920	990.093		Merritt - Chutter Ranch	December 2018 to January 2019 & June/July 2019	4		10-15
#4	BC LMD Hope to Langley	5B	5B Part 1	990.093	1015.449	84.814	Hope - St Elmo Rd, Chilliwack 7581 Cannor Rd	June 2018 to September 2018	4	2450	5-10
			5B Part 2	1015.449	1074.907			October 2018 to August 2019	11		
#3		6	6	1074.907	1144.442	69.535		April 2018 to July 2018	4		20-25
				1078.519	1144.442						

* Estimated total length per pipe truck only. Lineal loads per pipe truck will be dependent on pipe diameter, wall thickness, road conditions, area of transport, etc.

7.3.5 Construction Traffic Roadway Impacts

The stockpile sites are mainly located in rural areas with relatively low urban traffic activities. Truck traffic generated by the stockpile sites during the construction activities is negligible when compared to the current traffic carried by the adjacent public roadways. Furthermore, the truck activities to/from stockpile sites are spread throughout the working day(s) and therefore will not intensify during the morning and evening peak hours along adjacent transportation network elements.

7.3.5.1 Adjacent Network Element(s)

It is anticipated truck activities generated by travel to and from the stockpile sites considered to the stockpiles will not affect the transportation network, and more specifically, will not add operational pressure on adjacent network element capacities.

7.3.5.2 Access point(s)

The sites under consideration for the stockpiles may require certain upgrades and improvements to ensure safe and effective transport corridors are established for internal truck circulations as well as ingress/egress movements. Therefore, all access points will be studied to ensure sufficient turning radiuses as well as sight distance(s) are provided to the commuters.

7.3.5.3 Active and Public Transportation Element(s)

The areas adjacent to the stockpiles are rural with no significant public facilities including sidewalks, crosswalks, and/or dedicated cycling lanes that may be affected by construction traffic. There are no identified public transportation facilities, stations, or bus bays that will be affected as the result of truck activities. If rare occasions are identified, the Contractor(s) will be responsible to relocate the affected facilities and provide a safe environment with the same capacity as well as convenience for the commuters.

7.3.5.4 Parking

The sites under consideration for stockpiles will accommodate the parking requirements for the transport trucks, heavy, and light vehicles. Construction vehicles will not occupy off-site public parking spaces.

7.3.6 Construction Traffic Ancillary Effects

Ancillary effects are expected to be minimal at stockpiles given that noise and light effects will be almost exclusively during daytime hours and the stockpiles are generally located in non-residential, rural areas. Dust, if present, will be controlled using water trucks on the short, gravel access roads leading to stockpiles. For debris on the highway arising from construction traffic, trucks will be maintained as clean as feasible (as weather allows) and roads and shoulders will be swept, as required.

7.4 Camps – General

7.4.1 General Work Scope

Camp selection is currently being finalized. Camps are classified as either full service or as sleeper camps. Full service camps are located in areas with little local infrastructure to ensure community services are maintained for local residents. Sleeper camps are located in areas with established infrastructure to support camp residents and to maximize local commercial benefits. Camp planning is subject to change as Project planning progresses.

Camps will be occupied during construction primarily during mainline pipeline construction activity time-frames and in direct correlation with manpower requirements. See the Tables in Section 6.1.9 of this Plan for manpower tables.

The general work scope at each camp will be as follows:

- full service camps housing workers including food and non-alcoholic beverage service;
- sleeper camps housing workers providing rooms and washrooms/showers only; and
- parking areas for camp residents. Camp residents at sleeper camps will use local commercial services on a daily basis.

7.4.2 Schedule

Camp construction and use dates are being finalized but will be in place for peak manpower use during mainline pipeline construction from summer 2017 through to fall/winter of 2019. See the Tables in Section 6.1.9 of this Plan for man-power tables.

7.4.3 Construction Vehicles Road Usage

General traffic volumes to each of these camps are identified in Table 7-5 and include estimated personnel vehicle use to and from camps during work days.

TABLE 7-5

PROPOSED CAMP LOCATIONS AND ANTICIPATED VEHICLE TRAFFIC

Spreads & Area		Camp Selection Criteria			Vehicle Trips	Comments
Spreads	Site Locations	Camp Site Area Consideration >10-20 ACRES	Land Zoning	Close to Row (km)	Estimated daily based on work bus trips and worker travel with personal vehicles outside work hours to and from camp.	Numbers are approximate
Spread 3	Blue River Camp	Y	Industrial	1.3	30-50 trips in am 50-75 trips in pm	500 Man Full Service Camp
	Valemount Camp - 17th Avenue	Y	Industrial	2.4	150+ trips in am & 150+ trips in pm	350 Man Sleeper Camp close to Valemount
	Valemount Camp - Yellowhead	Y	Industrial	2.3		
	Valemount Camp - Whiskey Fill	Y	Industrial	5.8		
Spread 4	Clearwater Camp - Camp 2 Road	Y	Mixed	2.3	150+ trips in am & 150+ trips in pm	350 Man Sleeper Camp close to Clearwater
	Clearwater Camp - Old Mill Site	Y	Industrial	1.7		
	Clearwater Camp - McMahon	Y	Agricultural	0.7		
Spread 5A	Merritt Camp	Y	Mixed Industrial	2.6	150+ trips in am & 150+ trips in pm	350 Man Sleeper Camp close to Merritt
	Merritt Camp - Chutter Ranch	Y	Agricultural	3.8		
Spread 5B	Hope Camp	Y	Agricultural	1	150+ trips in am & 150+ trips in pm	350 Man Sleeper Camp close to Hope
	Hope Camp - St Elmo Road	Y	Agricultural	1.8		

7.4.4 Construction Traffic Roadway Impacts

The potential sites selected for camps may require some upgrades. The construction activities associated with the camps upgrade will generate negligible traffic volumes when compared to the adjacent network current traffic flows. In addition, the camp sites are generally selected in rural areas, at previously disturbed sites, and close to the pipeline construction activities. Any upgrade activities will be completed entirely inside the camps, and therefore, will not affect public traffic. The transport trucks will operate mostly during the off-peak hours to ensure minimal effects.

The camps, once operational, will be used to accommodate the pipeline construction workforce. Workers will be transported to/from work zone(s) using mostly high occupancy vehicles (HOVs) including buses, minibuses and multiple passenger pickup trucks. Use of single occupied vehicles will be minimized. In addition, the majority of the HOVs will leave/arrive to the camps during the off-peak hours. Therefore, the effects on the adjacent traffic network will be negligible.

Table 7-5 shows the current zoning for the potential camp location. The zonings include industrial and agricultural which reflects the rural nature of the adjacent transportation elements. However, it is recommended that the Contractor(s) conduct TIA(s) for these site(s) once the location and anticipated traffic volumes are finalized.

7.4.4.1 Adjacent Network Element(s)

The traffic generated from potential camp sites would peak during off-peak hours of public traffic flow. The labor shifts are planned in a way that the labor will arrive and leave the field at the shortest time to ensure utilization maximization. Therefore, the anticipated traffic to/from campsites will have negligible pressure on the adjacent transportation elements' capacities.

7.4.4.2 Access point(s)

Table 7-5 shows the current zoning for the potential camp location. The zonings include industrial and agricultural zones which reflect the rural nature of the adjacent transportation elements. Therefore, it is anticipated that the existing laning geometries at the access point(s) would provide sufficient sight distances and turning radiuses. To ensure safety is preserved during camp operation(s), it is recommended that the

Contractor(s) review the existing and required access point designs. The Contractor(s) will implement any upgrades that are identified for the access points prior to camps becoming operational.

7.4.4.3 Active and Public Transportation Element(s)

The areas adjacent to the camps are generally rural with no or significant public facilities including sidewalks, cross-walks, and/or dedicated cycling lanes that may be affected by the construction traffic. There are no identified public transportation facilities, stations, bus bays, etc. that will be affected as the result of truck activities. If situations arise, the Contractor(s) will be responsible to relocate the affected facilities and provide a safe environment with the same capacity as well as convenience for the commuters.

7.4.4.4 Parking

The sites under consideration for camps will accommodate the parking requirements for buses, minibuses, and pickup trucks. The traffic generated to/from camp sites will not occupy off-site public parking spaces.

7.4.5 Construction Traffic Ancillary Effects

Ancillary effects are expected to be minimal at camps given that noise and light effects will be almost exclusively during daytime hours and the camps are generally located in non-residential, rural areas. Dust, if present, will be controlled using water trucks on the short, gravel access roads leading to camps. For debris on the highway arising from construction traffic, trucks will be maintained as clean as feasible (as weather allows) and roads and shoulders will be swept, as required.

7.5 Construction Yards/Offices – General

7.5.1 General Work Scope

Construction yards/offices will be used for many functions including housing the main Spread offices storing equipment for mobilization and demobilization activities where equipment cannot be directly mobilized or demobilized from its point of origin to the Project ROW, providing warehouse areas, and providing an area for equipment repair. Some parking will also be available in these areas but is to be limited to the extent practical.

7.5.2 Schedule

Offices will generally be used early in construction in most spreads from summer 2017 through to fall or early winter in 2019.

Commercially available areas in industrialized areas where similar offices and yards already exist are being prioritized. In addition, getting traffic into and out of the area/yard will be considered before finalizing commercial agreements. It is anticipated that traffic from the Spread 7 yard will be of negligible effect on localized industrial area roadways or commercial trucking routes.

Table 7-6 provides a list of offices/yard locations by spread.

TABLE 7-6

CONSTRUCTION OFFICE/YARD SELECTION:

Spreads & Area		Office/Yard Selection Criteria	
Spreads	**Site Locations**	**Site Area Consideration >8- 12 ACRES**	**Close to Row (km)**
Spread 1/2A	Acheson Office/Yard	N	6.0
Spread 2B/2C	Edson Office/Yard - Range Rd 180	N	2.0
	Edson Industrial Office/Yard	Y	2.0
	Hinton Office / Yard	N	3.7
Spread 3	Valemount Office/Yard - Yellowhead	Y	2.3
	Valemount Office/Yard - 17th Avenue	Y	2.4
	Blue River - Office/Yard	Y	0.4
Spread 4	Clearwater Office/Yard - McMahon	Y	0.7
Spread 5A- North	Kamloops Office/Yard	N	0.6
Spread 5A-South	Merritt Office/Yard - Chutter Ranch	Y	3.8
Spread 5B & 6	Hope Office/Yard	Y	1.0
	Abbotsford Brandy Farms Office/Yard	N	0.2
	Chilliwack 7582 Cannor Road Office/Yard	N	9.5
Spread 7	Surrey 98A Avenue Office/Yard	N	0.2
	Canfor Avenue Office/Yard	Y	0.6
	Barnet Highway Office/Yard	N	0.6

7.5.3 Construction Vehicles Road Usage

Traffic to and from construction yards will vary greatly. Total traffic volumes will be dependent on day to day activities and whether workers can be staged directly to the work site from camp sites, or if parking and staging to the work site is required at construction yards. Also of note is that fuel storage capacity will be located at some or all Construction yards. For that reason, additional, non-peak hour traffic during the day or increased traffic in the mornings or evenings may result in construction vehicles fueling up in the construction yards. Traffic volumes at construction yards are estimated in Table 7-7 with consideration regarding peak manpower requirements at each spread (duration for these counts below will vary from fall 2017 to winter 2019).

TABLE 7-7

OFFICE/YARD CONSTRUCTION VEHICLE TRAFFIC

Spreads & Area		Traffic Volumes--Round-Trips, estimated			
Spreads	Site Locations	Light Vehicles	Personal Light Vehicle (On-Site Parking)	Buses & 15 Passenger Vans	Transport Trucks & Fuel Trucks
Spread 1/2A	Acheson Office/Yard	50-100	80-100	10-20	20
Spread 2B/2C	Edson Office/Yard - Range Rd 180	40-75	50-75	10-15	10
	Edson Industrial Office/Yard				
	Hinton Office / Yard				
Spread 3	Valemount Office/Yard - Yellowhead	50-100	80-100	20-30	20
	Valemount Office/Yard - 17th Avenue				
	Blue River - Office/Yard	50-100	50	10	10
Spread 4	Clearwater Office/Yard - McMahon	50-100	80-100	20-30	20
Spread 5A- North	Kamloops Office/Yard	40-50	40-50	10-15	20
	Kamloops Office/Yard - KIB3				
Spread 5A-South	Merritt Office/Yard - Chutter Ranch	40-50	40-50	10-15	20
Spread 5B & 6	Hope Office/Yard	20	20	5-10	15
	Abbotsford Brandy Farms Office/Yard				
	Chilliwack 7582 Cannor Road Office/Yard	25	25	10-15	15
Spread 7	Surrey 98A Avenue Office/Yard	20	20	5	10
	Canfor Avenue Office/Yard				
	Barnet Highway Office/Yard				

* Estimated against peak man-power requirements. Volumes will likely be decreased from the estimate noted for much of the Project

7.5.4 Construction Traffic Roadway Impacts

Office/yard upgrades are estimated to have moderate effect on public roadways in rural areas and minor effect in urban areas. Most traffic traveling to and from construction yards will occur in the morning (7:00 AM to 9:00 AM) and in the evening (5:30 PM to 7:30 PM). Further, existing roads are in place with few, if any, upgrades currently being contemplated to each office/yard access. Construction yard upgrades may be necessary at some locations where the area is not previously constructed to accept commercial vehicle use pertaining to overall site suitability (such as, drainage, gravel base, etc.). Upgrade construction to and from the location will be minimal consisting of a few pieces of heavy equipment working on the stockpile location and a few light vehicles travelling to and from the location on a daily basis with supervision and equipment operators.

7.5.4.1 Adjacent Network Element(s)

Table 7-6 shows the estimated distance(s) between yard/office site(s) and the associated Project ROW for which they provide services. These distances show that the yard/offices site(s) are selected with shortest distances with respective service areas. In addition, Table 7-7 shows the anticipated traffic volumes to/from yard/offices sites. The anticipated traffic is negligible when compared to the general public traffic carried by the adjacent transportation elements. The relatively low traffic volume generated to/from the yard/offices site(s), coupled with relatively short driving distances to/from the Project ROW, will reduce traffic effects on the adjacent transportation network elements.

7.5.4.2 Access Point(s)

The yard/office sites are generally located in rural areas with industrial or agricultural zonings. Therefore, the natural land patterns as well as the access points existing laning geometries provide with sufficient sight distances and turning radiuses. The Contractor(s) will review the access points geometry and will implement upgrades where applicable to ensure public traffic safety is preserved.

7.5.4.3 Active and Public Transportation Element(s)

The sites anticipated for yard/offices are located within rural settings with no significant public facilities including sidewalks, crosswalks and/or dedicated cycling lanes. There are no transit facilities in close vicinity to yard/office sites.

7.5.4.4 Parking

The targeted sites for yard/office use have sizable vacant land that will be used to accommodate the parking needs for the construction related traffic. The anticipated traffic generated during the construction will not occupy off-site public parking spaces.

7.5.5 Construction Traffic Ancillary Effects

Ancillary effects are expected to be minimal at offices/yards given that noise and light effects will be almost exclusively during daytime hours and the offices/yards are, generally, located in non-residential, rural areas. Dust, if present, will be controlled using water trucks on the short, gravel access roads leading to the offices/yards. For debris on the highway arising from construction traffic, trucks will be maintained as clean as feasible (as weather allows) and roads and shoulders will be swept, as required.

7.6 Borrow Pits – General

Borrow pit and gravel pit trucking using local roadways will be minimized to the extent possible. Trucking of material to and from commercial borrow pits and gravel pits will include on-ROW trucking and transportation from existing commercial sites on highway to the nearest access where material is required. See Section 7.1 for further information.

Strong pit is the anticipated borrow pit for the lower mainland, non-mainline pipeline construction area, and will require gravel trucks to utilize public roads to access this site. This site is yet to be finalized.

7.7 Spreads 1 and 2A

7.7.1 Enoch Stockpile Site

7.7.1.1 Overview

The Enoch Stockpile Site is located west of Highway 60 (Devonian Way), off of Township Road 523 (see Figure 7-1). The approximately 12.8 ha site is level and requires site preparation, granular material, and fencing.

Refer to Table 7-3 for scheduled use of the site for pipe stockpiling during construction.

7.13 Spread 5B & 6

7.13.1 Hope Stockpile - St Elmo Road

7.13.1.1 Overview

The Hope Stockpile and Camp - St Elmo Road is located off of Highway 1 on St Elmo Road in Hope, BC (see Figure 7-18). The approximately 8.2 ha site is flat and may require site preparation, granular material, and fencing.

Refer to Table 7-3 for scheduled use of the site for pipe stockpiling during construction.

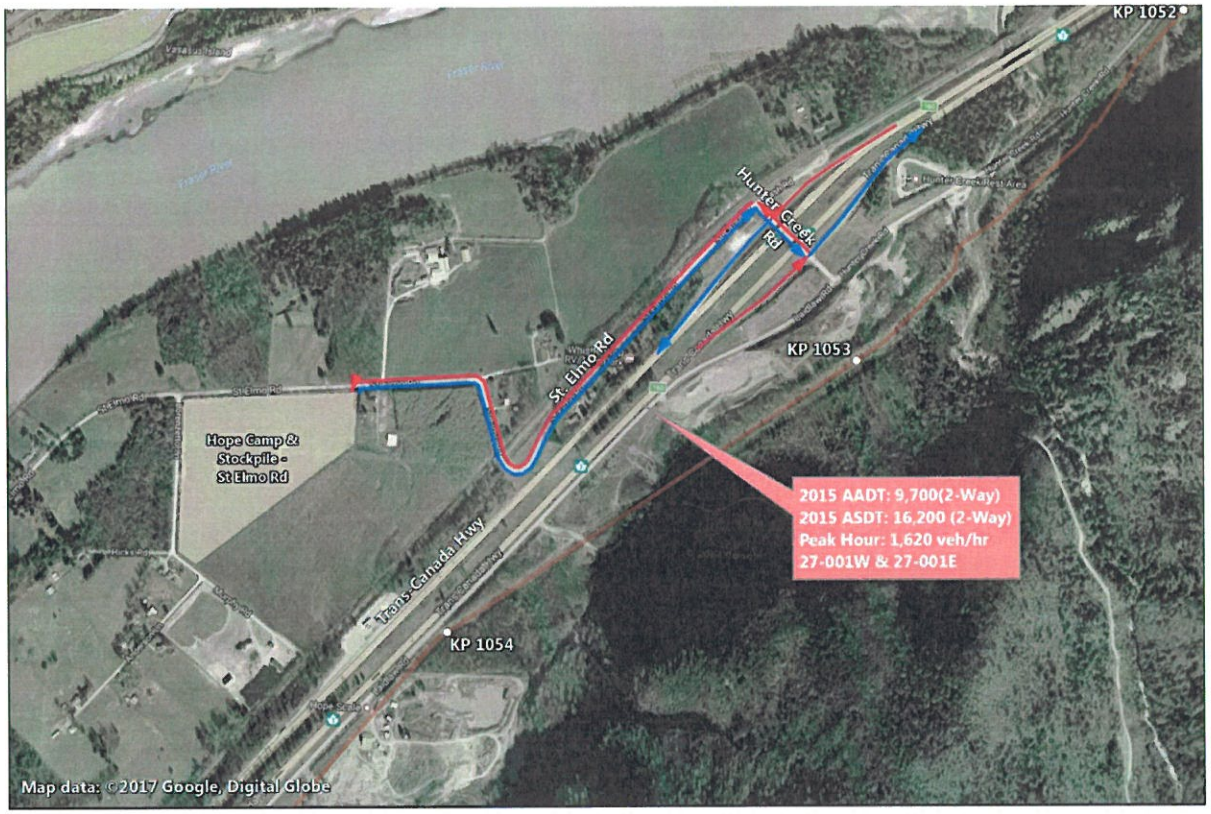


Figure 7-18 Hope Stockpile and Camp - St Elmo Road

7.13.1.2 Current Traffic and Anticipated Traffic Volumes

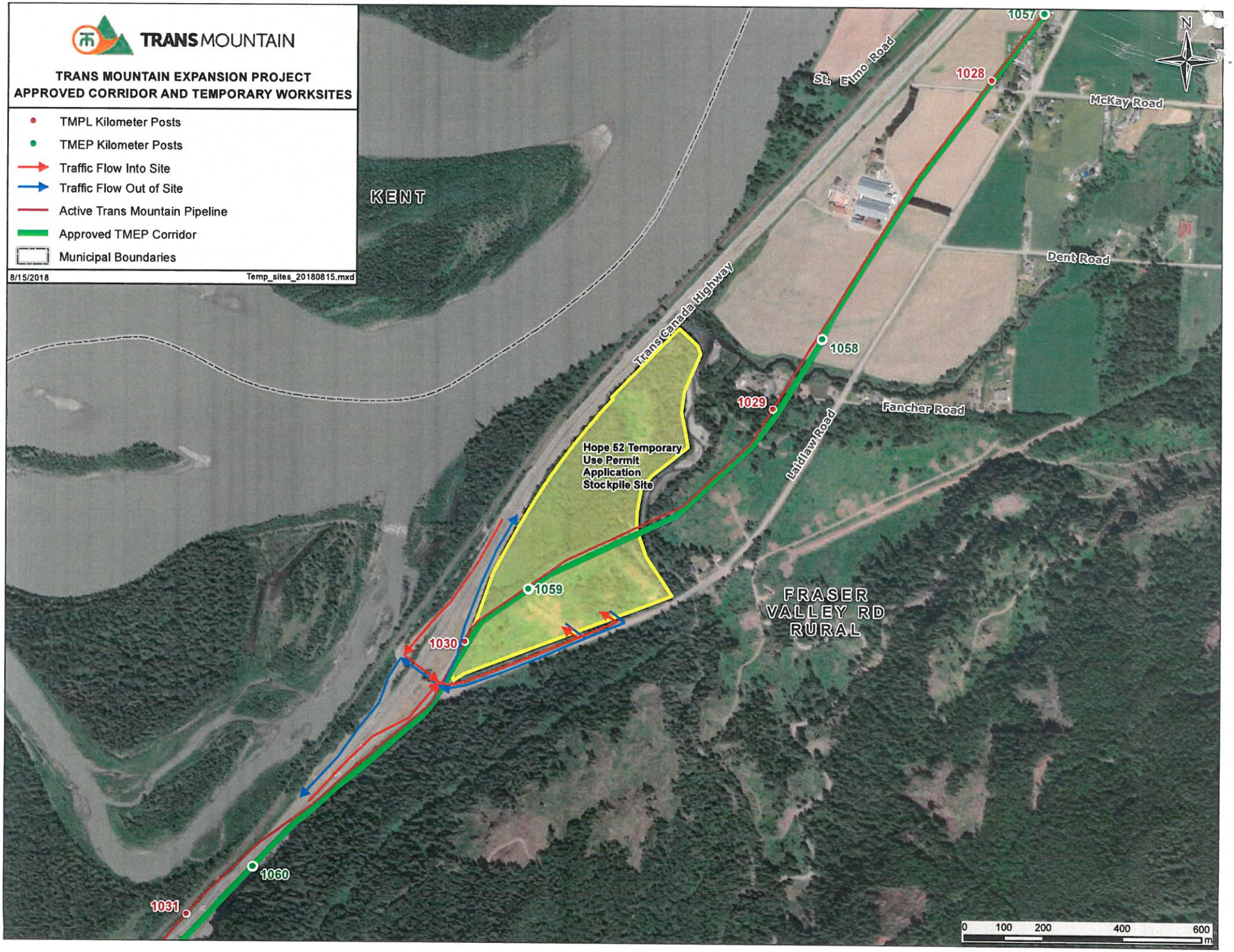
Figure 7-18 shows the current traffic data for the Hope Stockpile - St Elmo Road. Normally, the anticipated traffic volumes are the sum of the current traffic and the anticipated traffic generated from the construction activity. The anticipated traffic from the construction activities for the Hope Stockpile - St Elmo Road is shown in Table 7-4.

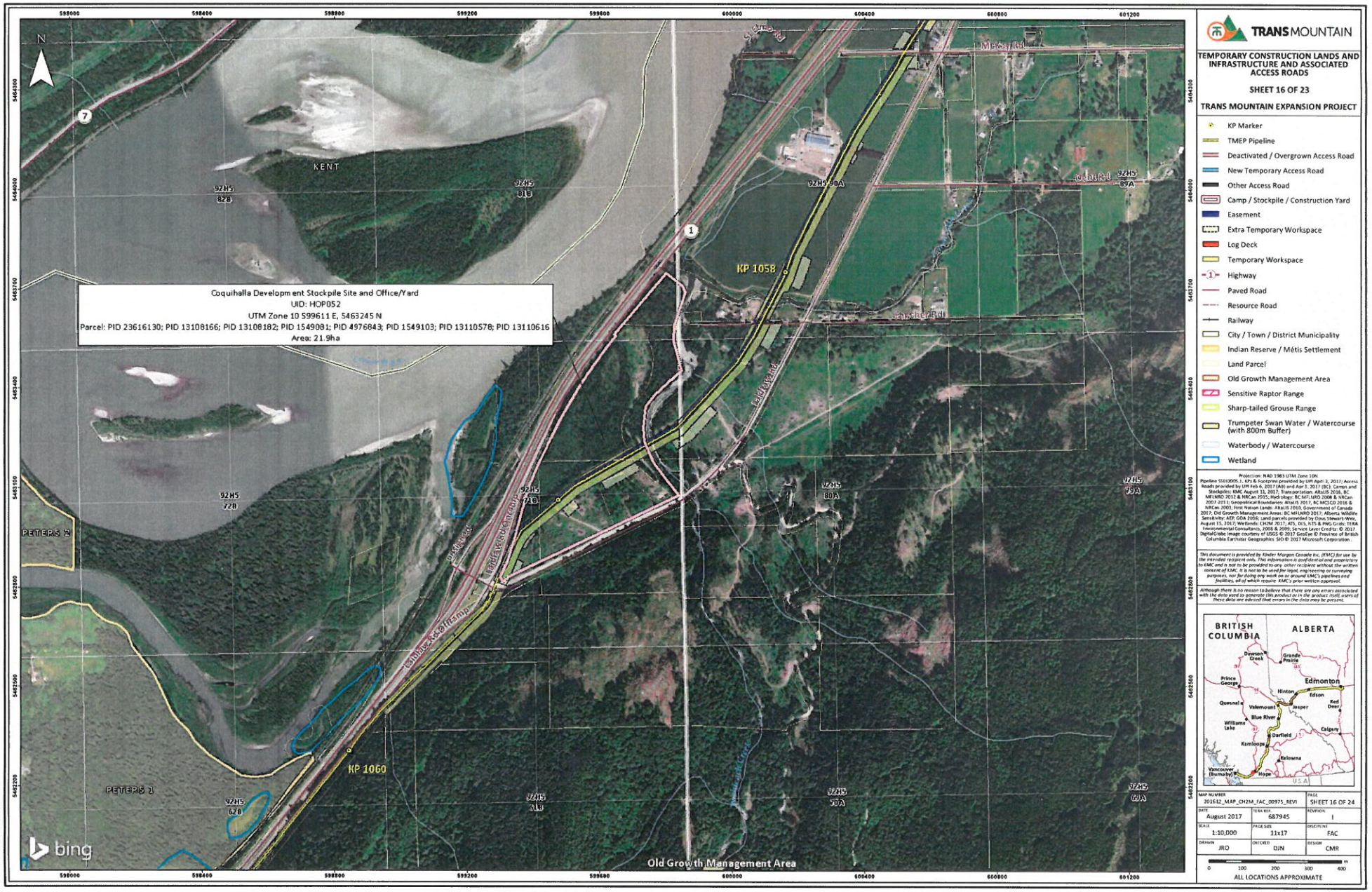
7.13.2 Chilliwack 7581 Cannor Road Stockpile Site

7.13.2.1 Overview

The Chilliwack 7581 Cannor Road Stockpile and Office/Yard Sites are located on the north side of Highway 1, west on Industrial Way, and off of Cannor Road in Chilliwack, BC (see Figure 7-19). The approximately 8.4 ha and 2.5 ha sites respectively, are flat and may require site preparation, granular material, and fencing.

Refer to Table 7-3 for scheduled use of the site for pipe stockpiling during construction.


TRANS MOUNTAIN
TRANS MOUNTAIN EXPANSION PROJECT
APPROVED CORRIDOR AND TEMPORARY WORKSITES
TMPL Kilometer Posts
TMEP Kilometer Posts
Traffic Flow Into Site
Traffic Flow Out of Site
Active Trans Mountain Pipeline
Approved TMEP Corridor
Municipal Boundaries
8/15/2018
Temp_sites_20180815.mxd
KENT
St. Elmo Road
McKay Road
Dent Road
Trans Canada Highway
Fancher Road
Laidlaw Road
Hope 52 Temporary Use Permit Application Stockpile Site
FRASER VALLEY RD RURAL
1057
1028
1058
1029
1059
1030
1060
1031
N
0 100 200 400 600 m



TRANS MOUNTAIN

TEMPORARY CONSTRUCTION LANDS AND INFRASTRUCTURE AND ASSOCIATED ACCESS ROADS

SHEET 16 OF 23

TRANS MOUNTAIN EXPANSION PROJECT

- KP Marker
- TMEP Pipeline
- Deactivated / Overgrown Access Road
- New Temporary Access Road
- Other Access Road
- Camp / Stockpile / Construction Yard
- Easement
- Extra Temporary Workspace
- Log Deck
- Temporary Workspace
- Highway
- Paved Road
- Resource Road
- Railway
- City / Town / District Municipality
- Indian Reserve / Métis Settlement
- Land Parcel
- Old Growth Management Area
- Sensitive Raptor Range
- Sharp-tailed Grouse Range
- Trumpeter Swan Water / Watercourse (with 800m Buffer)
- Waterbody / Watercourse
- Wetland

Projection: NAD 1983 UTM Zone 10N
Pipeline SSEDDB, 1, KPs & Footprint provided by UPI April 3, 2017; Access Roads provided by UPI Feb 6, 2017 (AB) and Apr 3, 2017 (BC). Camps and Stockpiles: KMC August 11, 2017; Transportation: AltaLIS 2016, BC MFLNRO 2012 & NRCan 2015; Hydrology: BC MFLNRO 2008 & NRCan 2007-2011; Geopolitical Boundaries: Alta IR 2017, BC MCSCD 2016 & NRCan 2003; First Nation Lands: AltaLIS 2010, Government of Canada 2017; Old Growth Management Areas: BC MFLNRO 2017; Alberta Wildlife Sensitivity: AEP, GOA 2016; Land parcels provided by Opus Stewart Weir, August 15, 2017; Wetlands: EKUM 2017, ATS, BLS, NTS & PWG Grids: TERA Environmental Consultants, 2008 & 2009; Service Layer Credits: © 2017 DigitalGlobe Image courtesy of USGS © 2017 GeoEye © Province of British Columbia Earthstar Geographics SIO © 2017 Microsoft Corporation

MAP NUMBER: 201612_MAP_CH2M_FAC_00975_REV1		PAGE: SHEET 16 OF 24
DATE: August 2017	TERA REF.: 687945	REVISION: 1
SCALE: 1:10,000	PAGE SIZE: 11x17	DISCIPLINE: FAC
DRAWN: JRO	CHECKED: DJN	DESIGN: CMR

0 100 200 300 400 m

ALL LOCATIONS APPROXIMATE

201612_MAP_CH2M_FAC_00975_Rev1.mxd

amec foster wheeler
Environment & Infrastructure

5681 - 70th Street
Edmonton, Alberta
Canada T6B 3P6
Tel: (780) 436-2152
Fax: (780) 435-8425

PLANS AND SECTIONS OF PROJECT NO. ET170033

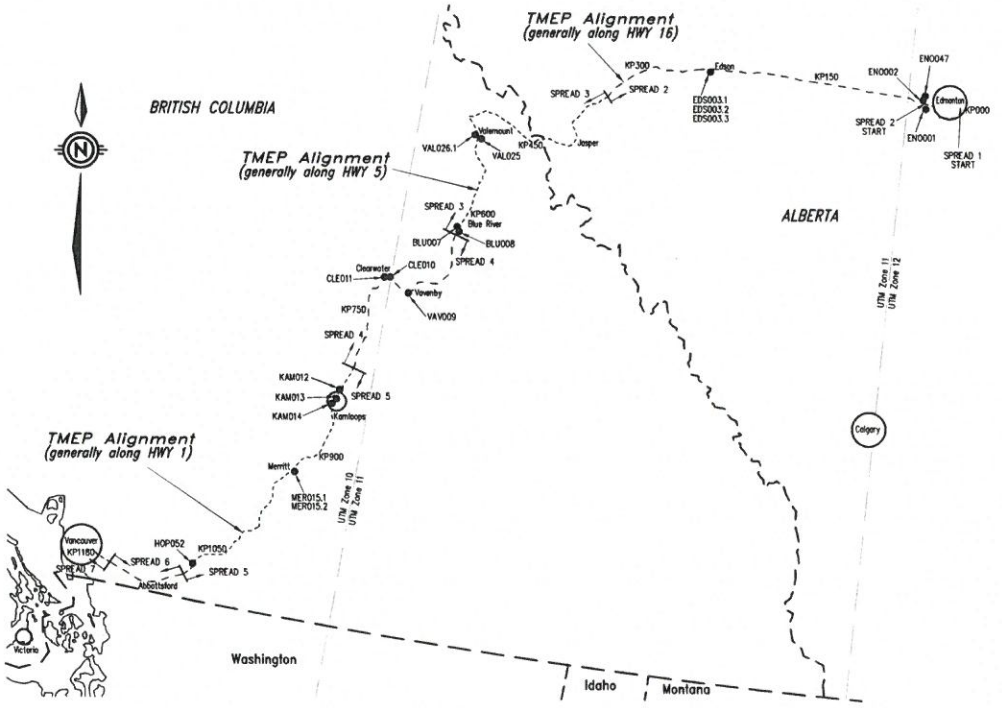
TRANS MOUNTAIN

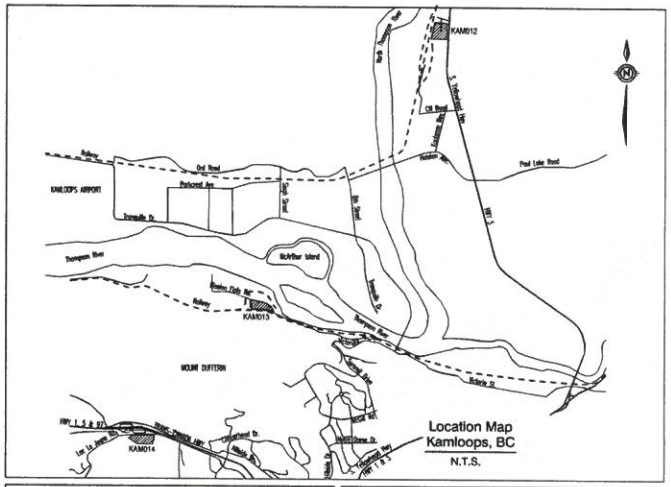
PIPELINE EXPANSION PROJECT (TMEP)

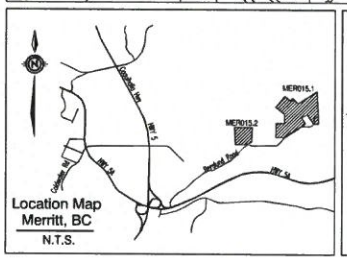
TEMPORARY INFRASTRUCTURE SITES: SPREAD 5

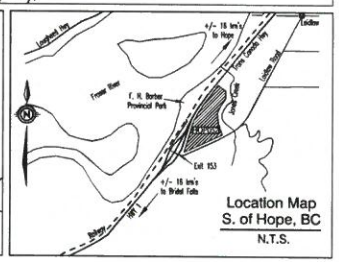
TRANSMOUNTAIN

MAP SHOWING OVERALL PROJECT LOCATION
N.T.S.









CONSTRUCTION NOTES:

1. SOIL SALVAGE TECHNIQUES TO FOLLOW LOCAL PRACTICES AND SHALL BE STORED IN STOCK PILES. EROSION CONTROL MEASURES TO BE EMPLOYED AND MAY INCLUDE SEEDING WITH NATIVE GRASSES.
2. FILL SECTIONS TO BE BROUGHT UP TO GRADE WITH SUITABLE EMBANKMENT MATERIALS, PLACED AND COMPACTED TO ACHIEVE 98% S.P.M.D.D. AND WITHIN +/- 3% OF OPTIMUM MOISTURE.
3. CUT SECTIONS TO BE CUT TO GRADE AND THEN TESTED FOR COMPETENCY (PROOF ROLL, ETC). ADDITIONAL SUB-GRADE PREPARATION TO BE PERFORMED AS REQUIRED TO ACHIEVE A SURFACE THAT HAS PERFORMANCE CHARACTERISTICS WHICH ARE SUBSTANTIALLY SIMILAR TO THE FILL SECTIONS.

CONSTRUCTION DETAIL
N.T.S.

**NOTE: ANY STRUCTURAL GEOGRID AND/OR GEOTEXTILE FABRIC PLACEMENT TO BE CONFIRMED BY THE PROJECT ENGINEER OR REPRESENTATIVE AT THE TIME OF CONSTRUCTION.

SPREAD 5 DRAWING LIST:

1. ET170033-SPR5-Title
2. ET170033-SPR5-MER015.1-01
3. ET170033-SPR5-MER015.1-02
4. ET170033-SPR5-MER015.2-01
5. ET170033-SPR5-MER015.2-02
6. ET170033-SPR5-HOP052-01
7. ET170033-SPR5-HOP052-02

ISSUED FOR CONSTRUCTION
23 NOV 2017

P.ENG. PROFESSIONAL ENGINEER K.E. HEISERER #36962 PROVINCE OF BRITISH COLUMBIA
DATE: 23-NOV-2017

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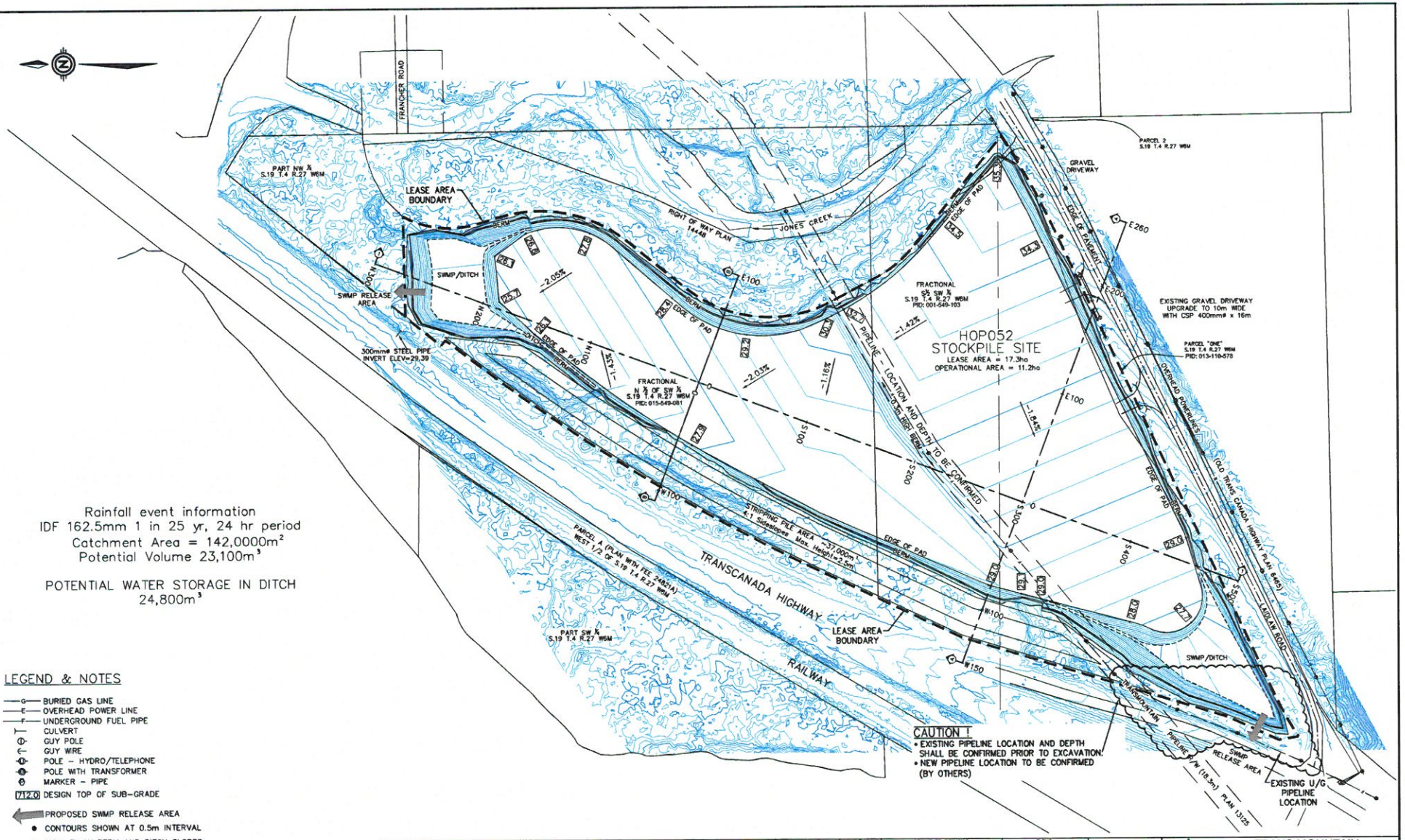
TRANSMOUNTAIN
TRANS MOUNTAIN PIPELINE EXPANSION
CIVIL PLANS FOR SITES IN SPREAD 5
GRADING PLANS, SECTIONS & DETAILS

TMEP Doc No.	-	DWG NO.	ET170033-SPR5-Title	REV
SCALE	DATE	DESIGNED	DRAWN	CHECKED	APPROVED
AS SHOWN	2017-11-23	BC	BC	KH	BC



Rainfall event information
IDF 162.5mm 1 in 25 yr, 24 hr period
Catchment Area = 142,0000m²
Potential Volume 23,100m³

POTENTIAL WATER STORAGE IN DITCH
24,800m³

LEGEND & NOTES

- BURIED GAS LINE
- OVERHEAD POWER LINE
- UNDERGROUND FUEL PIPE
- CULVERT
- GUY POLE
- GUY WIRE
- POLE – HYDRO/TELEPHONE
- POLE WITH TRANSFORMER
- MARKER – PIPE
- 712.0 DESIGN TOP OF SUB-GRADE
- PROPOSED SWMP RELEASE AREA
- CONTOURS SHOWN AT 0.5m INTERVAL
- MAX. 3H:1V BERM AND DITCH SLOPES
- MIN. 2m SETBACK TO LEASE BOUNDARY FOR BERMS, DITCHES & SOIL PILES

	BY	DATE	NO.	REVISION	DATE	BY	CK'D	APP'D
SURVEYED	THIRD PARTY (McElhanney)	2017-07-27	0	ISSUED FOR CONSTRUCTION	2017-11-23	MP	KH	BC

PERMIT TO PRACTICE
ISSUED FOR CONSTRUCTION
23 NOV 2017

P.ENG.
DATE 2017-11-23

amec foster wheeler

TRANS MOUNTAIN PIPELINE EXPANSION

HOPE STOCKPILE SITE - HOP052
SITE GRADING PLAN

TMEP DOC. NO. | DWG. NO. ET170033-SPR5-HOP052-01 | REV 0

SCALE	DATE	DESIGNED	DRAWN	CHECKED	APPROVED
1:1500	2017-11-23	MP	MP	KH	BC

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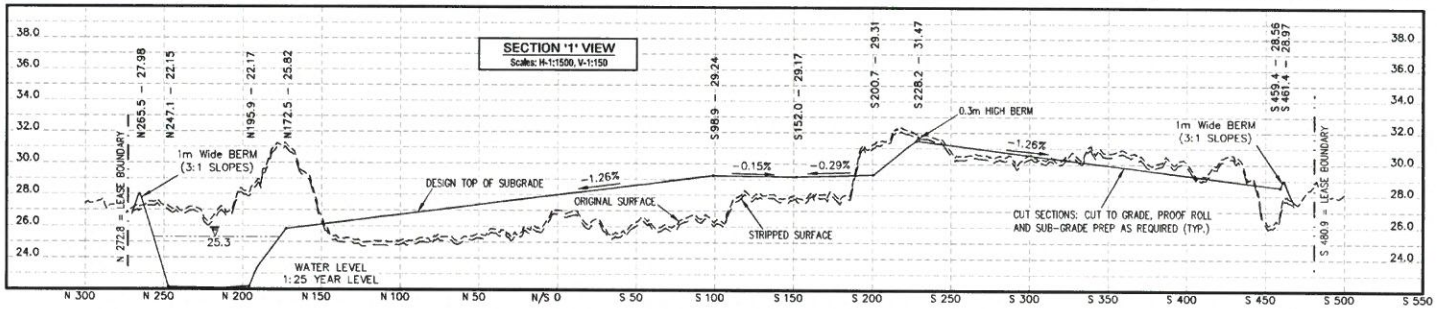
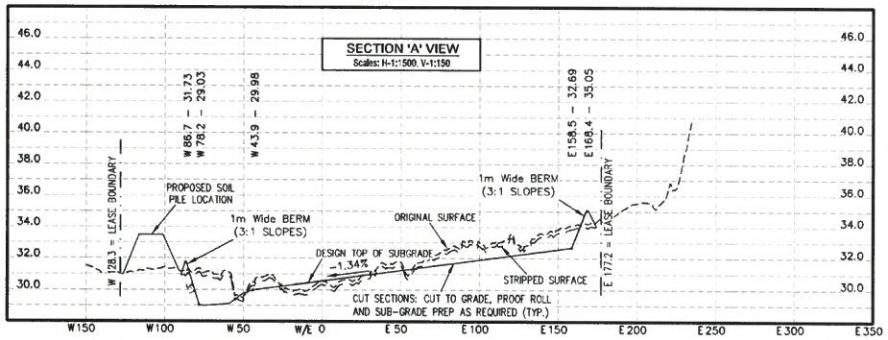
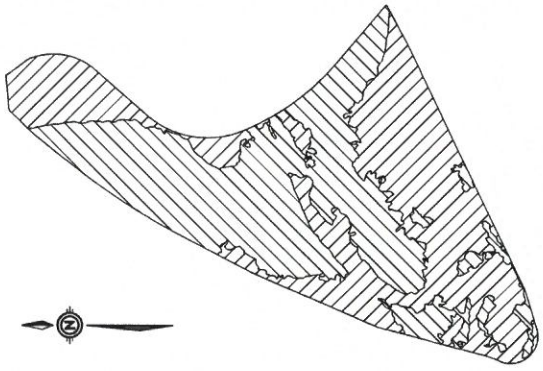


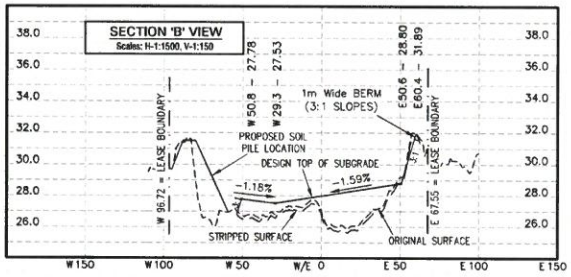


OPERATIONAL SURFACE – CUT/FILL SUMMARY

LEGEND:
- FILL AREA
- CUT AREA

NOTES:
TOTAL OPERATIONAL AREA = 111,892 m2
TOTAL FILL AREA = 57,588 m2
TOTAL CUT AREA = 54,304 m2
*REFER TO CONSTRUCTION NOTES 2 AND 3 FOR TYPICAL CUT AND FILL TREATMENTS.





GENERAL NOTES:

1. TOPOGRAPHIC DATA FOR DESIGN HAS BEEN PROVIDED BY THE CLIENT (TRANS MOUNTAIN), BASED ON SURVEY DATA COLLECTED BY A THIRD PARTY (McELHANNEY). AmecFW IS NOT RESPONSIBLE FOR ANY ERRORS DUE TO THE ACCEPTANCE OF THIS DATA.
2. AmecFW SHALL BE NOTIFIED IMMEDIATELY IF CONSTRUCTION DEVIATES FROM ORIGINAL DESIGN.
3. ALL GRADES ARE SHOWN TO TOP OF SUB-GRADE. GRAVEL SURFACING IS TO BE PLACED ABOVE.
4. ALL UNITS IN METRIC, UNLESS NOTED OTHERWISE
5. COORDINATE SYSTEM IS UTM, ZONE 10N NAD83

	BY	DATE	NO.	REVISION	DATE	BY	CK'D	APP'D
SURVEYED	THIRD PARTY (McElhanney)	2017-07-27	0	ISSUED FOR CONSTRUCTION	2017-11-23	MP	KH	BC

PERMIT TO PRACTICE
ISSUED FOR CONSTRUCTION
23 NOV 2017

P.ENG.
PROFESSIONAL ENGINEER
DATE 2017-11-23

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TRANS MOUNTAIN PIPELINE EXPANSION

HOPE STOCKPILE SITE - HOP052
SITE GRADING SECTIONS AND DETAILS

DWG. NO. ET170033-SPR5-HOP052-02 REV 0

SCALE	DATE	DESIGNED	DRAWN	CHECKED	APPROVED
AS SHOWN	2017-11-23	MP	MP	KH	BC

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Memo

amec foster wheeler

To:	Glen Kayne, P.Eng.		
From:	Marianne Rosted, MSc., P.Geo., P.Eng.		
		File No:	ET170033.010
Date:	16 November 2017	**Reviewed by:**	Nick Polysou, P.Eng.
Subject:	**Site HOP 052** **Trans Mountain Pipeline** **Hope, British Columbia**		

1.0 INTRODUCTION:

This memo presents the results of a desktop and field terrain stability assessment prepared for proposed development at a site located to the south of Laidlaw, approximately 15 km to the south of Hope, British Columbia. The desktop review was completed based on the information made available combined with observations made in the field.

The purpose of this review is to screen the sites to see if a *Terrain Stability Field Assessment* is warranted. This work is undertaken to fulfill the commitments in addressing NEB Condition 66 *Risk Management Plan for Geohazards*[1] with respect to Temporary Infrastructure Sites:

> *2.3 Temporary Stockpile Sites and Access Roads*
>
> *Terrain mapping completed for the project covers areas designated for stock pile sites as well as the access roads to be utilised during construction. Terrain Stability Field Assessments (TSFAs) will be conducted on Class IV and V and select Class III terrain post-clearing and prior to major construction to ensure that impacts to 3rd parties, the environment and worker safety from geohazards can be either prevented or minimised. Risk management strategies will be implemented in accordance with the Field Changes Manual for Geohazard Mitigation (NEB Condition 51 A83057) where hazards are identified as a result of TSFAs.*

2.0 AVAILABLE DATA:

The following data was either made available for review, or obtained from the web based on the knowledge of the site locations;

Amec Foster Wheeler Environment& Infrastructure,
a Division of Amec Foster Wheeler Americas Limited
Suite 600 – 4445 Lougheed Highway,
Burnaby, BC, Canada V5C 0E4
Tel +1 (604) 294-3811
Fax +1 (604) 294-4664
www.amecfw.com

- McElhanney site drawing: *Topographic Survey Plan of Hope Stockpile Site REM FRAC. N ½ And S ½ of the SW ¼ SEC 19, TP 4 R 27 W6M Lying Eat of the Fraser River Hope, BC.* Dated 2017-10-18.
- Geology of British Columbia 2005-3[ii]
- Map 737A, *Hope*, Scale 1 inch to 4 miles. Geological Survey, Department of Mines and Resources 1943[iii]
- Google Earth imagery
- *Terrain Classification System* for British Columbia. Ministry of Environment. 1997. Version 2[iv]
- *Mapping and Assessing Terrain Stability Guidebook*. Forest Practices Code of British Columbia. August 1999. Second Edition[v]
- Trans Mountain Expansion Project, *Field Changes Manual for Geohazard Mitigation*, Document # 01-13283-SG-0000-PL-RPT-0008, April 27, 2017[vi]

3.0 SITE DESCRIPTION:

HOP 052 is bounded to the west-northwest by TransCanada Highway No. 1, and to the south by Laidlaw Road. The Fraser River is located directly to the west and downslope of the highway. To the northeast of the site, the land is cultivated and there are some residential properties present.

An actively flowing, meandering creek (Jones Creek aka Waleach Creek) is present to the north-northeast of the proposed site boundary. Laidlaw Road crosses the creek just northeast of the site boundary. At the time of the field assessment, the creek level was between 2 to 3.5 m below the site grade. Near the Laidlaw Road crossing, the portion of the creek bank parallel to a property was lined with rip rap. Based on the plans provided (see attached) the site boundary adjacent to the creek appears to be set back between 35 m to 64 m from the creek. A buried Trans Mountain pipeline crosses the site in a northeast – southwest direction. Apart from discrete patches of mature trees, the site has been cleared, and some regrading has taken place. Several overgrown gravel paths were observed to criss-cross the site. Low shrubs were observed across the site. The site appears to be underlain by alluvial sands and gravels exposed where regrading has occurred. Upslope from Laidlaw Road the terrain becomes much steeper and mountainous. The steep area is typically densely forested, except for rock cut slopes along a section of Laidlaw Road. The rock cuts are near vertical, consisting of competent bedrock. This area did not display any signs of instability or rock fall. A ditch was observed on the upslope side of Laidlaw Road along the entire length of the project area. The ditch was well vegetated and did not show signs of fresh material having been deposited in the ditch as a result of either rock fall or instability upslope. The general geometry of the creek combined with the steep terrain to the south suggests that there may be a potential for debris flows. There were no signs of recent debris flows observed during the assessment. The general area was densely forested with mature forest.

Review of 1 in 200 year floodplain maps indicate that the site is not located within the floodplain to the Fraser River.

4.0 SITE GEOLOGY:

According to the above referenced surficial geology map, the site is underlain by post-glacial alluvium, glaciofluvial sands and gravels and till. The soils are underlain by Palaeozoic and Mesozoic undefined bedrock units consisting of slate, phyllite, sandstones, limestones and conglomerates.

5.0 TERRAIN STABILITY CLASSIFICATION:

The terrain stability has been classified in accordance with the referenced *Mapping and Assessing Terrain Stability Guidebook,* Forest Practices Code of British Columbia. The classification system details are presented in Table 1.

Table 1 - Terrain Stability Classification

Terrain stability class	Interpretation
I	• No significant stability problems exist.
II	• There is a very low likelihood of landslides following timber harvesting or road construction. • Minor slumping is expected along road cuts, especially for 1 or 2 years following construction.
III	• Minor stability problems can develop. • Timber harvesting should not significantly reduce terrain stability. There is a low likelihood of landslide initiation following timber harvesting. • Minor slumping is expected along road cuts, especially for 1 or 2 years following construction. There is a low likelihood of landslide initiation following road construction.
IVR	• Expected to contain areas with a moderate likelihood of landslide initiation following road construction and a low or very low likelihood of landslide initiation following timber harvesting.
IV	• Expected to contain areas with a moderate likelihood of landslide initiation following timber harvesting or road construction.
V	• Expected to contain areas with a high likelihood of landslide

Provided the applied set-back of the site from the meandering creek observed to the northeast, combined with development of protection berms, Terrain Stability Classification III is assigned to the site.

6.0 DISCUSSION:

Based on the information available, there are concerns with respect to the presence of a meandering creek crossing the proposed site. Comparing Google Earth imagery from 2004 to 2017 indicate that the Jones Creek is clearly migrating. The imagery suggest that between these dates the migration has occurred within the current channel. However, further lateral erosion of the current channel embankments cannot be ruled out based on the erodible alluvial deposits present combined with a significant flood event. Based on our current understanding of the site boundary, the proposed setback from the creek crest is between 35 and 65 m. This setback distance is likely adequate with respect to lateral erosion, given the temporary nature of the proposed use for stockpiling of materials. However, it is recommended that a hydrotechnical assessment is completed to understand the potential flood levels of the creek. The size of the proposed protection berms can be better defined based on the result of the hydrotechnical assessment.

Although evidence of recent debris flows was not observed in the field, the occurrence cannot be ruled out. Review of the geometry of the creek and the surrounding area suggests that the largest volume of a debris flow will most likely follow the course of the creek, however, some material could spill onto the Laidlaw Road and potentially impact the eastern corner of the site (adjacent to Laidlaw Road). The proposed berms would protect the site to some degree from inflow of debris, but there is a potential for some material to over-top the berms, spilling onto the site. Detailed assessment of the scale of a debris flow and the impact is beyond the scope of this assignment.

7.0 CLOSURE

The recommendations presented herein are based on a geotechnical evaluation of the findings of the desktop assessment and other information deemed relevant to the assessment. The material in this memo reflects Amec Foster Wheeler's judgement considering the information available to Amec Foster Wheeler at the time of preparation of the memo.

If conditions other than those described in this memo are noted during subsequent phases of the project, Amec Foster Wheeler Environment & Infrastructure should be notified and given the opportunity to review and revise the current recommendations, if necessary. Recommendations presented herein may not be valid if an adequate level of field review is not provided during construction or if relevant code requirements are not met.

This memo has been prepared for the exclusive use of Trans Mountain for the specific application to the development described within this memo. Any use which a third party makes of this memo, or any reliance on or decisions made based on it are the responsibility of such third parties. Amec Foster Wheeler accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this memo. It has been prepared in accordance with general accepted soil and foundation engineering practices. No other warranty, expressed or implied, is made.

Amec Foster Wheeler trusts this meets your immediate requirements. If you have any questions or require further information, please contact this office.

Respectfully submitted,

Amec Foster Wheeler Environment & Infrastructure,
a division of Amec Foster Wheeler Americas Limited

M. Rosted Nov 16, 2017

PROFESSIONAL ENGINEER PROVINCE OF BRITISH COLUMBIA M. ROSTED #31225

Marianne Rosted, MSc., P.Geo., P.Eng.
Senior Geological Engineer

Reviewed by:

Nick Polysou, P.Eng.
Principal Geotechnical Engineer

Attachments:

McElhanney site drawing: *Topographic Survey Plan of Hope Stockpile Site REM FRAC. N ½ And S ½ of the SW ¼ SEC 19, TP 4 R 27 W6M Lying Eat of the Fraser River Hope, BC*. Dated 2017-10-18.

References:

[i] *Trans Mountain Expansion Project, Risk Management Plan for Geohazards*, NEB Condition 66, May 15, 2017

[ii] Geology of British Columbia 2005-3

[iii] Map 737A, *Hope*, Scale 1 inch to 4 miles. Geological Survey, Department of Mines and Resources 1943

[iv] *Terrain Classification System* for British Columbia. Ministry of Environment. 1997. Version 2

[v] *Mapping and Assessing Terrain Stability Guidebook*. Forest Practices Code of British Columbia. August 1999. Second Edition

[vi] Trans Mountain Expansion Project, *Field Changes Manual for Geohazard Mitigation*, Document # 01-13283-SG-0000-PL-RPT-0008, April 27, 2017

Margaret Thornton

From:	Pountney, Bronwyn <Bronwyn_Pountney@transmountain.com>
Sent:	August-16-18 4:08 PM
To:	Margaret Thornton
Cc:	Andrea Antifaeff; Graham Daneluz; Stebbings, Kate; Catt, Michael S (Mike); Manchon, Andrea (Contractor)
Subject:	TMEP >> TUP for HOP052 - Application Information
Attachments:	tm hope yard.pdf; HOP052_Traffic_20180815.pdf

Hi Margaret,

Please find attached Geohazard Assurance Statement and site specific Traffic Management Figure. The previous Traffic document that I had submitted was an excerpt from a NEB filing (Condition 47 – Access Management Plan) and provided information for all contractors regarding traffic management. The attached map provides a visual representation of the content previously submitted.

If possible a confirmation from you that the application is complete and on track for the September 5th Committee Meeting and the Sept 25th FVRD Board meeting would be appreciated.

Kind Regards,

Bronwyn

Bronwyn Pountney, M.Env.Man., EP
Permitting Specialist
Trans Mountain Expansion Project

TRANSMOUNTAIN

Kinder Morgan Canada Inc
2700, 300 - 5 Avenue SW
Calgary, AB T2P 5J2
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Cell: 587.830.3549
Fax: 403.514.6427
bronwyn_pountney@transmountain.com

Geo-Hazard Assurance Statement
for Development Approvals

A. Project Information

Date August 14, 2018 FVRD File No.

Property Information

Project Name & Description Trans Mountain Expansion Project, Hope/Coquihalla Strehpile Site. HOP052

Legal Description Rem Frac. N½ and S½ of the SW¼ Sec 19, TP4, R27, W6M lying E. of the Fraser River, Hope, B.C. N5463245 E599610

Site Address PID

Client Information

Name Trans Mountain Expansion Project

Role ☐ Property Owner ☐ Developer ☑ Other (lessee)

Client Address Suite 2700, 300 - 5th Avenue SW, Calgary Alberta, T2P 5J2

Qualified Professional Information

Name Robert Forsyth

APEGBC Designation ☑ P.Eng. ☐ P. Geo. ☐ Eng.L ☐ Geo.L

Company Name Wood.

Mailing Address #110 - 18568 96th Avenue, Surrey, B.C. V4N 3P9

Email Address bob.forsyth@wood.plc.com Phone # 604-295-8661

Geo-Hazard Report Reference

Title Site HOP 052 Date November 10, 2017.

Personal information on this form is being collected in accordance with Section 27 of the Freedom of Information and Protection of Privacy Act, RSBC 1996 Ch. 165; Part 9, Division 1 [Building Regulation] and Part 14 [Planning and Land Use Management] of the Local Government Act, RSBC 2015 Ch. 1; and Section 56 of the Community Charter, SBC 2003 Ch. 26 and will only be collected, used and disclosed for the purpose of administering geo-technical hazard reviews and assurance statements related to development approvals. Questions? Contact FVRD Privacy Officer at 45950 Cheam Avenue, Chilliwack, BC V2P 1N6; 604-702-5000 or 1-800-528-0061; or FOI@fvrd.ca.

B. Assurance

Based on the contents of this Assurance Statement and the Report, I hereby give assurance that:
(check as applicable)

☐	Development Permit	The Report will "assist the local government in determining what conditions or requirements under it will impose in the permit", as required by the *Local Government Act* (Division 7)
☐	Building Permit	
	☐ Community Charter	"The land may be used safely for the use intended", as required by the *Community Charter* (Section 56)
	☐ Seismic Slope	The Report addresses the requirements of the BC Building Code 2006, 4.1.8.1.6 (8) and 9.4.4.4 (2), as detailed in the BC Building & Safety Policy Branch Information Bulletin B10-01, Jan 18, 2010
☐	Floodplain Management Bylaw Exemption	"The land may be used safely for the use intended", as required by the *Local Government Act*. (Section 524)
☐	Subdivision	"The land may be used safely for the use intended", as required by the *Land Title Act* (Section 86).
☑	Other *(e.g. Zoning Bylaw Amendment, Official Community Plan Amendment, Temporary Use Permit, etc.)*	<Insert statement as appropriate> Temporary stockpile site for pipeline construction.

C. APEGBC Professional Practice Guidelines

The Report and this Assurance Statement should be completed in accordance with the current version of one or both of the following Professional Engineers and Geoscientists of BC (APEGBC).

- *Legislated Flood Assessments in a Changing Climate in BC*
- *Legislated Landslide Assessments for Proposed Residential Development in British Columbia, ("APEGBC Landslide Guidelines").*

These two documents are collectively referred to as the "APEGBC Guidelines". The italicized words in this Assurance Statement are defined in the APEGBC Guidelines.

The Report has been prepared pursuant to the following APEGBC Guidelines *(check one or both as applicable).*

☑ APEGBC Flood Guidelines

☑ APEGBC Landslide Guidelines

If the Report is **not** prepared pursuant to either of the APEGBC Guidelines, please explain.

D. Background Information

Qualified Professionals **must** confirm and check that each item is included in the Report.

- [x] 1. Property location map — 8.5 x 11 size
- [ ] 2. Development proposal site plan — 8.5 x 11 size. *If a subdivision, show the parent parcel and all lots to be created, including any remainder.*
- [ ] 3. Description of the proposed development project (including building use) to the extent this is known at the time of Report preparation.
  - [ ] residential
  - [ ] industrial
  - [ ] commercial
  - [ ] institutional
  - [x] other Industrial - stockpile site for pipeline materials. Structures to be temporary (if any)

E. Technical Requirements

Qualified Professionals **must** review, confirm and check completed items (as applicable).

Report Content

☑ 4. Relevant information pertaining to the Property and pertinent potential hazards from appropriate background sources, including the FVRD online library.

☐ 5. Time limitation or condition statement to describe extent the FVRD may rely on the Assurance Statement and Report for development approvals, and when resubmittal is recommended.

☐ 6. Maps, illustrations and diagrams to illustrate areas referred to in the Report.

☐ 7. Description of field work conducted on and, if required, beyond the Property.

☐ 8. Contact and consultation with the Fraser Valley Regional District. Provide name and title of contact.

_____

☐ 9. Review of relevant FVRD bylaws and other statutory requirements.

☐ 10. Restrictive covenants registered against the Property title that pertain to geo-hazards (if registered, the Report provides relevant information about the covenants).

☐ 11. Notation of any visibly apparent natural hazards or other hazards identified in background reports, which are not identified and addressed in this Report. If yes, provide details in Section H: Geo-Hazard Summary Table.

- ○ Yes
- ☑ No

☐ 12. Does the report rely on one or more supporting reports, each of which is independently reviewed, signed and sealed. If yes, provide details in Section H: Geo-Hazard Summary Table.

- ○ Yes
- ☑ No

☐ 13. For subdivision approval, the Report addresses natural hazards for:

- ☐ the parent parcel prior to subdivision
- ☐ any lots to be created (including any remainder)

Geo-hazard Assessment, Risk Acceptability and Risk Transfer

☑ 14. In considering the above-noted potential hazards that may affect the property, I have:

- ☑ reviewed and characterized the potential hazard(s)
- ☐ estimated the potential frequency and magnitude of the potential hazard(s)
- ☐ relied on supporting reports as noted above
- ☐ relied on a pre-existing assessment of hazard frequency and magnitude
- ☐ considered the potential effects of climate change in the context identified in the Report
- ☐ considered the potential effects of changed future conditions (upstream watershed changes, forestry activity, land use changes, sea level rise, etc.) in the context identified in the Report

☑ 15. This Assurance Statement pertains to all geo-hazards that are assessed in the Report and any supporting reports, and accurately reflects the contents of those documents.

☐ 16. The FVRD has adopted "Hazard Acceptability Thresholds for Development Approvals by Local Government", which provides a specific level of hazard or risk tolerance. I have included a Hazard Summary Table which:

- ☐ lists all the potential hazards addressed by the Report and any supporting reports
- ☐ provides an annual return frequency and acceptability threshold classification for the unmitigated condition
- ☐ proposes mitigative measures to appropriately reduce the geo-hazard risk
- ☐ provides an annual return frequency and acceptability threshold classification for the mitigated condition

☑ 17. The Report describes the potential transfer of natural hazard risk to other properties or infrastructure as a result of the proposed project (including any proposed *mitigation works*) and

- ☐ considered the potential for transfer of natural hazard risk
- ☑ concludes that there is no significant transfer of natural hazard risk
- ☐ identifies the potential transfer of natural hazard risk and proposes measures to offset such transfer of risk

Mitigation and Design Recommendations (if recommended)

The Report contains the following items:

☐ 18. Implementation steps for the identified structural mitigation works (in terms of design, construction and approval).

☐ 19. Clearly identified safe locations for building(s), ancillary structures, and onsite utility services (as applicable, such as a septic field) out of the natural hazard area as a preferred development alternative.

☐ 20. Commentary on the effectiveness of proposed structural mitigation works in terms of ability to reduce the potential hazard impact, and identification of any residual risk that would remain.

☐ 21. Proposed Flood Construction Level (FCL) for future development and including specification of an appropriate method of achieving the FCL.

☑ 22. Proposed watercourse setback, which is clearly referenced from the natural boundary, top of bank or another suitable basis.

☐ 23. Proposed operation and maintenance actions that will be necessary in order for the level of safety to be maintained in the future, with indications of who should be responsible for those actions and when.

Riparian Area Regulation (if applicable)

☐ 24. QP must review RAR assessment report to avoid conflict with Geo-Hazard Report recommendations.

F. FVRD Supplemental Requirements

The following points are understood by the Qualified Professional when submitting a Report:

☑ 25. Permission is granted to the FVRD to use the Report in considering approval of the proposed development on the property, provided that such permission is limited only to the proposed development project for which the Report was prepared.

☑ 26. Methodology used in the Report is described in sufficient detail to facilitate a professional review of the study by the FVRD when necessary.

☑ 27. Professional liability insurance coverage of at least $1 million per claim is carried by the QP.

☑ 28. Third party review or supplemental information may be required by the FVRD where complex development proposals warrant.

☐ 29. Permission is granted to the FVRD to include the Report in the online FVRD geo-hazard report library (as background information, not for other parties to rely).

G. Qualified Professional (QP)

Prepared by: (QP of Record)

Name Robert Forsyth

Designation ☑ P.Eng. ☐ P. Geo. ☐ Eng.L ☐ Geo.L

Reviewed by:

Name Nick Polyson

Designation ☑ P.Eng. ☐ P. Geo.

The Report has received appropriate technical review which is consistent with both the APEGBC Professional Practice Guidelines, and APGBC Quality Management Guidelines. The name of the reviewer is noted in the Report and below.

Professional Seal, Signature and Date:

Bob Forsyth

☑ I am a Qualified Professional as defined in the APEGBC Guidelines, and I fulfill the education, training and experience requirements as outlined in the APEGBC Guidelines

☑ I have signed, sealed, dated and thereby certify, this Assurance Statement and the attached report.

H. Geo-Hazard Summary Table

The geo-hazard report and/or any supporting reports addresses the following hazard types.

Geo-Hazard Type #1		Geo-Hazard Type #2	
Flooding of Jones Ck.			
Annual Return Frequency (Unmitigated)		Annual Return Frequency (Unmitigated)	
Acceptability Threshold Classification		Acceptability Threshold Classification	
MITIGATION (if necessary)			
Proposed Mitigation Measures	Yes ○ No ○	Proposed Mitigation Measures	Yes ○ No ○
Annual Return Frequency (Mitigated)		Annual Return Frequency (Mitigated)	
Acceptability Threshold Classification		Acceptability Threshold Classification	
Comments See comment on following page.		Comments	
SUPPORTING REPORT			
Was this report prepared by others?	Yes ○ No ○	Was this report prepared by others?	Yes ○ No ○
If yes, list report name, date and author.		If yes, list report name, date and author.	

Geo-Hazard Type #3		Geo-Hazard Type #4	
Annual Return Frequency (Unmitigated)		Annual Return Frequency (Unmitigated)	
Acceptability Threshold Classification		Acceptability Threshold Classification	
MITIGATION (if necessary)			
Proposed Mitigation Measures	Yes ○ No ○	Proposed Mitigation Measures	Yes ○ No ○
Annual Return Frequency (Mitigated)		Annual Return Frequency (Mitigated)	
Acceptability Threshold Classification		Acceptability Threshold Classification	
Comments		Comments	
SUPPORTING REPORT			
Was this report prepared by others?	Yes ○ No ○	Was this report prepared by others?	Yes ○ No ○
If yes, list report name, date and author.		If yes, list report name, date and author.	

Indicate which hazards were NOT reviewed:

- [x] Chilliwack River Valley Erosion or Avulsion
- [ ] Debris Flow and Debris Torrent
- [ ] Debris Flood
- [ ] Fraser River & tributaries flooding
- [ ] Mountain Stream Erosion or Avulsion
- [ ] Major Catastrophic Landslide
- [x] Seismic Effects/Liquefaction
- [ ] Rockfall - Small Scale Detachment
- [ ] Slope Stability
- [ ] Small Scale Localized Landslide
- [x] Snow Avalanche
- [x] Tsunami

Hazard Acceptability Thresholds Classification, as per Hazard Acceptability Thresholds for Development Approvals by Local Government dated November 1993 by Dr. Peter Cave.

1 Approval with conditions relating to hazards.
2 Approval, without siting conditions or protective works conditions, but with a covenant including "save harmless" conditions.
3 Approval, but with siting requirements to avoid the hazard, or with requirements for protective works to mitigate the hazard.
4 Approval as (3) above, but with a covenant including "save harmless" conditions as well as siting conditions, protective works or both.
5 Not approvable.

Additional Comments

As per our memo of November 16, 2017, it is our opinion that the site is suitable for the purpose intended, that being a construction yard for stockpiling construction materials.

The site may be subject to flooding of Jones Creek. The 35m setback from the Creek should be followed as stated in the memo. As well, the site should be inspected with regard to the location of temporary structures such as site office trailers, relative to Jones Creek.

Activity/Concern	Mitigation Measures
Dust Control	8. Consult with land agents to provide opportunity for landowners and/or tenants with the potential to be affected by dust emissions from construction of ancillary sites to report on issues related to dust emissions so that corrective actions can be implemented. 9. Identify suitable water withdrawal locations for use as dust suppression prior to water withdrawal. 10. Water down the temporary construction lands and infrastructure construction site, when warranted, to reduce or avoid the potential for dust emissions due to soil pulverization. Increase the frequency of watering roads and temporary construction lands and infrastructure sites during periods of high risk (*e.g.*, high winds). Additional dust abatement measures will be implemented, when warranted and approved by an Environmental Inspector. 11. Ensure that the watering of roads and/or the temporary construction lands and infrastructure construction site does not generate excessive formation of surface water accumulation (*i.e.*, puddles or excessive mud generation) or result in overland water flow or sedimentation of nearby watercourses, wetlands or lakes.
Extra TWS	12. Follow the Project MOC process for changes or additions to extra temporary workspace in the MOC process is in the CMP (Volume 10 of the Environmental Plans).
Timing	13. Ensure construction activities do not cause excessive rutting, soil compaction or pulverization. Consider alternate soil handling measures and adhere to the measures outlined in the Wet/Thawed Soils Contingency Plan.
Snow Management and Windrow Gaps	14. Locate gaps in topsoil/root zone material, and spoil and snow windrows to facilitate wildlife, livestock and equipment movement and trapper lines, in places that also facilitate construction such as at slope changes, crossings (*i.e.*, watercourse, road, and railway) and bends. The locations will be approved in the field by an Environmental Inspector. Remove or pack down snow to increase frost penetration into the soil during the winter. During mid to late winter, pack snow to avoid premature thawing of the upper soils. Grade snow, if necessary, to improve driving conditions. 15. Use snow to create a level work surface, to the extent feasible, in order to avoid disturbance of the vegetation mat on cleared ungrubbed construction footprint and in watercourse or wetland vegetated riparian buffer areas. Grade the spoil area or grade snow over the spoil area on cultivated lands to smooth furrows and facilitate removal of spoil during backfilling.
Sod/ Vegetation Mat Conservation	16. Retain sod and the vegetation mat if ground conditions are considered competent enough to support equipment traffic without rutting or mixing soils (*i.e.*, are frozen and are not expected to thaw before completion of the work) on lands with thick sod or vegetation layers (*e.g.*, grasslands, hay tame pasture), or that are matted where grading is not required.

Site Name [ID] and Status	Site Type	Location	UTM (Zone)	Area (ha)	Site Description
Kamloops Office and Yard [KAM014] Included in the June 1, 2017 filing	Construction yard	Kamloops, BC	E682242; N5615664 (10)	7.94	Located on previously disturbed industrial land. Some vegetation is present on the site. Access to the site is existing from Frontage Road. No new temporary access is required.
Kamloops KIB3 Office and Yard Alternative [KAM012] Included in the June 1, 2017 filing	Construction yard	Kamloops, BC	E687719; N5623891 (10)	8.77	Located on Kamloops Indian Reserve No. 1 on partially disturbed, level, potential native grassland. The site is located between the CN Kamloops Yard and Highway 5. There are potential wet meadows on-site. The site was used for agriculture in the past. It is now part of the Kamloops Indian Band industrial development plan. Access is via existing trail extending from the highway. Road upgrades will be required.
Kamloops Domtar Old Mill Stockpile Site [KAM013] Included in the June 1, 2017 filing	Stockpile site and staging area	Kamloops, BC	E684434; N5618474 (10)	23.92	Located within the City of Kamloops on disturbed industrial land adjacent to the Thompson River. No vegetation is present at the site. Access to the site is existing from Mission Flats Road. No new temporary access is required.
Merritt Camp, Office and Yard – Chutter Ranch [MER015] Included in the June 1, 2017 filing	Construction camp, construction yard	Merritt, BC	E663413; N5552574 (10)	26.98	Located on pasture lands with sparse trees and existing borrow/gravel pit. The site is accessed via Highway 5A northeast along Berglund Road. There are potential drainages and wetlands on-site. Access upgrades may be required.
Abbotsford Brandy Farms Office and Yard [ABB024] Included in the June 1, 2017 filing	Construction yard	Abbotsford, BC	E564866; N5435592 (10)	4.63	Located on level agricultural land. Access to the site is existing along Interprovincial Highway. No new temporary access is required.
Surrey 19287 98A Ave Office and Yard (Imasco) [SUR021] Included in the June 1, 2017 filing	Construction yard	Surrey, BC	E522952; N5447770 (10)	0.83	Located on industrial land. Existing access via 98A Ave.
Surrey 19395 98A Ave Employee Parking [SUR022] Included in the June 1, 2017 filing	Parking area	Surrey, BC	E522837; N5447767 (10)	1.43	Located on bare industrial land. Existing access via 98A Ave.
430 Canfor Ave Office and Yard (Part 1 and Part 2) [NEW044.1] Included in the June 1, 2017 filing	Construction yard	New Westminster, BC	E508872; N5452733 (10)	8.88	Part 1 is located on mixed industrial lands with sparse trees adjacent to Brunette River. Existing access via United Boulevard. Part 2 is located on an industrial/parking area with sparse trees adjacent to a railway and the Fraser River. Existing access via United Boulevard and Canfor Ave.
7585 Barnet Highway Yard and Staging Area [BUR049] Included in the June 1, 2017 filing	Construction yard and staging area	Burnaby, BC	E 504052; N5459620 (10)	2.63	Located on industrial site, bounded to the south by the Barnet Highway. Burrard Inlet is located approximately 90 m north, separated from the site by CN railway and treed land. No new temporary access is required.
2115 Commissioner St (VersaCold Site) [VAN048] Included in the June 30, 2017 Addendum	Multi-use site	Vancouver, BC	E495490, N545951 (10)	2.24	Located on a previously disturbed, level industrial site (formerly called Waterlots 1 and 2). Includes a waterlot in the Inner Harbour of Burrard Inlet. Small amounts of marine riparian vegetation are present. The site is accessed via Commissioner Street. No new temporary access is required. The site is within the jurisdiction of Vancouver Fraser Port Authority (VFPA).
Coquihalla Development Stockpile and Office/Yard [HOP052] New as of August, 2017	Stockpile site, construction yard	Hope, BC	E599611; N5463245 (10)	21.92	Located on heavily cleared forested land with small areas of vegetation remaining. The property is adjacent to Wahleach Creek, which will not be directly disturbed. Access to the site is from the south from Laidlaw Road.
Cheam Apple Road [CHE053] New as of August, 2017	Construction camp	Fraser Valley	E590934 N5452437 (10)	3.93	Located on the Tseatah 2 Indian Reserve. Located on level agricultural land. Access to the site is along Apple Road. No new temporary access is required.