 Stantec	Trans Mountain Expansion Project Marine Water Quality Management During Rip Rap Removal Plan	Contractor Revision Date:	2017-08-17
		Contractor Revision No.:	Rev 2
		Page	1 of 24



Trans Mountain Expansion Project

MARINE WATER QUALITY MANAGEMENT PLAN DURING RIP RAP REMOVAL

KMC Document # 01-13283-TW-WT00-MD-RPT-0014 R1

Rev No.	Prepared by/ Date	Reviewed by/ Date	Approved by/ Date	TMEP Acceptance/ Date	Pages Revised	Issued Type
1	Barrie Tuite/Steve Murton 2017-08-16	Karen Munro 2017-08-16	Steve Murton 2017-08-16			Issued for Information
0	Barrie Tuite/Steve Murton 2017-05-10	Karen Munro 2017-05-10	Steve Murton 2017-05-10		All	Issued for TM legal review
A	Stantec Consulting 2017-04-07	Stefan Dick 2017-04-11	Karen Munro 2017-04-11			Issued for Trans Mountain Review



MARINE WATER QUALITY MANAGEMENT PLAN DURING RIP RAP REMOVAL FOR THE TRANS MOUNTAIN PIPELINE ULC TRANS MOUNTAIN EXPANSION PROJECT

August 2017

KMC Doc No.: 01-13283-TW-WT00-MD-RPT-0014 R1

Prepared for:



TRANSMOUNTAIN

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Visual guide to TMEP's Environmental Plans to the NEB Conditions related to the Environmental Protection Plan

Trans Mountain's environmental program during construction is presented in the ten volumes of the Environmental Plans as shown in the visual guide below. The Environmental Plans are to be used by the construction contractors and Environmental Inspectors to implement the plans during construction. As these plans are used in execution of the Project, they are complete and cover all aspects of Environmental Management. To demonstrate compliance with the Certificate of Public Convenience and Necessity conditions, Trans Mountain must file a subset of the Environmental Plans with the NEB. Consequently, the complete Environmental Plans are not filed as a single package with the NEB. To clarify how the documents relate, please see the table indicating how TMEP's Environmental Plans are filed under NEB Conditions.

Trans Mountain Expansion Project Guide to the Environmental Plans

Environmental Plans	NEB Condition and Filing ID
Volume 1 – Temporary Construction Lands and Infrastructure Environmental Protection Plan	78 Facilities Environmental Protection Plan
Volume 2 – Pipeline Environmental Protection Plan	72 Pipeline Environmental Protection Plan
Volume 3 – Facilities Environmental Protection Plan	78 Facilities Environmental Protection Plan
Volume 4 – Westridge Marine Terminal Environmental Protection Plan	81 Westridge Environmental Protection Plan
Volume 5 – Reactivation Environmental Protection Plan	72 Pipeline Environmental Protection Plan
Volume 6 – Environmental Management Plans	72 Pipeline Environmental Protection Plan 78 Facilities Environmental Protection Plan 81 Westridge Environmental Protection Plan
Volume 7 – Resource-Specific Mitigation Tables	72 Pipeline Environmental Protection Plan
Volume 8 – Environmental Alignment Sheets	72 Pipeline Environmental Protection Plan
Volume 9 – Burnaby Mountain Tunneling Environmental Protection Plan	72 Pipeline Environmental Protection Plan
Volume 10 – Compliance Plan	

This plan forms part of Volume 6 and is located:

Volume 6 – Environmental Management Plans		NEB Condition and Filing ID
Section 1 – Organizational Structure	1.1 - Project Organizational Structure	Condition 88
Section 2 – Socio-Economic Management	2.1 - Access Management Plan	Condition 47 A82635
	2.2 - Agricultural Management Plan	Condition 72
	2.3 - Socio-Economic Effects Monitoring Plan	Condition 13 A81754
	2.4 – Heritage Resources	Condition 100
	2.5 – Biosecurity Management Plan	Condition 72
	2.6 – Socio-Economic Management Plan	Condition 72
Section 3 – Contaminated Sites and Waste Management	2.7 – Worker Accommodation Strategy	Condition 59
	3.1 - Waste Management Plan	Condition 72
	3.2 - Contamination Identification and Assessment Plan	Condition 46 A82636
	3.3 - Hydrovac Cutting and Disposal Management Plan	Condition 72

Volume 6 – Environmental Management Plans		NEB Condition and Filing ID
Section 4 – Geological and Groundwater Management	4.1 - Metal Leaching and Acid Rock Drainage Management Plan	Condition 72
	4.2 – Groundwater Management Plan	Condition 72
Section 5 – Vegetation Management	5.1 - Timber Salvage Management Plan	Condition 72
	5.2 - Old Growth Management Areas Mitigation and Replacement Plan	Condition 76
	5.3 - Rare Ecological Community and Rare Plant Population Management Plan	Condition 40
	5.4 - Grasslands Survey and Mitigation Plan	Condition 42 A82362
	5.5 - Weed and Vegetation Management Plan	Condition 45 A82634
Section 6 – Wildlife Management Plans	6.1 – Preliminary Caribou Habitat Restoration Plan	Condition 37 A81921
	6.2 – Sowaqua Spotted Owl Mitigation Plan	Condition 38 A81923
	6.3 – Grizzly Bear Mitigation Plan	Condition 56
	6.4 – Wildlife Species at Risk Mitigation and Habitat Restoration Plans	Condition 44
	6.4.1 – American Badger Mitigation Plan	Condition 44
	6.4.2 – Barn Owl Mitigation Plan	Condition 44
	6.4.3 – Coastal Giant Salamander Mitigation Plan	Condition 44
	6.4.4 – Great Basin Spadefoot Mitigation Plan	Condition 44
	6.4.5 – Williamson's Sapsucker and Lewis's Woodpecker Mitigation Plan	Condition 44
	6.4.6 – Oregon Forestsnail Mitigation Plan	Condition 44
	6.4.7 – Oregon Spotted Frog Mitigation Plan	Condition 44
	6.4.8 – Pacific Water Shrew Mitigation Plan	Condition 44
	6.4.9 – Western Rattlesnake and Great Basin Gophersnake Mitigation Plan	Condition 44
	6.4.10 – Townsend's Mole Mitigation Plan	Condition 44
	6.4.11 – Western Screech-Owl Mitigation Plan	Condition 44
Section 7 – Wetland Management	7.1 - Wetland Survey and Mitigation Plan	Condition 41
Section 8 – Aquatic Resource Management	8.1 - Nooksack Dace and Salish Sucker Management Plan	Condition 75
	8.2 - Water Quality Monitoring Management Plan	Condition 72
	8.3 - HDD/Trenchless Planning and Procedures Management Plan	Condition 72
	8.4 - Horizontal Directional Drilling Noise Management Plan	Condition 74
	8.5 - Navigation and Navigation Safety Plan	Condition 48 A82632
	8.6 - Water Withdrawal and Discharge Procedures Management Plan	Condition 72
	8.7 - Riparian Habitat Management Plan	Condition 71
	8.8 - Watercourse Crossing Inventory	Condition 43 A82366 , A82369 , A82390 , A82392 , A82395 , A82397 , A82400 , A82405 , A82409
Section 9 – Reclamation Plans	9.1 – Reclamation Management Plan	Condition 72
	9.2 - British Columbia Parks Reclamation Plan	Condition 72
	9.2.1 - Finn Creek Provincial Park Land Use/Occupancy Park Use Permit Application	Condition 72
	9.2.2 - Lac du Bois Grasslands Protected Area Land Use/Occupancy Park Use Permit Application	Condition 72
	9.2.3 - Coquihalla Summit Recreation Area Land Use/Occupancy Park Use Permit Application	Condition 72
	9.3 – Wabamun Park Reclamation Plan	Condition 72

Volume 6 – Environmental Management Plans		NEB Condition and Filing ID
Section 10 – Facilities Management Plans	10.1 - Air Emissions Management Plan for the Edmonton, Sumas, and Burnaby Terminals	Condition 79
	10.2 - Noise Management Plan for Construction at Terminals and Pump Stations	Condition 80
	10.3 - Air Emissions Management Plan for Westridge Marine Terminal	Condition 52 A82640
	10.4 – Marine Water Quality Management Plan during Rip Rap Removal	Condition 35
	10.5 - Fugitive Emissions Management Plan for the Edmonton, Sumas, and Burnaby Terminals	Condition 54
	10.6 - Fugitive Emissions Management Plan for Westridge Marine Terminal	Condition 53 A82637
	10.7 - Fugitive Emissions Management Plan for Pump Stations	Condition 55
	10.8 - Light Emissions Management Plan	Condition 82
Section 11 – Burnaby Mountain Tunneling Management	11.1 - Air Emissions Management Plan for Burnaby Mountain Tunnel Construction	Condition 85
	11.2 - Burnaby Mountain Tunnel Construction Noise Management Plan for Burnaby Mountain	Condition 86
	11.3 - Groundwater Seepage Management Plan	Condition 87

Table of Contents

1.0	Introduction.....	1
1.1	Objectives and Measurable Goals.....	1
1.2	Links to other Trans Mountain Environmental Plans	1
1.3	Commitments Management.....	2
1.4	Regulatory Guidance.....	2
2.0	Consultation and Engagement.....	3
3.0	Description of Rip Rap Removal Activity	3
4.0	Existing Marine Sediment Conditions	5
5.0	Mitigation Measures	5
6.0	Monitoring Measures	5
7.0	Conclusion	8
8.0	References	8

APPENDICES

Appendix A.....	Consultation and Engagement
Appendix B	Record of Stakeholder Notifications of Plan

LIST OF TABLES

Table 1	Trans Mountain Plans Linked to this Plan	2
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LIST OF FIGURES

Figure 1	Proposed Rip Rap Removal Area and Example Monitoring Stations.....	4
Figure 2	Decision Tree for Turbidity Monitoring During Rip Rap Removal	7

1.0 INTRODUCTION

Trans Mountain Pipeline ULC (Trans Mountain) submitted a Facilities Application (the Application) to the National Energy Board (NEB) in December 2013 for the proposed Trans Mountain Expansion Project (“the Project” or “TMEP”). A Certificate of Public Convenience and Necessity allowing the Project to proceed, subject to 157 Conditions, was issued on December 1, 2016. The Project involves expansion of the existing Westridge Marine Terminal (WMT) and construction of a new dock complex. The Project will require removal of intertidal and subtidal rip rap along the shoreline of the existing WMT. Although no dredging will be required, removal of rip rap is likely to disturb some marine sediment, elevating turbidity in the surrounding water. Contaminants potentially present in sediment may also be mobilized during rip rap removal.

This Marine Water Quality Management Plan During Rip Rap Removal (Plan) provides details on the proposed in-water excavation of rip rap at the WMT and describes the mitigation and monitoring measures that will be implemented to protect marine water quality. This Plan was originally released as the Marine Sediment Management Plan (NEB Condition 35), which was submitted to Appropriate Government Authorities and potentially affected Aboriginal groups on November 22, 2016 for review and feedback. Once the decision was made that dredging was not necessary at the WMT, the draft Marine Sediment Management Plan was no longer required. However, since the draft Marine Sediment Management Plan did discuss the in-water excavation of rip rap and the proposed associated mitigation measures, the relevant content was retained, along with any feedback received during consultation, and the Plan renamed. The Plan now forms an appendix to the Westridge Environmental Protection Plan (NEB Condition 81).

Since the November 22, 2016 release of the draft Marine Sediment Management Plan, engineering design has continued to progress and there have been changes, as detailed in TMEP Fall 2016 Project Updates (www.transmountain.com/environmental-plans). All of the changes have been reviewed, and the relevant Project design updates have been incorporated into this Plan. This Plan was also updated to reflect the change in the foreshore design from a combi-wall to sheet pile cells.

1.1 Objectives and Measurable Goals

The objective of this Plan is to describe the mitigation and monitoring measures that will be implemented to protect marine water quality during in-water excavation of rip rap at the WMT. The measurable goals are based on the federal and provincial water quality guidelines provided in Section 1.4.

1.2 Links to other Trans Mountain Environmental Plans

Information from other environmental plans prepared for the Project that are related to marine water quality has been considered in this Plan. The links between this Marine Water Quality Management Plan During Rip Rap Removal and other Trans Mountain plans are provided in Table 1.

Table 1 Trans Mountain Plans Linked to this Plan

Environmental Plan	Description of the Environmental Plan	Linkage to this Plan
Westridge Marine Terminal EPP (NEB Condition 81, Volume 4 of the Environmental Plans)	The Westridge Marine Terminal EPP contains Trans Mountain's environmental procedures and mitigation measures to be implemented during construction of the Westridge Marine Terminal to avoid, reduce or mitigate potential adverse environmental effects.	The EPP includes general mitigation measures related to waste disposal and to working in or near water.

1.3 Commitments Management

Trans Mountain made a number of commitments regarding the Project during the OH-001-2014 proceedings and engagement activities up to May 2016. Commitments were made to improve and optimize Project planning and mitigation measures. As Trans Mountain has consolidated its commitments into a Commitments Tracking Table in accordance with NEB Condition 6, the Table of Commitments in each plan has been removed. Information Requests (IRs) and engagement activities that raised discussion, but did not result in a commitment, are not included in the Commitments Tracking Table.

The Commitments Tracking Table has been filed with the NEB and is available on Trans Mountain's web site at www.transmountain.com. Trans Mountain continues to monitor and track compliance with its commitments and will update, post to its website and file with the NEB updated versions of the Commitments Tracking Table according to the timeframes outlined in NEB Condition 6. Commitments with specific relevance to this Plan have been considered and addressed.

1.4 Regulatory Guidance

The Water Protection and Sustainability Branch of the British Columbia (BC) Ministry of the Environment & Climate Change Strategy (MOECCS) sets turbidity guidelines for the protection of aquatic life in British Columbia (BC MOECCS 2017). The federal Canadian Council of Ministers of the Environment (CCME) also sets water quality guidelines for turbidity (CCME 2017), which are the same for clear flow and clear water and slightly different for high flow and turbid water. Because it is not practical to measure total suspended solids (TSS) in real-time (due to turnaround time at an analytical laboratory), it is common practice to monitor turbidity during construction activities. The turbidity guideline for freshwater, marine and estuarine habitats (measured in nephelometric turbidity units, or NTU) is as follows:

- Change from background of 8 NTU at any one time for a duration of 24 hours in all waters during clear flows or in clear waters (BC MOECCS and CCME)
- Change from background of 2 NTU at any one time for a duration of 30 days in all waters during clear flows or in clear waters (BC MOECCS and CCME)
- Change from background of 5 NTU at any time when background is 8–50 NTU during high flows or in turbid waters. Change from background of 10% when background is greater than 50 NTU at any time during high flows or in turbid waters (BC MOECCS)
- Maximum increase of 8 NTU from background levels at any one time when background levels are between 8 and 80 NTU. Should not increase more than 10% of background levels when background is greater than 80 NTU (CCME)

The monitoring program employed during marine excavation will use the BC MOECCS turbidity guidelines as a management goal for water outside (i.e., seaward) of the turbidity curtains during rip rap removal. Water quality within the active work area will exceed these guidelines but will be isolated from the rest of Burrard Inlet by the turbidity curtain (see Section 5.0).

2.0 CONSULTATION AND ENGAGEMENT

Consultation and engagement activities related to marine water and sediment quality were conducted between May 2012 and February 2017 with Appropriate Government Authorities and potentially affected Aboriginal groups. Opportunities to discuss marine water and sediment quality and identify issues or concerns were provided to public stakeholders through the Trans Mountain website, workshops, meetings, and ongoing engagement activities during the reporting period. Appendix A includes a comprehensive record of these engagement activities, stakeholder feedback and Trans Mountain responses.

Engineering design changes were issued in the TMEP Fall 2016 Project Update document (www.transmountain.com/environmental-plans), along with a request for feedback. All of the design updates up to April 1, 2017 have been reviewed, and the Project design updates that are relevant have been incorporated into this Plan.

3.0 DESCRIPTION OF RIP RAP REMOVAL ACTIVITY

The foreshore extension at the WMT will require the excavation of approximately 24,000 m³ of rip rap (rock material) along the shoreline, in intertidal and shallow subtidal areas. The rip rap will be removed from a total area of approximately 8,800 m² to allow for the installation of sheet pile cells (Figure 1). Removal of the existing rip rap will also be required to allow for ground improvements to be made within the sheet pile cells. The rip rap will be removed using a combination of a barge-mounted crane with an orange peel bucket and a shore-based excavator. The excavated rock material will be disposed of on land at an offsite location, or reused for construction of marine fish habitat offsets (i.e., artificial rock reefs) if the material does not require costly storage, rehandling and sorting and if approval is granted by Fisheries and Oceans Canada (DFO) and the Vancouver Fraser Port Authority.

10094_sediment_fig_01_01_construction_area_and_monitoring_sites.mxd

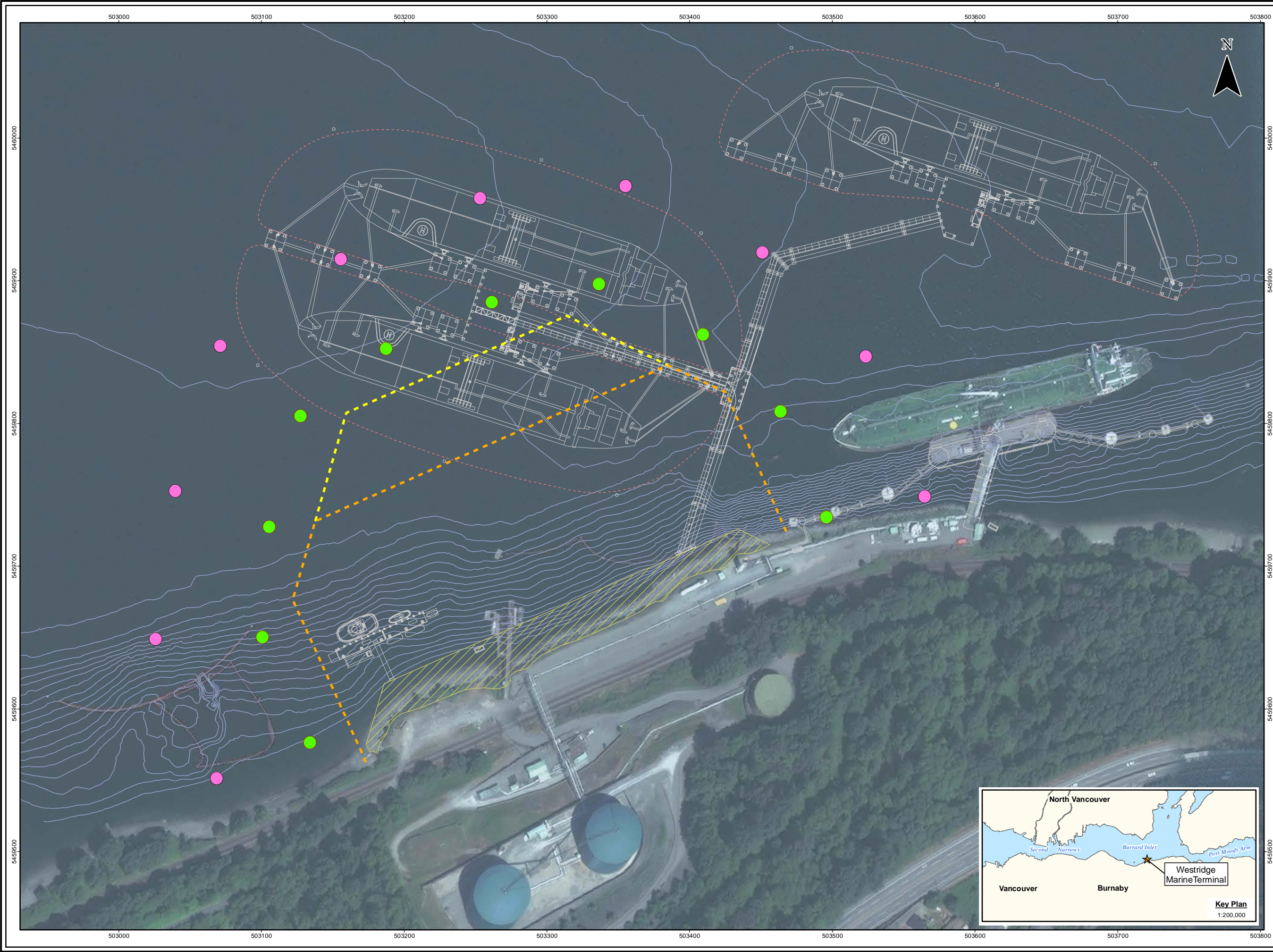









FIGURE: 1

**PROPOSED RIP RAP REMOVAL AREA
AND EXAMPLE OF PROPOSED
WATER QUALITY MONITORING
STATIONS AT THE WESTRIDGE
MARINE TERMINAL**

MARINE WATER QUALITY MANAGEMENT
PLAN DURING RIP RAP REMOVAL

**TRANS MOUNTAIN
EXPANSION PROJECT**

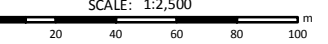
-  Bathymetry (m CD)
-  Containment Boom
-  Primary Turbidity Curtain
-  Secondary Turbidity Curtain
-  Rip Rap Removal Area
-  Water Quality Monitoring Station
30 m from Silt Curtain
-  Water Quality Monitoring Station
100 m from Silt Curtain

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Projection: NAD 83 UTM Zone 10N; Satellite Imagery: I-cubed, 2010; Bathymetry: Canadian Hydrographic Service, 2011; Existing and Proposed Westridge Water Lease: Moffatt & Nichol, 2012; Footprint (Marine): CH2M Hill, 2014; Fill Slope of Land Reclamation: CH2M Hill, 2014; Land Reclamation: CH2M Hill, 2014.

Although there is no reason to believe that there are any errors associated with the data used to generate this product or in the product itself, users of these data are advised that errors in the data may be present.

MAP NUMBER		PAGE	
10494_SEDIMENT_FIG 01_01		SHEET 1 OF 1	
DATE	May 2017	REVISION	0
SCALE	1:2,500	PAGE SIZE	11x17
DRAWN	SS	CHECKED	BT
		DESIGN	BT

SCALE: 1:2,500

ALL LOCATIONS APPROXIMATE

4.0 EXISTING MARINE SEDIMENT CONDITIONS

Although no dredging of soft sediment will be required at the WMT, in-water excavation of rip rap is expected to disturb existing sediments. This will result in elevated turbidity in the surrounding water, and may result in the resuspension of existing contaminants. Information on existing marine sediment conditions at the WMT is provided in the Project's Environmental and Socio-Economic Assessment (Volume 5A, Section 7.6.8; and Volume 5C-12 – *Marine Sediment and Water Quality: Westridge Marine Terminal Technical Report*). This includes data from a subtidal sediment sampling program conducted in May 2013, as well as data from past studies in the area. Additional sediment sampling to characterize sediment in and adjacent to the area of rip rap removal was conducted in October 2014 and November 2016. The sampling programs showed that levels of cadmium and lead were higher than the disposal at sea screening criteria in the top 0.5 m of sediment in isolated locations. Levels of copper were higher than the screening criteria down to 2.5 m depth in core samples, suggesting naturally elevated levels. Arsenic levels were above screening criteria down to 2 m depth at the existing berth, suggesting naturally elevated levels; however, concentrations were not elevated near the foreshore. Levels higher than the screening criteria were noted for polycyclic aromatic hydrocarbons (PAHs), primarily in some surface samples but also in isolated core samples to 0.5 m depth (up to 14.5 mg/kg total PAH, compared to disposal at sea screening criterion of 2.5 mg/kg).

5.0 MITIGATION MEASURES

The following mitigation measures will be implemented to protect marine water quality and reduce potential effects to marine life during in-water excavation of rip rap.

- In-water excavation of rip rap will be conducted during a timing window between August 16 and March 15. The expected duration of the rip rap removal if completed in a continuous manner is approximately one month. This scheduling will reduce potential exposure of sensitive species and life stages to elevated levels of suspended sediment.
- A turbidity curtain will be deployed around the work area to limit the spatial extent of elevated levels of suspended sediment. Turbidity curtains are effective in shallow depth, low current conditions, such as those found at the WMT. The turbidity curtain will be secured with a system of anchors, buoys and a weighted chain, and will extend around the entire work area where excavation will occur (Figure 1). If a barge is required for removal of the excavated material, this vessel will be contained within a separate turbidity curtain outside the in-water works area (Figure 1). This approach will allow passage of the barge to and from the site without opening the turbidity curtain surrounding the work site.

6.0 MONITORING MEASURES

Water quality will be monitored outside of the turbidity curtain during in-water excavation of rip rap. Turbidity levels will be measured outside of the turbidity curtain to determine the effectiveness of the curtain at containing suspended sediments. Results will be compared to the BC MOECCS turbidity guidelines for the protection of aquatic life.

The preliminary monitoring plan is as follows:

- Sample 10 monitoring sites in an arc 30 m from the turbidity curtain
- Sample an additional 10 monitoring sites in an arc 100 m from the turbidity curtain
- Collect water samples at the surface at all sites and 2 m from bottom at deeper sites (i.e., greater than 5 m depth)

- Collect samples a minimum of two times per day during the first week of work: prior to start-up and mid-morning, prioritizing test locations directly across from the rip rap removal location and in reference areas
- Collect samples every second day at the same two times of day when the onsite-spatial and temporal variations in water quality are well-understood, from the second week of work until completion. The number of monitoring locations will be adjusted based on initial findings and site conditions.

Background conditions, for comparison to the BC MOECCS turbidity guideline, will be established in two ways. The samples taken prior to start-up each day will reflect undisturbed conditions in Burrard Inlet, as will samples taken 100 m away on the up-current side of the excavation activity (depending on direction of tidal currents). The number and location of sampling sites is preliminary and may require refinement based on final construction methods and site conditions. Additional samples may be required to confirm the effectiveness of water quality mitigation measures, or to identify the need to adjust construction activities.

The monitoring sites will move if the turbidity curtain is moved. Figure 1 shows an example of sampling site locations. If water quality guideline exceedances are detected outside the turbidity curtains, the Water Quality Monitor will inform the excavation Contractor. Depending on the duration, extent, and magnitude of the exceedance, a temporary halt or adjustment to the excavation activity will be considered.

A decision tree for turbidity monitoring that refers to thresholds from the BC MOECCS turbidity guideline and identifies corrective actions to be implemented if a threshold is exceeded is provided in Figure 2.

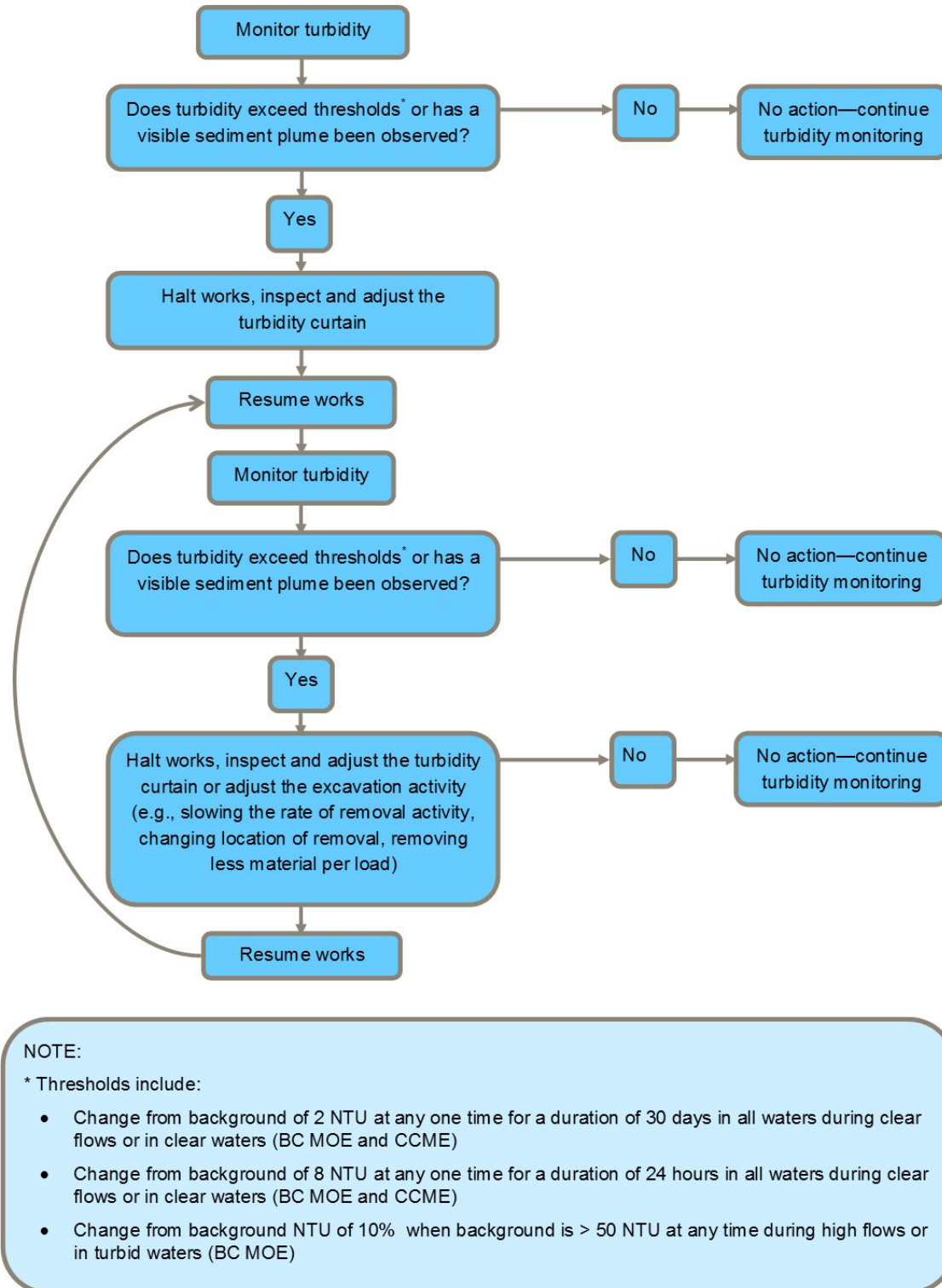


Figure 2 Decision Tree for Turbidity Monitoring During Rip Rap Removal

7.0 CONCLUSION

The mitigation measures outlined in this Plan are industry standards with a well-established record of effective use. As such, they are expected to successfully mitigate the effects of in-water excavation of rip rap on marine water quality, and reduce potential effects to marine life.

Measures to reduce the residual effects of in-water excavation of rip rap on marine water quality have been implemented during Project planning and will continue through the remaining phases of the Project with guidance from relevant government policies and management objectives and consultation.

8.0 REFERENCES

British Columbia Ministry of Environment. 2016. British Columbia Ambient Water Quality Guidelines for Turbidity. Website: <http://www.env.gov.bc.ca/wat/wq/BCguidelines/turbidity/turbidity.html>. Accessed: November 2016.

Canadian Council of Ministers of the Environment. Water Quality for the Protection of Aquatic Life. Website: http://st-ts.ccme.ca/en/index.html?lang=en&factsheet=218#aql_marine_concentration. Accessed: March 2017.

APPENDIX A

CONSULTATION AND ENGAGEMENT

Consultation and engagement activities related to marine water and sediment quality were completed with Appropriate Government Authorities and potentially affected Aboriginal groups. Opportunities to discuss marine water and sediment quality and identify issues or concerns were also provided to public stakeholders during meetings, workshops and ongoing engagement activities.

Consultation and engagement opportunities began in May 2012 with the Project announcement and are ongoing.

1.0 Consultation and Engagement Overview: Draft Plan Development

Reports on public consultation activities completed between May 2012 and June 30, 2015 were filed with the National Energy Board (NEB) and are available in the Application (Volume 3A: Stakeholder and Volume 3B: Aboriginal; Filing ID [A55987](#)) as well as in Consultation Update No. 1 and Errata, Technical Update No. 1 (Filing ID [A59343](#)) / Consultation Update 2 (Filing IDs [A62087](#) and [A62088](#)), Consultation Update 3 (Filing IDs [A4H1W2](#) through [A4H1W8](#)) and Consultation Update 4 (Filing ID [A72224](#)). These reports include results of consultation conducted to date, identification of issues and concerns as well as Trans Mountain's response and are included below. Where appropriate, Trans Mountain's response has been updated to reflect information developed since the original response was provided during the NEB proceeding for the Project.

Consultation and engagement activities completed between July 1, 2015 and February 24, 2017 have not been filed on the public record with the NEB. Any new issues and concerns identified during this period, as well as Trans Mountain's response, are described below.

2.0 Consultation and Engagement Overview: Draft Plan

The draft Marine Sediment Management Plan, which has been revised and renamed to this Plan, was released for review and feedback on November 22, 2016. The comment period closed on February 24, 2017. Email or mail notification regarding the Plan was sent to 141 public stakeholders, 17 regulatory authorities, 17 Aboriginal groups and all affected landowners. The notification included a summary description of the Plan, a request for review, the timing of the comment period and contact information. Aboriginal groups were offered the opportunity for an in-person meeting to review the Plan. See Appendix B for a complete list of notified stakeholders.

In addition to direct notification, the online posting of each Plan was promoted through Trans Mountain's weekly e-newsletter, Trans Mountain Today, which provides Project updates, regulatory information, stories and interviews to more than 6,000 subscribers. Each week Trans Mountain Today included a focus on a specific plan, or group of plans, as well as a reminder of all plans available for review.

- 2016
 - September 22—Wildlife Mitigation and Habitat Restoration Plans
 - September 29—Pipeline Environmental Protection Plans
 - October 6—Air Quality Management Plans
 - October 13—Watercourse and Water Ecosystems Plans
 - October 20—Vegetation Management Plans

- October 27—Air Quality Plans
- November 3—Socio-Economic Effects Monitoring Plan
- November 10—Access Management Plan
- December 22—General promotion all plans
- December 29—General promotion all plans
- 2017
 - January 5—General promotion all plans
 - January 12—General promotion all plans

Trans Mountain is committed to ongoing engagement throughout the life of the Project. The start and end date for the review and comment period for each environmental management plan is defined. These timelines are required to allow time for preparation of the final Plan in order to meet regulatory requirements and NEB submission dates.

3.0 Consultation and Engagement: Activities and Feedback

Consultation and engagement activities completed with identified stakeholder groups are described below, including: public stakeholders (Section 3.1); and Aboriginal groups (Section 3.2).

Feedback on this Plan, Trans Mountain's response, and where each issue or concern is addressed in this Plan, has been outlined in each section according to stakeholder group.

3.1 Public Consultation

3.1.1 Public Consultation Summary—May 2012 to June 2015

Feedback regarding marine water and sediment quality received during public consultation and engagement activities between May 2012 and June 2015 is summarized in Table A-1.

Table A-1 Summary of Public Consultation—May 2012 to June 2015 ¹

Issue or Concern	Summary Trans Mountain Response	Where Addressed
Dredging of Burrard Inlet (i.e., is it necessary and whose decision would it be)	The exact configuration of the new docks has yet to be determined and depending on their location some near shore dredging might be necessary to accommodate construction of the new docks. Piles will be driven to support the new dock structures. Once the docks are constructed, berthing and mooring structures will be constructed. In addition, top-side equipment will be installed, such as piping systems, loading arms, vapour control systems and fire protection systems. The number of piles and other structures will depend on the results of ongoing planning and engineering.	Volume 8A, Section 2.0 – Description of Marine Transportation Activities
Impacts of dredging on tides and on West Vancouver's shoreline near Ambleside	There is no proposed dredging of First or Second Narrows. Limited dredging will only be required for the expansion of Westridge Marine Terminal in Burnaby. Maintenance and dredging concerns to First Narrows fall within the stringent regulations and requirements of PMV (PMV) who would ultimately undertake a maintenance dredging program to ensure that oil tankers navigate local waters safely.	Volume 8A, Section 4.0 - ESA

Issue or Concern	Summary Trans Mountain Response	Where Addressed
Dredging requirements for the Project	Dredging of the Second Narrows to accommodate larger ships is not required for the Project. Dredging will be required in the area of Westridge (marine terminal) dock as part of the dock expansion and improvements. PMV manages the dredging program for Burrard Inlet and the Fraser River. More information can be found on their website at http://www.portmetrovanancouver.com/docs/default-source/Projects-	Volume 8A, Section 2.0 - Description of Marine Transportation Activities

NOTE:

¹ Table B-1, which was included in NEB Project proceedings, does not reflect current Project plan of no dredging of marine sediment.

3.1.2 New Interests, Issues, Concerns and Response—July 2015 to February 2017

No new issues or concerns with respect to marine water or sediment quality were identified by public stakeholders through engagement and communication opportunities between July 2015 and February 2017.

3.2 Regulatory Consultation

3.2.1 Regulatory Consultation Summary—May 2012 to June 2015

No feedback specific to this Plan was received between May 2012 and June 2015.

3.2.2 Feedback Regarding the Draft Plan—July 2015 to April 2017

Table A-2 includes new interests, issues and concerns, as well as Trans Mountain's response with respect to marine water quality during rip rap removal identified through public consultation and engagement activities between July 2015 and April 2017.

Table A-2 Summary of Public Consultation—July 2015 to April 2017

Stakeholder Name	Method of Contact	Date of Consultation Activity	Issue or Concern	Trans Mountain Response	Where Addressed in the Plan
BC MOECCS	Email	April 13, 2017	The in-water excavation component of the Westridge Marine Terminal Environmental Protection Plan outlined in Section 8 includes mitigation for reducing the remobilization of fine sediment during the removal of rip-rap from the intertidal and subtidal foreshore. Section 8.28 includes a commitment to monitor water quality during in-water excavation; however, no information is provided about which parameters will be measured, the frequency of monitoring, where monitoring will occur, which guidelines will be used to determine efficacy of mitigation and to trigger management actions, and an explanation of management actions that will be used to restore water quality to levels below guidelines. I recommend including a diagram showing monitoring locations (for example, Figure 1 in the Marine Sediment Management Plan). These deficiencies in the plan should be corrected in advance of in-water excavation activities	The Marine Water Quality Management Plan During Rip Rap Removal provides details on water quality monitoring, including parameters to be measured, frequency and location of monitoring, guidelines for screening, mitigation measures, and a figure showing sampling locations. The Westridge Marine Terminal Environmental Protection Plan was updated to include reference to the Marine Water Quality Management Plan During Rip Rap Removal.	Water quality guidelines are presented in Section 1.4, mitigation measures in Section 5.0, monitoring details in Section 6.0, and Figure 1 shows monitoring locations.

3.3 Aboriginal Engagement

Since April 2012, Trans Mountain has engaged with Aboriginal groups who might have an interest in the Project or have Aboriginal interests potentially affected by the Project, based on the proximity of their community and their assertion of traditional and cultural use of the land along the pipeline corridor to maintain a traditional lifestyle. The objectives of Aboriginal engagement are to:

- Have an open, transparent and inclusive process that seeks to exchange information in a respectful manner
- Address concerns shared by those who might have an interest in the Project or have Aboriginal interests potentially affected by the Project
- Incorporate feedback into Project planning and execution
- Provide opportunities to maximize Project benefits to Aboriginal communities and Aboriginal groups

A comprehensive Aboriginal engagement process is led by experienced engagement advisors in Alberta and BC, specialized in the areas of Aboriginal relations, law, economic development, education, training, employment and procurement. Trans Mountain's engagement process for the Project is flexible, allowing each community and group to engage in meaningful dialogue in the manner they choose and in a way to meet their objectives and values.

Each community has the opportunity to engage with Trans Mountain, depending on Project interests and potential effects. The following opportunities to engage have been provided:

- Project announcement
- Initial contact with Aboriginal community or Aboriginal group
- Meetings with Chief and Council and meetings with staff
- Host community information session(s)
- Conduct TLU studies and socio-economic interviews
- Identify interests and concerns
- Identify mitigation options

Issues and concerns specific to marine water and sediment quality raised during Aboriginal engagement between early 2012 and February 2017 are summarized in Table A-3.

Table A-3 Summary of Aboriginal Concerns Regarding Marine Water and Sediment Quality

Issue or Concern		Summary Trans Mountain Response	Where Addressed
Summary	Aboriginal Group		
More information is requested on actions taken in event that water quality samples or turbidity measurements exceed guidelines or thresholds.	Halalt	If water quality guideline exceedances are detected outside the silt curtains, the environmental monitor will inform the excavation contractor. Depending on the duration, extent, and magnitude of the exceedance, a temporary halt or adjustment of rip rap removal will be considered.	Section 2.0 and 3.0 of the Water Quality Management Plan During Rip Rap Removal

Trans Mountain continues to liaise with Indigenous and Northern Affairs Canada, the Government of Canada's Major Projects Management Office, the BC Ministry of Aboriginal Relations and Reconciliation, and the Alberta Ministry of Aboriginal Affairs to provide updates regarding Trans Mountain's engagement activities with Aboriginal groups.

Identifying Aboriginal Groups for Consultation

Trans Mountain used the First Nations Consultative Area Database Public Map Service to identify the Aboriginal groups with traditional territories that overlap with the Westridge Marine Terminal. Listed below are the Aboriginal groups identified for consultation. Throughout regular engagement with TMEP, any Aboriginal groups were added to the list if they identified marine water or sediment quality as a concern.

- Aitchelitz First Nation (Stó:lō)
- Cowichan Tribes
- Halalt First Nation (CNA)
- Kwikwetlem First Nation
- Lake Cowichan First Nation
- Leq'a:mel First Nation (Stó:lō)
- Lyackson First Nation
- Musqueam Indian Band
- Penelakut First Nation
- Popkum First Nation (Stó:lō)
- Skawahlook First Nation (Stó:lō)
- Skowkale First Nation (Stó:lō)
- Squamish Nation
- Stu'zuminus First Nation (Chemainus)
- Tsleil-Waututh Nation
- Tzeachten First Nation (Stó:lō)
- Yakwekwioose First Nation (Stó:lō)

Consultation Activities

A letter was sent to the Aboriginal groups listed above with a copy of the draft Plan in December 2016. Where appropriate and upon request, a follow up meeting was arranged to discuss this Plan in more detail and address any concerns..

Trans Mountain has summarized the feedback received through Trans Mountain's engagement on this Plan in Tables A-1, A-2 and A-3 and the summary includes how Trans Mountain responded to and addressed the concern or issue. It should be noted that although the engagement process also provided for opportunity for general discussion about Project construction and associated Aboriginal issues and opportunities; only feedback/issues directly related to marine water and sediment quality are provided in this Plan. Other issues and topics raised have been captured in the corresponding mitigation plan as appropriate.

This final Plan will be shared with the Aboriginal groups at the same time as the Plan is filed with the NEB in 2017.

APPENDIX B

RECORD OF STAKEHOLDER NOTIFICATIONS OF PLAN

Table B-1 Record of Notification

Regulator/Stakeholder Group	Contact Name (if applicable)	Date	Method of Contact
Landowners	N/A	September 11, 2016	Letter
Aboriginal Groups	N/A	December 2016	Letter
Vancouver Fraser Port Authority	Tim Blair	December 22, 2016	Email
Jasper National Park of Canada	Mayabe Dia	December 22, 2016	Email
Alberta Environment and Parks	Corinee Kristensen	December 22, 2016	Email
Ministry of Transportation and Infrastructure	Lisa Gow	December 22, 2016	Email
BC Parks	Ken Morrison	December 22, 2016	Email
BC Oil and Gas Commission	Brian Murphy	December 22, 2016	Email
Ministry of Natural Gas Development	Linda Beltrano	December 22, 2016	Email
Forests, Lands and Natural Resource Operations	Andrea Mah	December 22, 2016	Email
Forests, Lands and Natural Resource Operations	Susan Fitton	December 22, 2016	Email
FVAQC	Roger Quan	October 21,, 2016	Email
ECCC	Phil Wong	October 21, 2016	Email
ECCC	Rachel Mayberry	October 28, 2016	Email
ECCC	Coral Deshield	December 21,, 2016	Email
ECCC	Phil Wong	December 21, 2016	Email
Vancouver Fraser Port Authority	Patrick Coates	January 31, 2017	Email
Department of Fisheries and Oceans	Sandra Hollick-Kenyon	December 3, 2016	Email
Department of Fisheries and Oceans	Alston Bonamis	December 3, 2016	Email
City of Edmonton	N/A	November 29, 2016	Letter
City of Spruce Grove	N/A	November 29, 2016	Letter
Municipality of Jasper	N/A	November 29, 2016	Letter
Parkland County	N/A	November 29, 2016	Letter
Strathcona County	N/A	November 29, 2016	Letter
Town of Edson	N/A	November 29, 2016	Letter
Town of Hinton	N/A	November 29, 2016	Letter
Town of Stony Plain	N/A	November 29, 2016	Letter
Village of Wabamun	N/A	November 29, 2016	Letter
Yellowhead County	N/A	November 29, 2016	Letter
City of Kamloops	N/A	November 29, 2016	Letter
City of Kamloops RCMP Detachment	N/A	November 29, 2016	Letter
City of Merritt	N/A	November 29, 2016	Letter
City of Merritt RCMP Detachment	N/A	November 29, 2016	Letter
Clearwater Chamber of Commerce	N/A	November 29, 2016	Letter
District of Clearwater	N/A	November 29, 2016	Letter

Regulator/Stakeholder Group	Contact Name (if applicable)	Date	Method of Contact
District of Clearwater RCMP Detachment	N/A	November 29, 2016	Letter
Interior Health	N/A	November 29, 2016	Letter
Merritt Chamber of Commerce	N/A	November 29, 2016	Letter
Northern Health	N/A	November 29, 2016	Letter
Regional District of Fraser Fort George	N/A	November 29, 2016	Letter
Thompson Nicola Regional District	N/A	November 29, 2016	Letter
Town of Blue River	N/A	November 29, 2016	Letter
Venture Kamloops	N/A	November 29, 2016	Letter
Village of Valemount	N/A	November 29, 2016	Letter
Village of Valemount RCMP Detachment	N/A	November 29, 2016	Letter
Nicola Stock Breeder's Association - on behalf of the BC Cattlemen's Association	N/A	November 29, 2016	Letter
Grassland's Conservation Council	N/A	November 29, 2016	Letter
Thompson Rivers University	N/A	November 29, 2016	Letter
Southern Interior Weed Management Committee	N/A	November 29, 2016	Letter
Fraser Basin Council	N/A	November 29, 2016	Letter
Northwest Invasive Plant Council (NWIPC)		November 29, 2016	
Grassland's Conservation Council	N/A	November 29, 2016	Letter
Abbotsford Chamber of Commerce	N/A	November 29, 2016	Letter
Abbotsford Police Department	N/A	November 29, 2016	Letter
ASCA	N/A	November 29, 2016	Letter
BC Invasive Species	N/A	November 29, 2016	Letter
BC Ministry of Children and Family Development	N/A	November 29, 2016	Letter
BC Ministry of Social Development	N/A	November 29, 2016	Letter
BC Nature	N/A	November 29, 2016	Letter
BC Wildlife Federation	N/A	November 29, 2016	Letter
Burnaby Board of Trade	N/A	November 29, 2016	Letter
Burnaby RCMP Detachment	N/A	November 29, 2016	Letter
Chilliwack Chamber of Commerce	N/A	November 29, 2016	Letter
Chilliwack Economic Partners	N/A	November 29, 2016	Letter
City of Abbotsford	N/A	November 29, 2016	Letter
City of Burnaby	N/A	November 29, 2016	Letter
City of Chilliwack	N/A	November 29, 2016	Letter
City of Coquitlam	N/A	November 29, 2016	Letter
City of New Westminster	N/A	November 29, 2016	Letter
City of Port Coquitlam	N/A	November 29, 2016	Letter
City of Port Moody	N/A	November 29, 2016	Letter
City of Surrey	N/A	November 29, 2016	Letter
Coquitlam RCMP Detachment	N/A	November 29, 2016	Letter
Corporation of Delta	N/A	November 29, 2016	Letter
District of Hope	N/A	November 29, 2016	Letter

Regulator/Stakeholder Group	Contact Name (if applicable)	Date	Method of Contact
Eagle Creek	N/A	November 29, 2016	Letter
Fraser Valley Invasive Plant Council	N/A	November 29, 2016	Letter
Fraser Valley Regional District	N/A	November 29, 2016	Letter
Glen Valley Watershed Society	N/A	November 29, 2016	Letter
Hope Chamber of Commerce	N/A	November 29, 2016	Letter
Hope Community Policing Office	N/A	November 29, 2016	Letter
Langley Chamber of Commerce	N/A	November 29, 2016	Letter
LEPS	N/A	November 29, 2016	Letter
LFVAQCC	N/A	November 29, 2016	Letter
Metro Vancouver	N/A	November 29, 2016	Letter
Newton RCMP Detachment	N/A	November 29, 2016	Letter
RCMP Division 'E'	N/A	November 29, 2016	Letter
Sapperton Fish and Game	N/A	November 29, 2016	Letter
Stoney Creek	N/A	November 29, 2016	Letter
Surrey Board of Trade	N/A	November 29, 2016	Letter
Surry Environmental Partners	N/A	November 29, 2016	Letter
Surrey RCMP Detachment	N/A	November 29, 2016	Letter
Township of Langley	N/A	November 29, 2016	Letter
Township of Langley RCMP Detachment	N/A	November 29, 2016	Letter
TriCities Chamber of Commerce	N/A	November 29, 2016	Letter
Upper Fraser Valley Regional Detachment	N/A	November 29, 2016	Letter
Village of Anmore	N/A	November 29, 2016	Letter
Village of Belcarra	N/A	November 29, 2016	Letter
Yorkson	N/A	November 29, 2016	Letter
ACGI Shipping	N/A	November 29, 2016	Letter
Barnett Marine Park	N/A	November 29, 2016	Letter
BC Ambulance	N/A	November 29, 2016	Letter
BC Chamber of Shipping	N/A	November 29, 2016	Letter
BC Coast Pilots (BCCP)	N/A	November 29, 2016	Letter
BROKE (Burnaby Residents Opposed to Kinder Morgan Expansion)	N/A	November 29, 2016	Letter
Canadian Pacific (CP) Rail	N/A	November 29, 2016	Letter
Canexus- Ero- Newalta-Univar Community Advisory Panel (CAP)	N/A	November 29, 2016	Letter
Canexus Chemicals	N/A	November 29, 2016	Letter
Chevron	N/A	November 29, 2016	Letter
CN Rail	N/A	November 29, 2016	Letter
Council of Marine Carriers	N/A	November 29, 2016	Letter
District of North Vancouver	N/A	November 29, 2016	Letter
Empire Shipping	N/A	November 29, 2016	Letter
Erco Worldwide	N/A	November 29, 2016	Letter
First Nation Emergency Services Society (FNESS)	N/A	November 29, 2016	Letter
First Nation Health Authority	N/A	November 29, 2016	Letter
Fraser Health Authority	N/A	November 29, 2016	Letter

Regulator/Stakeholder Group	Contact Name (if applicable)	Date	Method of Contact
Inchcape Shipping	N/A	November 29, 2016	Letter
Island Tug and Barge	N/A	November 29, 2016	Letter
Kask Brothers	N/A	November 29, 2016	Letter
Ledcor Resources and Transportation Limited Partnership	N/A	November 29, 2016	Letter
Mason Agency (Shipping Service)	N/A	November 29, 2016	Letter
MLA- Burnaby Lougheed	N/A	November 29, 2016	Letter
MLA- Burnaby North	N/A	November 29, 2016	Letter
MLA- Coquitlam – Burke Mountain	N/A	November 29, 2016	Letter
MLA- North Vancouver Lonsdale	N/A	November 29, 2016	Letter
MLA- North Vancouver Seymour	N/A	November 29, 2016	Letter
MLA- Port Moody- Coquitlam	N/A	November 29, 2016	Letter
MP- Delta	N/A	November 29, 2016	Letter
MP- North Burnaby Seymour	N/A	November 29, 2016	Letter
MP- North Vancouver	N/A	November 29, 2016	Letter
MP- Vancouver Centre	N/A	November 29, 2016	Letter
MP- Vancouver East	N/A	November 29, 2016	Letter
MP- Vancouver Quadra	N/A	November 29, 2016	Letter
MP- West Vancouver – Sunshine Coast – Sea to Sky Country	N/A	November 29, 2016	Letter
North Shore NOPE	N/A	November 29, 2016	Letter
North Vancouver Chamber of Commerce	N/A	November 29, 2016	Letter
Pacific Coast Terminal	N/A	November 29, 2016	Letter
Pacific Pilotage Authority	N/A	November 29, 2016	Letter
Pacific Wildlife Foundation	N/A	November 29, 2016	Letter
Peter Kiewit Infrastructure Co.	N/A	November 29, 2016	Letter
Seaspan	N/A	November 29, 2016	Letter
Shell Terminal	N/A	November 29, 2016	Letter
Simon Fraser University	N/A	November 29, 2016	Letter
SMIT Marine	N/A	November 29, 2016	Letter
Suncor Terminal	N/A	November 29, 2016	Letter
UBC Stellar Sea Lion (Marine Mammal) Research Centre	N/A	November 29, 2016	Letter
Vancouver Aquarium	N/A	November 29, 2016	Letter
Vancouver Board of Trade	N/A	November 29, 2016	Letter
Vancouver Coastal Health Authority	N/A	November 29, 2016	Letter
Vancouver Pile and Dredge	N/A	November 29, 2016	Letter
West Vancouver Chamber of Commerce	N/A	November 29, 2016	Letter
Westward Shipping	N/A	November 29, 2016	Letter
Wild Bird Trust	N/A	November 29, 2016	Letter
Metro Vancouver Regional District	Ali Ergudenler	November 29, 2016	Email
Metro Vancouver Regional District	Roger Quan	November 29, 2016	Email