

Monitoring Report: SV-2020-07-09

## Trans Mountain Expansion Project – Westridge Marine Terminal Monitoring

In light of the current COVID-19 pandemic, Fisheries and Oceans Canada (DFO) and Musqueam Indian Band's (Musqueam's) Indigenous Advisory and Monitoring Committee Indigenous Monitor (IAMC IM) have not been conducting joint in-person monthly site inspections at the Westridge Marine Terminal (WMT), in Burrard Inlet, BC, since March 2020. Instead, DFO and several representatives from the IAMC (including the Musqueam IAMC IM) had two conference-call meetings per month with representatives from Trans Mountain Pipeline ULC (Trans Mountain), the Project Indigenous Monitor (Project IM) from Kwikwetlem First Nation (KFN), and Kiewit Ledcor Trans Mountain Partnership (KLTP). This monitoring report provides a summary of the meeting on July 9, 2020. The report includes a description of current in-water and nearshore construction at the WMT, any issues Trans Mountain reported during the meeting regarding measures implemented to avoid or mitigate impacts on fish and fish habitat, and how these issues have been or will be resolved. With the addition of new COVID-19 safety protocols in place, monthly in-person site visits are planned to resume.

|  |  |                              |         |                          |         |
|--|--|------------------------------|---------|--------------------------|---------|
| <b>Date</b>  | July 9, 2020   | <b>Time of Call (Start):</b> | 1:00 PM | <b>Time of Call End:</b> | 2:15 PM |
| <b>Format</b>  | Web-based conference call with Trans Mountain presenting photographs, documents and/or videos relevant to the expansion of the Westridge Marine Terminal.  |                              |         |                          |         |
| <b>DFO participants</b>  | DFO - TMX Review and Engagement Team, Fish and Fish Habitat Protection Program: R.L. (A/ Senior Biologist), W.B. (A/ Team Lead) and K.J. (Biologist)   |                              |         |                          |         |
| <b>IAMC participants</b>   | Musqueam Indian Band: J.H. (IAMC IM), R.K. (Environmental Stewardship Technician)<br>IAMC – Monitoring Subcommittee: C.T. (IAMC representative – Burrard Inlet and Lower Fraser River, from Tsleil-Waututh Nation)   |                              |         |                          |         |
| <b>Other participants</b>  | Trans Mountain: K.M. (Regulatory Lead), T.A (Construction Manager), S.D. (Lead Environmental Inspector), J.S. (Environmental Inspector) and B.J. (Chief Environmental Inspector)<br>Kwikwetlem First Nation (KFN): M.J. (Project IM)   |                              |         |                          |         |
| <b>Contractor/equipment on site at the time of the call</b>  | <b>Role</b>  |                              |         |                          |         |
| DB Bremerton   | Moored beside Junction platforms 1 and 2. On the Junction Platform 1 works are ongoing within the piles (welding, installing rebar cages, and concrete pours) to prepare for the platform that will be built above.  |                              |         |                          |         |
| Nearshore Barge  | Moored along the shoreline and working to construct the sheet-pile walls of foreshore Cells 1 and 2. Sheet-piles will be driven by a vibratory or impact hammer, and underwater noise levels will be monitored during pile driving. All works in this area are conducted in the dry (e.g., above high tide or when the tide is low). |                              |         |                          |         |
| Offshore barges (e.g. DB General)  | The template for Mooring Dolphin 3 was installed and vibratory pile driving is ongoing.  |                              |         |                          |         |
| <b>IAMC Indigenous Monitor/IAMC Observations and Comments</b>  |  |                              |         |                          |         |
| CT asked for clarification on the location of the derailment wall. SD showed the location on a slide. It currently extends from Cell 11 to the jet fuel bridge. Eventually it will extend to Cell 1. |  |                              |         |                          |         |
| CT confirmed with SD that pre-drilling for jet grouting is occurring in the foreshore and does not require an archeological monitor.   |  |                              |         |                          |         |



Monitoring Report: SV-2020-07-09

CT asked how far into the inlet are works occurring on Mooring Dolphin 3. SD confirmed works are ~200-250 m offshore.

CT asked for clarification on the LRBW in regards to offshore works. SD confirmed the extended least risk biological window (LRBW, August 16 – March 15) applies to works within 50 m of the shoreline. This helps mitigate potential harm to juvenile salmon migrating close to shore. All “offshore works” are seaward of this nearshore area.

CT asked what COVID-19 measures exist onsite at the WMT. TA explained that there are substantial protocols in place for workers and visitors. All regular personnel onsite complete a weekly form and provide it to their supervisor, identifying any questions or concerns. Temperature monitoring is required for everyone onsite at WMT and at the Kask yard. Social distancing is encouraged and masks are provided for anyone with tasks requiring people to be within two metres.

CT asked about the noise levels associated with vibratory pile driving offshore. SD explained that noise levels are variable for vibratory pile driving offshore and depend on the pile size. SD estimated that vibratory pile driving offshore produces sound pressure levels (SPL's) between 170-190 dB. No impact pile driving is currently occurring offshore. SPL's recorded during impact pile driving offshore generally range from 190-206.5 dB. Vibratory pile driving has a continuous noise signature compared to impact pile driving, which has a much stronger impulse signature.

JH does not have any follow-up questions regarding the HVAC and new treatment facility for the concrete waste water yet. Potential follow-up questions may be asked during subsequent meetings.



Monitoring Report: SV-2020-07-09

## Summary of inspection discussions (use initials of participants)

### Introductions

### Agenda Review

In addition to the agenda review, KM addressed that no in-water impact pile driving has occurred since DFO requested a series of photos depicting the ramp up sequence. Photos will be taken of the ramp-up sequence once impact pile driving is conducted offshore, which may be delayed past the previous timeframe specified (likely now in early August).

WB added discussion of the resumption of in-person site visits at the WMT to the agenda.

### Construction Update

SD provided an overview of the site layout at the WMT and described the construction works that have occurred since the June 26<sup>th</sup> compliance verification conference call. Most activities occurring over the past two weeks have been similar to the previous two weeks activities.

SD showed a labelled aerial photo of the WMT construction site, which displayed the numbered foreshore cells and arcs. SD provided an overview of the construction works in the foreshore:

- Cell 3: smoothing backfill material within the cell.
- Cell 2: vibratory pile driving, in the dry at low tide.
- Cell 1: impact pile driving, in the dry at low tide. TM experienced mechanical issues with the impact hammer, which are now fixed.
  - JASCO is monitoring underwater noise during impact pile driving with a hydrophone placed in the water for the first three sheet piles driven to ensure sound pressure levels (SPL's) are below the authorized threshold of 207 dB (outside of the least risk biological window). SPL's measured at 40 m from the pile are in the upper 150 dB range. A back calculation will be computed for equivalent SPL at R = 10 m. All pile driving for cells is currently being conducted during low tide, in dry conditions.
- The supersack retaining wall along the eastern shoreline (between Dock 59 and Cell 6) was completed on July 8<sup>th</sup>.
- Ongoing activities: deep soil mixing on the eastern foreshore, derailment wall excavation and French drain installation.
- New activities: installing formwork for concrete pours within excavated areas for the derailment wall.
  - CT asked for clarification on the location of the derailment wall. SD showed the location on a slide. It currently extends from Cell 11 to the jet fuel bridge. Eventually it will extend to Cell 1.

SD showed a schematic overview of the WMT site and a photo showing offshore works. SD provided an overview of the construction works:

- Mooring Dolphin 3: installed template and used vibratory pile driving for a set of 4 piles – will be cutting and splicing piles soon.
- Loading Platform 1/2: setting concrete girders, installing concrete deck panels on top of girders and concrete pours to lock in girders on the east and west side of the trestle span.
- Mooring Dolphins 4 and 5: welding shear lugs to connect jackets to piles.



Monitoring Report: SV-2020-07-09

- Junction Platform 1: installing rebar cages and pouring concrete plugs on top of piles to build foundation for deck structure above.

SD described specific works and mitigation measures in the foreshore:

- Cell 2: vibratory sheet pile driving on the south side of the cell. Impacting on the south side of the cell may be necessary, but will not occur until the full cell is threaded once we are within the LRBW.
- Cell 1: sheet piles have been vibrated and impacted farther down.
  - WB asked if Cell 1 is entirely enclosed (i.e., can water enter?).
  - SD stated that some water is able to flow in and out of the cell through small gaps between the threaded sheet piles. Once all of the sheets are driven, the cell will be backfilled with gravel. No works are currently being conducted inside the cell.
- The supersack retaining wall has been installed along the shoreline between Cell 6 and Dock 59. The area behind the supersack wall has been backfilled with gravel. This work is located in the intertidal zone and was completed in dry conditions.
- SD showed a slide of the new access road connecting the shore and Cell 6 (located above the supersack wall).
- TA reviewed that Cell 5 only has a template set and will be one of the first cells to have sheet piling installed once we are within the LRBW (starting on August 16<sup>th</sup>). Cells 4 and 11 are the only cells that are yet to have templates installed.
- Deep soil mixing columns are being installed on the expanded eastern foreshore. An auger injects the grout into a pit that is contained by a berm. Grout is allowed to harden and excess cured spoils are hauled offsite for disposal by truck. Eventually cured spoils will be moved offsite via a conveyor belt and a barge.
  - WB asked if any part of the conveyor system will be over water, what will the structure of the system look like and what sort of mitigation measures will be in place?
  - SD confirmed that the grout/cement mixture will only be moved as a solid after it cures and hardens. It can then be broken up into moveable chunks.
  - TA explained the hardened grout will be moved similarly to how gravel is moved on a conveyor system. The conveyor belt will have a hopper system to control the amount of materials that go onto the belt. The speed of the belt controls how much material is allowed to accumulate and is the number one mitigation measure to avoid material entering the water.
  - SD/TA explained they will be able to provide more details once the equipment starts to arrive onsite, in about three weeks.
  - WB requested that any further information on mitigation measures be discussed with DFO during the next site visit.
- Pre-drilling for jet grout columns before the grout can be injected is ongoing.
  - CT asked where this drilling is occurring.
  - SD stated the drilling is occurring on cells in the foreshore that have been backfilled.
  - CT wanted to confirm that there is no need for archeological monitoring.
- Derailment wall concrete footings are being installed. A French drain, a perforated pipe with gravel around it, is being installed along the south side of the derailment wall. The drain will capture any surface run off and redirect it to the surface run off pipes to the east and west of the foreshore.

SD described specific works and mitigation measures in the offshore:



Monitoring Report: SV-2020-07-09

- Mooring Dolphin 4 and 5: welding shear lugs into the holes that connect the dolphin jackets to the piles.
- Mooring Dolphin 3: the template is being supported by smaller pin piles. Four holes in the template are for larger piles. Vibratory pile driving is ongoing.
- Breasting Dolphin 5 and 6: the piles are installed – jackets have been delivered.
- Breasting Dolphin 7 and 8: fully installed.
- Junction platform 1: 8 piles have been installed. Rebar cages are installed inside the piles prior to pouring concrete pile plugs. Once concrete pours are finished then formwork will be completed for the future platform above.
- Loading platform 1/2: the first four trestles girders have been set between the loading platform and trestle span via a crane. Precast concrete deck panels will be installed on top of the concrete girders and finished with another concrete pour on top.
- WB asked if there have been any changes to mitigation measures or issues identified with offshore works.
  - SD stated things are going well - concrete pours have gone according to plan, most offshore works are currently out of the water, and TM is maintaining clean work areas to ensure work materials do not enter the water.
- CT asked how far out are offshore works occurring.
  - SD confirmed works are ~200-250 m offshore.
- CT asked for clarification on the timing of the LRBW in regards to offshore works.
  - SD confirmed the extended LRBW (August 16 to March 15) applies to works within 50 m of the shoreline. This helps mitigate potential harm to juvenile salmon migrating close to shore. All “offshore works” are seaward of this nearshore area.

Further Questions:

CT: what COVID-19 measures exist onsite?

TA: substantial protocols are in place for workers and visitors. All regular personnel onsite complete a weekly form and provide it to their supervisor, identifying any questions or concerns. Temperature monitoring is required for everyone onsite at the WMT and at the kask yard. Social distancing is encouraged and masks are provided for anyone with tasks requiring people to be within two metres.

WB: when will construction of habitat offsetting start?

SD: the foreshore cells need to be finished within the next LRBW so offsetting construction can begin in the following LRBW (August 2021). Barges and piles will be in the way and prevent reef construction while works on the foreshore cells are being completed.

WB: is partial construction possible during the upcoming LRBW?

SD/TA: it would be unlikely as works on the foreshore will take priority to complete within the next LRBW starting in August.

CT: what are the noise levels associated with vibratory pile driving offshore?

SD: noise levels are variable for vibratory pile driving offshore and depend on the pile size. SD estimated that vibratory pile driving offshore produces sound pressure levels (SPL's) between 170-190 dB. No impact pile driving is currently occurring offshore. SPL's recorded during impact pile driving offshore generally range from 190-206.5 dB. Vibratory pile driving has a continuous noise signature compared to impact pile driving, which has a much stronger impulse signature.



Monitoring Report: SV-2020-07-09

WB: will impact pile driving resume on week on July 20?

TA: impact pile driving may be delayed until the first week of August due to equipment issues.

WB flagged that further clarification regarding the CO2 bubble can be discussed during the next site visit if J.H. has further questions.

Discussion of the next in-person site visit at the WMT:

- WB: DFO plans to resume in-person CVA meetings at WMT involving DFO and IAMC IM's towards the end of the month (potentially July 30). Remaining onshore to view works is ideal for social distancing purposes – seeking out vantage points to view offshore activities is sufficient.
- KM: most protocols for in-person site visits were sent via email in response to WB's request. Temperature checks will be required and TM would like to limit the number of people on-site. Each person will have to complete a form and have their temperature checked. Masks are required in shuttles.
- TA/KM: confirmed parking for three additional vehicles can be accommodated for the site visit.
- TA: confirmed that a large boardroom is available for the site specific safety orientation and pre-meeting.
- WB: Evan Henderson will be at site visit and will coordinate the timing of the visit with KM.
- TA: reviewed Personal Protective Equipment (PPE required) in greenfield and brownfield areas – reflective vests, hard hats, and foamed-backed safety glasses are required, fire retardant coveralls are not necessary. Masks and PFD's are required on boats.
- WB: greenfield zonation also means facial hair restrictions are no longer in place? TA: yes.
- TA/KM: may be able to go out on the trestle span for a good vantage point. No Personal Floatation Device (PFD) is required to be on the trestle.

RL: asked TM to keep DFO updated when they have dates for impact pile driving to start.

SD: confirmed TM will keep DFO updated.

KJ: were there any marine mammal or juvenile salmon sightings with the past two weeks?

SD: no juvenile salmon were spotted, only just harbour seals. No work stoppages were required.

WB: is it an option to continue to upload photos to the Firmex website?

KM: yes, TM has an ongoing subscription and Firmex is available for document sharing.



Monitoring Report: SV-2020-07-09

### GENERAL AND MISCELLANEOUS MITIGATION MEASURES

*Measures specified within the Westridge Marine Terminal Fisheries Act Authorization Conditions:*

|   |  |                      |  |                      |   |                |                                     |
|---|--|----------------------|--|----------------------|---|----------------|-------------------------------------|
| <b>Schedule</b>   |  |                      |  |                      |   |                |                                     |
| 2.2.6 All nearshore in-water Project construction activities (within a 50-m horizontal distance seaward of the higher high water large tide level) at the Westridge Marine Terminal shall only be carried out during a work timing window from August 16 to March 15 each year.   |  |                      |  |                      |   |                |                                     |
| Discussed:  | <input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No | Issue(s) identified: | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No | Issue(s) unresolved: | <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable | <input type="checkbox"/>            |
| <b>Comments</b>   |  |                      |  |                      |   |                |                                     |
| TM acknowledged that all work completed within the past two weeks, since the last compliance monitoring call, is outside the timing window and that in-water works are only being conducted offshore (i.e., beyond 50 m of the higher high water large tide). Works on the foreshore cells are being completed at low tide in the dry.  |  |                      |  |                      |   |                |                                     |
| <b>Action Items</b>   |  |                      |  |                      |   |                |                                     |
| None.   |  |                      |  |                      |   |                |                                     |
| <b>Monitoring</b>   |  |                      |  |                      |   |                |                                     |
| 3.1 A qualified environmental professional must be on-site during the carrying on of in-water works, undertakings and activities, and shall monitor the works, undertakings or activities on a systematic and on-going basis to ensure that standards and avoidance measures to avoid impacts to fish and fish habitat are effective, and that unauthorized impacts to fish and fish habitat are avoided. |  |                      |  |                      |   |                |                                     |
| Discussed:  | <input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No | Issue(s) identified: | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No | Issue(s) unresolved: | <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable | <input type="checkbox"/>            |
| <b>Comments</b>   |  |                      |  |                      |   |                |                                     |
| The Lead Environmental Inspector spoke throughout the meeting about their experiences over the past two weeks at the WMT during construction. Qualified environmental professionals are conducting monitoring of construction activities at the WMT.  |  |                      |  |                      |   |                |                                     |
| <b>Action Items</b>   |  |                      |  |                      |   |                |                                     |
| None.   |  |                      |  |                      |   |                |                                     |
| <b>Marine Mammal Observations</b>   |  |                      |  |                      |   |                |                                     |
| 2.2.7 In-water construction activities must cease if any marine mammal is observed adjacent to or within the project area such that there is risk of direct physical harm to the marine mammal. Construction activities may only resume once the marine mammal has been confirmed to have left the immediate area or has not been sighted for 30 minutes.   |  |                      |  |                      |   |                |                                     |
| Discussed:  | <input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No | Issue(s) identified: | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No | Issue(s) unresolved: | <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable | <input type="checkbox"/>            |
| <b>Comments</b>   |  |                      |  |                      |   |                |                                     |
| Marine mammal monitoring is being conducted at WMT. Harbour seals were observed; however, pile driving only occurred in the dry during low tide. No work stoppages were reported.   |  |                      |  |                      |   |                |                                     |
| <b>Action Items</b>   |  |                      |  |                      |   |                |                                     |
| None.   |  |                      |  |                      |   |                |                                     |
| <b>Temporary Structures and Decommissioning of Existing Structures</b>  |  |                      |  |                      |   |                |                                     |
| The application for a <i>Fisheries Act</i> authorization states that a floating debris boom will be secured around the work area to collect drifting debris during demolition of the existing utility dock (page 3.1).  |  |                      |  |                      |   |                |                                     |
| Discussed:  | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No | Issue(s) identified: | <input type="checkbox"/> Yes<br><input type="checkbox"/> No            | Issue(s) unresolved: | <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable | <input checked="" type="checkbox"/> |



Monitoring Report: SV-2020-07-09

|   |  |  |  |
|---|--|--|--|
| 2.2.5 Temporary structures installed below the high-water mark shall be decommissioned and removed when they are no longer being used for construction purposes.  |  |  |  |
| Discussed: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No   | Issue(s) identified: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input checked="" type="checkbox"/> |
| <b>Comments</b>   |  |  |  |
| The utility dock has been removed and no structures are currently being decommissioned.   |  |  |  |
| <b>Action Items</b>   |  |  |  |
| None.   |  |  |  |
| <b>Pump Intake Screening</b>  |  |  |  |
| 2.2.2 Water intakes of any pumps shall be designed and screened in accordance with specifications outlined in the Addendum, Fisheries and Oceans Canada's <i>Freshwater Intake End-of-Pipe Fish Screen Guidelines</i> (Fisheries and Oceans Canada 1995), and Fisheries and Oceans Canada's <i>Guidelines for Minimizing Entrainment and Impingement of Aquatic Organisms at Marine Intakes in British Columbia</i> (Fisheries and Oceans Canada 1991). |  |  |  |
| Discussed: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No   | Issue(s) identified: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input checked="" type="checkbox"/> |
| <b>Comments</b>   |  |  |  |
| Screens for known water intakes have been discussed during previous site inspections. No issues were reported.  |  |  |  |
| <b>Action Items</b>   |  |  |  |
| None.   |  |  |  |
| <b>Fish Salvage</b>   |  |  |  |
| 2.2.3 Fish salvage and relocation shall be conducted, as appropriate, prior to the start of construction activities so as to avoid and minimize adverse impacts to fish.  |  |  |  |
| Discussed: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No   | Issue(s) identified: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input checked="" type="checkbox"/> |
| <b>Comments</b>   |  |  |  |
| No fish salvage has taken place at the WMT over the past two weeks.   |  |  |  |
| <b>Action Items</b>   |  |  |  |
| None.   |  |  |  |
| <b>Integrity of Habitat Offsets</b>   |  |  |  |
| 4.7 The Proponent shall not carry on any works, undertakings or activities that will adversely disturb or impact the offsetting measures.   |  |  |  |
| Discussed: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No   | Issue(s) identified: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input checked="" type="checkbox"/> |
| <b>Comments</b>   |  |  |  |
| Offsetting measures have yet to be installed.   |  |  |  |
| <b>Action Items</b>   |  |  |  |
| None.   |  |  |  |



Monitoring Report: SV-2020-07-09

### MITIGATION MEASURES SPECIFIC TO PILE DRIVING

*Measures specified within the Westridge Marine Terminal Fisheries Act Authorization Conditions:*

| <b>Underwater Sound Pressure Level Reduction</b>  |   |  |  |  |
|---|---|--|--|--|
| 2.2.8 A vibratory hammer will be used for pile driving where practical and feasible, and all in-water pile driving activities will be monitored via hydrophone to ensure underwater peak pressures do not result in adverse impacts to fish.  |   |  |  |  |
| Discussed: <input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No   | Issue(s) identified: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input type="checkbox"/>            |  |
| 2.2.9.1 To avoid death of fish, mitigation measures (e.g., bubble curtain around the full wetted length of the pile, fish exclusion, etc.) must be implemented.   |   |  |  |  |
| Discussed: <input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No   | Issue(s) identified: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input type="checkbox"/>            |  |
| <b>Comments</b>   |   |  |  |  |
| Trans Mountain confirmed that vibratory pile driving is currently only occurring during low tide in dry conditions; therefore, no monitoring was conducted via hydrophone. TM confirmed that underwater noise levels are being monitored via hydrophone during impact pile driving activities occurring in the dry during low tide and that underwater noise thresholds are not being exceeded. Previously, DFO requested and has since received a memo from TM outlining monitoring undertaken for impact pile driving conducted in the dry during low tide. |   |  |  |  |
| <b>Action Items</b>   |   |  |  |  |
| None.   |   |  |  |  |
| <b>Underwater Sound Pressure Level Monitoring</b>   |   |  |  |  |
| 2.2.9.2 Monitoring via underwater noise recordings must be conducted continuously and within 10 meters of the pile being driven to verify that underwater sounds do not exceed the 30 kPa (209.5 dB re: 1 µPa) threshold for injury to finfish.   |   |  |  |  |
| Discussed: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No   | Issue(s) identified: <input type="checkbox"/> Yes<br><input type="checkbox"/> No            | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input checked="" type="checkbox"/> |  |
| 2.2.9.3. Outside of the least risk window for Burrard Inlet (August 16 – February 28), a more conservative underwater sound threshold of 22.5 kPa (207 dB re: 1 µPa) will be adhered to, and monitored, to prevent injury to finfish. If sound levels exceed this threshold, or a fish kill is observed despite mitigation measures being in place, pile driving activities are to cease immediately and mitigation methods are to be reviewed and modified in consultation with DFO.   |   |  |  |  |
| Discussed: <input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No   | Issue(s) identified: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input type="checkbox"/>            |  |
| 2.2.9.4 If underwater noise recordings indicate that sound levels are likely to exceed the applicable threshold defined in conditions 2.2.9.2 or 2.2.9.3, the Proponent will take appropriate action with the goal of preventing the exceedance from occurring. These actions may include adjusting the force of the hammer, adjusting the mitigation measures already in place to increase their effectiveness, or implementing additional mitigation measures.  |   |  |  |  |
| Discussed: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No   | Issue(s) identified: <input type="checkbox"/> Yes<br><input type="checkbox"/> No            | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input checked="" type="checkbox"/> |  |
| 2.2.9.5 Upon commencement of pile driving, or recommencement after a delay of 30 minutes or more, pile installation shall ramp-up by starting with less frequent impact strikes of lower force. This ramp-up period is designed to enable any fish that may be in the area time to leave the area prior to the generation of peak pressure and noise levels for pile installation.  |   |  |  |  |
| Discussed: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No   | Issue(s) identified: <input type="checkbox"/> Yes<br><input type="checkbox"/> No            | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input checked="" type="checkbox"/> |  |
| <b>Comments</b>   |   |  |  |  |



Monitoring Report: SV-2020-07-09

|   |  |                      |  |                      |   |   |
|---|--|----------------------|--|----------------------|---|---|
| <p>TM demonstrated that they are monitoring underwater noise during vibratory pile driving offshore and that levels have remained below the threshold specified in the authorization. No impact pile driving occurred offshore during the past two weeks.</p>   |  |                      |  |                      |   |   |
| <p>TM demonstrated that they are monitoring underwater noise during impact pile driving occurring in the dry at low tide and that levels have remained below the threshold specified in the authorization.</p>  |  |                      |  |                      |   |   |
| <b>Action Items</b>   |  |                      |  |                      |   |   |
| None.   |  |                      |  |                      |   |   |
| <b>Marine Mammal Monitoring</b>   |  |                      |  |                      |   |   |
| 2.2.9.6 Prior to commencement of pile driving, or recommencement after a delay of 30 minutes or more, visual monitoring must be conducted to determine if marine mammals are present within an exclusion zone of 1 km (except for harbor seals, which will have an exclusion zone of 150 m).  |  |                      |  |                      |   |   |
| Discussed:  | <input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No | Issue(s) identified: | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No | Issue(s) unresolved: | <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input type="checkbox"/> |
| 2.2.9.7 Work may only commence if marine mammals and harbor seals are not observed in their respective exclusion zones for 30 minutes.  |  |                      |  |                      |   |   |
| Discussed:  | <input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No | Issue(s) identified: | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No | Issue(s) unresolved: | <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input type="checkbox"/> |
| 2.2.9.8 Exclusion zones must be monitored continuously during impact pile driving. If a marine mammal or marine mammals are observed within their respective exclusion zone, pile driving activities must cease until all marine mammals leave their respective exclusion zone or they have not been sighted for 30 minutes within their respective exclusion zone.   |  |                      |  |                      |   |   |
| Discussed:  | <input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No | Issue(s) identified: | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No | Issue(s) unresolved: | <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input type="checkbox"/> |
| 2.2.9.9 If underwater noise recordings reveal that the threshold of 160 dB is exceeded at the 1 km exclusion zone boundary, the exclusion zone radius must be widened to a new outer limit, where sound recordings demonstrate that the 160 dB threshold is not exceeded. Conditions 2.2.9.6 to 2.2.9.8 will need to be complied with within this new exclusion zone. |  |                      |  |                      |   |   |
| Discussed:  | <input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No | Issue(s) identified: | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No | Issue(s) unresolved: | <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input type="checkbox"/> |
| 2.2.9.10 Pile driving may only be carried out during daylight hours to enable effective visual monitoring of marine mammal exclusion zones.   |  |                      |  |                      |   |   |
| Discussed:  | <input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No | Issue(s) identified: | <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No | Issue(s) unresolved: | <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input type="checkbox"/> |
| <b>Comments</b>   |  |                      |  |                      |   |   |
| TM are carrying out marine mammal monitoring. Harbour seals were observed by TM, but not prior or during pile driving as no work stoppages were noted on the conference call.   |  |                      |  |                      |   |   |
| <b>Action Items</b>   |  |                      |  |                      |   |   |
| None.   |  |                      |  |                      |   |   |

*Measures specified within the Westridge Marine Terminal Environmental Protection Plan:*

|   |
|---|
| <b>Fish Salvage</b>   |
| 35. Immediately following the installation of each sheet pile cell, and prior to excavation and infilling of that cell, conduct a salvage of commercial, recreational and Aboriginal (CRA) fishery species via crab and fish trapping/netting and |



Monitoring Report: SV-2020-07-09

|   |  |  |  |
|---|--|--|--|
| seines (where appropriate). Release captured CRA fishery species in a suitable habitat at least 500 m away from marine construction activities.   |  |  |  |
| Discussed: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No   | Issue(s) identified: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input checked="" type="checkbox"/> |
| <b>Comments</b>   |  |  |  |
| No fish salvage has taken place at WMT over the past two weeks.   |  |  |  |
| <b>Action Items</b>   |  |  |  |
| None.   |  |  |  |
| <b>Turbidity Monitoring</b>   |  |  |  |
| 43. Should visual monitoring during in-water pile installation indicate concern regarding turbidity levels, the Environmental Inspector will arrange for in situ sampling of turbidity (nephelometric turbidity units). Should turbidity levels exceed specified thresholds, pile driving will temporarily be halted. |  |  |  |
| Discussed: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No   | Issue(s) identified: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input checked="" type="checkbox"/> |
| <b>Comments</b>   |  |  |  |
| Turbidity curtains are in place and water quality monitoring has recorded no exceedance in water quality guidelines for turbidity outside of the turbidity curtain. TM have installed a new custom made turbidity curtain, which is more durable than the previous curtain, and is contoured to the seafloor.         |  |  |  |
| <b>Action Items</b>   |  |  |  |
| None.   |  |  |  |

**MITIGATION MEASURES SPECIFIC TO FORESHORE CONSTRUCTION**

|  |  |  |  |
|--|--|--|--|
| <b>Riparian Planting and Material Handling</b>   |  |  |  |
| <i>Westridge Marine Terminal Fisheries Act Authorization Conditions</i>  |  |  |  |
| 2.2.4 Disturbed riparian areas shall be replanted as appropriate, with native non-invasive species of vegetation.  |  |  |  |
| Discussed: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No  | Issue(s) identified: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input checked="" type="checkbox"/> |
| <i>Westridge Marine Terminal Environmental Protection Plan Commitments</i>   |  |  |  |
| 30. Unless otherwise approved by DFO, retain all excavated [marine] material and dispose at a land-based facility in accordance with applicable regulations. |  |  |  |
| Discussed: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No  | Issue(s) identified: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input checked="" type="checkbox"/> |
| <b>Comments</b>  |  |  |  |
| Not applicable.  |  |  |  |
| <b>Action Items</b>  |  |  |  |
| None.  |  |  |  |

|   |  |  |  |
|---|--|--|--|
| <b>Water Quality Maintenance and Monitoring</b>                         |  |  |  |
| <i>Westridge Marine Terminal Fisheries Act Authorization Conditions</i> |  |  |  |



Monitoring Report: SV-2020-07-09

|   |   |  |  |
|---|---|--|--|
| 2.2.1 Effective sediment and erosion control measures (e.g., a turbidity curtain, etc.) shall be implemented before starting construction and shall be maintained during construction activities, as appropriate, to avoid the deposit and dispersion of sediment into the marine environment.  |   |  |  |
| Discussed: <input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No   | Issue(s) identified: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input type="checkbox"/>            |
| 2.2.10 A turbidity curtain must be used to isolate the work area during the excavation of riprap in order to contain marine sediment suspended in the water column and limit the extent of sediment dispersion. During severe weather conditions that may reduce the effectiveness of, or impede the visual monitoring of, the turbidity curtain (e.g., > 70 km/h winds, or dense fog), works, undertakings or activities that may increase suspended sediment concentrations within the turbidity curtain or adversely affect the integrity of the turbidity curtain, must be suspended. |   |  |  |
| Discussed: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No   | Issue(s) identified: <input type="checkbox"/> Yes<br><input type="checkbox"/> No            | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input checked="" type="checkbox"/> |
| <b><i>Westridge Marine Terminal Environmental Protection Plan Commitments</i></b>   |   |  |  |
| 29. During in-water excavation or rip rap, conduct water quality monitoring (WQM) as per the Water Quality Management Plan during Rip Rap Removal (Appendix H of this EPP). Conduct WQM to assess the effectiveness of the turbidity curtain and modify turbidity curtain deployment, if required.  |   |  |  |
| Discussed: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No   | Issue(s) identified: <input type="checkbox"/> Yes<br><input type="checkbox"/> No            | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input checked="" type="checkbox"/> |
| <b><i>Westridge Marine Terminal Sediment and Erosion Control Plan Commitments</i></b>   |   |  |  |
| The in-water sediment curtain will remain intact during Foreshore construction activities to ensure sediment laden water is not discharged into Burrard inlet.  |   |  |  |
| Discussed: <input checked="" type="checkbox"/> Yes<br><input type="checkbox"/> No   | Issue(s) identified: <input type="checkbox"/> Yes<br><input checked="" type="checkbox"/> No | Issue(s) unresolved: <input type="checkbox"/> Yes<br><input type="checkbox"/> No | Not applicable <input type="checkbox"/>            |
| <b>Comments</b>   |   |  |  |
| TM did not identify any issues related to the turbidity curtain that was present in photographs of the nearshore area.  |   |  |  |
| <b>Action Items</b>   |   |  |  |
| None.   |   |  |  |

|  |
|--|
| <b>Additional comments or action items</b> |
| None.                                      |