



Highway 91/17 Upgrade Project

Submittal No.	PGC-SUB-000576	Document No.	H9117-EV-MRP-0009
Title	Environmental Monthly Report	Revision:	1
Date Submitted to MoTI	12 February 2021		
Prepared by:	Gisele Rehe, P.Ag., B.I.T., (Brybil)		

REVISION LOG

Version #	Date	Revised By	Approved By	Revised Section
0	8 February 2021	Gisele Rehe, P.Ag., B.I.T.	Patty Burt, RP Bio, AQP	
1	12 February 2021	Patty Burt, RP Bio, AQP		Distribution List Section 2.1 and 2.2: Input from PGC Section 3.3: 12 January 2021 information added. Section 3.4: Added sampling requirements for pumping operations. Section 4.2: Legend added.

DISTRIBUTION LIST

Report sent to:	Details:	Contact Person:
Ministry of Transportation and Infrastructure (MoTI).	PROVREP.HWY91_17@gov.bc.ca	Garry Dawson / Brendan Reddington
Fisheries and Oceans Canada (DFO)	ReferralsPacific@dfo-mpo.gc.ca Sara.Jossul@dfo-mpo.gc.ca Rebecca.Seifert@dfo-mpo.gc.ca	Sara Jossul Rebecca Seifert
Ministry of Forestry, Lands, Natural Resource Operations and Rural Development (FLND)	SouthCoastWSAReporting@gov.bc.ca Roxanne.Snook@gov.bc.ca Emily.Elsiger@gov.bc.ca	Roxanne Snook R.P.Bio. Emily Elsliger, MSc, PAg

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1.0 INTRODUCTION

This report covers all activities from 04 to 31 January 2021. During this period works occurred in Areas B, C, D, E, F, G, H, I and a temporary truck parking facility. For the purposes of this report, the following areas shall be defined as:

- Area B: L100 North and 96th Street ditch
- Area C: Portion of River Road West of Highway 17 (Includes L250, L275, L325, L350, L375W)
- Area D: Silda Ditch, L375E, L475, L450 and W01 Detour
- Area E: Sunbury Mounds L500, L575, L550
- Area F: MKDelta (L1150S/1160/1170/1400) and C01 detour
- Area H: L1300 Weigh Scale
- Area G: Delta Nature Reserve (L2300/2400)
- Area I = West side of Hwy 91, truck parking area, L2100, L200, E02 and E04 Detour
- Temporary Truck Parking Facility*

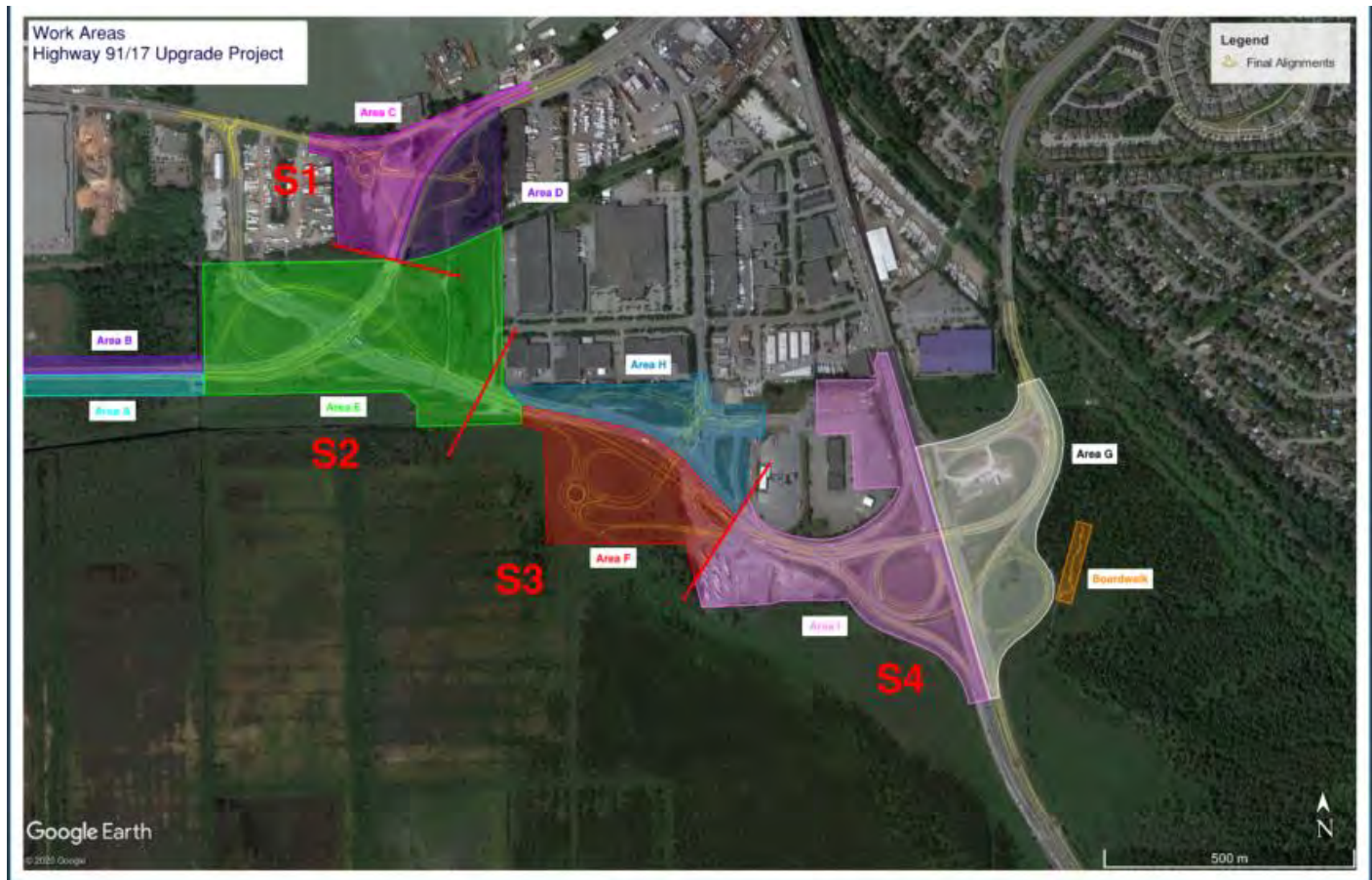


Figure 1: Approximate Work Area Locations *

A Key Plan has been included showing the project alignments (See Appendix 1).

2.0 CONSTRUCTION ACTIVITIES

2.1 Activities for this Period

The following works took place within Section 1 from 04 January and 31 January 2021:

Area C

- Completed placement of geosynthetic clay liner on embankment for contaminated groundwater management.
- Silt excavation from silt box and backfill with sand ongoing in preparation for stone column installation. Approximately 1500m³ of material excavated from the contaminated soil boundary. This material has been temporary stockpiled as per the Contaminated Sites Management Plan.
- Stone column test trials complete.
- Stormtec operations ongoing to treat contaminated groundwater.
- L250, sand embankment placement and compaction ongoing.

Area D

- At the L375, digging to expose gas lines (hydrovac location, machine excavation) Fortis BC completed gas line work.
- L375 watermain deficiencies rectified. A fire hydrant was straightened, and a concrete pad was placed under watermain valve boxes.

The following works took place in Section 2 from 04 January and 31 January 2021:

- No works were completed in Area A.

Area B

- L100/L400 – clearing and grubbing completed. CB leads extended north towards the new ditch line. Sand placed in the existing ditch line. Dewatering to 96th St ditch.

Area E

- L550E/L575, walls 202 and 210 construction and preload placement completed; preload settlement period commenced.
- L500N, embankment and preload placement completed; preload settlement period commenced.
- L550W – completed clearing and grubbing, installation of storm culvert commenced. Stormtec set up a groundwater treatment facility to manage contaminated groundwater with discharge on hold.

The following works took place in Section 3 from 04 January and 31 January 2021:

Area F

- L1400, L1150, L1170, completed sand haul and placement. Preload settlement period commenced.
- L500/L1160, continued sand haul, place and geogrid installation. Stone column operation continued.

Area H

- L1300, stripping top overburden layers and stockpiling material onsite.

The following works took place in Section 4 from 04 January and 31 January 2021:

Area I

- L2200, completed embankment fill at NW corner and barriers placed along L2200.
- Cofferdam re-established at L2100.

Area G

- L2300/L2400, berm built around the perimeter of the work area to prevent the migration of water outside the construction area. Excavation of peat and backfill with sand for toe key and preparation for installation of geomembrane liner.

Temporary Truck Parking

- Poles, lighting, electrical hook up complete,
- Signage and barriers installed,
- Washroom installed and ramp built,

2.2 Upcoming Activities

Section 1:

- Stone column installation.
- Fill placement over eastern most portion of roundabout at River Rd East.
- River Road and 96th St construction.
- Bridge construction scheduled to commence in March with Abutment foundation construction.
- L375 embankment and preload fill placement.

Section 2:

- Continue to monitor settlement at L575 and L550 (East) embankment and preload fills.
- L100 continue to place preload sand and complete ditch relocation and tie in to 96th St Ditch.
- L550 storm culvert, continue installation. Commence excavation into contaminated zone. Treat contaminated groundwater.

Section 3:

- L500, monitor settlement of embankment and preload fill placement.
L1400, L1170, L1150, L1160 – monitor settlement of completed embankment and preload fill. Construct L1170 construction access.
- Stone columns for bridge foundation ongoing.
- L500, placement of geogrid and placement of embankment fill.
- L1300, embankment and preload fill placement.

Section 4:

- Constructing of a settling pond to manage water in laydown area.
- L2300/L2400, resume excavating the remaining peat in Zone B2. Continue toe key excavation and backfill with sand. Commence installation of geomembrane. Commence installation of sheet pile wall. Continue embankment and preload placement.
- L2200, monitor settlement.
- Detour E04 construction.
- L2100S embankment and preload fills.

3.0 ENVIRONMENTAL ISSUES

3.1 Environmental Incidents

At approximately 09:00 on 06 January 2021, hydraulic fluid was noticed leaking from the boom of a CAT 320E excavator while moving sand on the L500 wall preloads (Photo 20). The operator shut down the machine immediately,

and the source of the leak was confirmed to be a broken hydraulic line. Spill pads were applied to the leak and on the ground below. Most of the fluid leaked onto the machine, though some dripped onto the sand below. Fluid was cleaned off the machine and contaminated sand was shoveled into a bag for disposal. The machine was equipped with bio-oil, and it was located on preload sand. The excavator was taken out of service and a mechanic was called to repair the line. It is estimated that less than <500mL of hydraulic fluid was released onto the machine and ground.

At approximately 13:30 on 14 January 2021, the hydraulic line on the box of a dump truck burst while raising the box to offload sand at the L500 preload site and <5 L of fluid spilled onto the preload sand (Photo 21). The truck was immediately turned off. Hydraulic fluid spilled onto the truck and preload sand and spill pads were applied to the ground and various components of the truck (Photo 22). Contaminated sand that had absorbed oil was quickly removed and bagged for disposal. Oil was cleaned off the truck and surrounding ground. The truck was taken out of service and the trucking company removed the truck from the site for repairs.

3.2 Non-Compliance

No Environmental Non-Compliance Reports were issued or received during the reporting period.

Table 1: Non-Compliance Tracking

NCR #	Date Issued	Location	Description	Status

3.3 Non-Conformance

At approximately 12:55am on 12 January 2021, it was observed that one of the dewatering pumps that PGC had in place adjacent to 96th ditch was not set up to manage potentially sediment laden water. The pump was immediately shut down. It was discovered that the cause of the occurrence was the fact that heavy rains were not taken into account when the team had completed the planning of the pump discharge location. The unit had been installed in close proximity to 96th St. ditch and the ground was overly saturated. NCR 27 was opened for this event. To remediate this a number of actions were taken. Going forward pumping will take place under the guidance and supervision of an environmental monitor. The sediment fence around 96th St ditch was repaired, and the soil stockpiles located adjacent to the ditch will be covered with poly until permanent relocation. The discharge point was relocated to a vegetated area and water discharged through filter fabric. Water quality monitoring will be conducted to ensure no impact to 96th St ditch. This NCR was closed on 2 February 2021.

3.4 Opportunities for Improvement

Additional information needs to be provided on pumping operations in the Project site in weekly and monthly environmental reports. Sampling locations need to include upstream, downstream and point of discharge. When actively pumping water, all parameters including temperature, dissolved oxygen, conductivity, pH, TDS, and turbidity need to be measured.

3.5 Outstanding Environmental Issues

The following ongoing monitoring is being conducted (Table 2):

Table 2: Environmental Issues Tracking Table

Item No	Date	Environmental Issue or Required Action	Corrective Action	Projected Closure Date	Open/ Closed	Comments
1	25 June	Sediment fence with accumulated material at River Road West	Remove material and repair fence	29 June	Closed	Discussed with Supervisor. Accumulated material has been removed.
2	25 June	Minor dust at E01 Detour	Area watered to suppress dust	25 June	Closed	Dust suppression ongoing.
3	25 June	Potential track out at River Road East and West	Install gravel access pad	14 August	Closed	Ongoing monitoring performed. Pads will be installed if required.
4	10 July	Japanese knotweed growth in topsoil stockpile at River Road West	Treat with foliar application	10 August	Closed	Ongoing treatment efforts.
5	10 July	Construction personnel smoking throughout site as opposed to designated areas	Reiterate policies regarding smoking	13 July	Closed	Policies have been reiterated. An environmental advisory will be issued.
6	10 July	Trash can at River Road West was left full on site	Trash was removed. Crews reminded that trash is to be removed daily	10 July	Closed	
7	13 July	Approximately 3 L of diesel spilt from light station onto pavement	Spill volumes collected with absorbent materials	13 July	Closed	Refueling procedures to be reviewed with construction crews to prevent over filling.
8	16 July	Damaged sediment fence at River Road West and E01	Fence needs to be repaired	20 July	Closed	Fence repaired, and areas swept for wildlife.
9	23 July	Concern noted with noise levels at E01	Noise monitoring will be carried out	19 August	Closed	Monitoring will commence once works are happening in that area
10	28 July	Less than 1 L of oil leaked from the track of a CAT D6K Dozer	Contained with drip trays and absorbent pads	28 July	Closed	Normal wear and tear of equipment.
11	29 July	Sediment fence needs attention at L575	Repair fence	14 August	Closed	Spoke with Superintendent, Foremen fixed
12	10 August	Monitor for new instances of Japanese knotweed growth-project wide	Treat with foliar application	30 August	Closed	Ongoing treatment efforts and monitoring.
13	02 September	Excavated soils with potential contamination not fully covered with plastic	PGC Environmental Representative spoke to the Site Superintendent who indicated that stockpiles will be covered the following day	03 September	Closed	Low risk of contamination. Soils placed on an impermeable paved surface and has suspected high NaCl concentrations; however, piles have since been covered

14	10 September	Overflowing general waste bin at the office laydown yard	Responsible party for scheduling was on days off, reminded to have a back up plan	11 September	Closed	Werner Beukes was already actioning a refuse pickup
15	17 September	Approximately 100 mL of engine oil spilled into the Burns Bog perimeter ditch due to a faulty fitting and the accumulation of water within a secondary containment structure	Spill response protocols were initiated immediately and the was reported to the appropriate agencies	17 September	Closed	Spill clean up initiated and reported to appropriate agencies
16	22 September	Gravel truck tracking out a hydrocarbon spill onto Hwy 91.	Truck was immediately taken out of service and spill volumes collected with kitty litter & absorbent materials	22 September	Closed	Spill clean up which included the use of a sweeper.
17	23 September	Swamped and compromised sediment fence as a result of the heavy precipitation	Inspection of all silt fence onsite and repair as required.	28 September	Closed	
18	29 September	Hydrocarbon spill while splicing plastic pipe	Spill was contained to a small area and immediately cleaned up	29 September	Closed	Spill absorbent materials were bagged and stored properly at the office laydown.
19	07 October	Small hydraulic fluid leak	Equipment immediately shutoff, cleaned, and repaired	7 October	Closed	Machine has been repaired, spill materials disposed of appropriately
20	16 October	Approximately 100 mL of applied tact coat at C01 that was impacted by rain events, migrated under the roadside barriers and entered into a ditch	Spill response protocols were initiated immediately, and the spill was reported to the appropriate agencies	16 October	Closed	Spill clean up initiated and reported to appropriate agencies: EMBC, DFO and MoTI
21	20 October	A sheen was observed on standing water within a trench tie in (total volume is estimated to be 50 mL). Source of spill is unknown.	Sheen was immediately collected with spill pads upon detection.	20 October	Closed	Reported to the Provincial Representative. Will continue to monitor the area.
22	23 October	Sand-slide failure on a small portion of the slope adjacent to the new paved detour at the Silda ditch.	The night shift Superintendent has been informed and immediate action has been taken to	28 October	Closed	Preparations are currently being made to procure a wheel excavator to mitigate the scoured area and to stabilize the entire area.

		This was a result of a dewatering pipe that scoured the sand bank.	stabilize the bank for further slides.			
23	26 October	Small spill (none to ground) due to a damaged hydraulic line fitting on a skid steer.	Spill was immediately cleaned with absorbent pads and the machine was taken out of service.	26 October	Closed	Equipment was repaired and returned to service.
24	3 November	Stockpiled waste asphalt at the S4 stockpile area appeared to be leaching a hydrocarbon sheen during rain event.	Construct berm around stockpile. Cover pile. Haul waste asphalt offsite.	3 November	Closed.	A berm was immediately built around the stockpile as temp control. The asphalt will be removed from site.
25	6 November	Hydraulic fluid leaked from under a hydraulic dump trailer. <1L of the hydraulic fluid contacted the pavement	Spill Pads were placed on the pavement to absorb the hydraulic fluid and disposed of in the contaminated waste containment area.	6 November	Closed	Proper protocols were followed by completing thorough equipment inspections on all equipment when it arrives on site prior to mobilizing into the field. This prevented a spill from occurring in a potentially more sensitive area.
26	12 November	Some equipment was observed to not have secondary containment	Spill trays needs to be placed under equipment when not in use	12 November	Closed	Spill trays placed under equipment + light plants. Crew reminded that spill trays need to be placed under equipment.
27	16 November	An oily sheen was observed in the truck stop parking lot near parked equipment. Hydrocarbon residue appeared to be left on pavement during refueling of light standard.	Hydrocarbon residue was cleaned with spill pads and reported by Werner Beukes (PGC).	16 November	Closed	Hydrocarbon residue cleaned.
28	25 November	Potential drainage issues identified at the S4 stockpile area. Weather events have caused damage to the sediment fence.	Sediment fence needs to be repaired and ongoing monitoring will occur.	1 December	Closed	Sediment fence repaired and area monitored.
29	25 November	Wet weather has caused roads in the S4 stockpile area to degrade	Cleaning of roadways. Access road maintenance. Other mitigation measures may include gravel placement on roadway.	26 November	Closed	Roads cleaned and monitoring in ongoing.

30	25 November	Accumulation of water in low lying areas. Site F.	Monitor areas. Drainage and pumping will be installed if required.		Closed	Continue to monitor
31	25 November	A trash can was observed to be full of water and unsorted waste indicating that it had been left uncovered.	On site trash needs to be removed from site daily and brought to PGC laydown and sorted. Trash cans must be covered and secured at all times.	30 November	Closed	Trash removed from sight and crews reminded of proper waste management.
32	27 November	The excavator which was loading trucks at the Hwy 99 sand pile had its hydraulic line rupture around 12:30 am. The leak was on top of the boom and the operator noticed it immediately and shut down the machine. The leak ran down the arm and into the bucket (<1L) but there was no noticeable spillage on the ground	Pads and trays were placed as a precaution.	28 November	Closed	Scheduled repair was completed on the machine.
33	29 November	Hydraulic line burst on tailgate of dump truck	Cleaned with absorbent spill pads and removed from site.	29 November	Closed	Truck departed from site to be repaired.
34	02 December	Hydraulic line fitting was damaged on excavator	Cleaned with absorbent spill pads and called for repairs.	02 December	Closed	Equipment was parked with containments until it could be repaired.
35	02 December	Trash issue at Area E (MESL)	Trash removed	23 December	Closed	Waste management practices reviewed with crews.
36	02 December	Drip trays had not been placed beneath some idle equipment, despite the trays being readily available (MESL)	Drip trays placed under equipment	04 December	Closed	Spill prevention and response reviewed with crews.
37	02 December 2020	Flooding in Area C at L250 and S1 stockpile area	Water management.	08 January	Closed	Additional sediment fence has been installed. A drainage swale has been cut to provide a flow path to River Rd ditches. A check dam has been built prior to entry into River Rd ditch. Water is pumped through a sediment dewatering bag. Poly has been

						placed on stockpile slopes.
38	09 December 2020	Damaged or otherwise lacking CB inserts along River Road West (C)	Install new CB inserts once they have been received	08 January	Closed	Additional catch basin covers installed.
39	15 December 2020	Diesel spill (~2 L) near the office trailers	Construction of a secondary containment for the tidy tank was completed.	2 February	Open	Secondary containment has been constructed for the tidy tank. An additional platform will be built as a secondary control, in addition to spill trays, for use when fueling. Signage will be posted.
40	10 December 2020	Increase in Noise Level Section 3	Monitor trend	20 January	Closed	Noise monitoring complete.
41	16 December 2020	Lacking spill trays or otherwise used incorrectly	Utilize spill trays as intended	08 January	Closed	All crews spoken to on requirement to use spill trays.
42	16 December	Improper waste handling (Site E) with garbage observed on the ground and in spill kits	Manage, sort, and dispose of wastes as per the CEMP	23 December	Closed	Ongoing issue at Site E was relayed to the PGC Environmental Representative
43	18 December	During sand placement in DNR, sediment laden water migrated outside of the construction area.	Stopped work. Water management. Environmental Incident Report attached.	8 January	Closed	Sediment fence repaired. Berm constructed to contain water & allow sediment to settle out. Discharge location for pump constructed.
44	6 January 2021	Hydraulic fluid was noticed leaking from the boom of a CAT 320E excavator while moving sand on the L500 wall preloads.	The operator shut down the machine immediately, and the source of the leak was located at a broken hydraulic line. Spill pads were applied to the leak and on the ground below.	8 January	Closed	Spill was cleaned and spill response materials were disposed of appropriately. Damaged equipment was removed from service and mechanic was called for repairs.
45	12 January 21	dewatering location adjacent to 96th st ditch not set up to manage potentially sediment laden water.	Pump shut down.	13 January 21	Closed	Pump discharge relocated and inspected by EM (filter fabric placed around discharge). Pumping done under EM supervision.
46	14 January 2021	The hydraulic line on the box of a dump truck burst while raising the box to offload sand at the L500 preload and release <5 L on the preload sand.	Truck was shut off immediately and spill pads were applied to the truck and ground below. Contaminated soils were bagged for disposal. Truck	15 January	Closed	Spill was cleaned and spill response materials were disposed of appropriately. Damaged equipment was removed from site for repairs.

			removed from the site for repairs.			
47	19 January 2021	Some CB Inserts along Hwy 91C were beginning to tear and may need to be replaced shortly	Monitor and replace inserts when deemed necessary	5 February	Open	Continue to Monitor
48	19 January 2021	Some track out observed from L1400	Road sweeping was in progress at the time of observations.	19 January	Closed	Road sweeping complete at end of shift with additional sweeping operations performed when required.
49	19 January 2021	Some unidentified stalks near L1170 appeared to be mowed.	Monitor area for regrowth. Remind crews about invasive species and the protocol that needs to be followed.	19 January	Closed	Crews were reminded about the common invasive species on this project and if they are ever unsure about a plant to stop work and notify the PGC environmental team. The area will be monitored for regrowth and a specialist will evaluate species.
50	19 January 2021	plate full of nachos had been discarded on the ground which could attract wildlife	Garbage removed from site	27 January	Closed	Training provided to crews about the risks of leaving garbage on site and the proper disposal procedure will be emphasized (training provided 27-Jan)
51	21 January 2021	Drip trays continue to be lacking from some idle equipment	Drip trays placed under equipment	27 January	Closed	Training complete 27-Jan.
52	21 January 2021	A full jerry can of diesel was observed near the L500 which lacked containment	Jerry can was removed from work area and placed in containment.	27 January	Closed	foreman responsible for area reminded about proper fuel storage procedure.

4.0 ENVIRONMENTAL MONITORING AND INSPECTION RESULTS

Daily site inspections were held during the reporting period by PGC (a representative was available during the day and night shift, as applicable). All operators and equipment were visited/inspected numerous times to ensure that all BMPs are adhered to. Regular equipment inspections are being done and kept on record by PGC.

MESL conducted a weekly visit on 7, 15, & 29 January 2021. MESL met with the Environmental Representative from PGC (Allegra Hollingbury) after the audit to provide comments and discuss observations which were recorded during the field visit.

MESL conducted extended visits (4 hours each day) on 19 & 21 January 2021. These additional monitoring efforts were to relieve PGC in the interim week as a newly hired environmental monitor was completing quarantine. MESL met with the Environmental Representative from PGC (Allegra Hollingbury) after the audits to provide comments and discuss observations which were recorded during the respective field visits.

PGC has indicated that all equipment is checked prior to arriving onsite to ensure that it is free of excess grease, leaks, and foreign materials. Machinery is also checked to ensure they are equipped with a spill kit, spill tray and fire extinguisher. Inspections were done on Delta Aggregate equipment pre-trip inspection sheets. All inspection summaries are available on request.

4.1 Air Quality and Dust Control

A water trailer was always available for dust control. Idling was limited to 1 minute for light duty vehicles and 5 minutes for heavy duty vehicles. PGC Environmental Coordinator checks each stockpile on a daily basis to monitor for any issues, including dust migration. Weather conditions generally wet throughout the month of November and no air quality or dust issues observed.

4.2 Noise and Vibration Management

To obtain more representative data, noise monitoring was collected for reporting period (January 18-24), as all current construction activities have resumed. Noise generation sources were relatively low during the reporting period. Results are provided in Tables 4A and 4B, for day and night data collections, respectively.

Legend

Green: Result \leq Baseline*1.15

Yellow: Baseline*1.15 < Result < Baseline* 1.3

Red: Result \geq Baseline*1.3

Table 4A Noise Data – 20 January 2020 Day

Start Time	Location	Description	Ambient Noise	GPS	Baseline (Day)			Results (Day)		
					Avg. (dB)	Min. (dB)	Max. (dB)	Avg. (dB)	Min. (dB)	Max (dB)
10:20	1	River Road West (Sect. 1)	Sand trucks hauling sand. Dozer, roller and excavator activities	49.154475 LAT, -122.956270 LONG	59	54.2	75	58.9	50	72.3
11:20	3	Nordel Way Bog Area (Sect. 3)	Highway traffic, Crane operating- Dozer and trucks operating on site	49.150918 LAT, -122.930019 LONG	69.6	54.2	86.5	60.1	52.4	90

Table 4B Noise Data – 20 January 2020 Night

Start Time	Location	Description	Ambient Noise	GPS	Baseline (Night)			Results (Night)		
					Avg. (dB)	Min. (dB)	Max. (dB)	Avg. (dB)	Min. (dB)	Max (dB)
23:00	4	Nordel underpass South (Sect 4)	Hauling and placement of sand & compaction. Traffic driving past	49.144235 LAT, -122.939154 LONG	49.4	42.0	68.6	49.4	45.9	72.4

4.3 Erosion and Sediment Control

Daily monitoring is done by PGC Environmental Representatives, Site Supervisors, and Foreman to ensure the installed sediment fences are fully functional site wide. Sediment control fences had been installed in active areas to prevent sediment run-off from clearing and grubbing activities in addition to containment of preload and isolation of wildlife. MESL inspected the silt fencing which appeared to be in overall good condition, PGC continues to inspect fencing and direct repairs, as needed. In some locations, such as stockpiles at the L2500 (G), two rows of sediment fencing were placed. Paved surfaces were observed in overall clean condition.

Most areas were relatively stable having been covered with preload sand, with exception to areas which were below the water table such as the L2300/L2400 (G). Pumps are used as required to manage surface water levels. Pumps discharge into a constructed channel or spillway which was lined with filter cloth and clear crush rock (Photo 23). The spillway was equipped with three check dams and the discharge hose was attached with a filter bag (Photo 24). The spillway drained into a heavily vegetated area (low velocities) and discharged water was visibly clear. PGC has indicated that upstream and downstream turbidity measurements (where flows ultimately drain into Cougar Creek) differed by negligible amounts.

A utility trench near River Road West (C) was being dewatered with a clear crush sump and discharge hose which was equipped with a filter bag (Photo 25, 26). Flows from this system were discharging into a residual portion of the roadside ditch. Some haul roads throughout the site were beginning to degrade due to use; however, sediment tracking was not observed onto public roadways. Crushed rock and sand are added to haul roads for ongoing maintenance.

Paved surfaces were observed in overall clean condition; however, sediment accumulation was observed along River Road West (Photo 27). To remedy this, the road was swept, and additional sweeping frequency will be added as required. Road sweeping occurs at a minimum at the end of every shift.

4.4 Water Quality Management

Dewatering at the L2300 (G) had been restarted following the implementation of a new system as described in Section 4.3. This system was functioning as intended, with turbidity of the discharge within acceptable ranges (sampled at Cougar Creek), and the pump was able to adequately draw down surface water volumes. This enabled the continuation of preload placement and the excavation of peat and toe key detail.

PGC continued to collect water quality samples along Silda Ditch (to the Fraser River), at the Fraser River, and in 96th ditch. Additional sampling will be conducted in 96th St ditch during dewatering activities at the L100 throughout the month. The results of this data collection are presented in Table 4 and locations are shown on Figure 3.

At River Rd, the water treatment system for the intake and effluent was sampled on 7 and 9 January 2021 for works in and around River Road. The pH was measured at 9.5 in the lab analysis, which was adjusted in the field and tested by the environmental monitor prior to discharge. Results can be found in Appendix 7.



Figure 3: Current water sampling locations.

4.5 Wildlife and Habitat Management

The fish salvages in the Area H ditches have been postponed until a later date in 2021. A fish salvage was conducted in Area I, west ditch between January 18 and 20, 2021. Wildlife captured during fish salvage included Northwestern salamanders (*Ambystoma gracile*) and invasive American bullfrogs (*Lithobates catesbeianus*). The results of this salvage are provided in the January 2021 monthly report in Appendix 3.

MESL and PGC have routinely observed beaver tracks leading from an active lodge and across the preload near the DNR and the L2300 (G) (Photo 28). Other tracks belonging to other semi-aquatic animals such as mink have also been observed. It is imperative that equipment and trucking accessing this area are mindful of wildlife particularly during the early morning and during night shifts when these species are most active.

4.6 Vegetation Management

Some unidentified stalks (since mowed) near the L1170 (F), along the south side of the Highway 91 Connector are suspected to be invasive (Photo 29). This occurrence was reported to PGC. PGC environmental manager spoke to crews to remind them about the common invasive species on this project. The correct protocol is to stop work and notify the PGC environmental team if there is ever uncertainty about a plant species. The area will be monitored for regrowth and a specialist will be called to evaluate species.

4.7 Fisheries Habitat Management

A fish salvage was conducted in Area I, west ditch between January 18 and 20, 2021. Species captured included 190 sticklebacks (*Gasterosteus* sp.). Data to be provided in the February 2021 monthly report.

4.8 Concrete Works and Grouting Management

Nothing to report this period for concrete works and grouting management.

4.9 Waste Management

In general, yellow wheelie bins were readily available and fully stocked at each active work location while mobile equipment was also equipped with spill kits. PGC has provided checklists and ensures that any depleted supplies within these bins are restocked immediately (as per the inventory posted on the inside of the lid).

Overall housekeeping and waste management has improved; however, some issues persist, particularly near the L500 (E). At the time of the field visit, food waste had been discarded on the ground which was likely to attract wildlife (Photo 30). Other areas, such as River Road West (C) are routinely tidy with waste streams being sorted and disposed of appropriately.

Hydrocarbon wastes were neatly stored in labelled drums near the site office which were covered and protected from rain. Zip tied hazardous waste bags containing used spill pads and contaminated soils are stored under the tent by office muster point to stop rain reaching and spreading beyond spill trays.

Table 4: Hazardous Waste Storage and Disposal Tracking

Date (2020)	Location	Haz-Material Stored	Volume m ³	Comments	Date of Disposal
13 July	PGC Site Office Yard	Spent absorbents	N/A	Approximately 2-3 L of diesel was spilled on the pavement. Spent absorbents to be collected by Tervita.	TBD
28 July	L575 Preload Area	Spent absorbents	N/A	Less than 1L of oil to spill tray, absorbent pads used to mitigate spill to ground. Spent absorbent pads to be collected by Tervita.	TBD
17 Sept	Burns Bog perimeter ditch	Spent Absorbents	N/A	~100 mL of engine oil to water. Spent absorbent pads to be collected by Tervita.	TBD
21 Sept	Site office waste area	Spent Absorbents	N/A	Excess pads that were placed in spill trays. Spent absorbent pads to be collected by Tervita.	24 September 2020-3 barrels
24 Sept	Site office waste area	Spent Absorbents	N/A	Excess pads that were placed in spill trays. Spent absorbent pads to be collected by Tervita.	24 September 2020-3 barrels
24 Sept	Site office waste area	Used aerosols	N/A	Spray paint cans that had collected to date.	24 September 2020-3/4 of a bin
25 Oct	PGC Site Office Yard	Used aerosol paint cans, contaminated soil and plastic oil containers.	55 m ³	Spray paint cans that had collected to date, damaged drum with the soil and empty containers.	25 October 2020
3 Nov	Site office waste area	Wood waste bin	N/A	Pallets and other wood by products	3 November 2020
2 Dec	Site office waste area	Spent absorbents, drum contaminated soil, plastic oil containers, bags with contaminated soil.	1.7 m ³	Used spill response materials and contaminated soils.	02 December 2020

4.10 Spill Management and Emergency Response

No emergency responses were recorded during this reporting period

4.11 Contaminated Sites Management

PGC inspected all secondary containments and emptied excess water which had accumulated from recent rainfall. PGC also reiterated (particularly with sub-contractors) that all equipment working near Burns Bog must be equipped with bio-degradable hydraulic oil.

Drip trays continue to be lacking from some idle equipment, despite the trays being readily available (Photo 31). In general, damaged drip trays appear to have been removed from service, while the use of trays appears to have improved such that they are routinely checked for accumulated rainwater and used appropriately (not under capacity). A full jerry can of diesel was observed near the L500 (E) which lacked any form of containment (Photo 32). In addition, some trays which were being utilized were damaged and would not function as intended in the event of a spill. Such an example was observed near the Truck Parking Lot (Photo 5). To mitigate the ongoing issues with spill trays, PGC provided training to site supervisors and crews on 27-January on the proper use of spill trays.

A fuel shed had also been erected near the site offices to protect rainwater from dripping and picking up hydrocarbons from the fueling area (around the tidy tank). An additional platform is scheduled to be built on 02 February 2021. This platform will provide secondary containment when refueling and will mitigate human error when fueling (process will no longer rely on a spill tray alone being moved into position). Additional signage will be posted on fueling procedure.

To date approximately 1500 m³ of material has been excavated from within the contaminated soil boundary in Section 1. Groundwater treatment ongoing through the month of January in Section 1. In Section 2, excavation into the contaminated soil boundary commenced on 28 January with approximately 100m³ of material excavated in the month of January. Groundwater treatment facility set up in section 2, no discharge occurred in the month of January. All stockpiling of contaminated material follows the temporary stockpile procedure outlined in the PGC Contaminated Site Management Plan.

5.0 ENVIRONMENTAL PERMITS

5.1 Status Update

A Permit Tracker is provided in Appendix 4.

A Permit Conditions Tracker is included as Appendix 5 outlining all DFO and WSA permit terms and conditions.

5.2 Status of the Table of Commitments and Assurances

The status of completed and ongoing commitments in the Table of Commitments and Assurances is provided in Appendix 6.

6.0 SITE PHOTOS



Photo 1. Stormtec water treatment facility for contaminated groundwater. System includes intake pumps, oxidation, pH adjustment, flocculation, settling tanks, and filters (C).



Photo 2. Separate area of Fortis gas line excavation. Yellow pipe being fused for tie-in at River Road West (C).



Photo 3. Seismic fabric being rolled out at Wall 210 (E).



Photo 4. L500 – Walls 202 and 210 (E). Preload bordering Hwy 91C continuing to be built up and pulled out to the east.



Photo 5. Some spill trays were damaged and were no longer functional.



Photo 6. Menard installing the crane near River Road West (C).



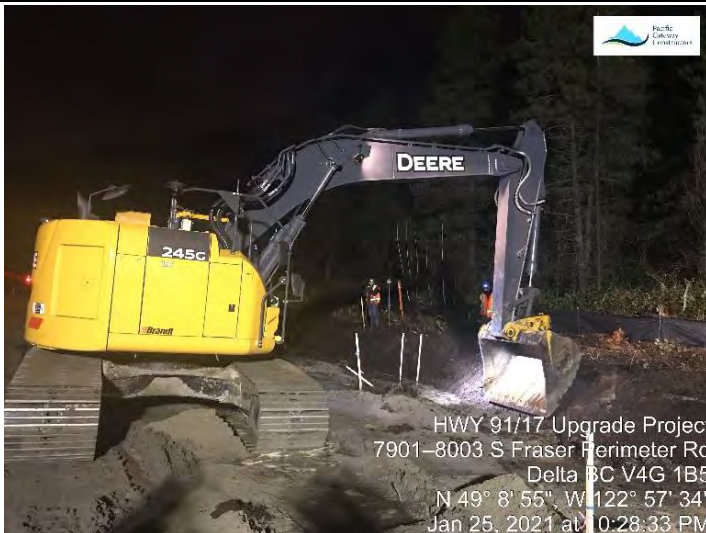
HWY 91/17 Upgrade Project
7901-8003 S Fraser Perimeter Rd
Delta BC V4G 1B5
N 49° 8' 55", W 122° 57' 28"
Jan 19, 2021 at 12:49:43 AM

Photo 7. Preload placement and infilling of roadside ditches continued at the L100 (B).



HWY 91/17 Upgrade Project
7901-8003 S Fraser Perimeter Rd
Delta BC V4G 1B5
N 49° 8' 55", W 122° 57' 34"
Jan 19, 2021 at 10:54:35 PM

Photo 8 Installation of CB extensions at the L100 (B).



HWY 91/17 Upgrade Project
7901-8003 S Fraser Perimeter Rd
Delta BC V4G 1B5
N 49° 8' 55", W 122° 57' 34"
Jan 25, 2021 at 10:28:33 PM

Photo 9. Infilling of roadside ditch & removal of peat at the L100 (B).



HWY 91/17 Upgrade Project
#Section-02 #MSE Wall #L500
49° 8' 54" N, 122° 57' 0" W
Jan 6, 2021 at 8:46:45 AM

Photo 10. Lock block wall placement on top slope of Wall 210 (E).



Highway 91/17 Upgrade Project
#Section 2
N 49.148278° W 122.953264°
74° E
January 11, 2021 at 2:02:05 PM PST

Photo 11. 200 mm culvert to be installed running along west side of Hwy 17 (E).



Highway 91/17 Upgrade Project
#Section 2
N 49.148291° W 122.949631°
114° SE
January 11, 2021 at 2:49:29 PM PST

Photo 12. Importing and placing sand and lock blocks at Wall 210 (E).



HWY 91/17 Upgrade Project
Delta BC
N 49° 8' 53", W 122° 56' 57"
Jan 19, 2021 at 12:35:59 AM

Photo 13. Preload placement and compaction continued at the L500/L575 (E).



Hwy 91/17 Upgrade Project
S3 Truck Stop
N 49.146320°, W 122.944132°
290° W
Jan 4, 2021 at 12:16:00 PM

Photo 14. Stone column installation continued. Sand berm separates work area (shallow rainwater) from deep pool of water between sand alignments at the L1150/L500 (F).



Highway 91/17 Upgrade Project
#Section 3
N 49.146801°, W 122.945359°
149° SE
January 6, 2021 at 2:51:50 PM PST

Photo 15. Menard assembling new crane for further stone column installation at the L1450 (F).



HWY 91/17 Upgrade Project
Nordel Way
Delta BC
N 49° 8' 44", W 122° 56' 38"
Jan 28, 2021 at 11:03:49 PM

Photo 16. Stockpiling, relocation, & placement of preload sand at the L1150 (F).



HWY 91/17 Upgrade Project
Delta BC
N 49° 8' 51", W 122° 56' 45"
Jan 25, 2021 at 11:31:43 PM

Photo 17. Placement of lock block wall commenced at the L1300 (H).



HWY 91/17 Upgrade Project
Delta BC
N 49° 8' 37", W 122° 56' 16"
Jan 26, 2021 at 10:53:15 PM

Photo 18. Dewatering into temporary cofferdam at the L2100 (I).



Photo 19. Clearing & padding out sand to build out alignment that extends over removed boardwalk area at the east end of L2300 (G).



Photo 20. Hydraulic fluid from broken hydraulic line on excavator dripped onto machine and ground at the L500 (E).



Photo 21. Broken hydraulic hose at the L500 preload sand delivery area north of Hwy 91C (E).



Photo 22. Spill pads applied immediately on ground at the L500 preload sand delivery area north of Hwy 91C (E).



Photo 23. Pumping at north end of L2300/L2400 (DNR)(G). Flows from 6-inch pump dewatered through filter bag and into clear crush spillway.



Photo 24. The dewatering channel constructed near the Delta Nature Reserve (G) was not in use during this inspection.



Photo 25. Clear crush sump in utility trench - River Road West (C).



Photo 26. Filter bag at end of discharge hose - River Rd West (C).



Photo 27. Sediment accumulation was observed along River Road West (C).



Photo 28. Beaver tracks were observed in the sand preload near the Delta Nature Reserve (G).



Photo 29. An unidentified plant (suspected invasive) was observed near the L1170.

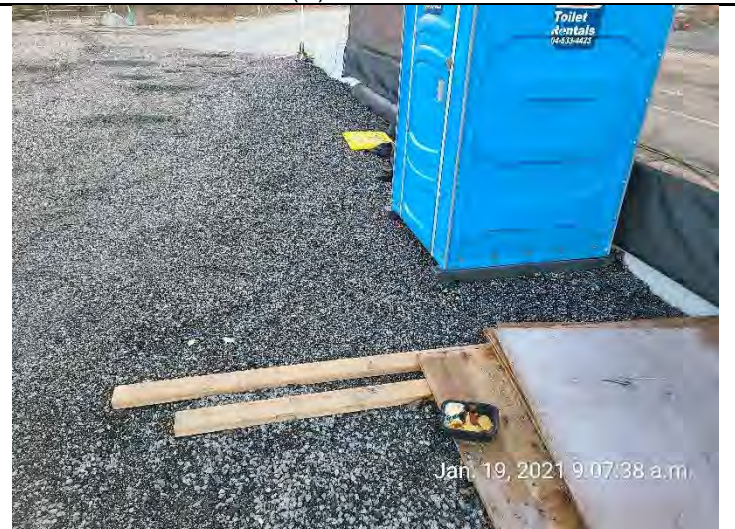


Photo 30. A plate of nachos had been discarded on the ground at the L500 (E).

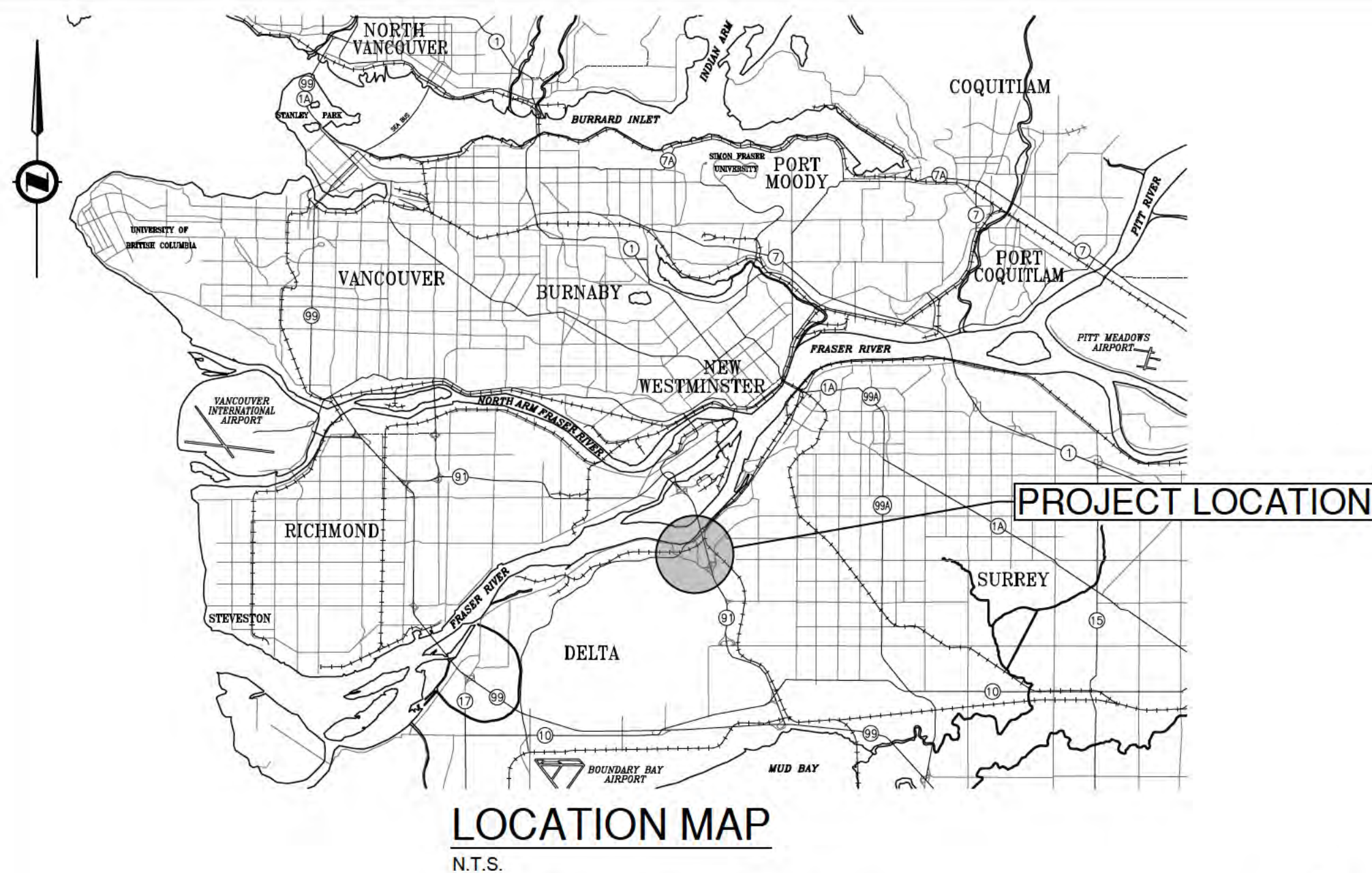


Photo 31. Spill trays were often lacking from idle equipment despite being readily available.



Photo 32. A full jerry can of diesel lacked containment at the L500 (E).

APPENDIX 1: KEY PLAN DRAWING



Ministry of
Transportation
and Infrastructure

PROJECT NO. 08900

HIGHWAY 91/17 UPGRADE PROJECT DESIGN BUILD

HIGHWAY 17 - STA. P.O.T 221+80.000 - STA. P.O.C. 236+60.000

1.480 km

HIGHWAY 91 - STA. P.O.T 113+05.000 - STA. P.O.T. 122+11.892

0.907 km

LANDMARK KILOMETRE INVENTORY - SOUTH FRASER PERIMETER ROAD: HWY 99 - 136 ST

SEGMENT 3134 (EAST)

km 8.92 to km 10.23

SEGMENT 3135 (WEST)

km 9.67 to km 12.17

LANDMARK KILOMETRE INVENTORY - HWY 91 ANNACIS: RTE99 - NORDEL I/C

SEGMENT 3002 (NORTH)

km 7.10 to km 7.85

SEGMENT 3003 (SOUTH)

km 0.00 to km 0.75

LANDMARK KILOMETRE INVENTORY - HWY 91 ANNACIS: NORDEL I/C - JCT 91A

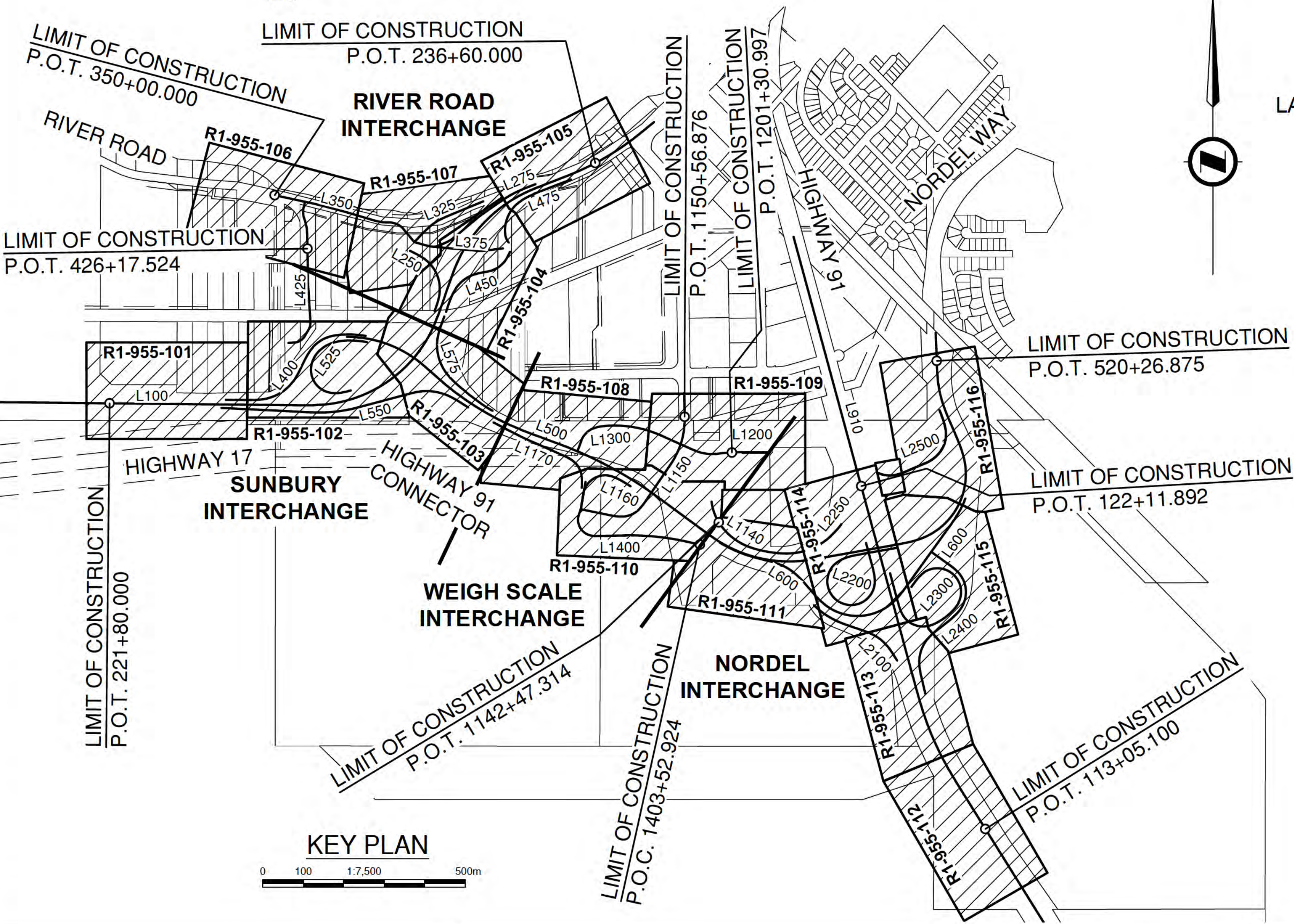
SEGMENT 3030 (NORTH)

km 0.00 to km 0.27

SEGMENT 3050 (SOUTH)

km 3.61 to km 3.88

ROADWAY DESIGN



KEY PLAN

SCALE AS SHOWN		CAD FILENAME R1-955-011	
		PLOT DATE 2020-02-14	
REV	DATE	REVISIONS	NAME
A	2020-02-14	30% INTERIM DESIGN SUBMISSION	D. DULAY



MINISTRY OF TRANSPORTATION
AND INFRASTRUCTURE
SOUTH COAST REGION
HIGHWAY ENGINEERING AND GEOMATICS



HIGHWAY 91/17 UPGRADE PROJECT
KEY PLAN

DESIGNED V. MAK DATE 2020-02-14	QUALITY CONTROL T. SMILJANIC DATE 2020-02-14
ENGINEER OF RECORD D. DULAY DATE 2020-02-14	QUALITY ASSURANCE D. DULAY DATE 2020-02-14
DRAWN E. YANG DATE 2020-02-14	

CONTRACTOR FILE NUMBER	PROJECT NUMBER	REG	DRAWING NUMBER	REV
2111-40088-00	08900	1	R1-955-011	A

APPENDIX 2: SPILL AND INCIDENT TRACKER

HWY 91/17 SI E Environmental Spill and Incident Tracking																	
Incident #	Date Of Event	Date Reported	Date Initial Notification Issued	Shift	Approx Time	Contractor	Sub Contractor	Silo	Classification	Description of Event	Location	Fluid Amount (L)	Fluid Type	Type of Equipment	Causal Factors	Action Taken	Corrective Actions Date Complete
21	~Jan-21	~Jan-21	5-Jan-21	Night	20:31-21:00	PGC	Delta Aggregate		Minor spill (<1L)	Hydraulic line broke	S3 L1 00	<500mL	Hydraulic fluid	Rock truck (Volvo T-13)	Normal wear and tear on moving machine parts (hydraulic line); unforeseen circumstances.	Leaking hydraulic line noticed during pre-shift inspection. Operator shut down the machine immediately and placed spill pads on the leak source and on the ground below the leak. Machine was parked with its box up how leak was found and in the locked position. A spill tray was placed below the leak, and contaminated pads and sand below were removed for disposal. Mechanic repaired the broken line in the morning (05 Jan 2021).	5-Jan-21
22	6-Jan-21	6-Jan-21	6-Jan-21	Day	9:01-9:30	PGC			Minor spill (<1L)	Hydraulic line broke	S2 L500 preload	<500mL	Hydraulic fluid	Excavator (CAT 320E)	Normal wear and tear on moving machine parts (hydraulic line); unforeseen circumstances.	Leaking hydraulic line noticed on boom during operation. Operator shut down the machine immediately and placed spill pads on the leak source and on the ground below the leak. Machine was taken out of service, and a spill tray was placed below the leak. Contaminated pads and sand below were removed for disposal. Mechanic repaired the broken line later in the day.	6-Jan-21
23	12-Jan-21	12-Jan-21		Night	00:01-00:30	PGC				Silty water released to 96th St ditch	S2 adjacent to 96th St ditch	unknown quantity of water	silty water		not allowing sit practices. No EM present. Working during heavy rain event	Work was immediately stopped and pumps turned off.	Jan 17 - EM will be present for operations to resume with a dewatering plan in place.
2	1 ~Jan-21	1 ~Jan-21	1 ~Jan-21	Day	1:31-15:00	PGC			Spill (1.1 L - 5L)	Hydraulic hose broke	S2 L500 preload	<5L	Hydraulic fluid	Dump truck	Normal wear and tear on moving machine parts (hydraulic line); unforeseen circumstances.	Hydraulic line burst while raising box of dumptruck to off load sand. Machine was immediately turned off. Hydraulic fluid spilled onto machine and preload sand. Spill pads were applied to ground and machine. Contaminated sand that had absorbed oil was quickly removed and bagged for disposal. Oil was fully cleaned off machine and surrounding ground.	Trucking company took machine out of service and will complete repairs off site.

SUMMARY		
totals	Unit/Value	total
Total Volume	L	0
Total Spills	#	4
Classification		
Minor Spill (<1L)	#	2
Spill (1.1L-5L)	#	0
Large Spill (5.1L-99.9L)	#	0
Significant Spill (To water or >100L)	#	0
Total	#	2
Fluid Type		
Hydraulic	#	3
Antifreeze	#	0
Diesel	#	0
Oil	#	0
Gasoline	#	0
Black Water	#	0
Glycol	#	0
Unknown	#	0
Total	#	3

APPENDIX 3: WILDLIFE SALVAGE RESULTS

GLOSSARY OF TERMS

PEMA = North American Deer Mouse

Sorex sp = shrew family

MITO = Townsend vole

MIOR = Creeping vole

SOBE: Sorex bendirii (Pacific Water Shrew)

RACL: Rana clamitans (Green Frog)

AMGR: Ambystoma gracile (Northwestern Salamander)

RAAU: Rana aurora (Red-legged frog)

RARA: Rattus norvegicus (Black rat)

Area C1

Day	Time (hr)	Trap	Species	Body length (mm)	Total length (mm)	Weight (g)	Notes	Initials
30-Apr-20	6:35	P1	Common Shrew	60	100		relocated	PM, NS
30-Apr-20	7:13	P14	Common Shrew	45	80		relocated	PM, NS
30-Apr-20	7:31	P22	Common Shrew	50	100		Distinct next fringe and dark fringes along the thighs and back	PM, NS
3-May-20	6:30	S7	PEMA				relocated	JC
3-May-20	22:00	P13	Common Shrew	50	100		relocated	SB, JW
3-May-20	22:00	P13	Common Shrew	50	95		relocated	SB, JW
4-May-20	6:20	S3	PEMA				escaped	NS
4-May-20	6:35	S4	PEMA				escaped	NS
4-May-20	6:50	S7	PEMA				relocated	NS
4-May-20	7:20	M3	green frog (juv)				euthanized	NS
5-May-20	6:29	S3	PEMA				relocated	NS
5-May-20	6:45	S9	PEMA				relocated	NS
5-May-20	22:15	P8	PEMA				escaped	JC, JW
5-May-20	22:30	S9	PEMA				relocated	JC, JW
5-May-20	22:40	M2	green frog				escaped	JC, JW
5-May-20	22:45	S11	PEMA				relocated	JC, JW
6-May-20	6:36	S3	PEMA				relocated	NS, PM
6-May-20	14:50	P13	Common Shrew	40	70		white belly; relocated	JC
7-May-20	6:50	M3	green frog				euthanized	JC, PM
7-May-20	14:45	M6	green frog				escaped; traps closed	NS, JC

Area D1

Day	Time (hr)	Trap	Species	Body length (mm)	Total length (mm)	Weight (g)	Photo #	Notes	Initials
20-May-20	14:30	DS5	Creeping vole?					no red on back; relocated	NS
21-May-20	6:15	DS1	PEMA					relocated	NS
21-May-20	14:15	DS1	common shrew	45	90			white belly; relocated	JC
21-May-20	14:30	DP4	common shrew	50	90			white belly; relocated	JC
22-May-20	14:20	DS1	Townsend's vole	80	120			no red on back; relocated	NS
23-May-20	14:00	CLOSED							

Area E1

Day	Time (hr)	Trap	Species	Body length (mm)	Total length (mm)	Weight (g)	Photo #	Notes	Initials
19-May-20	22:00	ES40	PEMA						SB, PJM
21-May-20	7:17	ES4	PEMA				relocated		NS
21-May-20	7:48	ES13	PEMA				relocated		NS
21-May-20	8:03	ES22	PEMA				relocated		NS
21-May-20	8:08	ES28	PEMA				relocated		NS
21-May-20	8:34	ES40	PEMA				relocated		NS
21-May-20	23:15	ES30	PEMA				relocated		JC/PM
22-May-20	6:52	EP1	common shrew	40	80		relocated		NS
22-May-20	7:00	ES3	townsend's vole	100	140		no red on back; relocated		NS
22-May-20	7:04	ES4	PEMA				relocated		NS
22-May-20	7:37	ES33	PEMA				relocated		NS
23-May-20	6:45	EP1	common shrew	50	100		white belly		JC
23-May-20	7:00	ES9	house mouse?				grey, small ears		JC
23-May-20	7:15	EP5	common shrew	60	110		white belly		JC
23-May-20	7:15	EP5	common shrew	40	80		white belly		JC
23-May-20	7:45	ES33	house mouse?				escaped		JC
24-May-20	6:18	ES3	PEMA				relocated		NS
25-May-20	6:00	EP1	common shrew	40	80		relocated		NS/JC
25-May-20	6:00	EP1	common shrew	50	90		relocated		NS/JC
25-May-20	6:00	ES3	PEMA				relocated		NS/JC
25-May-20	6:15	EP5	common shrew	40	75		relocated		NS/JC
25-May-20	6:15	EP5	common shrew	50	85		relocated		NS/JC
25-May-20	6:15	EP5	common shrew	50	50		relocated		NS/JC
26-May-20	6:20	ES22	PEMA				relocated		NS

Area D2

Day	Time (hr)	Trap	Species	Body length (mm)	Total length (mm)	Weight (g)	Photo #	Notes	Initials
11-Aug-20	15:15	P14	Sorex sp.	50	40			relocated	NS
11-Aug-20	15:15	P14	Sorex sp.	50	40			slightly darker w/ lighter belly	NS
11-Aug-20	22:33	P14	Sorex sp.	35	40				PM/SB **PEMA was
12-Aug-20	6:25	S4B	PEMA					relocated	NS frequently
12-Aug-20	7:10	S30	PEMA					relocated	NS misidentified as
12-Aug-20	14:30	P8	Sorex sp.	50	30				PM MUMU on data
12-Aug-20	22:54	S31	Sorex sp.	45	45				SB/KD sheets;
12-Aug-20	23:07	S36	PEMA						SB/KD corrected here
13-Aug-20	6:50	S21	PEMA					mortality	NS
13-Aug-20	7:15	P28	Sorex sp.	45	30			relocated	NS
13-Aug-20	7:28	S34	PEMA					relocated	NS
13-Aug-20	7:31	S36	Rat						NS
13-Aug-20	14:33	P17	Sorex sp.	45	30				PM
13-Aug-20	15:03	S22	Sorex sp.	50	45				PM
13-Aug-20	22:14	P11	Sorex sp.	45	50			mortality	SB
13-Aug-20	22:29	P17	Sorex sp.	50	50				SB
13-Aug-20	22:29	P17	Sorex sp.	45	50				SB
13-Aug-20	22:41	S21	PEMA?						SB
14-Aug-20	6:20	P2	Sorex sp.						PJM
14-Aug-20	7:20	S23	Sorex sp.					mortality	PJM
14-Aug-20	7:30	S30	PEMA						PJM
14-Aug-20	7:40	P24	Sorex sp.						PJM
14-Aug-20	7:55	S34	PEMA						PJM
14-Aug-20	8:00	S36	PEMA						PJM
14-Aug-20	14:31	P8	garter snake					escaped when lifted lid	PM
14-Aug-20	14:45	P14	Sorex sp.	45	35				PM
14-Aug-20	14:45	P14	Sorex sp.	45	30				PM
14-Aug-20	14:45	P14	PEMA					mortality; appears to have been predated by the shrews	PM
14-Aug-20	22:33	S36	PEMA						SB/KD
15-Aug-20	6:55	S21	PEMA					mortality	NS
15-Aug-20	7:35	P28	Sorex sp.	50	40			mortality	NS
15-Aug-20	7:50	S30	PEMA					mortality	NS
15-Aug-20	14:00	P11	Sorex sp.	45	45				SB
15-Aug-20	22:00	P14	Sorex sp.	45	45				SB/JW
15-Aug-20	22:00	P14	Sorex sp.	45	45				SB/JW
15-Aug-20	22:00	S23	bird sp.					little brown bird; flew away	SB/JW
16-Aug-20	8:00	S36	PEMA					relocated	NS
16-Aug-20	14:26	S9	Sorex sp.	50	45				PM
16-Aug-20	22:00	S4B	PEMA						SB/JW
16-Aug-20	22:00	P5	PEMA					baby?	SB/JW

16-Aug-20	22:00	P10	Pacific treefrog					SB/JW
16-Aug-20	22:00	S24	PEMA					SB/JW
16-Aug-20	22:00	S34	PEMA					SB/JW
16-Aug-20	22:00	S36	PEMA					SB/JW
17-Aug-20	7:25	S18	PEMA					NS
17-Aug-20	7:35	P21	Sorex sp.	60	50	relocated		NS
17-Aug-20	7:50	P24	Sorex sp.	50	50	darker; light underside; relocated		NS
17-Aug-20	7:50	P24	Sorex sp.	60	50	lighter brown; relocated		NS
17-Aug-20	8:25	S34	PEMA			relocated		NS
17-Aug-20	8:30	S36	PEMA			weird growth on right side of belly, near hing legs		NS
17-Aug-20	22:15	S4B	PEMA					PM/JC
17-Aug-20	22:25	S8	PEMA			escaped		PM/JC
17-Aug-20	22:30	S14	PEMA					PM/JC
17-Aug-20	22:45	S19	PEMA					PM/JC
17-Aug-20	22:45	S20	PEMA					PM/JC
17-Aug-20	22:55	S24	PEMA					PM/JC
17-Aug-20	23:10	P24	Sorex sp.	40	35			PM/JC
17-Aug-20	23:20	S37	PEMA					PM/JC
17-Aug-20	23:25	S34	PEMA					PM/JC
17-Aug-20	23:30	S29	Sorex sp.	35	35			PM/JC
17-Aug-20	23:30	S31	Sorex sp.	50	40	almost dead, attempted to revive but died		PM/JC
18-Aug-20	6:10	S1	PEMA					NS
18-Aug-20	6:25	S4B	PEMA					NS
18-Aug-20	6:40	P11	Creeping vole	70	40	relocated		NS
18-Aug-20	7:00	S13	PEMA			small; relocated		NS
18-Aug-20	7:10	S14	PEMA			relocated		NS
18-Aug-20	7:30	S23	PEMA			small; relocated		NS
18-Aug-20	7:45	S22	PEMA			relocated		NS
18-Aug-20	7:50	P24	Sorex sp.	60	40	relocated		NS
18-Aug-20	7:50	P24	Sorex sp.	60	50	relocated		NS
18-Aug-20	7:50	P24	Sorex sp.	60	50	relocated		NS
18-Aug-20	8:15	S32	PEMA			relocated		NS
18-Aug-20	14:20	S4	Sorex sp.	50	40	fed mealworm		JC
18-Aug-20	14:30	P6	Peromyscus sp.			grey; large hind legs; long tail; ears flat to head		JC
18-Aug-20	15:30	S22	Sorex sp.	45	40	mortality		JC
18-Aug-20	15:45	S24	Sorex sp.	50	35	mortality		JC
18-Aug-20	16:10	S33	Sorex sp.	45	35			JC
18-Aug-20	16:15	S36	Sorex sp.	40	40	fed mealworm		JC
18-Aug-20	22:09	S1	PEMA					JC/JG
18-Aug-20	22:19	S7	PEMA					JC/JG
18-Aug-20	22:28	S9	PEMA					JC/JG
18-Aug-20	23:02	S20	PEMA					JC/JG
18-Aug-20	23:04	P21	Sorex sp.	40	40			JC/JG
18-Aug-20	23:12	S22	Sorex sp.	50	40			JC/JG

18-Aug-20	23:23 S22B	Sorex sp.	45	40	mortality	JC/JG
18-Aug-20	23:29 S24	PEMA				JC/JG
18-Aug-20	23:30 P26	Sorex sp.	40	40		JC/JG
18-Aug-20	23:38 S25	PEMA				JC/JG
18-Aug-20	23:52 S32	Sorex sp.	40	40		JC/JG
18-Aug-20	23:54 S34	PEMA				JC/JG
19-Aug-20	0:04 S36	PEMA				JC/JG
19-Aug-20	0:07 S37	PEMA			growth on right side	JC/JG
19-Aug-20	0:15 S14	PEMA				JC/JG
19-Aug-20	6:15 S1	PEMA			relocated	NS
19-Aug-20	6:25 S3	PEMA			relocated	NS
19-Aug-20	7:30 S21	PEMA			relocated	NS
19-Aug-20	7:35 S22	PEMA			mortality	NS
19-Aug-20	7:45 S24	PEMA			relocated	NS
19-Aug-20	7:50 S25	PEMA			relocated	NS
19-Aug-20	7:55 S26	Sorex sp.	50	40	mortality	NS
19-Aug-20	8:05 P28	Sorex sp.	50	50	relocated	NS
19-Aug-20	8:30 S32	Sorex sp.	50	40	mortality	NS
19-Aug-20	8:38 P30	Sorex sp.	60	50	relocated	NS
19-Aug-20	8:45 S36	PEMA			relocated	NS
19-Aug-20	14:20 S3	Sorex sp.			mortality	PJM
19-Aug-20	14:30 P2	garter snake			relocated	PJM
19-Aug-20	15:50 P23	Sorex sp.			fed mealworm; relocated	PJM
19-Aug-20	16:20 S24	bird sp.			flew away	PJM
19-Aug-20	16:50 S37	Sorex sp.			mortality	PJM
19-Aug-20	22:09 S2	Sorex sp.	40	35		PM/JG
19-Aug-20	22:19 S7	PEMA				PM/JG
19-Aug-20	22:33 S13	Sorex sp.	40	40		PM/JG
19-Aug-20	22:56 P23	Sorex sp.	35	40		PM/JG
19-Aug-20	22:56 S22	Sorex sp.	40	40		PM/JG
19-Aug-20	23:08 S4	PEMA				PM/JG
19-Aug-20	23:23 S23	PEMA				PM/JG
19-Aug-20	23:18 S26	PEMA				PM/JG
19-Aug-20	23:35 P30	Sorex sp.	40	40		PM/JG
19-Aug-20	23:39 S34	PEMA				PM/JG
20-Aug-20	6:25 P1	Sorex sp.			escaped	NS
20-Aug-20	6:25 P1	Sorex sp.	60	50	relocated	NS
20-Aug-20	6:55 S7	PEMA			relocated	NS
20-Aug-20	7:10 S9	Sorex sp.	60	50	relocated	NS
20-Aug-20	7:20 P14	Sorex sp.	50	40	relocated	NS
20-Aug-20	7:35 P16	Sorex sp.	50	40	relocated	NS
20-Aug-20	8:05 P23	Sorex sp.	50	40	relocated	NS
20-Aug-20	8:05 P23	Sorex sp.	55	45	relocated	NS
20-Aug-20	8:05 P23	Sorex sp.	45	40	mortality; other 2 eating it	NS

20-Aug-20	8:25 P24	Sorex sp.	50	40	relocated	NS
20-Aug-20	8:40 P26	Sorex sp.	50	50	relocated	NS
20-Aug-20	8:40 P26	Sorex sp.	45	40	mortality; slug feeding on it	NS
20-Aug-20	8:50 S25	PEMA			relocated	NS
20-Aug-20	8:55 S26	Sorex sp.	60	50	relocated	NS
20-Aug-20	9:10 S28	Sorex sp.	50	50	relocated	NS
20-Aug-20	9:25 S32	Sorex sp.	60	50	relocated	NS
20-Aug-20	9:35 S34	PEMA			relocated	NS
20-Aug-20	14:30 S6	Sorex sp.			fed mealworm; relocated	PJM
20-Aug-20	15:00 S9	Sorex sp.			relocated	PJM
20-Aug-20	15:20 P16	Sorex sp.			relocated	PJM
20-Aug-20	15:50 S23	Sorex sp.			fed mealworm; relocated	PJM
20-Aug-20	22:10 S2	Sorex sp.	60	50		PM/JG
20-Aug-20	22:26 S9	Sorex sp.	40	40		PM/JG
20-Aug-20	22:29 S10	PEMA				PM/JG
20-Aug-20	22:33 S12	Sorex sp.	50	45		PM/JG
20-Aug-20	22:43 P16	Sorex sp.	60	40		PM/JG
20-Aug-20	22:50 S16	PEMA				PM/JG
20-Aug-20	22:57 P20	Sorex sp.	60	50		PM/JG
20-Aug-20	23:08 S23	PEMA				PM/JG
20-Aug-20	23:14 S22B	Sorex sp.	60	45	mortality	PM/JG
20-Aug-20	23:20 S26	PEMA				PM/JG
20-Aug-20	23:26 S34	Sorex sp.	60	45		PM/JG
20-Aug-20	23:40 P29	Sorex sp.	60	40		PM/JG
21-Aug-20	6:15 P1	Sorex sp.	45	40		JC
21-Aug-20	7:00 P11	Sorex sp.	50	40		JC
21-Aug-20	7:20 S15	Sorex sp.	45	35	mortality	JC
21-Aug-20	7:40 P20	Sorex sp.	40	40		JC
21-Aug-20	8:00 P23	Sorex sp.	50	40		JC
21-Aug-20	8:15 P22	Sorex sp.	50	45		JC
21-Aug-20	8:15 S21	PEMA				JC
21-Aug-20	8:45 S35	PEMA				JC
21-Aug-20	14:45 S3	Sorex sp.	45	45	relocated	NS
21-Aug-20	15:00 S5	Sorex sp.	50	45	mortality	NS
21-Aug-20	15:15 S8	Sorex sp.	50	50	relocated	NS
21-Aug-20	16:15 S27	Sorex sp.	45	45	mortality	NS
21-Aug-20	16:45 S31	Sorex sp.	45	45	mortality	NS
21-Aug-20	22:00 S2	Sorex sp.	40	40	relocated to east side of Silda	PJM/JG
21-Aug-20	22:10 S4	Sorex sp.	40	40	relocated to east side of Silda	PJM/JG
21-Aug-20	22:15 S7	PEMA			relocated	PJM/JG
21-Aug-20	22:20 S9	PEMA			relocated	PJM/JG
21-Aug-20	22:30 S13	PEMA			relocated south of site	PJM/JG
21-Aug-20	22:30 P14	Sorex sp.	40	35	relocated south of site	PJM/JG
21-Aug-20	22:45 S20	Sorex sp.	40	30	relocated	PJM/JG

21-Aug-20	23:00 S26	Sorex sp.	50	40	relocated	PJM/JG
21-Aug-20	23:10 P27	Sorex sp.			relocated	PJM/JG
22-Aug-20	6:20 S4	PEMA			relocated	NS
22-Aug-20	6:25 S4B	PEMA			relocated	NS
22-Aug-20	6:30 S5	PEMA			relocated	NS
22-Aug-20	6:35 S6	PEMA			relocated	NS
22-Aug-20	7:05 S13	Sorex sp.	45	40	mortality; trap had been thrown/moved	NS
22-Aug-20	7:10 S14	PEMA			relocated	NS
22-Aug-20	7:40 S18	PEMA			relocated	NS
22-Aug-20	7:50 S21	PEMA			relocated	NS
22-Aug-20	7:52 S23	PEMA			relocated	NS
22-Aug-20	7:55 S22B	Sorex sp.	45	40	mortality	NS
22-Aug-20	8:10 P24	Sorex sp.	45	40	relocated	NS
22-Aug-20	8:10 P24	Sorex sp.	50	50	relocated	NS
22-Aug-20	8:20 P26	Sorex sp.	50	50	relocated	NS
22-Aug-20	8:35 P28	Sorex sp.	50	50	relocated	NS
22-Aug-20	8:50 S32	PEMA			relocated	NS
22-Aug-20	14:30 P1	Sorex sp.	40	40		JC
22-Aug-20	14:35 S4	Sorex sp.	50	40		JC
22-Aug-20	14:40 P2	Sorex sp.	45	45		JC
22-Aug-20	22:00 S4	PEMA				KD/JC
22-Aug-20	22:03 S4B	PEMA				KD/JC
22-Aug-20	22:16 S12B	Sorex sp.	50	40		KD/JC
22-Aug-20	22:18 S13	PEMA				KD/JC
22-Aug-20	22:30 P23	Sorex sp.	45	45		KD/JC
22-Aug-20	23:08 S35	PEMA				KD/JC
22-Aug-20	23:10 S36	PEMA				KD/JC
22-Aug-20	23:15 S37	Sorex sp.	40	45		KD/JC
23-Aug-20	6:30 S13	PEMA			relocated to south side of railroad tracks	PJM
23-Aug-20	6:45 S14	PEMA			relocated to south side of railroad tracks	PJM
23-Aug-20	6:50 S12B	PEMA			relocated to south side of railroad tracks	PJM
23-Aug-20	7:20 S21	PEMA			mortality	PJM
23-Aug-20	7:40 P30	Sorex sp.	45	40	relocated to east side of Silda	PJM
23-Aug-20	7:45 P32	PEMA			escaped	PJM
23-Aug-20	8:00 P37	PEMA			escaped	PJM
23-Aug-20	14:50 S12B	Sorex sp.			mortality	PM
23-Aug-20	14:54 P14	Sorex sp.	50	50		PM
23-Aug-20	15:03 S15	PEMA				PM
23-Aug-20	15:08 S16	Sorex sp.	40	40		PM
23-Aug-20	22:00 S2	Sorex sp.	45	40		KD/PM
23-Aug-20	22:10 S10	Sorex sp.	45	40	signs of stress	KD/PM
23-Aug-20	22:15 S13	Sorex sp.	45	40		KD/PM
23-Aug-20	22:20 S14	Sorex sp.	45	40	mortality	KD/PM
23-Aug-20	22:22 S15	Sorex sp.	40	40		KD/PM

23-Aug-20	23:00 S21	PEMA					KD/PM
23-Aug-20	23:20 S35	PEMA					KD/PM
23-Aug-20	23:30 S37	PEMA					KD/PM
24-Aug-20	6:25 S2	Sorex sp.	50	50	relocated		NS/PJM
24-Aug-20	6:45 S12B	Sorex sp.	45	45	relocated		NS/PJM
24-Aug-20	7:10 S21	PEMA			relocated		NS/PJM
24-Aug-20	7:15 P23	Sorex sp.	50	50	relocated		NS/PJM

Area B1

Day	Time (hr)	Trap	Species	Body length (mm)	Total length (mm)	Weight (g)	Photo #	Notes	Initials
13-Aug-20	16:25	B1P3	MITO	70	30				PM
16-Aug-20	22:00	B1S3	PEMA						SB, JW
18-Aug-20	17:00	B1P3	garter snake						JC
18-Aug-20	0:45	B1S4	PEMA						JC, JG
18-Aug-20	0:50	B1S3	Sorex sp	50	45		mortality		JC, JG
18-Aug-20	0:55	B1S2	PEMA						JC, JG
19-Aug-20	9:25	B1S1	PEMA						NS
19-Aug-20	9:30	B1S2	PEMA						NS
19-Aug-20	9:40	B1S3	PEMA						NS
19-Aug-20	17:20	B1P1	garter snake						PJM
19-Aug-20	0:05	B1S4	PEMA						PM, JG
19-Aug-20	0:10	B1S3	PEMA						PM, JG
19-Aug-20	0:15	B1S1	PEMA						PM, JG
20-Aug-20	10:10	B1S1	PEMA						NS
20-Aug-20	0:05	B1S3	PEMA						PM, JG
20-Aug-20	0:10	B1S1	PEMA						PM, JG
21-Aug-20	9:00	B1S1	PEMA						JC
21-Aug-20	9:05	B1P1	Sorex sp	40	35				JC
21-Aug-20	23:45	B1S1	PEMA						PJM, JG
21-Aug-20	23:45	B1S3	PEMA						PJM, JG
22-Aug-20	9:30	B1S1	PEMA						NS
22-Aug-20	9:35	B1S3	PEMA						NS

Areas B2a

Day	Time (hr)	Trap	Species	Body length (mm)	Total length (mm)	Weight (g)	Photo #	Notes	Initials
2-Sep-20	0:38	S1	PEMA						PM, JG
2-Sep-20	7:30	S1	PEMA					relocated	PJM, NS
2-Sep-20	7:40	P5	Sorex sp.					mortality; voucher specimen	PJM, NS
2-Sep-20	7:00	M2	green frog					escaped	PJM, NS
3-Sep-20	7:50	M2	NW salamander					relocated	NS, PJ
5-Sep-20	1:40	S5	PEMA						JC, PM
5-Sep-20	6:00	S6	PEMA					young; grey pelage	NS, TP
6-Sep-20	6:45	S6	PEMA					immature; relocated	TP, PM
6-Sep-20	19:25	M3	garter snake						PM, MT
7-Sep-20	1:31	S4	PEMA						PM, MT
7-Sep-20	7:20	S5	PEMA					relocated	PJM, JZ
7-Sep-20	19:00	P4	garter snake						TP
8-Sep-20	13:00	P9	PEMA					mortality; buried offsite	PJM, ML

Area G1

Day	Time (hr)	Trap	Species	Body length (mm)	Total length (mm)	Weight (g)	Photo #	Notes	Initials
2-Sep-20	1:50	P12	MIOR					(creeping vole)	PM, JG
3-Sep-20	6:50	P23	Sorex sp.	55	45			relocated	NS, PJ
3-Sep-20	7:10	M1	green frog					tadpole	NS, PJ
3-Sep-20	7:20	M4	NW Salamander					relocated	NS, PJ
3-Sep-20	12:35	M3	NW Salamander						NS, RW
4-Sep-20	6:25	M2	green frog						NS, PJ
4-Sep-20	6:40	P18	Sorex sp.	45	40				NS, PJ
4-Sep-20	6:55	M1	green frog					tadpole	NS, PJ
4-Sep-20	7:00	M4	green frog					tadpole	NS, PJ
5-Sep-20	0:30	M1	Long-toed Salamander					tadpole	JC, PM
5-Sep-20	0:50	M2	NW Salamander					tadpole	JC, PM
5-Sep-20	0:50	M2	NW Salamander					tadpole	JC, PM
5-Sep-20	12:35	M1	green frog					adult; euthanized	JC, PM
6-Sep-20	0:18	P23	Sorex sp.	50	40				JC, MT
6-Sep-20	12:10	M1	NW Salamander					juvenile	TP
6-Sep-20	18:50	M3	green frog						PM, MT
7-Sep-20	0:34	P20	Sorex sp.	50	45				PM, MT
7-Sep-20	0:57	S5	PEMA						PM, MT
7-Sep-20	1:06	M3	NW Salamander						PM, MT
7-Sep-20	6:50	S7	PEMA						PJM, JZ
7-Sep-20	12:39	M3	NW Salamander						JC, AD
8-Sep-20	6:20	P9	Sorex sp.	60	55				NS, PJ
8-Sep-20	18:30	M3	NW Salamander						RD
9-Sep-20	6:20	M4	Long-toed Salamander					tadpole	PJM, NS
9-Sep-20	6:40	P22	Sorex sp.	40	40				PJM, NS

Area F1

Day	Time (hr)	Trap	Species	Body length (mm)	Total length (mm)	Weight (g)	Photo #	Notes	Initials
3-Sep-20	13:40	M2	green frog					escaped	NS, RW
3-Sep-20	14:00	M3	green frog					escaped	NS, RW
4-Sep-20	8:00	S6	Sorex sp.	55	45			relocated	NS, PJ
4-Sep-20	13:40	M3	green frog					euthanized	PJM, RW
5-Sep-20	2:20	S1	PEMA						JC, PM
5-Sep-20	2:30	M4	NW Salamander						JC, PM
5-Sep-20	3:00	P10	Sorex sp.	40	40				JC, PM
5-Sep-20	19:15	M3	green frog					escaped	RW
6-Sep-20	1:51	P10	Sorex sp.	50	45				JC, MT
6-Sep-20	1:51	P10	Sorex sp.	45	40				JC, MT
6-Sep-20	19:50	M3	green frog						PM, MT
7-Sep-20	2:17	M4	NW Salamander						PM, MT
7-Sep-20	13:23	M3	Salamander sp						JC, AP
7-Sep-20	13:23	M3	Vole sp.						JC, AP
8-Sep-20	7:10	M3	green frog					tadpole	NS, PJ
9-Sep-20	1:30	P11	Sorex sp.	45	40			mortality	PM, JG
9-Sep-20	1:38	P12	Sorex sp.	45	40				PM, JG
10-Sep-20	6:30	P10	Sorex sp.	50	40			relocated	NS
10-Sep-20	7:00	M4	NW Salamander					relocated	NS
11-Sep-20	6:30	M3	green frog					escaped minnow	NS, JC
11-Sep-20	6:30	M3	NW Salamander					relocated	NS, JC

Area I3

Day	Time (hr)	Trap	Species	Body length (mm)	Total length (mm)	Weight (g)	Photo #	Notes	Initials
17-Sep-20	0:38	P12	M-SOVA	50	100			Sorex vagrans; dark brown, beige belly	TP, MT, LS
17-Sep-20	19:20	S3	Sorex sp.	50	95				ADP, PM, SP
18-Sep-20	0:36	P8	M-SOBE					mortality; voucher specimen	TP, MT, SS
19-Sep-20	9:21	P3	M-SOBE	65-70	125				SS, LS
20-Sep-20	19:37	S3	Sorex sp.	40	80			dorsal - light brown/ grey underbelly	KD, SS
21-Sep-20	1:50	S3	PEMA						PM, MT, JC
21-Sep-20	13:45	S4	Sorex sp.	45	90				NS, JZ
22-Sep-20	19:50	S4	Sorex sp.	45	90				PM, ADP
23-Sep-20	0:29	S4	Sorex sp.	50	95				MT, TP
23-Sep-20	0:53	P3	Sorex sp.	45	85				MT, TP
23-Sep-20	8:40	S4	Sorex sp.	40	80			relocated	NS, RT
23-Sep-20	9:05	P7	Sorex sp.	50	95			relocated	NS, RT
23-Sep-20	9:05	P7	Sorex sp.	45	85			relocated	NS, RT
23-Sep-20	9:05	P7	Sorex sp.	50	95			relocated	NS, RT
30-Sep-20	7:20	P8	Sorex sp.	55	100				NS, LS
30-Sep-20	19:10	P12	Sorex sp.	45	85				JC, SP
1-Oct-20	0:15	S5	M-RARA					black rat; jumped out	TP, PM
1-Oct-20	0:21	P12	Sorex sp.						TP, PM

Areas E2 and E3

Day	Time (hr)	Trap	Species	Body length (mm)	Total length (mm)	Weight (g)	Photo #	Notes	Initials
6-Oct-20	18:43	M2	A-RACL						JB, ADP
7-Oct-20	0:10	M1	A-AMGR						TP, JC
7-Oct-20	0:25	P8	PEMA						TP, JC
7-Oct-20	0:37	S30	PEMA					subadult	TP, JC
7-Oct-20	0:52	S21	PEMA					subadult	TP, JC
7-Oct-20	6:22	S8	PEMA						NS, LS
7-Oct-20	6:28	S10	PEMA						NS, LS
7-Oct-20	12:20	S8	PEMA						PJM, AW
7-Oct-20	18:35	M4	RACL						PM, JG
8-Oct-20	0:25	S10	PEMA						TP, JC
8-Oct-20	0:30	M3	AMGR						TP, JC
8-Oct-20	6:23	P10	Sorex sp.	45	85			brown dorsal; tan ventral	SS, LS
8-Oct-20	7:06	S31	PEMA						SS, LS
8-Oct-20	12:30	M4	A-AMGR					tadpole	NS, PJ
8-Oct-20	17:55	M3	A-RACL						JB, SPE
9-Oct-20	0:35	S26	PEMA						JC, PM
9-Oct-20	6:35	S20	PEMA						SS, NS
9-Oct-20	12:15	P3	Sorex sp.	55	100			closed traps due to rain	NS, RW
11-Oct-20	0:15	P1	Sorex sp.						TP, SP
11-Oct-20	0:30	S8	PEMA						TP, SP
11-Oct-20	0:35	S10	PEMA						TP, SP
11-Oct-20	0:40	S11	PEMA						TP, SP
11-Oct-20	0:45	S25	PEMA						TP, SP
11-Oct-20	7:12	S26	PEMA						NS
11-Oct-20	12:00							traps closed due to forecast rain	SS, SPE
14-Oct-20	0:05	M3	A-AMGR						JC, SB
14-Oct-20	0:30	S19	PEMA						JC, SB
14-Oct-20	0:45	P32	Sorex sp.	50	100				JC, SB
14-Oct-20	6:28	S15	PEMA						NS, LS
14-Oct-20	6:45	S19	PEMA						NS, LS

15-Oct-20	0:15 S18	PEMA			young	TP, JC
15-Oct-20	0:20 S19	PEMA			young	TP, JC
15-Oct-20	0:30 S26	PEMA			subadult	TP, JC
15-Oct-20	6:49 S26	PEMA				SS, PJ
16-Oct-20	0:17 P30	Sorex sp.	50	100		PM, JG
16-Oct-20	0:17 P30	Sorex sp.	45	90		PM, JG
16-Oct-20	0:42 S20	PEMA				PM, JG
16-Oct-20	6:28 S19	PEMA			mortality	NS, LS
16-Oct-20	12:50 S29	PEMA				JC, RW
17-Oct-20	0:19 P27	Sorex sp.				TP, SP
17-Oct-20	0:50 S26	PEMA			mortality	TP, SP

Area F2

Day	Time (hr)	Trap	Species	Body length (mm)	Total length (mm)	Weight (g)	Photo #	Notes	Initials
16-Sep-20	18:58	P27	Sorex sp.						TP, SP, RD
17-Sep-20	0:29	P12	Sorex sp.						TP, SS, MT
17-Sep-20	0:39	P16	Sorex sp.						TP, SS, MT
17-Sep-20	0:39	P16	Sorex sp.						TP, SS, MT
17-Sep-20	0:49	P27	Sorex sp.						TP, SS, MT
17-Sep-20	0:55	S17	PEMA						TP, SS, MT
17-Sep-20	6:30	P12	Sorex sp.	50	90	7		mortality; brown top, silver bottom	SS, JB, PJ
17-Sep-20	7:00	S13A	Sorex sp.	55	100	8		brown dorsal, silver ventral, relocated	SS, JB, PJ
18-Sep-20	0:35	P13	Sorex sp.	52	89	3		brown dorsal, cream ventral	SS, MT, TP
18-Sep-20	0:46	P16	Sorex sp.	50	100	7		brown dorsal, silver ventral	SS, MT, TP
18-Sep-20	1:15	S17	Sorex sp.	50	90			brown dorsal, silver ventral	SS, MT, TP
18-Sep-20	1:25	P39	Sorex sp.	-	-			escaped; brown dorsal, cream ventral	SS, MT, TP
18-Sep-20	6:26	P16	Sorex sp.	55	100				JZ, NS, JB
18-Sep-20	6:33	P18	Sorex sp.	60	110				JZ, NS, JB
18-Sep-20	12:30	S16	Sorex sp.	60	100				RW, NS, LS
18-Sep-20	18:21	S10	Sorex sp.	50	85				ADP, PM, PJM
18-Sep-20	18:32	P12	Sorex sp.	40	75				ADP, PM, PJM
18-Sep-20	18:59	P39	Sorex sp.	50	85				ADP, PM, PJM
19-Sep-20	0:56	P3	Sorex sp.					s.vagrans/monticolus type	TP, SP
19-Sep-20	1:14	S13B	Sorex sp.					s.vagrans/monticolus type	TP, SP
19-Sep-20	1:20	P16	Sorex sp.					s.vagrans/monticolus type	TP, SP
19-Sep-20	1:56	P57	Sorex sp.					s.vagrans/monticolus type	TP, SP
19-Sep-20	1:56	P57	Sorex sp.					s.vagrans/monticolus type	TP, SP
19-Sep-20	2:15	P66	Sorex sp.						TP, SP
19-Sep-20	6:15	P1	Sorex sp.	55	95			brown dorsal, silver ventral	SS, LS
19-Sep-20	7:30	P35	Sorex sp.	50	90			brown dorsal, beige ventral	SS, LS
19-Sep-20	7:38	P49A	Sorex sp.	45	80			brown dorsal, silver ventral	SS, LS
19-Sep-20	8:13	P57	Sorex sp.	45	85			brown dorsal, silver ventral	SS, LS

19-Sep-20	18:00 P16	Sorex sp.	-	-		TP, SP
20-Sep-20	0:10 P1	Sorex sp.		50	90	PM, SP
20-Sep-20	0:20 P13	Sorex sp.		55	105	PM, SP
20-Sep-20	0:32 P18	Sorex sp.		50	95	PM, SP
20-Sep-20	0:40 P23	Sorex sp.		50	95	PM, SP
20-Sep-20	0:44 P28	Sorex sp.		45	90	PM, SP
20-Sep-20	6:20 P1	Sorex sp.		55	100	LS, NS
20-Sep-20	6:25 S1	Sorex sp.		55	100	LS, NS
20-Sep-20	6:40 P5	SOBE	75-80		150	LS, NS
						dorsal - grey and brown, ventral - lighter
20-Sep-20	7:00 P17	Sorex sp.		55	105	beige/grey LS, NS
20-Sep-20	7:31 P30	Sorex sp.		45	85	LS, NS
						dorsal - grey and brown, ventral - light
20-Sep-20	7:38 P32	Sorex sp.		50	95	grey LS, NS
20-Sep-20	7:38 P32	Sorex sp.		40	80	LS, NS
20-Sep-20	7:46 P37	Sorex sp.		45	85	LS, NS
20-Sep-20	12:40 P27	Sorex sp.		50	90	d - brown SS, PJM
20-Sep-20	12:55 P30	Sorex sp.		35	70	d - brown SS, PJM
20-Sep-20	18:20 S3	Sorex sp.		40	70	d - brown, v-creamy/grey SS, KD
21-Sep-20	0:00 P2	Sorex sp.		45	90	PM, MT, JC
21-Sep-20	0:10 S13B	Sorex sp.		50	95	PM, MT, JC
21-Sep-20	0:15 P17	Sorex sp.		45	85	PM, MT, JC
21-Sep-20	0:30 P22	Sorex sp.		45	90	PM, MT, JC
21-Sep-20	0:45 P29B	Sorex sp.		40	80	PM, MT, JC
21-Sep-20	6:20 S14	Sorex sp.		55	100	PJ, JB
21-Sep-20	6:50 P29B	Sorex sp.		58	104	PJ, JB
21-Sep-20	6:55 P23	Sorex sp.		54	96	PJ, JB
21-Sep-20	7:25 P40B	Sorex sp.		55	100	PJ, JB
21-Sep-20	12:40 P27	Sorex sp.		50	90	NS, JZ
21-Sep-20	12:52 P38	Sorex sp.		50	95	NS, JZ
22-Sep-20	18:10 P1	Sorex sp.		45	80	relocated; light belly RD, PJM
22-Sep-20	18:20 S1	Sorex sp.		40	75	relocated; light belly RD, PJM
22-Sep-20	0:10 P4	Sorex sp.		45	85	JC, PM, TP
22-Sep-20	0:30 P10	Sorex sp.		50	95	JC, PM, TP

22-Sep-20	0:50 P17	Sorex sp.	45	90		JC, PM, TP
22-Sep-20	1:15 P29B	Sorex sp.	50	90		JC, PM, TP
22-Sep-20	6:18 P2	Sorex sp.	50	90	D=brown/v=cream; escaped	SS, LS
22-Sep-20	6:53 P13	Sorex sp.	50	90	D=brown/v=cream	SS, LS
22-Sep-20	6:31 S17	Sorex sp.	50	95	D=brown/v=beige	SS, LS
					D=brown/v=lighter brown; lrg eyes & ears	SS, LS
22-Sep-20	6:45 S18	PEMA	60	120		SS, LS
22-Sep-20	8:17 P69	Sorex sp.	45	85	D=brown/v=grey/silver	SS, LS
22-Sep-20	12:30 P19	Sorex sp.	40	75	light belly; relocated	AW, PJM
22-Sep-20	12:50 S19	Sorex sp.	45	85	light belly; relocated	AW, PJM
22-Sep-20	18:26 P17	Sorex sp.	50	95		ADP, PM
22-Sep-20	18:43 P40B	Sorex sp.	50	90		ADP, PM
22-Sep-20	18:43 P40B	Sorex sp.	55	100		ADP, PM
22-Sep-20	18:56 P48	Sorex sp.	40	80		ADP, PM
23-Sep-20	0:25 P7	Sorex sp.				TP, MT
23-Sep-20	0:32 P10	Sorex sp.				TP, MT
23-Sep-20	0:32 P10	Sorex sp.				TP, MT
23-Sep-20	0:45 P17	Sorex sp.				TP, MT
23-Sep-20	1:15 S25	PEMA				TP, MT
23-Sep-20	1:37 P58	Sorex sp.				TP, MT
23-Sep-20	6:20 P2	Sorex sp.	50	100	relocated	NS, RT
23-Sep-20	6:20 P2	Sorex sp.	50	95	relocated	NS, RT
23-Sep-20	6:30 P3	Sorex sp.	45	85	relocated	NS, RT
23-Sep-20	6:40 P5	Sorex sp.	50	90	relocated	NS, RT
23-Sep-20	6:48 P6	Sorex sp.	45	85	relocated	NS, RT
23-Sep-20	6:59 P11	Sorex sp.	45	85	relocated	NS, RT
23-Sep-20	7:05 P12	Sorex sp.	55	105	relocated	NS, RT
23-Sep-20	7:10 P16	Sorex sp.	60	110	relocated	NS, RT
23-Sep-20	7:15 P17	Sorex sp.	45	85	relocated	NS, RT
23-Sep-20	7:15 P17	Sorex sp.	50	95	relocated	NS, RT
23-Sep-20	7:35 S22	Sorex sp.	45	80	relocated	NS, RT
23-Sep-20	7:40 P43	Sorex sp.	45	85	relocated	NS, RT
23-Sep-20	7:50 P49A	Sorex sp.	55	105	relocated	NS, RT
23-Sep-20	8:00 P54	Sorex sp.	55	100	relocated	NS, RT

23-Sep-20	8:03 P56	Sorex sp.	50	90	relocated	NS, RT
28-Sep-20	18:24 P16	Sorex sp.	50	100		PM, ADP
28-Sep-20	19:09 S24	Sorex sp.	50	95		PM, ADP
29-Sep-20	1:41 P41	Sorex sp.	40	80	mortality; voucher specimen	MT, JG
29-Sep-20	6:37 P20	SOBE	100	170		JZ, JC
29-Sep-20	6:58 P29B	Sorex sp.	40	80		JZ, JC
30-Sep-20	23:30 P1	Sorex sp.				TP, JG, MT
30-Sep-20	0:45 P7	Sorex sp.				TP, JG, MT
1-Oct-20	0:34 P10	Sorex sp.	50	95		PM, TP
1-Oct-20	0:56 P29B	Sorex sp.	50	95		PM, TP

Area G2 and Boardwalk

Day	Time (hr)	Trap	Species	Body length (mm)	Total length (mm)	Weight (g)	Photo #	Notes	Initials
6-Oct-20	20:14	P19	Sorex sp.	40	80				JB, ADP
6-Oct-20	20:14	P19	Sorex sp.	40	80				JB, ADP
7-Oct-20	2:05	S15	PEMA					subadult	TP, JC
7-Oct-20	2:10	M2	A-RAAU					red-legged frog; relocated	TP, JC
7-Oct-20	2:15	S6	PEMA					adult	TP, JC
7-Oct-20	7:40	P12	A-AMGR						NS, LS
7-Oct-20	7:55	M2	A-AMGR						NS, LS
8-Oct-20	7:55	M1	A-AMGR	100	100			relocated	SS, LS
8-Oct-20	7:55	M1	A-AMGR	25	25			relocated	SS, LS
8-Oct-20	8:33	S4	PEMA					relocated	SS, LS
9-Oct-20	1:10	P12	Sorex sp.	50	95				PM, JC
9-Oct-20	1:25	F3	A-RACL					euthanized	PM, JC
9-Oct-20	1:35	M2	A-RAAU					relocated	PM, JC
9-Oct-20	7:30	F2	A-RACL						NS, SS
9-Oct-20	7:35	M2	A-RACL						NS, SS
9-Oct-20	8:20	S6B	PEMA					mortality	NS, SS
9-Oct-20	13:20	M1	garter snake					escaped	NS, RW
9-Oct-20	13:25	M3	fish sp.					relocated; traps close due to forecast rain	NS, RW
11-Oct-20	1:39	S15	PEMA						TP, SP
11-Oct-20	2:00	P19	Microtus sp.					Creeping vole?	TP, SP
11-Oct-20	2:05	M1	A-AMGR						TP, SP
11-Oct-20	2:40	M2	A-AMGR						TP, SP
11-Oct-20	2:40	P21	A-AMGR						TP, SP
11-Oct-20	8:20	P9	Sorex sp.	45	85				NS
11-Oct-20	8:40	F1	A-AMGR						NS
11-Oct-20	9:20	S7	PEMA						NS
11-Oct-20	12:00							traps closed due to forecast rain	SS, SPE
13-Oct-20	19:30	P17	Salamander sp.						JB, SP
14-Oct-20	1:00	F1	A-AMGR						JC, SB
14-Oct-20	1:00	F1	A-AMGR						JC, SB

14-Oct-20	1:30 M3	A-AMGR				JC, SB
14-Oct-20	1:30 M3	A-AMGR				JC, SB
14-Oct-20	1:30 M3	A-AMGR				JC, SB
15-Oct-20	7:40 F3	A-AMGR				NS, LS
15-Oct-20	1:30 M2	A-AMGR				TP, JC
15-Oct-20	1:30 M2	A-AMGR				TP, JC
15-Oct-20	7:53 M4	A-AMGR			SNV: 75 mm	SS, PJ
15-Oct-20	8:05 M1	A-AMGR			SNV: 110 mm	SS, PJ
15-Oct-20	8:38 P34	Sorex sp.	50	93	dark brown dorsal; light cream ventral	SS, PJ
16-Oct-20	1:30 P19	Sorex sp.	45	85		PM, JG
16-Oct-20	7:29 M1	A-AMGR				NS, LS
16-Oct-20	7:37 M4	A-AMGR				NS, LS
16-Oct-20	8:00 F5	A-AMGR				NS, LS
17-Oct-20	1:08 F1	A-AMGR				TP, SP
17-Oct-20	1:08 F1	A-AMGR				TP, SP
17-Oct-20	7:46 F1	A-AMGR				SS
17-Oct-20	8:02 P17	A-RAAU				SS
17-Oct-20	12:00				Traps closed/pulled; only minnows and f	JC, SPE
18-Oct-20	12:02 M1	F-TSB				SS
18-Oct-20	12:03 F5	A-RAAU			relocated	SS
18-Oct-20	12:18 F3	A-RAAU			relocated	SS
18-Oct-20	12:35 M2	A-RAAU			relocated	SS
18-Oct-20	12:35 M2	A-AMGR				SS
19-Oct-20	8:00				No captures; minnows & funnel traps pu	NS

Area H

Day	Time (hr)	Trap	Species	Body length (mm)	Total length (mm)	Weight (g)	Photo #	Notes	Initials
22-Oct-20	6:22	S2	PEMA						SS, LS
22-Oct-20	7:20	M2	A-AMGR						SS, LS
24-Oct-20	0:25	S8	PEMA						TP, SP
26-Oct-20	18:45	M3	A-AMGR					larval stage	JB, PJ
27-Oct-20	6:25	S3	PEMA						SS, ADP
28-Oct-20	18:30	S20	sparrow					released	JB, SPE
29-Oct-20	12:30	M3	A-AMGR					small	JC, LS
30-Oct-20	6:15	S23	PEMA						NS, LS

Area B2b

Day	Time (hr)	Trap	Species	Body length (mm)	Total length (mm)	Weight (g)	Photo #	Notes	Initials
23-Oct-20	1:16	P1	Sorex sp.	45	90				PM, MT
27-Oct-20	1:08	S3	PEMA						SB, MT
27-Oct-20	1:15	S4	PEMA						SB, MT
27-Oct-20	7:26	S6	PEMA						SS, ADP
27-Oct-20	18:34	S3	Wren sp.				flew away		JB, KD
28-Oct-20	0:39	P4	A-RACL						TP, JG
28-Oct-20	6:50	P16	Sorex sp.	50	90				NS, LS
29-Oct-20	7:15	P10	Sorex sp.	60	105			Brown dorsal / silver ventral; Grovesnail observed adj to pitfall	SS, PJ
29-Oct-20	7:15	P10	Sorex sp.	60	100			Brown dorsal / silver ventral	SS, PJ
30-Oct-20	7:34	P3	A-AMGR					relocated to 96th St ditch, north of isolation	NS, JG, LS, ADP
30-Oct-20	7:35	P5A	A-AMGR					relocated to 96th St ditch, north of isolation	NS, JG, LS, ADP
30-Oct-20	7:38	S4	PEMA						NS, JG, LS, ADP
30-Oct-20	7:41	S5	PEMA						NS, JG, LS, ADP

APPENDIX 4: PERMIT TRACKER

Facility Name															
Facility Address															
Facility Phone															
Facility Fax															
Facility Email															
Facility Website															
Facility Description															
Facility Status															
Facility Type															
Facility Location															
Facility Coordinates															
Facility Capacity															
Facility Hours															
Facility Notes															
Facility Comments															
Facility History															
Facility Details															
Facility Summary															
Facility Footer															

APPENDIX 5: PERMIT CONDITIONS TRACKER

Conditions	Responsibility
1 The removal of or disturbance to riparian vegetation should be kept to a minimum during the works.	PGC
2 Whenever possible, works are to be conducted when the watercourse is dry.	PGC
3 If works are not conducted in the dry, works are to be conducted in isolation of flow and the following measures are to be implemented:	PGC
a An appropriately qualified professional is to conduct a fish salvage of the isolated work area. Choose low impact salvage methods such as minnow trapping and seining before opting for higher impact electrofishing. In the event that isolation is breached, stop work and repeat fish salvage efforts.	Brybil
b Dewater the isolated area gradually to reduce the potential for stranding fish.	PGC
c Ensure bypass pump intakes and outlets are located within the confines of the fish-isolated work area (i.e., to prevent fish impingement on pump intakes, and to prevent dewatering areas where fish may be present). Ensure pumps are screened to prevent entrainment or impingement of fish in accordance with DFO's interim code of practice for End-of-pipe Fish Protection Screens for Small Water Intakes in Freshwater (https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecraneng.html).	PGC/Brybil
d When diverting watercourse flows, maintain an appropriate depth and flow (i.e., base flow) for the protection of fish and fish habitat downstream of the isolated work area.	PGC
4 Complete the works as quickly as possible once they are started.	PGC
5 Undertake works during dry weather and low water conditions.	PGC
6 Equipment is to be situated in the dry watercourse channel within the footprint of the works or operated from the top of the bank.	PGC
7 Ensure that material such as rock, riprap, or other materials placed on the banks or within the active channel or floodplain of the watercourse is inert and free of silt, overburden, debris, or other substances deleterious to aquatic life.	PGC
8 Minimize the introduction of sediments (e.g., silts, clays and sand) into the watercourse or downstream reaches of the watercourse.	PGC
9 Develop and implement an erosion and sediment control plan to avoid and minimize the introduction of sediment into or induced sedimentation in the watercourse.	PGC
10 Do not deposit any substances deleterious to fish or fish habitat directly or indirectly into the watercourse or downstream reaches of the watercourse.	PGC
11 Develop and implement a response plan to avoid a spill of deleterious substances into the watercourse.	PGC
12 Works should be monitored full-time during start-up and any instream works or sensitive activity. The environmental monitor must be an appropriately qualified professional and ensure mitigation measures are implemented for the protection of fish and fish habitat.	PGC, weekly audit MESL
13 While the Program recommends works be conducted during the least risk to fish instream work window of August 1 – September 15 where possible. It is recognized instream works will be required to commence upland works. Therefore, if works are proposed for outside the least risk window, work should especially be conducted under the direction of an appropriately qualified professional as per item 12 above.	PGC
14 Monitor before, during, and after all phases of construction to ensure that fish do not become trapped/isolated, stranded, or entrained within the project area.	PGC, weekly audit MESL
15 If fish are observed at the site, or upstream or downstream of the site, work should be halted. Works may only resume following implementation of appropriate mitigation measures and under the direction of an appropriately qualified professional.	PGC
16 Ensure that when dewatering, site water is appropriately managed to prevent sediment laden water from entering downstream watercourses.	PGC

Conditions		Responsibility
1	The removal of or disturbance to riparian vegetation should be kept to a minimum during the works.	PGC
2	Whenever possible, works are to be conducted when the watercourse is dry.	PGC
3	If instream works are not conducted in the dry, works are to be conducted in isolation of flow and the following measures are to be implemented:	PGC
a	An appropriately qualified professional is to conduct a fish salvage of the isolated work area. Choose low impact salvage methods such as minnow trapping and seining before opting for higher impact electrofishing. In the event that isolation is breached, stop work and repeat fish salvage efforts.	Brybil
b	Dewater the isolated area gradually to reduce the potential for stranding fish.	PGC
c	Ensure bypass pump intakes and outlets are located within the confines of the fish-isolated work area (i.e., to prevent fish impingement on pump intakes, and to prevent dewatering areas where fish may be present). Ensure pumps are screened to prevent entrainment or impingement of fish in accordance with DFO's interim code of practice for End-of-pipe Fish Protection Screens for Small Water Intakes in Freshwater (https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecraneng.html).	PGC/Brybil
d	When diverting watercourse flows, maintain an appropriate depth and flow (i.e., base flow) for the protection of fish and fish habitat downstream of the isolated work area.	PGC
4	Complete the works as quickly as possible once they are started.	PGC
5	Undertake works during dry weather and low water conditions.	PGC
6	Equipment is to be situated in the dry watercourse channel within the footprint of the works or operated from the top of the bank.	PGC
7	Ensure that material such as rock, riprap, or other materials placed on the banks or within the active channel or floodplain of the watercourse is inert and free of silt, overburden, debris, or other substances deleterious to aquatic life.	PGC
8	Minimize the introduction of sediments (e.g., silts, clays and sand) into the watercourse or downstream reaches of the watercourse.	PGC
9	Develop and implement an erosion and sediment control plan to avoid and minimize the introduction of sediment into or induced sedimentation in the watercourse.	PGC
10	Do not deposit any substances deleterious to fish or fish habitat directly or indirectly into the watercourse or downstream reaches of the watercourse.	PGC
11	Develop and implement a response plan to avoid a spill of deleterious substances into the watercourse.	PGC
12	Works should be monitored full-time during start-up and any instream works or sensitive activity. The environmental monitor must be an appropriately qualified professional and ensure mitigation measures are implemented for the protection of fish and fish habitat.	PGC, weekly audit MESL
13	The Program recommends works within fish-bearing or potentially fish-bearing watercourses be completed during the least risk to fish instream work window of August 1 – September 15 where possible. However, it is recognized that there are proposed instream works outside this window. Therefore, if works are proposed for outside this time window, additional measures should be implemented under the direction of an appropriately qualified professional, as per item 12 above.	PGC
14	Monitor before, during, and after all phases of construction to ensure that fish do not become trapped/isolated, stranded, or entrained within the project area.	PGC, weekly audit MESL
15	If fish are observed at the site, or upstream or downstream of the site, work should be halted. Works may only resume following implementation of appropriate mitigation measures and under the direction of an appropriately qualified professional.	PGC
16	Ensure that when dewatering, site water is appropriately managed to prevent sediment laden water from entering downstream watercourses.	PGC
17	Use non-acid rock drainage and metal leaching (non-ARD/ML) riprap.	

DFO 20-HPAC-00304

Subject: Highway 91/17 – Site G – Wetland Infilling, Burns Bog, Delta - Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

Conditions	Responsibility
1 The removal of or disturbance to riparian vegetation should be kept to a minimum during the works.	PGC
2 Whenever possible, works are to be conducted when the watercourse is dry.	PGC
3 If works in the roadside ditches are not conducted in the dry, works are to be conducted in isolation of flow. When diverting watercourse flows, maintain an appropriate depth and flow (i.e., base flow) for the protection of fish and fish habitat downstream of the isolated work area.	PGC
4 Complete the works as quickly as possible once they are started.	PGC
5 Undertake works during dry weather and low water conditions.	PGC
6 Equipment is to be situated in the dry watercourse channel within the footprint of the works or operated from the top of the bank.	PGC
7 Ensure that material such as rock, riprap, or other materials placed on the banks or within the active channel or floodplain of the watercourse is inert and free of silt, overburden, debris, or other substances deleterious to aquatic life.	PGC
8 Minimize the introduction of sediments (e.g., silts, clays and sand) into the watercourse or downstream reaches of the watercourse.	PGC
9 Develop and implement an erosion and sediment control plan to avoid and minimize the introduction of sediment into or induced sedimentation in the watercourse.	Brybil -develop PGC - lead and implement
10 Do not deposit any substances deleterious to fish or fish habitat directly or indirectly into the watercourse or downstream reaches of the watercourse.	PGC
11 Develop and implement a response plan to avoid a spill of deleterious substances into the watercourse.	PGC, weekly audit MESL
12 Works should be monitored full-time during start-up and any instream works or sensitive activity. The environmental monitor must be an appropriately qualified professional and ensure mitigation measures are implemented for the protection of fish and fish habitat.	PGC, weekly audit MESL
13 If fish are observed at the site, or upstream or downstream of the site, work should be halted. Works may only resume under the direction of an appropriately qualified professional, as per Item 12 above, with the following measures in place: a Works are to be conducted in isolation of flow. An appropriately qualified professional is to conduct a fish salvage of the isolated work area. Choose low impact salvage methods such as minnow trapping and seining before opting for higher impact electrofishing. Use appropriate fish handling techniques and relocate salvaged fish to a nearby undisturbed location. In the event that isolation is breached, stop work and repeat fish salvage efforts. b Dewater the isolated area gradually to reduce the potential for stranding fish. Ensure bypass pump intakes and outlets are located within the confines of the fish-isolated work area (i.e., to prevent fish impingement on pump intakes, and to prevent dewatering areas where fish may be present). Ensure pumps are screened to prevent entrainment or impingement of fish in accordance with DFO's interim code of practice for End-of-pipe Fish Protection Screens for Small Water Intakes in Freshwater (https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html). c Monitor before, during, and after all phases of construction to ensure that fish do not become trapped/isolated, stranded, or entrained within the project area. d Ensure that when dewatering, site water is appropriately managed to prevent sediment laden water from entering downstream watercourses. e Ensure that flows are maintained to downstream fish habitat in East Ditch, West Ditch, Silda Ditch, and 96 Street Ditch.	PGC PGC Brybil PGC PGC, Brybil PGC PGC PGC
14 Use non-acid rock drainage and metal leaching (non-ARD/ML) riprap.	PGC

Conditions	Responsibility
1 The removal of or disturbance to riparian vegetation should be kept to a minimum during the works.	
2 Whenever possible, works are to be conducted when the watercourse is dry.	
3 If works are not conducted in the dry, works are to be conducted in isolation of flow and the following measures are to be implemented: An appropriately qualified professional is to conduct a fish salvage of the isolated work area. Choose low impact salvage methods such as minnow trapping and a seining before opting for higher impact electrofishing. In the event that isolation is breached, stop work and repeat fish salvage efforts. b Dewater the isolated area gradually to reduce the potential for stranding fish. Ensure bypass pump intakes and outlets are located within the confines of the fish-isolated work area (i.e., to prevent fish impingement on pump intakes, and to prevent dewatering areas where fish may be present). Ensure pumps are screened to prevent entrainment or impingement of fish in accordance with DFO's interim code of practice for End-of-pipe Fish Protection Screens for Small Water Intakes in Freshwater (https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecraneng.html). When diverting watercourse flows, maintain an appropriate depth and flow (i.e., base flow) for the protection of fish and fish habitat downstream of the isolated work area.	
4 Complete the works as quickly as possible once they are started.	
5 Undertake works during dry weather and low water conditions.	
6 Equipment is to be situated in the dry watercourse channel within the footprint of the works or operated from the top of the bank.	
7 For works in fish-bearing waters, fish passage is to be maintained through any culverts in fish-bearing waters upon completion of works.	
8 Ensure that material such as rock, riprap, or other materials placed on the banks or within the active channel or floodplain of the watercourse is inert and free of silt, overburden, debris, or other substances deleterious to aquatic life.	
9 Minimize the introduction of sediments (e.g., silts, clays and sand) into the watercourse or downstream reaches of the watercourse.	
10 Develop and implement an erosion and sediment control plan to avoid and minimize the introduction of sediment into or induced sedimentation in the watercourse.	
11 Do not deposit any substances deleterious to fish or fish habitat directly or indirectly into the watercourse or downstream reaches of the watercourse.	
12 Develop and implement a response plan to avoid a spill of deleterious substances into the watercourse.	
13 Works should be monitored full-time during start-up and any instream works or sensitive activity. The environmental monitor must be an appropriately qualified professional and ensure mitigation measures are implemented for the protection of fish and fish habitat.	
14 While the Program recommends works be conducted during the least risk to fish instream work window of August 1 – September 15 where possible. It is recognized that there are proposed instream works outside this window. Therefore, if works are proposed for outside the least risk window, work should especially be conducted under the direction of an appropriately qualified professional and additional measure should be implemented, as per item 13 above.	
15 Monitor before, during, and after all phases of construction to ensure that fish do not become trapped/isolated, stranded, or entrained within the project area	
16 If fish are observed at the site, or upstream or downstream of the site, work should be halted. Works may only resume following implementation of appropriate mitigation measures and under the direction of an appropriately qualified professional.	
17 Ensure that when dewatering, site water is appropriately managed to prevent sediment laden water from entering downstream watercourses.	
18 Use non-acid rock drainage and metal leaching (non-ARD/ML) riprap.	

DFO 20-HPAC-00349
 Highway 91/17 Upgrades – Site I, Nordel Ditches & West Ditch – Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

Conditions	Responsibility
1 The removal of or disturbance to riparian vegetation should be kept to a minimum during the works.	PGC
2 Whenever possible, works are to be conducted when the watercourse is dry.	PGC
3 If works are not conducted in the dry, works are to be conducted in isolation of flow and the following measures are to be implemented	PGC/Brybil
a An appropriately qualified professional is to conduct a fish salvage of the isolated work area. Choose low impact salvage methods such as minnow trapping and seining before opting for higher impact electrofishing. In the event that isolation is breached, stop work and repeat fish salvage efforts.	Brybil
b Dewater the isolated area gradually to reduce the potential for stranding fish.	PGC
c Ensure bypass pump intakes and outlets are located within the confines of the fish-isolated work area (i.e., to prevent fish impingement on pump intakes, and to prevent dewatering areas where fish may be present). Ensure pumps are screened to prevent entrainment or impingement of fish in accordance with DFO's interim code of practice for End-of-pipe Fish Protection Screens for Small Water Intakes in Freshwater (https://www.dfompo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html).	PGC
d When diverting flows, maintain an appropriate depth and flow (i.e., base flow) for the protection of fish and fish habitat, both upstream and downstream of the isolated work area.	PGC
4 Complete the works as quickly as possible once they are started.	PGC
5 Undertake works during dry weather and low water conditions.	PGC
6 Equipment is to be situated in the dry stream channel within the footprint of the works or operated from the top of the bank.	PGC
7 Ensure that material such as rock, riprap, or other materials placed on the banks or within the active channel or floodplain of the watercourse is inert and free of silt, overburden, debris, or other substances deleterious to aquatic life.	PGC
8 Minimize the introduction of sediments (e.g., silts, clays and sand) into the watercourse or downstream reaches of the watercourse.	PGC
9 Develop and implement an erosion and sediment control plan to avoid and minimize the introduction of sediment into or induced sedimentation in the watercourse.	PGC
10 Do not deposit any substances deleterious to fish or fish habitat directly or indirectly into the watercourse or downstream reaches of the watercourse.	PGC
11 Develop and implement a response plan to avoid a spill of deleterious substances into the watercourse.	PGC
12 Works should be monitored full-time during start-up and any instream works or sensitive activity. The environmental monitor must be an appropriately qualified professional and ensure mitigation measures are implemented for the protection of fish and fish habitat.	PGC, weekly audit MESL
13 Monitor before, during, and after all phases of construction to ensure that fish do not become trapped/isolated, stranded, or entrained within the project area.	PGC
14 Ensure that when dewatering, site water is appropriately managed to prevent sediment laden water from entering downstream watercourses.	PGC
15 Use non-acid rock drainage and metal leaching (non-ARD/ML) rip rap.	PGC

Highway 91/17 Upgrades – Site H, Unnamed Tributary Ditches to Silda Ditch – Implementation of Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat

Conditions	Responsibility
1 The removal of or disturbance to riparian vegetation should be kept to a minimum during the works.	PGC
2 Whenever possible, works are to be conducted when the watercourse is dry.	PGC
3 If works are not conducted in the dry, works are to be conducted in isolation of flow and the following measures are to be implemented:	PGC/Brybil
a An appropriately qualified professional is to conduct a fish salvage of the isolated work area. Choose low impact salvage methods such as minnow trapping and seining before opting for higher impact electrofishing. In the event that isolation is breached, stop work and repeat fish salvage efforts.	Brybil
b Dewater the isolated area gradually to reduce the potential for stranding fish.	PGC
c Ensure bypass pump intakes and outlets are located within the confines of the fish-isolated work area (i.e., to prevent fish impingement on pump intakes, and to prevent dewatering areas where fish may be present). Ensure pumps are screened to prevent entrainment or impingement of fish in accordance with DFO's interim code of practice for End-of-pipe Fish Protection Screens for Small Water Intakes in Freshwater (https://www.dfompo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html).	PGC
d When diverting flows, maintain an appropriate depth and flow (i.e., base flow) for the protection of fish and fish habitat, both upstream and downstream of the isolated work area.	PGC
4 Complete the works as quickly as possible once they are started.	PGC
5 Undertake works during dry weather and low water conditions.	PGC
6 Equipment is to be situated in the dry stream channel within the footprint of the works or operated from the top of the bank.	PGC
7 Ensure that material such as rock, riprap, or other materials placed on the banks or within the active channel or floodplain of the watercourse is inert and free of silt, overburden, debris, or other substances deleterious to aquatic life.	PGC
8 Minimize the introduction of sediments (e.g., silts, clays and sand) into the watercourse or downstream reaches of the watercourse.	PGC
9 Develop and implement an erosion and sediment control plan to avoid and minimize the introduction of sediment into or induced sedimentation in the watercourse.	PGC
10 Do not deposit any substances deleterious to fish or fish habitat directly or indirectly into the watercourse or downstream reaches of the watercourse.	PGC
11 Develop and implement a response plan to avoid a spill of deleterious substances into the watercourse.	PGC
12 Works should be monitored full-time during start-up and any instream works or sensitive activity. The environmental monitor must be an appropriately qualified professional and ensure mitigation measures are implemented for the protection of fish and fish habitat.	PGC, weekly audit MESL
13 Monitor before, during, and after all phases of construction to ensure that fish do not become trapped/isolated, stranded, or entrained within the project area.	PGC
14 Ensure that when dewatering, site water is appropriately managed to prevent sediment laden water from entering downstream watercourses.	PGC
15 Use non-acid rock drainage and metal leaching (non-ARD/ML) rip rap.	PGC

WSA Notification 100310655
Notice to Habitat Officer / Changes in and about a Stream under Part 3 Water Sustainability Regulation

Conditions	Responsibility
1 Any work associated with the proposed changes in and about a stream must not cause stream channel instability or increase the risk of sedimentation into the stream.	PGC
2 During work onsite, erosion and sediment control materials must be available on site at all times and must be installed if sedimentation is likely to occur into the stream. A contingency plan must be developed outlining the measures to be taken by workers when carrying out any work to control erosion and sediment.	PGC
3 Soil disturbance must not occur in heavy rain conditions and any soil removed must be placed in a location that ensures that sedimentor debris does not enter the stream.	PGC
4 Within a work area, water that contains sediment must be pumped to a vegetated area away from the stream where it can seep into the ground, or to a settling pond that is sufficiently far from the stream to allow sediment to settle out before the water returns to the stream.	PGC
5 The disturbance of stream bank vegetation must not occur or be minimized as much as possible.	PGC
6 Any areas that are disturbed during the work (such as exposed soil) must be promptly restored at a minimum to the pre-disturbance condition. Note: Guidance is provided in the Enhancement Section of the Best Management Practices Instream Works	PGC
7 If possible, work must be conducted on, and equipment located and operated from, dry land (no water present) and the worksite must be isolated from flowing water.	PGC
8 Any equipment used in conducting work must be in good mechanical condition and, when operating in close proximity to the wetted perimeter of a stream, the operator must prevent entry of any substance, sediment, debris or material (e.g., hydrocarbons, silt) into the stream so as to prevent harm to fish, wildlife or the aquatic ecosystem of a stream. Note that Section 46 of the Water Sustainability Act prohibits the introduction of foreign matter into a stream. Failure to comply may result in a remediation order and it is also an offence to do so.	PGC
9 The original rate of water flow in the stream (existing prior to commencing work) must be maintained upstream and downstream of the worksite during all phases of instream activity associated with the work.	PGC
10 When work requires de-watering or isolation of the worksite in the stream, a permit for the salvage of fish and wildlife must be obtained prior to commencing work. All required salvage permits must be obtained from Front Counter BC : http://www.frontcounterbc.gov.bc.ca/ . Any salvage must be carried out by a qualified environmental professional (such as an R.P.Bio.).	Brybil
11 Following de-watering or isolation of the worksite, stream flow must be returned gradually to the de-watered or isolated area within the stream and not in a single sudden rush so as to avoid erosion of the stream channel and sediment delivery to the stream.	PGC
12 The stream channel width must not change as a result of the work.	PGC
13 Any materials, such as riprap or gabion rock, placed within the stream must be clean and not contain substances that could be harmful to fish, wildlife or the aquatic ecosystem of the stream.	PGC
14 Any areas disturbed as part of the work must be restored as close as possible to their pre-disturbance condition. Any soil exposed at the worksite must be promptly re-vegetated.	PGC
15 Subject to section 16 and 17 below, the work must be completed during the timing window for the stream in respect of which the changes are proposed. The applicable timing window (by region and/or by stream) are specified in the following links (see below) and are designed to protect fish, wildlife or the aquatic ecosystem of a stream. To determine the timing window, please select the relevant region from the map: http://www.frontcounterbc.ca/pdf/RegionMap.pdf and then determine the applicable timing window: *Regional Timing Windows: http://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-licensing-rights/working-around-water/regional-terms-conditions-timing-windows <for that region and for the stream where the proposed changes will be made. For projects proposed to take place outside these timing windows, please see section 16 and 17 below	PGC
16 In addition to the timing windows specified in section 15 above, work may be carried out during the following times provided these requirements are met when the changes are carried out: i. If the stream channel is naturally dry (no flow) or frozen to the bottom at the worksite and the instream work / activity associated with the proposed change will not adversely impact fish, wildlife or the aquatic ecosystem of the stream (e.g. not result in any substance, sediment, debris or other material entering or leaching into the stream that would adversely affect fish, wildlife or the aquatic ecosystem), ii. In the construction of a winter crossing, the stream channel is frozen to the bottom at the worksite and related work does not adversely impact the stream channel (including stream bed and banks), or fish, wildlife or the aquatic ecosystem of the stream, or impede their passage (in both directions) in the stream.	PGC PGC PGC
17 If your work is proposed outside of the timing window (as described in section 15 above), you must retain a qualified environmental professional (such as an R.P. Bio.). The professional will be responsible for providing a written technical rational that assesses and addresses the risks of the proposed changes in and about a stream, including proposing site specific mitigation (e.g. an Erosion Control Plan that identifies contingency measures and emergency procedures related to the proposal) and onsite monitoring of their implementation. This document must be submitted to the Habitat Officer via Front Counter B.C. with reference to your file number (shown on top of this document).	PGC

WSA Approval 2007795 Change Approval -Changes In and About 96th Street Ditch and Silda Ditch (Sites B, D, and E)

Legend
Difference between Approval 2007783 & 2007795
Difference between Approval 2007749 & 2007795
Difference between Approval 2007770 & 2007795
Difference between Approval 2007755 & 2007795

Conditions	Responsibility
If land clearing is to occur within the breeding bird period (March 30 to August 16 in Zone A1, which includes the Lower Mainland and Fraser Valley), a nest survey must be conducted and a 10m no-clearing buffer placed around the nest until the nest is determined to be no longer active.	PGC, Brybil
d The work(s) authorized in this Approval shall be completed on or before Dec. 31, 2023.	PGC
e All works associated with the Environmental Enhancement Management Plan, as outlined in clause (m) and required in clause (oo) below, shall be completed on or before December 31, 2033 (based on 10 years).	PGC, Brybil - development of plan
f Work in the stream and stream channel shall occur only during the periods outlined below, so that the fisheries interests are protected	PGC - implementation
1 Instream work during the reduced risk instream work window shall occur during the period of August 1 to September 15; or	Brybil/MESL - provide input
2 Based on project justification and risk, instream work outside of the reduced risk instream work window (as stated above), subject to the following	
i An appropriately qualified professional shall provide advice to the holder of this Approval on the timing of the work based on the nature of the works, environmental values (including fish, amphibians, wildlife, any listed species present), water quality, channel stability, weather conditions, water levels, and any other relevant factors); and	
ii The Qualified Professional shall also provide additional construction mitigation advice to the holder of this Approval, and daily or full-time supervision of all work in or near the stream; and	
iii Work must be timed and planned appropriately, the stream must be completely dry or have marginal flows for the duration of the construction activities; and	
iv The advice of the Qualified Professional on construction timing (as per (i) above) and mitigation measures (as per (ii) above), as well as the timing of work and the presence of the Qualified Professional, must be documented in writing. This documentation must be submitted as part of the post construction reporting for this project.	
g All machinery and equipment operating within the stream shall be clean, free of external grease, oil or fluid leaks and shall use biodegradable grease, oil and fluids.	PGC
h Fuelling and servicing of vehicles and equipment must occur a minimum of 30 metres away from all streams, lakes and waterbodies. Keep a spill containment kit on site and train on site staff in its use. Immediately report any spill of a substance that is toxic, polluting, or deleterious to aquatic life of reportable quantities to the Dangerous Goods Incident Report 24-hour phone line at 1-800-663-3456.	PGC
i The works shall not result in depressions that have the ability to trap fish and other aquatic life.	PGC
j The holder of this approval shall take reasonable care to avoid damaging any land, works, trees, or other property and shall make full compensation to the owners for any damage or loss resulting from the exercise of the rights granted with this approval.	PGC
k Riparian areas which are disturbed by the works shall be restored to their original condition and protected from erosion.	PGC
l All material utilized during construction shall be contoured and placed in a stable area such that it is not able to mobilize, and it shall be managed to avoid entry into any stream or watercourse.	PGC
m All works shall be completed in accordance with	PGC
1 ENG DWG Site E Culvert Plan and Profile, 2020-01-27	PGC
2 ENG DWG Site B Culvert Plan and Profile, 2020-01-27	PGC
3 ENG DWG Site D River Road Interchange Silda Wetland Encroachment, 2020-02-19	PGC
4 Report Section 11 Approval Application Highway 91/17 Upgrades, Section 1 And 2, By Brybil Projects Ltd., February 21, 2020	PGC
5 Stormwater Management Plan, McElhanney May 6, 2020	PGC
6 CEMP, 3rd Revision, May, 2020	PGC
7 Surface Water Quality & Sediment Control Plan (of CEMP)	PGC
8 Fisheries Habitat Mitigation and Compensation Plan (of CEMP)	PGC
9 Environmental Enhancement Management Plan (CEMP), Brybil Projects Ltd., June 2020	PGC
10 Memo Additional FLNRO information, Dave Hayward, Brybil, June 8, 2020	PGC
n The holder of this approval must adhere to the standards of professional accountability, as signed off by Qualified Professional(s), Dave Hayward and Rob Hoogendorn on June 2, 2020, regarding the Key Aquatic Habitat Questions for Qualified Professionals specific to Bank Erosion Protection and Stream Diversion/in-filling, on behalf of the holder of this approval. It is the responsibility of the holder of this Approval to retain an appropriately qualified professional(s) for the relevant duration of works in order to uphold this signed professional assessment.	PGC
o All work shall be carried out in accordance with the Provincial "Standards and Best Practices for In-stream Works" (2004). The Provincial guidance document can be found at the following link http://www.env.gov.bc.ca/wld/documents/bmp/ismwstdsbpsmarch2004.pdf .	PGC
p The holder of this Approval must hire an appropriately Qualified Professional to conduct Environmental Monitoring on all in-stream works authorized under this Approval. The Qualified Professional must be an applied scientist or technologist, acting alone or together with another	
July 23, 2020 Job Number 114324 File Number 20077955 of 10 Ministry of Forests, Lands, Natural Resource Operations, and Rural Development Water Management Mailing Address 200-10428 153 Street, Surrey BC V3R 1E1 Location 200-10428 153 Street, Surrey BC V3R 1E1 Phone (604) 586-4400 Fax (604) 586-4444 Web https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/qualified-professional . He or she must be registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association. The Qualified Professional is responsible for observing the methods of construction and preparing information and reports on the compliance of the construction activities. The Qualified Professional shall	
1 Ensure all best management practices and mitigation measures are in place to avoid and minimize environmental impact on the land and on fish and fish habitat of the stream.	PGC
2 Where applicable, assist in the isolation of the stream prior to the commencement of works.	PGC
3 Implement and ensure erosion and sediment control measures are constructed, installed, and maintained appropriately for the full duration of instream works.	PGC
4 Supervise all instream works authorized under this Approval.	PGC
5 When the works involve temporary diversions to isolate the work site,	
i Monitor all diversion works daily to ensure pumps & flow by passes are in proper working condition;	PGC
ii Ensure diversion works that include pump intakes be screened for fish and aquatic species in accordance with the "Interim code of practice End-of-pipe fish protection screens for small water intakes in freshwater"(Fisheries and Oceans Canada, 2020);and	PGC
iii Ensure fish are prevented from entering the works.	PGC
6 When the works involve dewatering or isolation of flow and the stream is known or suspected to contain fish and/or amphibians,	PGC
i Attend the site prior to conducting any instream works to complete fish and wildlife search and salvages;	PGC, Brybil
ii Obtain any permits needed prior to undertaking the salvage(s); and	Brybil
iii Inspect the extraction area for fish stranding at least once after water levels have declined.	PGC, Brybil
7 In the event of an environmental incident or non-compliance with any of the terms or conditions of this Approval, notify the Water Manager (SouthCoastWSAReporting@gov.bc.ca), within 24 hours.	PGC
8 Be granted authority to stop the work authorized under this Approval if deemed necessary to address risks to the environment. The Qualified Professional or their designate (specified in writing) must be on site during all phases of construction in and around the stream to ensure this component is upheld.	PGC, MESL
q Upon commencement of the project, the work shall be pursued to completion as quickly as possible.	PGC
r All equipment and machinery used in or near the stream channel	PGC
1 Must be in good operating condition and free of leaks, excess oil and grease;	PGC

2 Must have a spill containment kit readily accessible on-site;	PGC
3 May not be refuelled within 30 meters of any watercourse; and	PGC
4 Must use environmentally sensitive hydraulic fluids which are non-toxic to aquatic life and which are readily or inherently bio-degradable.	PGC
s Any spill of a substance that is toxic, polluting, or deleterious to aquatic life of reportable quantities must be reported to the Dangerous Goods Incident Report 24-hour phone line at 1-800-663-3456.	PGC
t Sediment and Erosion Control measures to prevent the release of silt, sediment or sediment-laden water must be in place before starting works that may result in sediment mobilization. Care shall be exercised during all phases of the work to prevent the release of silt, sediment, sediment-laden water, raw concrete, concrete leachate or any deleterious substances. All control measures must meet or surpass the Provincial "Standards and Best Practices for In-stream Works" (2004) and the "Land Development Guidelines for the Protection of Aquatic Habitat" (Fisheries and Oceans Canada and the British Columbia, 1993).	PGC
u Sediment removal boundaries must be clearly delineated prior to commencement of work. All sediment excavation for removal purposes shall be completed in isolation of the stream flows.	PGC
v Care shall be exercised during sediment screening so that fine size fractions are not introduced into wetted areas or left in dry areas of the stream channel following the completion of work.	PGC
w Discharge and runoff water from the site into any watercourse(s) must comply with the BC Approved Water Quality Guidelines for the Protection of Aquatic Life (https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines and https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/approved-wqgs/turbidity-or.pdf) and/or the applicable Local Government Bylaw(s). Water quality monitoring must be conducted by an appropriately qualified professional or their designated Environmental Monitor on every day in which instream works are being conducted. Measurements must be taken upstream of any works taking place and within the extent of the sedimentation downstream of where instream work is actively occurring. Measurements should be taken immediately prior to works beginning, and then at regular intervals until the works are completed and may require additional frequency during wet weather conditions. Wet weather conditions will be defined as being equal to or greater than 25 millimetres of rainfall within a 24-hour period.	PGC
x All excavated material and debris shall be removed from the site or placed in a stable area above the high-watermark of the stream. Mitigative measures must be applied July 23, 2020 Job Number 114324 File Number 20077957 of Ministry of Forests, Lands, Natural Resource Operations, and Rural Development Water Management Mailing Address 200-10428 153 Street, Surrey BC V3R 1E1 Location 200-10428 153 Street, Surrey BC V3R 1E1 Phone (604) 586-4400 Fax (604) 586-4444 Web https://www2.gov.bc.ca/gov/content/environment/air-land-water/waterto protect the excavated material and debris from erosion and reintroduction into the watercourse. These measures may include covering the material with erosion blankets, seeding and planting with native vegetation, or as otherwise directed by a Qualified Professional.	PGC
y All material utilized during construction shall be contained and placed in a stable area such that it is not able to mobilize and managed to avoid entry into any stream or watercourse.	PGC
z Measures must be taken to ensure that no harmful material (e.g. fuel and other hydrocarbons, soil, road fill, or sediment) which could adversely impact water quality, fish and other aquatic life, and/or fish habitat, be allowed to enter the wetted perimeter as a result of the project activities. All staff must be trained in handling and applying a spill kit appropriately to any spills/incidents.	PGC
aa Site preparation is to be carried out from the banks of the stream, thus minimizing disturbance to the stream.	PGC
bb The holder of this Approval shall ensure that instream works are designed and installed so as not to restrict fish passage and/or lead to fish stranding.	PGC
cc All temporary works (including a ford, stream crossing and flow bypass) shall be removed on completion of the project, and the stream channel restored to its natural condition.	PGC
dd Vegetation along the banks of the stream shall be disturbed as little as possible. All disturbed areas must be restored using native vegetation that is suitable for the site conditions.	PGC
ee All disturbed areas of the banks of the stream shall be restored to their original condition.	PGC
ff The new channel of the stream must have greater or equal hydraulic capacity than the existing channel.	MESL Design, PGC implementation
gg The hydraulic capacity of installed culvert(s) must be equivalent to the hydraulic capacity of the stream channel or be capable of passing the 1 in 200 year maximum daily flow without the water level at the culvert(s) inlet exceeding the top of the culvert(s).	MESL Design, PGC implementation
hh Rock used as riprap shall be clean of any substances deleterious to aquatic life and shall be durable, angular in shape and suitably graded and sized to resist movement by stream flow. Any other engineering material required for the construction of the works shall be clean of any substances deleterious to aquatic life.	PGC
ii All rock used in the works shall be clean and free of sediment producing material, durable, non-acid generating and suitably graded.	PGC
jj Treated wood products shall not be used in any construction below the high-water mark of the stream channel.	PGC
kk Large woody debris and the stubs of large diameter trees must be left in place or retained on-site where it is safe to do so.	PGC
l Care shall be exercised during pile driving to minimize potential adverse impacts to fish or wildlife. The following mitigation measures shall be implemented	PGC
1 Where possible and feasible, piles should be installed using a vibratory hammer.	PGC
2 Piles installed using an impact hammer must implement mitigation measures to reduce water pressure sound waves in excess of 30 kilopascals (kPa).	PGC
3 Mitigation measures such as bubble curtains, double wall piles, or isolation methods shall be implemented to avoid adverse impacts to fish.	PGC
4 Where water pressure sound waves may exceed 30 kPa, isolation methods must be implemented to prevent fish and wildlife from entering the work area.	PGC
5 Monitoring underwater sound wave levels must be conducted continuously and within 10 meters of the pile being driven to ensure levels do not exceed 30 kPa. The construction with timber piles does not require underwater sound monitoring.	PGC
6 In the event that distressed, injured or dead fish are observed following the initiation of pile driving, work shall halt immediately and the holder of this Approval or appropriate designate must contact the Water Manager as soon as practicable for additional requirements before work is resumed.	PGC
mm The holder of this Approval shall be responsible for the repair, operation and maintenance of works to the satisfaction of the Water Manager.	PGC
nn The holder of this Approval must provide a detailed post-construction report no later than December 1 of the year works were completed. The report must be labelled with this Approval file number and labelled in the subject line of the email and submitted to SouthCoastWSARreporting@gov.bc.ca . That report shall include a signed statement from an appropriately Qualified Professional summarizing	PGC
1 The in-stream works undertaken,	PGC
2 The timing of those works,	PGC
3 The total in-stream area directly affected,	PGC
4 The volume of gravel or sediment removed (if applicable),	PGC
5 The frequency of monitoring including who the QP or EM was;	PGC
6 The turbidity reporting and accompanying data along with a description of any levels higher than the authorization and what immediate steps were taken (if applicable),	PGC
7 Representative site photographs;	PGC
8 Whether or not they observed or were otherwise aware of any non-compliance with the terms and conditions of this Approval; and	PGC
9 A description of any environmental incidents, non-compliance or other difficulties, and how these were addressed and reported.	PGC
oo The holder of this Approval must retain an appropriately Qualified Professional to design, implement and report on the effectiveness of mitigation, restoration, and/or offsetting measures required in this Approval. The effectiveness monitoring term required for this approval is 10 years, ending on Dec. 31, 2033, or 10 years following the completion of construction, whichever is later. Monitoring for riparian, instream, and wetland habitats should occur on years 1, 2, 3, 6, 7, and 10. Effectiveness Monitoring Reports shall be submitted no later than December 1 of each calendar year for the duration of monitoring. The reports shall be submitted via email to SouthCoastWSARreporting@gov.bc.ca , with the approval file number listed in the report and the subject line of the email. The reports shall include	Brybil Development, PGC Implementation
1 Documentation (including photographs) and summary of the survival of planted trees and shrubs. Tree survival rates must be 100%. Shrub and other plant survival rates must exceed 80%. Replanting may be required to achieve this success rate. If the area is susceptible to invasive species, the riparian planting plan should be modified to include a denser plant spacing as well as additional monitoring and maintenance to ensure an adequate plant survival rate of 80% can be achieved. It is recommended that trees and shrubs be protected from beavers and voles with metal fencing and vole guards, respectively.	Province
2 Observation and documentation (including photographs) related to flows and function of the restored or new channel and its features.	Province

3 Fish presence, species composition, and if fish stranding is occurring within the newly constructed channel.	Province
4 Amphibian species presence by egg mass surveys,	Province
5 Recommendations for adaptive management, such as additional channel complexing or modifications if required, to address habitat limitations such as insufficient flows, fish stranding, etc.,	Province
6 Monitoring, maintenance and implementation of the above recommendations if required.	Province
7 Water quality monitoring including temperature, pH, Dissolved Oxygen, and turbidity.	Province
<p>pp To address the permanent in stream and riparian impacts associated with the project, the holder of this Approval must</p> <p>1 Retain one or more appropriately qualified professionals to develop an offsetting plan that includes</p> <p>i</p> <p>The creation of a minimum of 206 m2 of instream, 2,705 m2 of wetland, and 1,082 m2 riparian habitat that is like for like, or like for better habitat, in terms of structure, functionality (e.g., flow regime), and target species. If the actual instream, wetland, and or riparian impact area is larger than estimated in "Environmental Enhancement Management Plan Hwy 91/17 Upgrade Project, Delta, BC. Submitted to Pacific Gateway Constructors prepared by Brybil Projects Ltd. Dated June, 2020" the compensation works must offset the actual area lost using the above stated like for like or like for better guidelines.</p> <p>ii A post-construction monitoring plan of the compensation works over 10 years following the completion of the offsetting measures.</p> <p>iii A commitment to prepare and submit annual post-construction monitoring reports at the end of every year of the monitoring program. A final monitoring report must be submitted upon completion of the annual monitoring program or upon reaching the survivorship and/or functionality requirements if these were not met during the monitoring program.</p> <p>2 Develop the offsetting plan in collaboration with interested First Nations and the Ministry of Forests, Lands, and Natural Resource Operations and Rural Development.</p> <p>3 Submit an amendment to this approval, or a new Change Approval or a Water License, whichever is applicable to the offsetting proposal, to authorize the construction of the offsetting works. This application must be submitted to Front Counter BC and the tracking number must be provided to WaterActReferrals.LowerMainland@gov.bc.ca no later than December 31, 2020, unless otherwise specified in writing by the Water Manager.</p>	<p>Brybil/PGC</p> <p>Province</p> <p>Province</p> <p>Brybil/PGC</p>

WSA Approval 2007783 Change Approval - Changes in and About East West Perimeter Ditch and Burns Bog [Site F]

Legend
Difference between Approval 2007795 & 2007783
Difference between Approval 2007749 & 2007783
Difference between Approval 2007770 & 2007783
Difference between Approval 2007755 & 2007783

Conditions	Responsibility
If land clearing is to occur within the breeding bird period (March 30 to August 16 in Zone A1, which includes the Lower Mainland and Fraser Valley), a nest survey must be conducted and a 10m no-clearing buffer placed around the nest until the nest is determined to be no longer active.	
d The work(s) authorized in this Approval shall be completed on or before Dec. 31, 2023.	
e All works associated with the Environmental Enhancement Management Plan, as outlined in clause (m) and requirements in clause (jj) below, shall be completed on or before December 31, 2033 (based on 10 years).	
f Work in the stream and stream channel shall occur only during the periods outlined below, so that the fisheries interests are protected	
1 Instream work during the reduced risk instream work window shall occur during the period of August 1 to September 15; or	
2 Based on project justification and risk, instream work outside of the reduced risk instream work window (as stated above), subject to the following	
i An appropriately qualified professional shall provide advice to the holder of this Approval on the timing of the work based on the nature of the works, environmental values (including fish, amphibians, wildlife, any listed species present), water quality, channel stability, weather conditions, water levels, and any other relevant factors); and	
ii The Qualified Professional shall also provide additional construction mitigation advice to the holder of this Approval, and daily or full-time supervision of all work in or near the stream; and	
iii Work must be timed and planned appropriately, the stream must be completely dry or have marginal flows for the duration of the construction activities; and	
iv The advice of the Qualified Professional on construction timing (as per (i) above) and mitigation measures (as per (ii) above), as well as the timing of work and the presence of the Qualified Professional, must be documented in writing. This documentation must be submitted as part of the post construction reporting for this project.	
g All machinery and equipment operating within the stream shall be clean, free of external grease, oil or fluid leaks and shall use biodegradable grease, oil and fluids.	
h Fuelling and servicing of vehicles and equipment must occur a minimum of 30 metres away from all streams, lakes and waterbodies. Keep a spill containment kit on site and train onsite staff in its use. Immediately report any spill of a substance that is toxic, polluting, or deleterious to aquatic life of reportable quantities to the Dangerous Goods Incident Report 24-hour phone line at 1-800-663-3456.	
i The works shall not result in depressions that have the ability to trap fish and other aquatic life.	
j The holder of this approval shall take reasonable care to avoid damaging any land, works, trees, or other property and shall make full compensation to the owners for any damage or loss resulting from the exercise of the rights granted with this approval.	
k Riparian areas which are disturbed by the works shall be restored to their original condition and protected from erosion.	
l All material utilized during construction shall be contained and placed in a stable area such that it is not able to mobilize and managed to avoid entry into any stream or watercourse.	
m All works shall be completed in accordance with	
1 Reference ENG DWGs Site F Key Plan/Drawing Index 2020-02-14; Plan 2020-02-14; Profiles 2020-02-14; Typical sections 2020-02-14; Culvert Plan and Profiles, 2020-02-14	
2 Report Section 11 Approval Application Highway 91/17 Upgrades, Section 3, Site F, By Brybil Projects Ltd., February 28, 2020	
3 Stormwater Management Plan, McElhanney May 6, 2020	
4 CEMP, 3rd Revision, May 2020	
5 Surface Water Quality & Sediment Control Plan (of CEMP)	
6 Fisheries Habitat Mitigation and Compensation Plan (of CEMP)	
7 Environmental Enhancement Management Plan (EEMP), Brybil Projects Ltd., June 2020	
8 Memo Additional FLNRO information, Dave Hayward, Brybil, June 8, 2020	
The holder of this approval must adhere to the standards of professional accountability, as signed off by Qualified Professional(s), Dave Hayward and Rob Hoogendorn on June 2, 2020, regarding the Key Aquatic	
n Habitat Questions for Qualified Professionals specific to Bank Erosion Protection and Stream Diversion/in-filling, on behalf of the holder of this approval. It is the responsibility of the holder of this Approval to retain an appropriately qualified professional(s) for the relevant duration of works in order to uphold this signed professional assessment.	
o All work shall be carried out in accordance with the Provincial "Standards and Best Practices for In-stream Works" (2004). The Provincial guidance document can be found at the following link http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf .	
p The holder of this Approval must hire an appropriately Qualified Professional to conduct Environmental Monitoring on all in-stream works authorized under this Approval. The Qualified Professional must be an applied scientist or technologist, acting alone or together with another qualified professional. He or she must be registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association. The Qualified Professional is responsible for observing the methods of construction and preparing information and reports on the compliance of the construction activities. The Qualified Professional shall	
1 Ensure all best management practices and mitigation measures are in place to avoid and minimize environmental impact on the land and on fish and fish habitat of the stream.	
2 Where applicable, assist in the isolation of the stream prior to the commencement of works.	
3 Implement and ensure erosion and sediment control measures are constructed, installed, and maintained appropriately for the full duration of instream works.	
4 Supervise all instream works authorized under this Approval.	
5 When the works involve temporary diversions to isolate the work site,	
i Monitor all diversion works daily to ensure pumps & flow bypasses are in proper working condition;	
ii Ensure diversion works that include pump intakes be screened for fish and aquatic species in accordance with the "Interim code of practice End-of-pipe fish protection screens for small water intakes in freshwater" (Fisheries and Oceans Canada, 2020); and	
iii Ensure fish are prevented from entering the works.	
6 When the works involve dewatering or isolation of flow and the stream is known or suspected to contain fish and/or amphibians,	
i Attend the site prior to conducting any instream works to complete fish and wildlife search and salvages;	
ii Obtain any permits needed prior to undertaking the salvage(s); and	
iii Inspect the extraction area for fish stranding at least once after water levels have declined.	
7 In the event of an environmental incident or non-compliance with any of the terms or conditions of this Approval, notify the Water Manager (SouthCoastWSAReporting@gov.bc.ca), within 24 hours.	
8 Be granted authority to stop the work authorized under this Approval if deemed necessary to address risks to the environment. The Qualified Professional or their designate (specified in writing) must be on site during all phases of construction in and around the stream to ensure this component is upheld.	
q Upon commencement of the project, the work shall be pursued to completion as quickly as possible.	
r All equipment and machinery used in or near the stream channel	
1 Must be in good operating condition and free of leaks, excess oil and grease;	
2 Must have a spill containment kit readily accessible on-site;	
3 May not be refuelled within 30 meters of any watercourse; and	
4 Must use environmentally sensitive hydraulic fluids which are non-toxic to aquatic life and which are readily or inherently bio-degradable.	

	<p>Sediment and Erosion Control measures to prevent the release of silt, sediment or sediment-laden water must be in place before starting works that may result in sediment mobilization. Care shall be exercised during all phases of the work to prevent the release of silt, sediment, sediment-laden water, raw concrete, concrete leachate or any deleterious substances. All control measures must meet or surpass the Provincial "Standards and Best Practices for In-stream Works" (2004) and the "Land Development Guidelines for the Protection of Aquatic Habitat" (Fisheries and Oceans Canada and the British Columbia, 1993).</p>	
t	<p>Sediment removal boundaries must be clearly delineated prior to commencement of work. All sediment excavation for removal purposes shall be completed in isolation of the stream flows.</p>	
u	<p>Discharge and runoff water from the site into any watercourse(s) must comply with the BC Approved Water Quality Guidelines for the Protection of Aquatic Life (https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines and https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/approved-wqgs/turbidity-or.pdf) and/or the applicable Local Government Bylaw(s).</p> <p>Water quality monitoring must be conducted by an appropriately qualified professional or their designated Environmental Monitor on every day in which instream works are being conducted. Measurements must be taken upstream of any works taking place and within the extent of the sedimentation downstream of where instream work is actively occurring. Measurements should be taken immediately prior to works beginning, and then at regular intervals until the works are completed and may require additional frequency during wet weather conditions. Wet weather conditions will be defined as being equal to or greater than 25 millimetres of rainfall within a 24 hour period.</p>	
v	<p>All excavated material and debris shall be removed from the site or placed in a stable area above the high water mark of the stream. Mitigative measures must be applied to protect the excavated material and debris from erosion and reintroduction into the watercourse. These measures may include covering the material with erosion blankets, seeding and planting with native vegetation, or as otherwise directed by a Qualified Professional.</p>	
w	<p>All material utilized during construction shall be contoured and placed in a stable area such that it is not able to mobilize and managed to avoid entry into any stream or watercourse.</p>	
x	<p>Site preparation and construction of the works is to be carried out from the banks of the stream, thus minimizing disturbance to the stream.</p>	
y	<p>The holder of this Approval shall ensure that instream works are designed and installed so as not to restrict fish passage and/or lead to fish stranding.</p>	
z	<p>All temporary works (including a ford, stream crossing and flow bypass) shall be removed on completion of the project, and the stream channel restored to its natural condition.</p>	
aa	<p>Vegetation along the banks of the stream shall be disturbed as little as possible. All disturbed areas must be restored using native vegetation that is suitable for the site conditions.</p>	
bb	<p>The new channel of the stream must have greater or equal hydraulic capacity than the existing channel.</p>	
cc	<p>The hydraulic capacity of installed culvert(s) must be equivalent to the hydraulic capacity of the stream channel or be capable of passing the 1 in 200 year maximum daily flow without the water level at the culvert(s) inlet exceeding the top of the culvert(s).</p>	
dd	<p>Rock used as riprap shall be clean of any substances deleterious to aquatic life and shall be durable, angular in shape and suitably graded and sized to resist movement by stream flow. Any other engineering material required for the construction of the works shall be clean of any substances deleterious to aquatic life.</p>	
ee	<p>Treated wood products shall not be used in any construction below the high-water mark of the stream channel.</p>	
ff	<p>Large woody debris and the stubs of large diameter trees must be left in place or retained on-site where it is safe to do so.</p>	
gg	<p>Care shall be exercised during pile driving to minimize potential adverse impacts to fish or wildlife. The following mitigation measures shall be implemented</p> <ol style="list-style-type: none"> 1 Where possible and feasible, piles should be installed using a vibratory hammer. 2 Piles installed using an impact hammer must implement mitigation measures to reduce water pressure sound waves in excess of 30 kilopascals (kPa). 3 Mitigation measures such as bubble curtains, double wall piles, or isolation methods shall be implemented to avoid adverse impacts to fish. 4 Where water pressure sound waves may exceed 30 kPa, isolation methods must be implemented to prevent fish and wildlife from entering the work area. 5 Monitoring underwater sound wave levels must be conducted continuously and within 10 meters of the pile being driven to ensure levels do not exceed 30 kPa. The construction with timber piles does not require underwater sound monitoring. 6 In the event that distressed, injured or dead fish are observed following the initiation of pile driving, work shall halt immediately and the holder of this Approval or appropriate designate must contact the Water Manager as soon as practicable for additional requirements before work is resumed. 	
hh	<p>The holder of this Approval must provide a detailed post-construction report no later than December 1 of the year works were completed. The report must be labelled with this Approval file number and labelled in the subject line of the email and submitted to SouthCoastWSAReporting@gov.bc.ca.</p> <p>That report shall include a signed statement from an appropriately Qualified Professional summarizing</p> <ol style="list-style-type: none"> 1 The in-stream works undertaken, 2 The timing of those works, 3 The total in-stream area directly affected, 4 The volume of gravel or sediment removed (if applicable), 5 The frequency of monitoring including who the QP or EM was; 6 The turbidity reporting and accompanying data along with a description of any levels higher than the authorization and what immediate steps were taken (if applicable), 7 Representative site photographs; 8 Whether or not they observed or were otherwise aware of any non-compliance with the terms and conditions of this Approval; and 9 A description of any environmental incidents, non-compliance or other difficulties, and how these were addressed and reported. 	
ii	<p>The holder of this Approval must retain an appropriately Qualified Professional to design, implement and report on the effectiveness of mitigation, restoration, and/or offsetting measures required in this Approval. The effectiveness monitoring term required for this approval is 10 years, ending on Dec. 31, 2033, or 10 years following the completion of construction, whichever is later. Monitoring for riparian, instream, and wetland habitats should occur on years 1, 2, 3, 6, 7, and 10.</p> <p>Effectiveness Monitoring Reports shall be submitted no later than December 1 of each calendar year for the duration of monitoring. The reports shall be submitted via email to SouthCoastWSAReporting@gov.bc.ca, with the approval file number listed in the report and the subject line of the email.</p> <p>The reports shall include</p> <ol style="list-style-type: none"> 1 Documentation (including photographs) and summary of the survival of planted trees and shrubs. Tree survival rates must be 100%. Shrub and other plant survival rates must exceed 80%. Replanting may be required to achieve this success rate. If the area is susceptible to invasive species, the riparian planting plan should be modified to include a denser plant spacing as well as additional monitoring and maintenance to ensure an adequate plant survival rate of 80% can be achieved. It is recommended that trees and shrubs be protected from beavers and voles with metal fencing and vole guards, respectively. 2 Observation and documentation (including photographs) related to flows and function of the restored or new channel and its features. 3 Fish presence, species composition, and if fish stranding is occurring within the newly constructed channel. 4 Amphibian species presence by egg mass surveys, 5 Recommendations for adaptive management, such as additional channel complexing or modifications if required, to address habitat limitations such as insufficient flows, fish stranding, etc., 6 Monitoring, maintenance and implementation of the above recommendations if required. 7 Water quality monitoring including temperature, pH, Dissolved Oxygen, and turbidity. 	
jj	<p>To address the permanent instream and riparian impacts associated with the project, the holder of this Approval must</p> <ol style="list-style-type: none"> 1 Retain one or more appropriately qualified professionals to develop an offsetting plan that includes <p>The creation of a minimum of 382 m2 of instream, 21,648 m2 of wetland, and 52 m2 riparian habitat that is like for like, or like for better habitat, in terms of structure, functionality (e.g., flow regime), and target species. If the actual instream, wetland, and/or riparian impact area is larger than estimated in "Environmental Enhancement Management Plan Hwy 91/17 Upgrade Project, Delta, BC. Submitted to Pacific Gateway Constructors prepared by Brybil Projects Ltd. Dated June, 2020" the compensation works must offset the actual area lost using the above stated like for like or like for better guidelines.</p> <p>A post-construction monitoring plan of the compensation works over 10 years following the completion of the offsetting measures. Monitoring must take place during the same time of year each year to provide comparable data. Monitoring of plant survival in riparian and wetland areas and of instream areas should be scheduled during the summer, during a period between high and low water (likely July). Results of initial monitoring will determine how much further monitoring may be required until enhancement habitats are self-sustaining.</p>	

<p>iii A commitment to prepare and submit annual post-construction monitoring reports at the end of every year of the monitoring program. A final monitoring report must be submitted upon completion of the annual monitoring program or upon reaching the survivorship and/or functionality requirements if these were not met during the monitoring program.</p> <p>2 Develop the offsetting plan in collaboration with interested First Nations, local governments, and the Ministry of Forests, Lands, and Natural Resource Operations and Rural Development.</p> <p>3 Submit an amendment to this approval, or a new Change Approval or a Water license, whichever is applicable to the offsetting proposal, to authorize the construction of the offsetting works. This application must be submitted to Front Counter BC and the tracking number must be provided to WaterActReferrals.LowerMainland@gov.bc.ca no later than December 31, 2020, unless otherwise specified in writing by the Water Manager.</p>	
<p>kk Effectiveness monitoring must take place during the same time of year each year to provide comparable data.</p> <p>Monitoring of plant survival in riparian and wetland areas and of instream areas should be scheduled during the summer, during a period between high and low water (likely July). Targets include</p> <p>1 Plant survival is $\geq 80\%$; Tree survival rate of 100 %.</p> <p>2 Native plant cover is two thirds greater than invasive species cover within 5 years;</p> <p>3 Visual survey of LWD and boulders to confirm they are in place and intact, and that boulders are effectively creating riffles and pools, creating cover for fish and habitat for amphibians; and</p> <p>4 Fish are present in instream areas and there are no new barriers to movement.</p>	

WSA Approval 2007749 Change Approval - Changes In and About a Stream (Site G)
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Legend
Difference between Approval 2007795 & 2007749
Difference between Approval 2007783 & 2007749
Difference between Approval 2007770 & 2007749
Difference between Approval 2007755 & 2007749

Conditions	Responsibility
if land clearing is to occur within the breeding bird period (March 30 to August 16 in Zone A1, which includes the Lower Mainland and Fraser Valley), a nest survey must be conducted and a 10m no-clearing buffer placed around the nest until the nest is determined to be no longer active.	
d The work(s) authorized in this Approval shall be completed on or before Dec. 31, 2023.	
e All works associated with the Environmental Enhancement Management Plan, as outlined in clause (m) and requirements in clause (jj) below, shall be completed on or before December 31, 2033 (based on 10 years).	
f Work in the stream and stream channel shall occur only during the periods outlined below, so that the fisheries interests are protected	
1 Instream work during the reduced risk instream work window shall occur during the period of August 1 to September 15; or	
2 Based on project justification and risk, instream work outside of the reduced risk instream work window (as stated above), subject to the following	
i An appropriately qualified professional shall provide advice to the holder of this Approval on the timing of the work based on the nature of the works, environmental values (including fish, amphibians, wildlife, any listed species present), water quality, channel stability, weather conditions, water levels, and any other relevant factors); and	
ii The Qualified Professional shall also provide additional construction mitigation advice to the holder of this Approval, and daily or full-time supervision of all work in or near the stream; and	
iii Work must be timed and planned appropriately, the stream must be completely dry or have marginal flows for the duration of the construction activities; and	
iv The advice of the Qualified Professional on construction timing (as per (i) above) and mitigation measures (as per (ii) above), as well as the timing of work and the presence of the Qualified Professional, must be documented in writing. This documentation must be submitted as part of the post construction reporting for this project.	
g All machinery and equipment operating within the stream shall be clean, free of external grease, oil or fluid leaks and shall use biodegradable grease, oil and fluids.	
h Fuelling and servicing of vehicles and equipment must occur a minimum of 30 metres away from all streams, lakes and waterbodies. Keep a spill containment kit on site and train onsite staff in its use. Immediately report any spill of a substance that is toxic, polluting, or deleterious to aquatic life of reportable quantities to the Dangerous Goods Incident Report 24-hour phone line at 1-800-663-3456.	
i The works shall not result in depressions that have the ability to trap fish and other aquatic life.	
j The holder of this approval shall take reasonable care to avoid damaging any land, works, trees, or other property and shall make full compensation to the owners for any damage or loss resulting from the exercise of the rights granted with this approval.	
k Riparian areas which are disturbed by the works shall be restored to their original condition and protected from erosion.	
l All material utilized during construction shall be contoured and placed in a stable area such that it is not able to mobilize and managed to avoid entry into any stream or watercourse.	
m All works shall be completed in accordance with	
1 Reference ENG DWGs Site G Key Plan/Drawing Index 2020-02-14; Plan 2020-02-14; Profiles 2020-02-14; Typical sections 2020-02-14; Culvert Plan and Profiles, 2020-02-14	
2 Report Section 11 Approval Application Highway 91/17 Upgrades, Section 4, Site G, By Brybil Projects Ltd., February 28, 2020	
3 Stormwater Management Plan, McElhanney May 6, 2020	
4 CEMP, 3rd Revision, May 2020	
5 Surface Water Quality & Sediment Control Plan (of CEMP)	
6 Fisheries Habitat Mitigation and Compensation Plan (of CEMP)	
7 Environmental Enhancement Management Plan (EEMP), Brybil Projects Ltd., June 2020	
8 Memo Additional FLNRO Information, Dave Hayward, Brybil, June 8, 2020	
n The holder of this approval must adhere to the standards of professional accountability, as signed off by Qualified Professional(s), Dave Hayward and Rob Hoogendorn on June 2, 2020, regarding the Key Aquatic Habitat Questions for Qualified Professionals specific to Bank Erosion Protection and Stream Diversion/In-filling, on behalf of the holder of this approval. It is the responsibility of the holder of this Approval to retain an appropriately qualified professional(s) for the relevant duration of works in order to uphold this signed professional assessment.	
o All work shall be carried out in accordance with the Provincial "Standards and Best Practices for In-stream Works" (2004). The Provincial guidance document can be found at the following link http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf .	
p The holder of this Approval must hire an appropriately Qualified Professional to conduct Environmental Monitoring on all in-stream works authorized under this Approval. The Qualified Professional must be an applied scientist or technologist, acting alone or together with another qualified professional. He or she must be registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association. The Qualified Professional is responsible for observing the methods of construction and preparing information and reports on the compliance of the construction activities. The Qualified Professional shall	
1 Ensure all best management practices and mitigation measures are in place to avoid and minimize environmental impact on the land and on fish and fish habitat of the stream.	
2 Where applicable, assist in the isolation of the stream prior to the commencement of works.	
3 Implement and ensure erosion and sediment control measures are constructed, installed, and maintained appropriately for the full duration of instream works.	
4 Supervise all instream works authorized under this Approval.	
5 When the works involve temporary diversions to isolate the work site,	
i Monitor all diversion works daily to ensure pumps & flow bypasses are in proper working condition;	
ii Ensure diversion works that include pump intakes be screened for fish and aquatic species in accordance with the "Interim code of practice End-of-pipe fish protection screens for small water intakes in freshwater" (Fisheries and Oceans Canada, 2020); and	
iii Ensure fish are prevented from entering the works.	
6 When the works involve dewatering or isolation of flow and the stream is known or suspected to contain fish and/or amphibians,	
i Attend the site prior to conducting any instream works to complete fish and wildlife search and salvages;	
ii Obtain any permits needed prior to undertaking the salvage(s); and	
iii Inspect the extraction area for fish stranding at least once after water levels have declined.	
7 In the event of an environmental incident or non-compliance with any of the terms or conditions of this Approval, notify the Water Manager (SouthCoastWSAReporting@gov.bc.ca), within 24 hours.	
8 Be granted authority to stop the work authorized under this Approval if deemed necessary to address risks to the environment. The Qualified Professional or their designate (specified in writing) must be on site during all phases of construction in and around the stream to ensure this component is upheld.	
q Upon commencement of the project, the work shall be pursued to completion as quickly as possible.	
r All equipment and machinery used in or near the stream channel	
1 Must be in good operating condition and free of leaks, excess oil and grease;	
2 Must have a spill containment kit readily accessible on-site;	
3 May not be refuelled within 30 meters of any watercourse; and	
4 Must use environmentally sensitive hydraulic fluids which are non-toxic to aquatic life and which are readily or inherently bio-degradable.	

	<p>Sediment and Erosion Control measures to prevent the release of silt, sediment or sediment-laden water must be in place before starting works that may result in sediment mobilization. Care shall be exercised during all phases of the work to prevent the release of silt, sediment, sediment-laden water, raw concrete, concrete leachate or any deleterious substances. All control measures must meet or surpass the Provincial "Standards and Best Practices for In-stream Works" (2004) and the "Land Development Guidelines for the Protection of Aquatic Habitat" (Fisheries and Oceans Canada and the British Columbia, 1993).</p>	
t	<p>Sediment removal boundaries must be clearly delineated prior to commencement of work. All sediment excavation for removal purposes shall be completed in isolation of the stream flows.</p>	
u	<p>Discharge and runoff water from the site into any watercourse(s) must comply with the BC Approved Water Quality Guidelines for the Protection of Aquatic Life (https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines and https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/approved-wqgs/turbidity-or.pdf) and/or the applicable Local Government Bylaw(s).</p> <p>Water quality monitoring must be conducted by an appropriately qualified professional or their designated Environmental Monitor on every day in which instream works are being conducted. Measurements must be taken upstream of any works taking place and within the extent of the sedimentation downstream of where instream work is actively occurring. Measurements should be taken immediately prior to works beginning, and then at regular intervals until the works are completed and may require additional frequency during wet weather conditions. Wet weather conditions will be defined as being equal to or greater than 25 millimetres of rainfall within a 24 hour period.</p>	
v	<p>All excavated material and debris shall be removed from the site or placed in a stable area above the high water mark of the stream. Mitigative measures must be applied to protect the excavated material and debris from erosion and reintroduction into the watercourse. These measures may include covering the material with erosion blankets, seeding and planting with native vegetation, or as otherwise directed by a Qualified Professional.</p>	
w	<p>All material utilized during construction shall be contoured and placed in a stable area such that it is not able to mobilize and managed to avoid entry into any stream or watercourse.</p>	
x	<p>Site preparation and construction of the works is to be carried out from the banks of the stream, thus minimizing disturbance to the stream.</p>	
y	<p>The holder of this Approval shall ensure that instream works are designed and installed so as not to restrict fish passage and/or lead to fish stranding.</p>	
z	<p>All temporary works (including a ford, stream crossing and flow bypass) shall be removed on completion of the project, and the stream channel restored to its natural condition.</p>	
aa	<p>Vegetation along the banks of the stream shall be disturbed as little as possible. All disturbed areas must be restored using native vegetation that is suitable for the site conditions.</p>	
bb	<p>The new channel of the stream must have greater or equal hydraulic capacity than the existing channel.</p>	
cc	<p>The hydraulic capacity of installed culvert(s) must be equivalent to the hydraulic capacity of the stream channel or be capable of passing the 1 in 200 year maximum daily flow without the water level at the culvert(s) inlet exceeding the top of the culvert(s).</p>	
dd	<p>Rock used as riprap shall be clean of any substances deleterious to aquatic life and shall be durable, angular in shape and suitably graded and sized to resist movement by stream flow. Any other engineering material required for the construction of the works shall be clean of any substances deleterious to aquatic life.</p>	
ee	<p>Treated wood products shall not be used in any construction below the high-water mark of the stream channel.</p>	
ff	<p>Large woody debris and the stubs of large diameter trees must be left in place or retained on-site where it is safe to do so.</p>	
gg	<p>Care shall be exercised during pile driving to minimize potential adverse impacts to fish or wildlife. The following mitigation measures shall be implemented</p> <ol style="list-style-type: none"> Where possible and feasible, piles should be installed using a vibratory hammer or helical (screw) method. Piles installed using an impact hammer must implement the following mitigation measures to reduce water pressure sound waves in excess of 30 kilopascals (kPa) <ol style="list-style-type: none"> Mitigation measures such as bubble curtains, double wall piles, or isolation methods shall be implemented to avoid adverse impacts to fish. Where water pressure sound waves may exceed 30 kPa, isolation methods must be implemented to prevent fish and wildlife from entering the work area. Monitoring underwater sound wave levels must be conducted continuously and within 10 meters of the pile being driven to ensure levels do not exceed 30 kPa. The construction with timber piles does not require underwater sound monitoring. In the event that distressed, injured or dead fish are observed following the initiation of pile driving, work shall halt immediately and the holder of this Approval or appropriate designate must contact the Water Manager as soon as practicable for additional requirements before work is resumed. 	
hh	<p>The holder of this Approval must provide a detailed post-construction report no later than December 1 of the year works were completed. The report must be labelled with this Approval file number and labelled in the subject line of the email and submitted to SouthCoastWSAREporting@gov.bc.ca. That report shall include a signed statement from an appropriately Qualified Professional summarizing</p> <ol style="list-style-type: none"> The in-stream works undertaken, The timing of those works, The total in-stream area directly affected, The volume of gravel or sediment removed (if applicable), The frequency of monitoring including who the QP or EM was; The turbidity reporting and accompanying data along with a description of any levels higher than the authorization and what immediate steps were taken (if applicable), Representative site photographs; Whether or not they observed or were otherwise aware of any non-compliance with the terms and conditions of this Approval; and A description of any environmental incidents, non-compliance or other difficulties, and how these were addressed and reported. 	
ii	<p>The holder of this Approval must retain an appropriately Qualified Professional to design, implement and report on the effectiveness of mitigation, restoration, and/or offsetting measures required in this Approval. The effectiveness monitoring term required for this approval is 10 years, ending on Dec. 31, 2033, or 10 years following the completion of construction, whichever is later. Monitoring for riparian, instream, and wetland habitats should occur on years 1, 2, 3, 6, 7, and 10. Effectiveness Monitoring Reports shall be submitted no later than December 1 of each calendar year for the duration of monitoring. The reports shall be submitted via email to SouthCoastWSAREporting@gov.bc.ca, with the approval file number listed in the report and the subject line of the email. The reports shall include</p> <ol style="list-style-type: none"> Documentation (including photographs) and summary of the survival of planted trees and shrubs. Tree survival rates must be 100%. Shrub and other plant survival rates must exceed 80%. Replanting may be required to achieve this success rate. If the area is susceptible to invasive species, the riparian planting plan should be modified to include a denser plant spacing as well as additional monitoring and maintenance to ensure an adequate plant survival rate of 80% can be achieved. It is recommended that trees and shrubs be protected from beavers and voles with metal fencing and vole guards, respectively. Observation and documentation (including photographs) related to flows and function of the restored or new channel and its features. Fish presence, species composition, and if fish stranding is occurring within the newly constructed channel. Amphibian species presence by egg mass surveys, Recommendations for adaptive management, such as additional channel complexing or modifications if required, to address habitat limitations such as insufficient flows, fish stranding, etc., Monitoring, maintenance and implementation of the above recommendations if required. Water quality monitoring including temperature, pH, Dissolved Oxygen, and turbidity. 	
jj	<p>To address the permanent instream and riparian impacts associated with the project, the holder of this Approval must</p> <ol style="list-style-type: none"> Retain one or more appropriately Qualified Professionals to develop an offsetting plan that includes <ul style="list-style-type: none"> The creation of a minimum of, 7,617 m² of wetland habitat that is like for like, or like for better habitat, in terms of structure, functionality (e.g., flow regime), and target species. If the actual instream, wetland, and/or riparian impact area is larger than estimated in "Environmental Enhancement Management Plan Hwy 91/17 Upgrade Project, Delta, BC. Submitted to Pacific Gateway Constructors prepared by Brybil Projects Ltd. Dated June, 2020" the compensation works must offset the actual area lost using the above stated like for like or like for better guidelines. A post-construction monitoring plan of the compensation works over 10 years following the completion of the offsetting measures. A commitment to prepare and submit annual post-construction monitoring reports at the end of every year of the monitoring program. A final monitoring report must be submitted upon completion of the annual monitoring program or upon reaching the survivorship and/or functionality requirements if these were not met during the monitoring program. Develop the offsetting plan in collaboration with interested First Nations, local governments, and the Ministry of Forests, Lands, and Natural Resource Operations and Rural Development. 	

<p>Submit an amendment to this approval, or a new Change Approval or a Water License, whichever is applicable to the offsetting proposal, to authorize the construction of the offsetting works. This application must be submitted to Front Counter BC and the tracking number must be provided to WaterActReferrals.LowerMainland@gov.bc.ca no later than December 31, 2020, unless otherwise specified in writing by the Water Manager.</p>	
<p>kk Effectiveness monitoring must take place during the same time of year each year to provide comparable data. Monitoring of plant survival in riparian and wetland areas and of instream areas should be scheduled during the summer, during a period between high and low water (likely July). Targets include</p> <ol style="list-style-type: none"> 1 Plant survival is $\geq 80\%$; Tree survival rate of 100 %. 2 Native plant cover is two thirds greater than invasive species cover within 5 years; 3 Visual survey of LWD and boulders to confirm they are in place and intact, and that boulders are effectively creating riffles and pools and creating cover for fish and habitat for amphibians; and 5 Fish are present in instream areas and there are no new barriers to movement 	

WSA Approval 2007770
Change Approval - Changes in and About a Stream (Site I)

Conditions	Responsibility
if land clearing is to occur within the breeding bird period (March 30 to August 16 in Zone A1, which includes the Lower Mainland and Fraser Valley), a nest survey must be conducted and a 10m no-clearing buffer placed around the nest until the nest is determined to be no longer active.	
if it is possible amphibians may be present in the streams, such as Nordel Ditches, an amphibian salvage must be undertaken prior to works taking place.	
d The works authorized shall be completed on or before December 31, 2023.	
e All works associated with an authorized Environmental Enhancement Management Plan, as outlined in clause (n) and required in clause (ff) below shall be completed on or before December 31, 2033 (based on 10 years).	
f Work in the stream and stream channel shall occur only during the periods outlined below, so that the fisheries interests are protected	
1 Instream work during the reduced risk instream work window shall occur during the period of August 1 to September 30; or	
2 Based on project justification and risk, instream work outside of the reduced risk instream work window (as stated above), subject to the following	
i An appropriately qualified professional shall provide advice to the holder of this Approval on the timing of the work based on the nature of the works, environmental values (including fish, amphibians, wildlife, any listed species present), water quality, channel stability, weather conditions, water levels, and any other relevant factors; and	
ii The Qualified Professional shall also provide additional construction mitigation advice to the holder of this Approval, and daily or full-time supervision of all work in or near the stream; and	
iii Work must be timed and planned appropriately, the stream must be completely dry or have marginal flows for the duration of the construction activities; and	
iv The advice of the Qualified Professional on construction timing (as per (i) above) and mitigation measures (as per (ii) above), as well as the timing of work and the presence of the Qualified Professional, must be documented in writing. This documentation must be submitted as part of the post construction reporting for this project.	
g All works shall be completed in accordance with	
1 Reference ENG DWGs Site I Plan 2020-02-27, Profiles 2020-02-27, Culvert/ Storm Plans and Profiles 2020-02-27	
2 Report Section 11 Approval Application Highway 91/17 Upgrades, Section 4, Site I, By Brybil Projects Ltd., March 10, 2020	
3 Stormwater Management Plan, McElhanney May 6, 2020	
4 CEMP, 3rd Revision, May, 2020	
5 Surface Water Quality & Sediment Control Plan (of CEMP)	
6 Fisheries Habitat Mitigation and Compensation Plan (of CEMP)	
7 Environmental Enhancement Management Plan (EEMP), Brybil Projects Ltd., June 2020	
8 Memo Additional FLNRO Information, Dave Hayward, Brybil, June 8, 2020	
h The holder of this approval must adhere to the standards of professional accountability, as signed off by Qualified Professional(s), Dave Hayward and Rob Hoogendorn on June 2, 2020, regarding the Key Aquatic Habitat Questions for Qualified Professionals specific to Bank Erosion Protection and Stream Diversion/In-filling, on behalf of the holder of this approval. It is the responsibility of the holder of this Approval to retain an appropriately qualified professional(s) for the relevant duration of works in order to uphold this signed professional assessment.	
i All work shall be carried out in accordance with the Provincial "Standards and Best Practices for In-stream Works" (2004). The Provincial guidance document can be found at the following link http://www.env.gov.bc.ca/wld/documents/bmp/bswstdbbspmarch2004.pdf .	
j The holder of this Approval must hire an appropriately Qualified Professional to conduct Environmental Monitoring on all in-stream works authorized under this Approval. The Qualified Professional must be an applied scientist or technologist, acting alone or together with another qualified professional. He or she must be registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association. The Qualified Professional is responsible for observing the methods of construction and preparing information and reports on the compliance of the construction activities. The Qualified Professional shall	
1 Ensure all best management practices and mitigation measures are in place to avoid and minimize environmental impact on the land and on fish and fish habitat of the stream.	
2 Where applicable, assist in the isolation of the stream prior to the commencement of works.	
3 Implement and ensure erosion and sediment control measures are constructed, installed, and maintained appropriately for the full duration of instream works.	
4 Supervise all instream works authorized under this Approval.	
5 When the works involve temporary diversions to isolate the work site,	
i Monitor all diversion works daily to ensure pumps & flow bypasses are in proper working condition;	
ii Ensure diversion works that include pump intakes be screened for fish and aquatic species in accordance with the "Interim code of practice End-of-pipe fish protection screens for small water intakes in freshwater" (Fisheries and Oceans Canada, 2020); and	
iii Ensure fish are prevented from entering the works.	
6 When the works involve dewatering or isolation of flow and the stream is known or suspected to contain fish and/or amphibians,	
i Attend the site prior to conducting any instream works to complete fish and wildlife search and salvages;	
ii Obtain any permits needed prior to undertaking the salvage(s); and	
iii Inspect the extraction area for fish stranding at least once after water levels have declined.	
7 In the event of an environmental incident or non-compliance with any of the terms or conditions of this Approval, notify the Water Manager (SouthCoastWSAReporting@gov.bc.ca), within 24 hours.	
8 Be granted authority to stop the work authorized under this Approval if deemed necessary to address risks to the environment. The Qualified Professional or their designate (specified in writing) must be on site during all phases of construction in and around the stream to ensure this component is upheld.	
k All equipment and machinery used in or near the stream channel	
1 Must be in good operating condition and free of leaks, excess oil and grease;	
2 Must have a spill containment kit readily accessible on-site;	
3 May not be refuelled within 30 meters of any watercourse; and	
4 Must use environmentally sensitive hydraulic fluids which are non-toxic to aquatic life and which are readily or inherently bio-degradable.	
l Fuelling and servicing of vehicles and equipment must occur a minimum of 30 metres away from all streams, lakes and waterbodies. Keep a spill containment kit on site and train onsite staff in its use. Immediately report any spill of a substance that is toxic, polluting, or deleterious to aquatic life of reportable quantities to the Dangerous Goods Incident Report 24-hour phone line at 1-800-663-3456.	
m Upon commencement of the project, the work shall be pursued to completion as quickly as possible.	
n Sediment and Erosion Control measures to prevent the release of silt, sediment or sediment-laden water must be in place before starting works that may result in sediment mobilization. Care shall be exercised during all phases of the work to prevent the release of silt, sediment, sediment-laden water, raw concrete, concrete leachate or any deleterious substances. All control measures must meet or surpass the Provincial "Standards and Best Practices for In-stream Works" (2004) and the "Land Development Guidelines for the Protection of Aquatic Habitat" (Fisheries and Oceans Canada and the British Columbia, 1993).	
o Sediment removal boundaries must be clearly delineated prior to commencement of work. All sediment excavation for removal purposes shall be completed in isolation of the stream flows.	
p All excavated material and debris shall be removed from the site or placed in a stable area above the high water mark of the stream. Mitigative measures must be applied to protect the excavated material and debris from erosion and reintroduction into the watercourse. These measures may include covering the material with erosion blankets, seeding and planting with native vegetation, or as otherwise directed by a Qualified Professional.	
q Discharge and runoff water from the site into any watercourse(s) must comply with the BC Approved Water Quality Guidelines for the Protection of Aquatic Life (https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines and https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/water-quality/wqgs-wqos/approved-wqgs/turbidity-or-pdf) and/or the applicable Local Government bylaw(s).	

Legend
Difference between Approval 2007795 & 2007770
Difference between Approval 2007783 & 2007770
Difference between Approval 2007749 & 2007770
Difference between Approval 2007755 & 2007749

	Water quality monitoring must be conducted by an appropriately qualified professional or their designated Environmental Monitor on every day in which instream works are being conducted. Measurements must be taken upstream of any works taking place and within the extent of the sedimentation downstream of where instream work is actively occurring. Measurements should be taken immediately prior to works beginning, and then at regular intervals until the works are completed and may require additional frequency during wet weather conditions. Wet weather conditions will be defined as being equal to or greater than 25 millimetres of rainfall within a 24 hour period.		
f	The holder of this approval shall take reasonable care to avoid damaging any land, works, trees, or other property and shall make full compensation to the owners for any damage or loss resulting from the exercise of the rights granted with this approval.		
g	Site preparation and construction of the works is to be carried out from the banks of the stream, thus minimizing disturbance to the stream.		
h	The works shall not result in depressions that have the ability to trap fish and other aquatic life.		
i	The holder of this Approval shall ensure that instream works are designed and installed so as not to restrict fish passage and/or lead to fish stranding.		
j	All temporary works (including a ford, stream crossing and flow bypass) shall be removed on completion of the project, and the stream channel restored to its natural condition.		
k	Riparian areas which are disturbed by the works shall be restored to their original condition and protected from erosion.		
l	The new channel of the stream must have greater or equal hydraulic capacity than the existing channel.		
m	The hydraulic capacity of installed culvert(s) must be equivalent to the hydraulic capacity of the stream channel or be capable of passing the 1 in 200 year maximum daily flow without the water level at the culvert(s) inlet exceeding the top of the culvert(s).		
n	Rock used as riprap shall be clean of any substances deleterious to aquatic life and shall be durable, angular in shape and suitably graded and sized to resist movement by stream flow. Any other engineering material required for the construction of the works shall be clean of any substances deleterious to aquatic life.		
o	All rock used in the works shall be clean and free of sediment producing material, durable, non-acid generating and suitably graded.		
p	Treated wood products shall not be used in any construction below the high-water mark of the stream channel.		
q	Large woody debris and the stubs of large diameter trees must be left in place or retained on-site where it is safe to do so.		
r	Care shall be exercised during pile driving to minimize potential adverse impacts to fish or wildlife. The following mitigation measures shall be implemented		
	1 Where possible and feasible, piles should be installed using a vibratory hammer.		
	2 Piles installed using an impact hammer must implement mitigation measures to reduce water pressure sound waves in excess of 30 kilopascals (kPa).		
	3 Mitigation measures such as bubble curtains, double wall piles, or isolation methods shall be implemented to avoid adverse impacts to fish.		
	4 Where water pressure sound waves may exceed 30 kPa, isolation methods must be implemented to prevent fish and wildlife from entering the work area.		
	5 Monitoring underwater sound wave levels must be conducted continuously and within 10 meters of the pile being driven to ensure levels do not exceed 30 kPa. The construction with timber piles does not require underwater sound monitoring.		
	6 In the event that distressed, injured or dead fish are observed following the initiation of pile driving, work shall halt immediately and the holder of this Approval or appropriate designate must contact the Water Manager as soon as practicable for additional requirements before work is resumed.		
s	The holder of this Approval must provide a detailed post-construction report no later than December 1 of the year works were completed. The report must be labelled with this Approval file number and labelled in the subject line of the email and submitted to SouthCoastWSAREporting@gov.bc.ca. That report shall include a signed statement from an appropriately Qualified Professional summarizing		
	1 The in-stream works undertaken,		
	2 The timing of those works,		
	3 The total in-stream area directly affected,		
	4 The volume of gravel or sediment removed (if applicable),		
	5 The frequency of monitoring including who the QP or EM was;		
	6 The turbidity reporting and accompanying data along with a description of any levels higher than the authorization and what immediate steps were taken (if applicable),		
	7 Representative site photographs;		
	8 Whether or not they observed or were otherwise aware of any non-compliance with the terms and conditions of this Approval; and		
	9 A description of any environmental incidents, non-compliance or other difficulties, and how these were addressed and reported.		
t	The holder of this Approval must retain an appropriately Qualified Professional to design, implement and report on the effectiveness of mitigation, restoration, and/or offsetting measures required in this Approval. The effectiveness monitoring term required for this approval is 10 years following the completion of construction of the offsetting habitat. Monitoring for riparian, instream, and wetland habitat should occur for 5 years, over a 10-year period following the completion of construction of the habitat offsetting unless a Qualified Professional deems the site functional prior to the end of the 5 years of monitoring. Monitoring must occur until the habitat is deemed functional at like for like or like for greater than the original habitat by a Qualified Professional. Effectiveness Monitoring reports shall be submitted no later than December 1 of each calendar year for the duration of monitoring. The reports shall be submitted via email to SouthCoastWSAREporting@gov.bc.ca, with the approval file number listed in the report and the subject line of the email. The reports shall include		
	1 Documentation (including photographs) and summary of the survival of planted trees and shrubs. Tree survival rates must be 100%. Shrub and other plant survival rates must exceed 80%. Replanting may be required to achieve this success rate. If the area is susceptible to invasive species, the riparian planting plan should be modified to include a denser plant spacing as well as additional monitoring and maintenance to ensure an adequate plant survival rate of 80% can be achieved. It is recommended that trees and shrubs be protected from beavers and voles with metal fencing and vole guards, respectively.		
	2 Observation and documentation (including photographs) related to flows and function of the restored or new channel and its features.		
	3 Fish presence, species composition, and if fish stranding is occurring within the newly constructed channel.		
	4 Amphibian species presence by egg mass surveys,		
	5 Recommendations for adaptive management, such as additional channel complexing or modifications if required, to address habitat limitations such as insufficient flows, fish stranding, etc.,		
	6 Monitoring, maintenance and implementation of the above recommendations if required.		
	7 Water quality monitoring including temperature, pH, Dissolved Oxygen, and turbidity.		
u	To address the permanent instream and riparian impacts associated with the project, the holder of this Approval must		
	1 Retain one or more appropriately qualified professionals to develop an offsetting plan that includes		
v	The creation of a minimum of 1,310 m2 of instream, 2,274 m2 of wetland, and 743 m2 riparian habitat that is like for like, or like for better habitat, in terms of structure, functionality (e.g., flow regime), and target species. If the actual instream, wetland, and/or riparian impact area is larger than estimated in "Environmental Enhancement Management Plan Hwy 91/17 Upgrade Project, Delta, BC. Submitted to Pacific Gateway Constructors prepared by Brybil Projects Ltd. Dated June, 2020" the compensation works must offset the actual area lost using the above stated like for like or like for better guidelines.		
w	A post-construction monitoring plan of the compensation works over 10 years following the completion of the offsetting measures.		
x	A commitment to prepare and submit annual post-construction monitoring reports at the end of every year of the monitoring program. A final monitoring report must be submitted upon completion of the annual monitoring program or upon reaching the survivorship and/or functionality requirements if these were not met during the monitoring program.		
y	Develop the offsetting plan in collaboration with interested First Nations, local governments, and the Ministry of Forests, Lands, and Natural Resource Operations and Rural Development. Submit an amendment to this approval, or a new Change Approval or a Water License, whichever is applicable to the offsetting proposal, to authorize the construction of the offsetting works. This application must be submitted to Front Counter BC and the tracking number must be provided to WaterActReferrals.LowerMainland@gov.bc.ca no later than December 31, 2020, unless otherwise specified in writing by the Water Manager.		
z	Effectiveness monitoring must take place during the same time of year each year to provide comparable data. Monitoring of plant survival in riparian and wetland areas and of instream areas should be scheduled during the summer, during a period between high and low water (likely July). Results of initial monitoring will determine how much further monitoring may be required until enhancement habitats are self-sustaining. Targets include		
	1 Plant survival is ≥ 80%; Tree survival rate of 100 %.		
	2 Native plant cover is two thirds greater than invasive species cover within 5 years;		
	3 Visual survey of LWD and boulders to confirm they are in place and intact, and that boulders are effectively creating riffles and pools and creating cover for fish and habitat for amphibians; and		
	4 Fish are present in instream areas and there are no new barriers to movement		

WSA Approval 2007755
Change Approval - Changes in and About SFPR Offset site FC239, and drainage between SFPR Offset site FC239 and Silda Ditch (Site H)

Legend
Difference between Approval 2007795 & 2007755
Difference between Approval 2007783 & 2007755
Difference between Approval 2007749 & 2007755
Difference between Approval 2007770 & 2007755

Conditions	Responsibility
If land clearing is to occur within the breeding bird period (March 30 to August 16 in Zone A1, which includes the Lower Mainland and Fraser Valley), a nest survey must be conducted and a 10m no-clearing buffer placed around the nest until the nest is determined to be no longer active.	
d The work(s) authorized in this Approval shall be completed on or before Dec. 31, 2023.	
e All works associated with an Environmental Enhancement Management Plan, as outlined in clause (m) and requirements in clause (ii) below shall be completed on or before December 31, 2033 (based on 10 years).	
f Work in the stream and stream channel shall occur only during the periods outlined below, so that the fisheries interests are protected	
1 Instream work during the reduced risk instream work window shall occur during the period of August 1 to September 30; or	
2 Based on project justification and risk, instream work outside of the reduced risk instream work window (as stated above), subject to the following	
i An appropriately qualified professional shall provide advice to the holder of this Approval on the timing of the work based on the nature of the works, environmental values (including fish, amphibians, wildlife, any listed species present), water quality, channel stability, weather conditions, water levels, and any other relevant factors; and	
ii The Qualified Professional shall also provide additional construction mitigation advice to the holder of this Approval, and daily or full-time supervision of all work in or near the stream; and	
iii Work must be timed and planned appropriately, the stream must be completely dry or have marginal flows for the duration of the construction activities; and	
iv The advice of the Qualified Professional on construction timing (as per (i) above) and mitigation measures (as per (ii) above), as well as the timing of work and the presence of the Qualified Professional, must be documented in writing. This documentation must be submitted as part of the post construction reporting for this project.	
g All machinery and equipment operating within the stream shall be clean, free of external grease, oil or fluid leaks and shall use biodegradable grease, oil and fluids.	
h Fuelling and servicing of vehicles and equipment must occur a minimum of 30 metres away from all streams, lakes and waterbodies. Keep a spill containment kit on site and train onsite staff in its use. Immediately report any spill of a substance that is toxic, polluting, or deleterious to aquatic life of reportable quantities to the Dangerous Goods Incident Report 24-hour phone line at 1-800-663-3456.	
i The works shall not result in depressions that have the ability to trap fish and other aquatic life.	
j The holder of this approval shall take reasonable care to avoid damaging any land, works, trees, or other property and shall make full compensation to the owners for any damage or loss resulting from the exercise of the rights granted with this approval.	
k Riparian areas which are disturbed by the works shall be restored to their original condition and protected from erosion.	
l All material utilized during construction shall be contained and placed in a stable area such that it is not able to mobilize and managed to avoid entry into any stream or watercourse.	
m All works shall be completed in accordance with	
1 ENG DWG Site H Key Plan/Drawing Index, by McElhanney, 2020-02-20	
2 ENG DWG Site H Plan, by McElhanney, 2020-02-20	
3 ENG DWG Site H Profile, by McElhanney, 2020-02-20	
4 ENG DWG Site H Typical Sections, by McElhanney, 2020-02-20	
5 ENG DWG Site H Culvert Plan and Profiles, by McElhanney, 2020-02-20	
6 Report Section 11 Approval Application Highway 91/17 Upgrades, Section 1 And 2, By Brybil Projects Ltd., February 21, 2020	
7 Stormwater Management Plan, McElhanney May 6, 2020	
8 CEMP, 3rd Revision, May 2020	
9 Surface Water Quality & Sediment Control Plan (of CEMP)	
10 Fisheries Habitat Mitigation and Compensation Plan (of CEMP)	
11 Environmental Enhancement Management Plan (EEMP), Brybil Projects Ltd., June 2020	
12 Memo Additional FLNRO Information, Dave Hayward, Brybil, June 8, 2020; and	
13 Any other documents related to the File No. 2007755.	
The holder of this approval must adhere to the standards of professional accountability, as signed off by Qualified Professional(s), Dave Hayward and Rob Hoogendorn on June 2, 2020, regarding the Key Aquatic	
n Habitat Questions for Qualified Professionals specific to Bank Erosion Protection and Stream Diversion/in-filling, on behalf of the holder of this approval. It is the responsibility of the holder of this Approval to retain an appropriately qualified professional(s) for the relevant duration of works in order to uphold this signed professional assessment.	
o All work shall be carried out in accordance with the Provincial "Standards and Best Practices for In-stream Works" (2004). The Provincial guidance document can be found at the following link http://www.env.gov.bc.ca/wld/documents/bmp/iswstdsbpsmarch2004.pdf .	
p The holder of this Approval must hire an appropriately Qualified Professional to conduct Environmental Monitoring on all in-stream works authorized under this Approval. The Qualified Professional must be an applied scientist or technologist, acting alone or together with another qualified professional. He or she must be registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association. The Qualified Professional is responsible for observing the methods of construction and preparing information and reports on the compliance of the construction activities. The Qualified Professional shall	
1 Ensure all best management practices and mitigation measures are in place to avoid and minimize environmental impact on the land and on fish and fish habitat of the stream.	
2 Where applicable, assist in the isolation of the stream prior to the commencement of works.	
3 Implement and ensure erosion and sediment control measures are constructed, installed, and maintained appropriately for the full duration of instream works.	
4 Supervise all instream works authorized under this Approval.	
5 When the works involve temporary diversions to isolate the work site,	
i Monitor all diversion works daily to ensure pumps & flow bypasses are in proper working condition;	
ii Ensure diversion works that include pump intakes be screened for fish and aquatic species in accordance with the "Interim code of practice End-of-pipe fish protection screens for small water intakes in freshwater" (Fisheries and Oceans Canada, 2020); and	
iii Ensure fish are prevented from entering the works.	
6 When the works involve dewatering or isolation of flow and the stream is known or suspected to contain fish and/or amphibians,	
i Attend the site prior to conducting any instream works to complete fish and wildlife search and salvages;	
ii Obtain any permits needed prior to undertaking the salvage(s); and	
iii Inspect the extraction area for fish stranding at least once after water levels have declined.	
7 In the event of an environmental incident or non-compliance with any of the terms or conditions of this Approval, notify the Water Manager (SouthCoastWSAReporting@gov.bc.ca), within 24 hours.	
8 Be granted authority to stop the work authorized under this Approval if deemed necessary to address risks to the environment. The Qualified Professional or their designate (specified in writing) must be on site during all phases of construction in and around the stream to ensure this component is upheld.	
q Upon commencement of the project, the work shall be pursued to completion as quickly as possible.	
r All equipment and machinery used in or near the stream channel	
1 Must be in good operating condition and free of leaks, excess oil and grease;	
2 Must have a spill containment kit readily accessible on-site;	



3	May not be refuelled within 30 meters of any watercourse; and	
4	Must use environmentally sensitive hydraulic fluids which are non-toxic to aquatic life and which are readily or inherently bio-degradable.	
5	Sediment and Erosion Control measures to prevent the release of silt, sediment or sediment-laden water must be in place before starting works that may result in sediment mobilization. Care shall be exercised during all phases of the work to prevent the release of silt, sediment, sediment-laden water, raw concrete, concrete leachate or any deleterious substances. All control measures must meet or surpass the Provincial "Standards and Best Practices for In-stream Works" (2004) and the "Land Development Guidelines for the Protection of Aquatic Habitat" (Fisheries and Oceans Canada and the British Columbia, 1993).	
t	Sediment removal boundaries must be clearly delineated prior to commencement of work. All sediment excavation for removal purposes shall be completed in isolation of the stream flows.	
u	Discharge and runoff water from the site into any watercourse(s) must comply with the BC Approved Water Quality Guidelines for the Protection of Aquatic Life (https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines/approved-water-quality-guidelines and https://www2.gov.bc.ca/assets/gov/environment/air-land-water/water/waterquality/wqgs-wqos/approved-wqgs/turbidity-or.pdf) and/or the applicable Local Government Bylaw(s).	
	be taken upstream of any works taking place and within the extent of the sedimentation downstream of where instream work is actively occurring. Measurements should be taken immediately prior to works beginning, and then at regular intervals until the works are completed and may require additional frequency during wet weather conditions. Wet weather conditions will be defined as being equal to or greater than 25 millimetres of rainfall within a 24 hour period.	
v	All excavated material and debris shall be removed from the site or placed in a stable area above the high water mark of the stream. Mitigative measures must be applied to protect the excavated material and debris from erosion and reintroduction into the watercourse. These measures may include covering the material with erosion blankets, seeding and planting with native vegetation, or as otherwise directed by a Qualified Professional.	
w	All material utilized during construction shall be contoured and placed in a stable area such that it is not able to mobilize and managed to avoid entry into any stream or watercourse.	
x	Site preparation and construction of the works is to be carried out from the banks of the stream, thus minimizing disturbance to the stream.	
y	The holder of this Approval shall ensure that instream works are designed and installed so as not to restrict fish passage and/or lead to fish stranding.	
z	All temporary works (including a ford, stream crossing and flow bypass) shall be removed on completion of the project, and the stream channel restored to its natural condition.	
aa	Vegetation along the banks of the stream shall be disturbed as little as possible. All disturbed areas must be restored using native vegetation that is suitable for the site conditions.	
bb	The new channel of the stream must have greater or equal hydraulic capacity than the existing channel.	
cc	The hydraulic capacity of installed culvert(s) must be equivalent to the hydraulic capacity of the stream channel or be capable of passing the 1 in 200 year maximum daily flow without the water level at the culvert(s) inlet exceeding the top of the culvert(s).	
dd	Rock used as riprap shall be clean of any substances deleterious to aquatic life and shall be durable, angular in shape and suitably graded and sized to resist movement by stream flow. Any other engineering material required for the construction of the works shall be clean of any substances deleterious to aquatic life.	
ee	All rock used in the works shall be clean and free of sediment producing material, durable, non-acid generating and suitably graded.	
ff	Treated wood products shall not be used in any construction below the high-water mark of the stream channel.	
gg	Large woody debris and the stubs of large diameter trees must be left in place or retained on-site where it is safe to do so.	
hh	Care shall be exercised during pile driving to minimize potential adverse impacts to fish or wildlife. The following mitigation measures shall be implemented	
1	Where possible and feasible, piles should be installed using a vibratory hammer.	
2	Piles installed using an impact hammer must implement mitigation measures to reduce water pressure sound waves in excess of 30 kilopascals (kPa).	
3	Mitigation measures such as bubble curtains, double wall piles, or isolation methods shall be implemented to avoid adverse impacts to fish.	
4	Where water pressure sound waves may exceed 30 kPa, isolation methods must be implemented to prevent fish and wildlife from entering the work area.	
5	Monitoring underwater sound wave levels must be conducted continuously and within 10 meters of the pile being driven to ensure levels do not exceed 30 kPa. The construction with timber piles does not require underwater sound monitoring.	
6	In the event that distressed, injured or dead fish are observed following the initiation of pile driving, work shall halt immediately and the holder of this Approval or appropriate designate must contact the Water Manager as soon as practicable for additional requirements before work is resumed.	
ii	The holder of this Approval must provide a detailed post-construction report no later than December 1 of the year works were completed. The report must be labelled with this Approval file number and labelled in the subject line of the email and submitted to SouthCoastWSAReporting@gov.bc.ca. That report shall include a signed statement from an appropriately Qualified Professional summarizing	
1	The in-stream works undertaken,	
2	The timing of those works,	
3	The total in-stream area directly affected,	
4	The volume of gravel or sediment removed (if applicable),	
5	The frequency of monitoring including who the QP or EM was;	
6	The turbidity reporting and accompanying data along with a description of any levels higher than the authorization and what immediate steps were taken (if applicable),	
7	Representative site photographs;	
8	Whether or not they observed or were otherwise aware of any non-compliance with the terms and conditions of this Approval; and	
9	A description of any environmental incidents, non-compliance or other difficulties, and how these were addressed and reported.	
jj	The holder of this Approval must retain an appropriately Qualified Professional to design, implement and report on the effectiveness of mitigation, restoration, and/or offsetting measures required in this Approval. The effectiveness monitoring term required for this approval is 10 years following the completion of construction of the offsetting habitat. Monitoring for riparian, instream, and wetland habitat should occur for 5 years, over a 10-year period following the completion of construction of the habitat offsetting unless a Qualified Professional deems the site functional prior to the end of the 5 years of monitoring. Monitoring must occur until the habitat is deemed functional at like for like or like for greater than the original habitat by a Qualified Professional. Effectiveness Monitoring Reports shall be submitted no later than December 1 of each calendar year for the duration of monitoring. The reports shall be submitted via email to SouthCoastWSAReporting@gov.bc.ca, with the approval file number listed in the report and the subject line of the email. The reports shall include	
1	Documentation (including photographs) and summary of the survival of planted trees and shrubs. Tree survival rates must be 100%. Shrub and other plant survival rates must exceed 80%. Replanting may be required to achieve this success rate. If the area is susceptible to invasive species, the riparian planting plan should be modified to include a denser plant spacing as well as additional monitoring and maintenance to ensure an adequate plant survival rate of 80% can be achieved. It is recommended that trees and shrubs be protected from beavers and voles with metal fencing and vole guards, respectively.	
2	Observation and documentation (including photographs) related to flows and function of the restored or new channel and its features.	
3	Fish presence, species composition, and if fish stranding is occurring within the newly constructed channel.	
4	Amphibian species presence by egg mass surveys,	
5	Recommendations for adaptive management, such as additional channel complexing or modifications if required, to address habitat limitations such as insufficient flows, fish stranding, etc.,	
6	Monitoring, maintenance and implementation of the above recommendations if required.	
7	Water quality monitoring including temperature, pH, Dissolved Oxygen, and turbidity.	
kk	To address the permanent instream and riparian impacts associated with the project, the holder of this Approval must	
1	Retain one or more appropriately qualified professionals to develop an offsetting plan that includes	
i	The creation of a minimum of 406 m ² of instream, 702 m ² of wetland, and 5,495 m ² riparian habitat that is like for like, or like for better habitat, in terms of structure, functionality (e.g., flow regime), and target species. If the actual instream, wetland, and/or riparian impact area is larger than estimated in "Environmental Enhancement Management Plan Hwy 91/17 Upgrade Project, Delta, BC. Submitted to Pacific Gateway Constructors prepared by Brybil Projects Ltd. Dated June, 2020" the compensation works must offset the actual area lost using the above stated like for like or like for better guidelines.	



<p>A post-construction monitoring plan of the compensation works over 10 years following the completion of the offsetting measures. Monitoring must take place during the same time of year each year to provide comparable data. Monitoring of plant survival in riparian and wetland areas and of instream areas should be scheduled during the summer, during a period between high and low water (likely July). Results of initial monitoring will determine how much further monitoring may be required until enhancement habitats are self-sustaining.</p> <p>iii A commitment to prepare and submit annual post-construction monitoring reports at the end of every year of the monitoring program. A final monitoring report must be submitted upon completion of the annual monitoring program or upon reaching the survivorship and/or functionality requirements if these were not met during the monitoring program.</p> <p>2 Develop the offsetting plan in collaboration with interested First Nations, local governments, and the Ministry of Forests, Lands, and Natural Resource Operations and Rural Development.</p> <p>Submit an amendment to this approval, or a new Change Approval or a Water License, whichever is applicable to the offsetting proposal, to authorize the construction of the offsetting works. This application must be submitted to Front Counter BC and the tracking number must be provided to WaterActReferrals.LowerMainland@gov.bc.ca no later than December 31, 2020, unless otherwise specified in writing by the Water Manager.</p>	
<p>ii Effectiveness monitoring must take place during the same time of year each year to provide comparable data.</p> <p>Monitoring of plant survival in riparian and wetland areas and of instream areas should be scheduled during the summer, during a period between high and low water (likely July). Targets include</p> <p>1 Plant survival is $\geq 80\%$; Tree survival rate of 100 %.</p> <p>2 Native plant cover is two thirds greater than invasive species cover within 5 years;</p> <p>3 Visual survey of LWD and boulders to confirm they are in place and intact, and that boulders are effectively creating riffles and pools, creating cover for fish and habitat for amphibians; and</p> <p>4 Fish are present in instream areas and there are no new barriers to movement</p>	

APPENDIX 6: STATUS OF TOCA COMMITMENTS TABLE

Ref	Objective Commitments & Assurances	Timing	Delivered By	Status Update	
				Ongoing	Complete
1.0 Responsible Environmental Management					
1.1	Develop, implement, and maintain an Environmental Management Plan (EMP) for the Project to demonstrate how the design, construction and operation, including maintenance, of the Project: - Will be carried out to avoid or mitigate negative impacts; - Will be carried out in an environmentally responsible manner, in accordance with DBSS 165 [Protection of the Environment]; - Will employ Best Management Practices (BMPs3); and - Will comply with federal and provincial legislation, permits, approvals and authorizations, including the Environmental Assessment Certificate (EAC).	All phases	Contractor	X	
1.2	Prepare and implement a Construction Environmental Management Plan (CEMP), (which is a component of the EMP), including relevant sub-plans, for the Project prior to the start of relevant construction activities.	Pre-construction	Contractor	X	
1.3	Obtain required statutory permits, approvals, and authorizations before proceeding with construction that requires such permits.	All phases	Contractor	X	
1.4	Adhere to the terms and conditions of the: EAC; federal screening report; the EMP; DBSS 165 [Protection of the Environment]; and any other applicable permits, licenses and approvals.	Pre-construction, construction	Contractor	X	
1.5	Establish an Inter-Agency Environmental Review Committee (IAERC), in accordance with the Terms of Reference developed during Application review, to provide for agency review and comment on plans and designs prior to construction, including but not limited to: - Detailed design of stormwater management infrastructure;	Pre-construction, construction	MOTI / Contractor	N/A	

	- Detailed vegetation and wildlife mitigation plans and mitigation monitoring plans; and - Environmental management plans.				
1.6	Provide all project related EMPs, including component EMPs, to applicable regulatory agencies in the IAERC for review and comment, at least 30 calendar days prior to the start of construction that requires such plans.	Pre-construction	Contractor	N/A	
1.7	Relevant sub-plans to be included in the CEMP will include those to address environmental issues identified in the Application and supporting documentation submitted to the EAO during the Application review, and described in the Application (Section 11, pg. 523), including but not limited to: - Agriculture Mitigation Plan; - Air Quality and Dust Control Plan; - Archaeological Mitigation / Monitoring Plan; - Construction and Hazardous Waste Management Plan; - Contaminated Sites Management Plan; - Contractor Awareness and Education Plan; - Environmental Monitoring Plan; - Fisheries Habitat Mitigation and Compensation Plan; - Health and Safety Plan; - Invasive Species Management Plan; - Noise and Vibration Management Plan; - Spill Management and Emergency Response Plan; - Surface Water Quality and Sediment Control Plan; - Wildlife and Habitat Management Plan.	Pre-construction	Contractor	X	
1.8	Manage contamination encountered during project development, regardless of the current assessment of potential contamination, in accordance with applicable regulatory requirements.	All phases	Contractor	X	
1.9	Prepare and implement an Operational Environmental Management Plan, prior to operation and maintenance activities. Provide the operational EMP to relevant reviewing and regulatory agencies, for review and comment, at least 30 calendar days prior to the onset of operation and maintenance activities.	Pre-construction	Contractor	TBD	
1.10	At a minimum, review the Wildlife and Habitat Management Plan and modify if required, three years post- construction and make a decision regarding the next review date and/or determine the closure date for the plan(s). The method for review, modification, and decision on closure of the plan(s) will be defined by the applicable regulatory agencies within the IAERC	Operations	Contractor	N/A	
2.0 Monitoring					
2.1	Ensure that environmental monitoring and reporting for the Project will be conducted, with respect to the terms and conditions of the EAC and other regulatory permits, approvals and authorizations as applicable.	Construction	Contractor	X	
2.2	Incorporate a monitoring component into all applicable sub-plans of the construction EMP developed for the construction phase of the Project.	Pre-construction	Contractor	X	
2.3	Outline in each of the sub-plans of the construction EMP: - Rationale for monitoring; - Parameters to be monitored;	Pre-construction	Contractor	X	

	- Monitoring program details; and - Required follow-up actions.				
2.4	The Owner will engage an Environmental Monitor for the construction phases of the Project to undertake environmental monitoring activities and oversee implementation of each of component plans of the EMP developed for the Project. The Environmental Monitor will monitor, evaluate, and report to the owner on construction activities and the effectiveness of the environmental management strategies and mitigation measures, with respect to the terms and conditions of the Application and other regulatory Permits, Approvals and Authorizations that may apply. The Monitor will be responsible for making onsite decisions and taking on-site action to avoid/respond to potential environmental effects which could include temporary stop work orders if necessary.	Construction	Contractor	X	
2.5	Implement environmental quality management program through monitoring, auditing and reporting activities for the Project with respect to the terms and conditions of the EAC and other regulatory permits, approvals and authorizations.	All phases	Contractor	X	
3.0 Incident Management					
3.1	Respond to environmental incidents, including spill incidents in accordance with the Emergency Response Plan to minimize effects and risks to the general public, on-site workers and the environment.	All phases	Contractor	X	
3.2	Include protocols, consistent with the BC Spill Reporting Regulation, for reporting spills to appropriate emergency response authorities, including; - The Provincial Emergency Program, in the case of any spills of reportable deleterious substances into waters frequented by fish, regardless of the amount of the spill; and - To adjacent property owners and occupiers, including local government, where utilities cross the highway and there is a potential for an incident to extend beyond the Project boundaries.	Pre-construction	Contractor	X	
3.3	Train all field Project personnel regarding implementation of the Construction and Hazardous Waste Management and Spill Management and Emergency Response Plans.	All phases	Contractor	X	
3.4	Incorporate relevant municipal contacts into the emergency contacts for the Construction and Hazardous Waste Management and Spill Management and Emergency Response Plans prepared for construction of the Project.	Pre-construction	Contractor	X	
3.5	Follow applicable DBSS 165 and Canadian Council of Ministers of Environment codes and procedures if temporary fuel storage/fueling facilities are required during construction. Where there is a difference in standards, the most stringent measure for environmental protection will take precedence.	Construction	Contractor	X	
4.0 Community Consultation					
4.1	Consult with local governments, stakeholders and the public during all stages of Project development.	Pre-construction; construction	MoT, Contractor	X	
4.2	Conduct community open houses and information sessions during the design review stage to obtain input on design refinements, during the preliminary and final design review stages.	Pre-construction	MoT, Contractor	N/A	
4.3	Provide regular public information updates on the progress of construction, the schedule, and upcoming milestones.	Construction	MoT, Contractor	X	

4.4	Consult with the Corporation of Delta (CoD) and the City of Surrey (CoS) during all stages of project development and construction.	Pre-construction; construction	Contractor	X	
4.5	Provide updated media information materials, as part of the Project commitment to making project information available to the public.	All phases	Contractor	X	
4.6	Track project enquiries and responses.	All phases	Contractor	X	
4.7	Discuss potential economic opportunities generated by the Project with participating First Nations throughout the Post-EA Certification, Design and Construction Phases of the Project.	Pre-construction; construction	MoT, Contractor	X	
4.8	Obtain input from participating First Nations to identify appropriate measures to mitigate potential project related impacts on their previously identified interests in relation to fisheries and habitat matters.	Pre-construction	Contractor	X	
5.0 Stormwater Management					
5.1	Ensure that the design, construction and maintenance of stormwater management infrastructure for the Project takes an integrated approach to stormwater management and contributes to maintaining, or improving, drainage and water quality conditions directly adjacent to the corridor.	All phases	Contractor	TBD	
5.2	Design, construct and maintain stormwater management infrastructure, such that it to meets the performance objectives outlined in the Stormwater Management Plan Outline (July, 2007) and the Application. Monitoring of the infrastructure will be undertaken to confirm performance objectives are met or, if necessary, additional steps are taken to ensure performance objectives are achieved.	All phases	Contractor	X	
5.3	Consult with municipalities adjacent to the new construction area such that the approach to the management of stormwater and drainage design is complementary to, and can be integrated with, adjacent municipal stormwater infrastructure.	Pre-construction	Contractor	TBD	
5.4	Provide final designs for stormwater management infrastructure to relevant First Nations and reviewing and regulatory agencies for review and comment at least 30 calendar days prior to relevant construction activities in order to verify that the proposed infrastructure achieves agreed upon performance measures identified in the Stormwater Management Plan Outline (July 2007).	Pre-construction	Contractor	TBD	
5.5	Drain stormwater and road runoff away from red and blue listed plant communities and do not construct integrated stormwater management infrastructure in such habitat areas.	Construction; operation	Contractor	TBD	
5.6	Obtain input from participating First Nations regarding mitigation measures outlined in the stormwater and drainage plan and effective integration of those measures into the design and operation of the Project.	Pre-construction	Contractor	TBD	
6.0 Agriculture					
6.1	Consult with the Agricultural Land Commission (ALC), Ministry of Agriculture and Lands (MAL), Delta Farmers' Institute (DFI), individual farm owners and the CoD, through all future stages of Project development, construction and operation, to ensure impacts to agricultural lands and operations are minimized where possible and appropriately addressed where impacts are unavoidable.	All phases	MoT, Contractor	X	
6.2	Obtain ALC approvals regarding areas within the Agricultural Land Reserve (ALR) required for the project, prior to construction.	Pre-construction	MoT, Contractor		X

6.3	Develop and implement an Agricultural Mitigation Plan as outlined in the Application that identifies potential impacts to agriculture as a result of project construction activities and measures for avoiding and addressing such impacts where possible. The scope will include those measures outlined in the Application and the Agricultural Enhancement Strategy (April 2008), including but not limited to mitigation measures focused on: - Road access; - Drainage and irrigation; - Utilities; and - Maintaining the agricultural land base.	Pre-construction	Contractor	X	
6.4	Finalize and implement specific agricultural enhancement initiatives, including but not limited to, compensation mechanisms focused on improving road access and drainage and irrigation, as part of the application process to the ALC and summarily as part of the Agricultural Enhancement Strategy (April 2008).	Pre-construction; construction	MoT	X	
6.5	Retain the services of a Professional Agrologist to: - Liaise with the owner, Design-Builder and farmer(s); - Oversee a consultation and dispute resolution process for individual farmers affected by the Project; and - Oversee monitoring and effectiveness of measures proposed to address impacts to agriculture during design, construction and operation.	All phases	MoT	X	
6.6	Avoid, to the extent possible, using agricultural lands outside of the Right-Of-Way (ROW), for staging areas. For all agricultural lands that are required for use as staging areas, implement construction BMPs (as noted in the Agriculture Mitigation Plan in the EMP) to manage potential construction related effects and restore lands to pre-construction condition, or better agricultural capability, upon completion of project works.	Pre-construction; construction	Contractor	X	
6.7	Consult with individual farm owners, as well as MAL, ALC, CoD, DFI and other stakeholders, to identify potential impacts to agricultural operations and infrastructure and ensure that such impacts are avoided, mitigated for, or appropriately addressed during future stages of design and construction of the Project. The scope of potential impacts to farm operations includes, but is not limited to: - Agricultural drainage; - Utilities; - Road Access; and - Pollinators.	Pre-construction; construction	MoT; contractor	X	
6.8	Undertake reasonable measures to facilitate the consolidation of parcels of isolated agricultural lands, to promote continued agricultural use of such lands.	All phases	MoT	X	
6.9	Undertake reasonable measure to minimize potential loss of ALR lands, including existing farm(s) by: - Refining the Project footprint where feasible; and - Optimizing use of existing ROW.	Pre-construction; construction	Contractor	X	
7.0 Air Quality					
7.1	Ensure that the construction works and operations for the Project are conducted in compliance with environmental permits and approvals and that all reasonable measures are taken to address project-related effects on air quality.	Construction, operation	Contractor	X	

7.2	Develop and implement an Air Quality and Dust Control Plan for the construction phase of the project. The plan will: - Include an air quality monitoring program with thresholds, which if exceeded, will trigger the implementation of additional mitigation and corrective measures; - Commit to the best available, known and effective, measures for mitigating construction related air emissions, including diesel particulate matter (PM), as identified by relevant regulatory agencies. This would include, where practical, the use of diesel oxidation catalysts (DOCs) or diesel particulate filters (DPFs) on all on-road and off-road project equipment in combination with use of a B20 biodiesel blend; - Include an anti-idling policy for construction equipment and other vehicles associated with construction related activities; - Commit to fugitive dust minimization strategies (e.g. wheel wash and sweeping), and dust suppression techniques (e.g. watering) on roads; and - Identify site specific considerations, where applicable, such as proximity to sensitive environmental or human receptors.	Pre-construction; construction	Contractor	X	
7.3	Provide the Air Quality and Dust Control Plan to Metro Vancouver, Environment Canada (EC), Ministry of Environment (MoE), Transport Canada, Health Canada (HC) and other relevant agencies for review and comment at least 30 calendar days prior to relevant construction activities.	Pre-construction	MoT, Contractor	X	
7.4	Avoid burning as a means for disposing of land clearing debris.	Construction	Contractor	X	
8.0 Traffic Management					
8.1	Ensure that the design of the Project is integrated with local road networks, and that construction of the proposed project includes measures for avoiding or minimizing impacts to local road networks.	Pre-construction; construction	MoT, Contractor	X	
8.2	Prepare and implement a Traffic Management Plan in coordination with CoS and CoD to address construction related traffic conditions.	Pre-construction; construction	Contractor	X	
8.3	Consult with the CoD, CoS, MoT district office, and other stakeholders to design and construct project infrastructure so that it is effectively integrated with existing and planned local road networks.	Pre-construction; construction	Contractor	X	
9.0 Noise and Vibration					
9.1	Ensure that potential noise impacts associated with the project are considered and mitigation provided for during design, construction and operation of the project.	All phases	Contractor	X	
9.2	Prepare and implement a Noise and Vibration Management Plan for the construction phase of the Project that will include specific mitigation measures, and locations where they will be applied to address construction related noise.	Pre-construction; construction	Contractor	X	
9.3	Prepare a noise complaint protocol as part of the CEMP Noise and Vibration Management Plan to respond in a timely manner to concerns and complaints raised by residents and take reasonable actions to reduce the Project-related construction noise in question.	Pre-construction	Contractor	X	
9.4	Provide the construction Noise and Vibration Management Plan to the CoS, CoD and other stakeholders for review and comment 30 calendar days prior to the onset of relevant construction activities.	Pre-construction	Contractor	X	

9.5	Design and construct mitigation measures to address potential operational noise impacts on residential areas as part of the project according to the MoT Noise Policy (1993) [referenced as the Noise Policy in this Agreement].	Pre-construction; construction	Contractor	TBD	
9.6	Conduct noise monitoring at the baseline sites during the first year after construction is complete to assess the effectiveness of mitigation measures, with a commitment to further mitigation if necessary, technically feasible and practical.	Operation	Contractor	TBD	
9.7	Consult with the CoD and CoS to look for opportunities to use tree planting and landscaping to mitigate potential visual, noise and air quality impacts.	Pre-construction; construction	Contractor		
9.8	Participate in meetings with affected communities and residents to address site-specific noise issues in the event that late evening or night time construction works prove necessary in the vicinity of residential areas.	Pre-construction; construction	Contractor	TBD	
9.10	Perform pre-condition surveys to document existing state of buildings and facilities in the vicinity of SFPR construction activities as per standard geotechnical BMPs. This will form the baseline conditions, against which post-construction condition surveys will be carried out to assess any vibration impacts to buildings and facilities as a result of Project construction.	Pre-construction	Contractor	X	
9.11	Monitor ground vibrations, as per standard geotechnical BMPs, adjacent to buildings to confirm that vibration levels are within ranges expected to avoid construction-related vibration.	Construction	Contractor	X	
10.0 Contaminated Sites and Property Acquisition					
10.1	Ensure that potential site contamination is investigated, and managed in compliance with the Contaminated Sites Regulation (Environmental Management Act), during all stages of project development including property acquisition, design and construction.	All phases	Contractor	X	
10.2	Assess all Tier 1 and Tier 2 properties required for the ROW for potential contamination prior to construction and take steps, as required, to investigate and address site contamination that may exist.	Pre-construction; construction	MoT; Contractor	X	
10.3	Manage any contaminated groundwater encountered in accordance with the requirements of the Environmental Management Act and associated regulations.	Pre-construction; construction	MoT; Contractor	X	
10.4	Undertake risk assessment and remediation activities, as required, and manage potential contamination in compliance with the provincial Environmental Management Act and Contaminated Sites Regulation.	Pre-construction; construction	MoT; Contractor	X	
10.5	Should contaminated groundwater be identified along the route, include measures to control/mitigate the potential for impacts to surface water in future stormwater design.	All phases	MoT; Contractor	X	
10.6	Notify MoE of potential migration of contaminants from known or identified Tier 1 off-corridor properties of concern discovered during supplementary investigations or Project-related activities and use information to manage and mitigate contaminated sites issues prior to construction.	Pre-construction	Contractor	X	
10.7	As part of the CEMP, the Contaminated Sites Management, Construction and Hazardous Waste Management and Spill Management and Emergency Response Plans, develop and implement a protocol for identifying and managing contaminated and potentially contaminated materials during the construction phase of the Project.	Pre-construction; construction	Contractor	X	
11.0 Fisheries					

11.1	Ensure that all works and activities associated with the construction, operation and maintenance of the project are conducted in compliance with the Fisheries Act. This includes implementing mitigation measures and best management practices to ensure that the project does not cause any unauthorized harmful alteration, disruption or destruction of fish habitat, that the project does not cause any harm or mortality to fish, and that the project does not cause or result in the deposit of a deleterious substance of any type, including sediment, into a watercourse that is frequented by fish.	All phases	Contractor	X	
11.2	Obtain an authorization under subsection 35(2) of the Fisheries Act for any unavoidable harmful alteration, disruption or destruction of fish habitat prior to relevant construction works or activities.	All phases	Contractor	X	
11.3	Develop and construct fish habitat compensation measures that offset all project impacts to fish habitat. These fish habitat compensation measures will be constructed by the proponent as directed by Fisheries and Oceans Canada and in accordance with any s. 35(2) Fisheries Act authorizations.	Pre-construction; construction	Contractor	X	
11.4	Implement appropriate measures to adequately mitigate the effects of the creation of impervious surfaces on volume of surface runoff, rate of runoff, and water quality. These will meet performance targets established in the Stormwater Management Plan Outline (July, 2007) for the project.	Pre-construction; construction; operation	Contractor	TBD	
11.5	Establish and maintain riparian setback areas from drainage channels and watercourses in accordance with regulatory requirements.	Pre-construction; construction; operation	Contractor	X	
11.6	Take all reasonable measures to prevent substances that may be harmful to fish from entering the aquatic environment at the construction sites in the proximity to fish and aquatic habitat, paying particular attention to discharges of suspended sediments, construction waste, handling of uncured concrete and other deleterious substances.	Construction	Contractor	X	
11.7	Construct bridges for watercourse crosses in the vicinity of Delta Ravines (i.e. Norum, McAdam, Collings, Nelson View and Gunderson Creeks), as shown in plans attached to the Application (Technical Volume 1) and over a minimum 450 m portion of the Fraser Heights Wetlands, using the design and the construction methods outlined in the draft Fraser Heights Wetlands Bridge Preliminary Design Report.	Pre-construction; construction	Contractor	N/A	
11.8	Obtain input from the Musqueam Indian Band and other participating First Nations to identify appropriate measures to mitigate potential project related impacts on the identified interests of the Musqueam Band in relation to fisheries and habitat matters. Identify potential opportunities for mutually agreeable opportunities to assist in advancing the fisheries interests of the Musqueam Indian Band or other participating First Nations.	All phases	MoT, contractor	X	
11.9	Review with the applicable regulatory agencies, including but not limited to DFO and MOE, proposals for compensation habitat, including opportunities for habitat to be constructed in advance of other Project construction (i.e. "habitat banking"), to determine the ratio of habitat types and to which drainage compensation will apply.	Pre-construction	Contractor	X	
11.10	Follow BMPs in the construction of all new ditches and stormwater watercourses.	Construction	Contractor	X	

11.11	Retain maintenance responsibility for compensation sites within the Project limits. For sites constructed in areas outside of the Project limits, establish site-specific agreements for access and maintenance with the relevant stakeholder/landowner.	Operations	Contractor		
12.0 Water Quality					
12.1	Ensure that the construction works and operations for the Project are conducted in compliance with environmental requirements and BMPs in order to avoid impacts to water quality.	All phases	Contractor	X	
12.2	Develop and implement a Surface Water Quality and Sediment Control Plan and provide the plan for review and comment by relevant environmental agencies at least 30 calendar days prior to the start of relevant construction activities.	Pre-construction	Contractor	X	
12.3	Sample water from potentially impacted drinking water wells to assess potential adverse effects to water quality associated with during construction and operation phases of the project. Provide sampling water quality data to the local health authority for review and comment.	Construction; operation	Contractor	TBD	
12.4	The Surface Water Quality and Sediment Control Plan will at a minimum: - Identify requirements for additional water quality monitoring prior to and during construction to ensure preventative and mitigation measures can be taken as appropriate, to avoid impacts to water quality; - Identify potential water quality contaminants of concern generated by construction activities and associated preventative and mitigative measures; - Include a BMP maintenance plan to ensure BMPs implemented are functioning as designed and corrective actions are taken when required; and - Be submitted to the applicable regulatory agencies at least 30 calendar days prior to start of construction activities for review.	Pre-construction; construction	Contractor	X	
13.0 Wildlife and Vegetation					
13.1	Ensure that the design, construction, and operation of the project, avoids where practical and technically feasible, impacts to vegetation and wildlife.	All phases	Contractor	X	
13.2	Prepare and implement a Wildlife and Habitat Management Plan to avoid and, where necessary, mitigate potential impacts to vegetation, wildlife and wildlife habitat. Provide the Plan to relevant regulatory and reviewing agencies for review and comment at least 30 calendar days prior to relevant construction activities beginning. The Wildlife and Habitat Management Plan will include best practices including but not limited to those identified in the Application (Table 7.717, draft Wildlife Mitigation Crossing Plan (April 2007) [replaced by the Wildlife and Wildlife Habitat Mitigation Plan (September 2008)], and Zones of Influence memo (July 2007) [replaced by the Wildlife and Wildlife Habitat Mitigation Plan (September 2008)] in order to avoid, and where necessary, mitigate potential effects on vegetation and wildlife. This plan will also identify protocols for the survey and salvage of vegetation and wildlife as appropriate and required.	Pre-construction; construction	Contractor	X	
13.3	Develop and implement mitigation measures to avoid and minimize impacts to wildlife during construction and operation of the project including, but not limited to those measures identified in the Application (September, 2006), draft Wildlife Mitigation Crossing Plan (April 2007) [replaced by the Wildlife and Wildlife Habitat Mitigation Plan (September 2008)] and Zones of Influence Assessment memo (July 2007) [replaced by the Wildlife and Wildlife Habitat Mitigation Plan (September 2008)].	Pre-construction; construction	Contractor	X	

13.4	During the design phase, MoT will finalize its determination of the type and location of sound barriers to be constructed along the perimeter of Burns Bog. For the south-western alignment (adjacent to Crescent Slough), this design will include the construction of a solid sound barrier or a barrier that will provide equivalent mitigation. MoT will ensure on-going consultation with TC, EC, MoE and other IAERC members as appropriate, during design regarding the proposed type and location of sound barriers to be installed around Burns Bog.	Pre-construction	MoT, Contractor	TBD	
13.5	Consult with the MoE and the Canadian Wildlife Service (CWS) of Environment Canada, to identify suitable compensation, including but not limited to that identified in the Wildlife and Habitat Management Plan and Habitat Compensation Plan (February, 2007) [replaced by Habitat Compensation Plan (May 2007)], to address residual effects on vegetation and wildlife as a result of the Project.	Pre-construction	Contractor	X	
13.6	Work with reviewing and regulatory agencies to develop and implement a comprehensive and long term Mitigation Monitoring Plan (MMP) [currently known as the SFPR Vegetation and Wildlife Mitigation Monitoring Plan], based on the Vegetation and Wildlife Mitigation Monitoring Strategy (April 2007) [replaced by the SFPR Vegetation and Wildlife Mitigation Monitoring Plan], to monitor the effectiveness of proposed mitigation measures in addressing Project-related effects on vegetation and wildlife, including species at risk. Data collection and monitoring in support of the implementation of the MMP will begin prior to construction and continue for a period of time, to be determined with relevant regulatory agencies, during operation. Information collected in relation to the MMP will be used to guide detailed planning of mitigation, assess the effectiveness of such mitigation, and determine where additional measures may be required. The MMP will include scientifically defensible thresholds or performance measures to facilitate the evaluation of the effectiveness of mitigation.	All phases	Contractor	X	
13.7	Undertake site-specific vegetation surveys in accordance with the regionally supported Protocols for Rare Plants Surveys, to identify the presence and distribution of red- and blue-listed plants species prior to final design and construction. Provide information on the presence and distribution of such plants species to MoE for review and use the information to guide final design and construction to avoid or mitigate impacts to these species.	Pre-construction	Contractor	X	
13.8	Avoid direct impacts to sensitive red and blue listed plant communities where possible and adhere to construction exclusion windows determined by regulators.	Construction	Contractor	X	
13.9	Develop a plan for salvaging plants and seeds, for review by MoE, where impacts to red and blue listed plant species cannot be avoided, for replanting off-alignment.	Pre-construction	Contractor		
13.10	Make all reasonable efforts to avoid impacts to confirmed streambank lupine habitat and confirmed stream bank lupine seed banks in the project corridor, as identified in consultation with the Streambank lupine recovery team, during design construction and operation of the Project. Where impacts to such areas cannot be avoided, work with the Ministry of Environment and the Streambank Lupine Recovery team to identify and carry out appropriate mitigation measures including, but not limited to, the stockpiling of soil containing streambank lupine seeds.	Construction	Contractor	X	

13.11	Undertake pre-construction bird nest surveys and restrict clearing during the breeding season. Pre- construction bird nest surveys will include, but not necessarily be limited to the following: - Conduct pre-construction raptor, heron or any listed species nest and roost tree surveys, consistent with applicable BMPs, to determine presence of active/inactive raptor and heron nests in the corridor and work scheduling with respect to the nest locations and applicable timing restrictions; - Prepare pre-construction bird nest survey protocols should works include clearing of vegetation during the general bird breeding time period as determined by MOE; - Conduct pre-construction bird nest surveys to the satisfaction of the MOE should the Design-Builder intend to seek approval from the MOE for vegetation clearing within the bird breeding time period (defined by MOE) in any year during the Term.	Pre-construction	Contractor	X	
13.12	Consult with MoE on the development and implementation of an Invasive Species Management Plan to address potential effects of the project related to the spread of invasive plant and aquatic wildlife species within the project corridor.	Pre-construction; construction	Contractor	X	
13.13	Include large mammal crossings adjacent to the perimeter of Burns Bog. The final number and location of wildlife crossings will be identified in the Wildlife Mitigation Crossing Plan [replaced by the Wildlife and Wildlife Habitat Mitigation Plan (September 2008)] which will be finalized in consultation with MoE and EC.	Pre-construction	Contractor	X	
13.14	Follow the design criteria outlined in the MOT Manual of Aesthetic Design Practice and the MOT Landscape Policy and Design Standards that form the landscape and site restoration design criteria for the Project.	Pre-construction; construction	Contractor	X	
13.15	Use data collected through the MOT administered Wildlife Accident Reporting System to identify areas of increased wildlife collisions and to monitor direct effects on wildlife.	Operations	Contractor	TBD	
13.16	Identify the location of sensitive wildlife habitats, including but not limited to habitat for species at risk, red and blue listed plant communities and high biodiversity habitats, on detailed design drawings in order to avoid or minimize potential effects to these areas.	Pre-construction	Contractor	X	
14.0 Species at Risk					
14.1	Ensure that all reasonable measures are taken to avoid or lessen effects of the Project on listed wildlife species and their critical habitat and that potential effects that could occur are monitored. All mitigation and monitoring measures will be undertaken in a manner that is consistent with applicable recovery strategy and actions plans.	Pre-construction; construction	MoT, contractor	X	
14.2	Undertake a salvage program for Pacific water shrew from, at a minimum, high and moderate-rated habitat adjacent to the SFPR. Other areas potentially requiring salvage will include lower-rated habitat, connected to higher-rated habitat, and will be determined in consultation with MoE and the PWS Recovery Team.	Pre-construction; construction	Contractor	X	
14.3	Consult with MoE regarding the mitigation of potential effects on Pacific water shrew, and take all practical steps to apply the most recent Pacific water shrew best management practices to address potential effects, including identifying additional opportunities to avoid direct effects to areas, designated as critical habitat by the PWS Recovery Team, during design, construction and operation.	Pre-construction; construction	Contractor	TBD	

14.4	Consult with MOE to develop a mitigation and compensation strategy for Pacific water shrew, where opportunities are available, based on habitat quality and connectivity to surrounding habitat. Undertake sampling program, where required, to determine the presence and distribution of Pacific water shrew to support detailed design of mitigation.	Pre-construction; construction	MoT, Contractor	TBD	
14.5	Detailed design of wildlife crossing mitigation for southern red-backed vole (RBV) will be conducted assuming the presence of RBV in high and moderate rated habitat identified in the EA. Monitoring of the use of wildlife crossing structures will include provisions for assessing the use of such structures by RBV.	Pre-construction	Contractor	TBD	
14.6	Undertake a review of local museum specimens to confirm the distribution of <i>Sorex rowheri</i> within the Lower Fraser Valley. Where possible, use findings to support detailed design of mitigation.	Pre-construction	Contractor	TBD	
14.7	Use information obtained through the Mitigation Monitoring Plan [currently known as the SFPR Vegetation and Wildlife Mitigation Monitoring Plan (February 2008)] to support detailed planning of mitigation to address potential noise, visual and collision effects of the project on barn owl. Undertake long term monitoring of the effectiveness of such mitigation as part of the implementation of the Mitigation Monitoring Plan [currently known as the SFPR Vegetation and Wildlife Mitigation Monitoring Plan (February 2008)].	All phases	Contractor	TBD	
14.8	Use information obtained through the Mitigation Monitoring Plan [currently known as the SFPR Vegetation and Wildlife Mitigation Monitoring Plan (February 2008)] to support detailed planning of mitigation, including pre-construction salvage where appropriate, to address potential effects of the project, including those related to collision and changes in hydrology, on red-legged frog and western toad. Undertake long term monitoring of the effectiveness of such mitigation as part of the implementation of the Mitigation Monitoring Plan [currently known as the SFPR Vegetation and Wildlife Mitigation Monitoring Plan (February 2008)].	All phases	Contractor	X	
14.9	Consult with MOE to plan and undertake at least one preconstruction, one construction and two operational inventories of at-risk aquatic insects in habitat known to or suspected of supporting such species and potentially affected by the project, including but not necessarily limited to the Fraser Heights Wetland, to confirm the findings of the environmental assessment and to monitor potential impacts of the project on aquatic insects.	All phases	Contractor	X	
14.10	Consult with the Canadian Wildlife Service to develop and implement a Mitigation Monitoring Plan [currently known as the SFPR Vegetation and Wildlife Mitigation Monitoring Plan] to monitor and assess the effectiveness of measures proposed to avoid or mitigate potential effects on Sandhill Crane. The Plan will identify: - species habitat requirements; - existing conditions in the project area; - potential project related effects and mitigation; - core indicators for assessing the effectiveness of mitigation; and - proposed study methodology and data interpretation and reporting protocols.	Pre-construction; construction	MoT	TBD	
15.0 Burns Bog					
15.1	Avoid potentially significant impacts to hydrological and ecological values associated with Burns Bog (i.e. alignment refinements to avoid ecological and hydrological values, development of hydrological mitigation that meet the hydrologic objectives identified).	All phases	MoT, Contractor	X	

15.2	Consult with the MV, CoD, MoE, EC, and the Burns Bog Management Planning Committee (BBMPC) and Scientific Advisory Panel (SAP) to ensure design, construction and operation of the Project complements long term management objectives established for the Burns Bog Ecological Conservation Area.	All phases	Contractor	TBD	
15.3	Consult with the reviewing agencies to finalize construction and post construction monitoring requirements related to Burns Bog including, but not limited to, those identified in the Vegetation and Wildlife Mitigation Monitoring Strategy (April 2007) [replaced by the SFPR Vegetation and Wildlife Mitigation Monitoring Plan]. Monitoring requirements with respect to Burns Bog will include but not be limited to those relating to: air quality, water quality, water levels, red-listed plant communities, and wildlife	Construction, operation	Contractor	X	
15.4	Share environmental data from Burns Bog collected as part of the development of the SFPR project, with agencies responsible for the management of the Burns Bog Ecological Conservancy Area in order to support the implementation of the long term management plan for the Bog.	All phases	Contractor	TBD	
15.5	Design, construct and operate hydrology mitigation infrastructure, to mitigate potential effects of the project on the hydrology of Burns Bog, in a way that meets the following performance objectives: - Site specific solutions – the design, construction and operation of hydrology mitigation will be based on, and take into account, site specific conditions. - Compatibility between highway water management and bog water management – Providing for active water level controls in the Bog that are independent of SFPR-related water management. - Prevention of mineral migration into the Bog. – Where indicated, providing a low permeability barrier between the SFPR highway ditch and the lagg ponds/ditches by: using material to construct the berm that supports appropriate vegetation on the berm and prevents the introduction of mineral material into the Bog; and maintaining hydraulic gradients so that Type 1 bog waters flow toward the highway at all times. - Resilience – Providing a design that is sufficiently robust to maintain and actively manage water levels under average and extreme conditions and if Bog conditions change. - Highway and mitigation construction does not preclude future restoration of Burns Bog – Providing flexibility of design that allows, for example, for future water control structures that allow for raising of water level as part of future bog restoration. - Holistic design – Hydrology mitigation concepts are designed in way that ensure they will be compatible with, and help achieve multiple, mitigation requirements. As the design of hydrology mitigation is advanced, it will be documented in a Hydrology Work Plan [currently known as Hydrology Workplan (Burns Bog)]. This document will be finalized prior to commencement of pre-load activities around Burns Bog.	All phases	MoT	TBD	
15.6	Pre-load activities around Burns Bog, including areas north of the Highway 99 interchange and west of Nordel Way, will not commence until TC (and other decision-making authorities as required) has reviewed and is satisfied with the final Hydrology Work Plan and the status of the hydrology mitigation design.	Pre-construction	MoT	TBD	

15.7	Provide opportunities for the active involvement of agencies responsible for the management of the Burns Bog Ecological Conservancy Area, and the Scientific Advisory Panel (SAP), in the design, construction and operation of project related works adjacent to Burns Bog including but not limited to those proposed as mitigation for potential project related effects.	All phases	MoT, contractor	TBD	
15.8	Consult with MV, CoD, EC and MoE on the development of a water balance model and a drainage model to support the design, construction and operation of hydrology mitigation infrastructure adjacent to Burns Bog and support implementation of the Burns Bog Ecological Conservancy Area Management Plan.	Pre-construction	Contractor	TBD	
15.9	Finalize an Air Quality Management Plan [currently known as SFPR Air Quality Management Plan (Burns Bog Segment)], in consultation with TC, EC and other IAERC members as appropriate, prior to commencing pre-loading activities around Burns Bog. This document will identify all technically and economically feasible mitigation measures to be implemented to prevent generation and transmission of dust during the pre-load and construction phases of the project.	Pre-construction	MoT, contractor		X
15.10	Collect a minimum of 4 months of baseline dust fall monitoring between June and September 2008. Following the collection of this information, the MoT will meet with TC and EC to discuss the baseline monitoring information collected and the approach for continued data collection, prior to the commencement of pre-loading activities around Burns Bog (i.e., north of the Highway 99 interchange and west of Nordel Way).	Pre-construction	MoT		X
15.11	Work co-operatively with the Tsawwassen First Nation to maintain appropriate access for TFN members to Burns Bog to facilitate TFN's harvesting rights pursuant to the Tsawwassen Final Agreement.	All phases	MoT, Contractor	TBD	
15.12	Ensure that the development and operation of Stormwater management infrastructure does not compromise the ability to achieve hydrology mitigation objectives adjacent to Burns Bog.	All phases	MoT, Contractor	TBD	
15.13	Implement the monitoring and follow-up activities identified in the Screening document, for a period of five years after the project has commenced operation, to ensure the effectiveness of mitigation measures related to aerial deposition, hydrology, and Sandhill crane in the vicinity of Burns Bog.	All phases	MoT, Contractor	TBD	
16.0 Archaeology					
16.1	Ensure that the design, construction and operation of the Project is advanced in a way that avoids, or minimizes potential impacts to known archaeological sites, including the Nottingham Farm, St. Mungo and the Glenrose Cannery sites, as well as other sites that may be encountered during project planning and development.	All phases	Contractor		X
16.2	Work with participating First Nations who have identified related interests within the context of the ongoing environmental review process and the BC Archaeology Branch regarding investigation of unsurveyed areas within the Project area assessed as having archaeological potential at an appropriate level for an archaeological impact assessment and develop mitigation measures consistent with the BC Archaeological Impact Assessment Guidelines.	Pre-construction	MoT, Contractor	X	

16.3	Obtain a valid Heritage Conservation Act Section 14 Heritage Inspection Permit with adequate provisions to address requirements for investigations and potential impacts to previously unrecorded archaeological sites should they arise. Immediately report previously undocumented archaeological sites that come to light during the construction phase of the Project to the BC Archaeology Branch and participating First Nations.	Pre-construction; construction	MoT, Contractor	X	
16.4	Include required edits and revisions to the Application in the final Heritage Conservation Act Permit report.	Pre-construction	MoT	X	
16.5	Work with the Musqueam Indian Band and other interested First Nations in developing a mutually acceptable Site Management Plan (SMP) for the Glenrose / St. Mungo area [currently known as Archaeological Impacts and Mitigation Strategy St. Mungo and Glenrose Cannery], to encourage the preservation of archaeological deposits through the protection and management of archaeological and heritage resources during planning, design, construction and operation phases of the SFPR project. The Plan will include, but not be limited to: - a summary of existing information (archaeology and oral history); - summary of existing site conditions; - site management objectives (short, medium and long term); and - site management strategies (preconstruction, construction, post-construction phases).	Pre-construction	MoT	N/A	
16.6	Develop and implement an archaeological mitigation program focused on intact archaeological deposits that includes systematic data recovery (excavation) and archaeological monitoring for the St. Mungo and Glenrose Cannery Sites. Develop methodology and sample size with input from the Archaeology Branch and First Nations. Obtain Heritage Conservation Act Section 14 Heritage Investigation Permits and Section 12 Alteration Permits prior to mitigation and/or alteration of known archaeological sites.	Pre-construction, construction	Contractor	N/A	
16.7	Work with the Musqueam Indian Band and other interested First Nations in establishing a final design for the SFPR segment in the Glenrose / St. Mungo area focused on minimizing potential project related impacts on identified archaeological resources.	Pre-construction,	MoT, Contractor	N/A	
16.8	Work with the Musqueam Indian Band and other interested First Nations to further explore options/opportunities to establish appropriate First Nation recognition and/or interpretation measures in relation to the Glenrose / St. Mungo sites.	All phases	MoT	N/A	
16.9	Undertake appropriate archaeological site impact mitigation measures, including construction monitoring and systematic data recovery (i.e., an archaeological excavation), at the St. Mungo and Glenrose Cannery archaeological sites and support these measures with field programs that involve the Musqueam Indian Band and other interested First Nations as appropriate. The proposed mitigation strategy will be based on an archaeological site management plan for the St. Mungo, Wet Site and Glenrose Cannery archaeological sites currently under development in conjunction with representatives of the Musqueam Indian Band.	All phases	MoT, Contractor	N/A	
16.10	Report the discovery of previously undocumented archaeological sites that may come to light during the construction phase of the SFPR project to the British Columbia Archaeology Branch and interested First Nations. Engage an archaeologist to investigate and assess such sites under the terms and conditions of a Heritage Conservation Act permit.	All phases	Contractor	X	

16.11	Provide opportunities for members of the Musqueam Indian Band and other interested First Nations to participate in field programs supporting the implementation of archaeological site mitigation measures.	All phases	MoT, contractor	X	
16.12	Notify and invite First Nations to participate in specified archaeological work that is to occur at identified archaeological sites within their respective asserted traditional territories.			X	
17.0 Heritage					
17.1	Ensure that the design, construction and operation of the proposed project is advanced in a way that avoids, or minimizes potential impacts to heritage buildings	All phases	MoT, contractor	X	
17.2	Consult with the Delta Heritage Advisory Commission and the Surrey Heritage Committee to define heritage interests and work with the Delta Museum and Archive to develop a photo record and inventory of potentially affected heritage houses.	Pre-construction, construction	Contractor	N/A	
17.3	Prior to construction, undertake pre-condition surveys with respect to heritage buildings, as further described in commitment 9.9.	Pre-construction	Contractor	N/A	
17.4	Avoid, where practical and technically feasible, direct impacts to heritage buildings.	All phases	Contractor	NA/	
18.0 Navigable Waters					
18.1	Obtain regulatory approval related to crossings of designated Navigable Waters pursuant to the Navigable Waters Protection Act (NWPA), including but not necessarily limited to, McAdam Creek, Collings Creek, Manson Canal, and Crescent Slough, prior to commencement of works.	Pre-construction, construction	MoT, Contractor	N/A	
19.0 Socio-economic					
19.1	Mitigate potential Project-related visual/lighting impacts through use of screening, fencing and landscaping in consultation with local government. Use dark-sky compliant lighting for the Project.	Pre-construction, construction	Contractor	TBD	
19.2	Manage potential impacts to emergency response services by: - Ensuring emergency response plans (including a Spill Response Management and Emergency Response Plan) are in place during the construction phase of the Project, and updated annually, at a minimum; - Consulting first responders in Traffic Management Plan development; and - Consulting with local fire departments to ensure adequate access.	Pre-construction, construction	Contractor	X	
20.0 Rail					
20.1	Avoid or minimize potential impacts from Project works and activities to rail corridors.	All phases	Contractor	X	
20.2	Notify Transport Canada of project works as required under the <i>Notice of Railway Works Regulations</i> . Notify the public and affected stakeholders in accordance with the <i>Railway Safety Act</i> .	All phases	Contractor	TBD	
20.3	Comply with Canadian transportation standards and regulations as well as the design specifications of the respective railway with regard to vertical and horizontal railroad clearance of new or upgraded infrastructure.	Pre-construction	Contractor	TBD	
20.4	Minimize railroad closures during construction.	Construction	Contractor	X	

APPENDIX 7: WATER QUALITY DATA

Site Code	Site	Date	Time	Water Temp (°C)	Dissolved Oxygen (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
WQ-12	Fortis Culvert DS	02/11/2020	01:00	9.6	4.38	0.35	4.75	0.17	3.0	Sampling done during night shift
WQ-12	Fortis Culvert DS	02/11/2020	03:00	8.4	4.25	0.45	4.80	0.25	5.2	Sampling done during night shift
WQ-2	Silda Ditch MS	02/11/2020	13:15	11.6	4.98	0.22	7.20	0.16	7.9	
WQ-3	Silda Ditch DS	02/11/2020	13:20	11.7	6.77	0.16	6.91	0.09	12.1	
WQ-4	Fraser Rr Inlet	02/11/2020	13:00	11.4	8.37	0.26	7.84	0.13	92.8	High tide, coming in
WQ-11	Fortis Culvert US	02/11/2020	13:30	12.4	4.06	0.10	5.08	0.06	3.0	No instream works today
WQ-12	Fortis Culvert DS	02/11/2020	13:35	12.1	5.98	0.11	4.71	0.05	3.5	No instream works today.
WQ-11	Fortis Culvert US	03/11/2020	01:30	11.4	4.53	0.80	4.95	0.07	3.8	Nightshift-dewatering and instream works
WQ-12	Fortis Culvert DS	03/11/2020	01:00	11.5	4.09	0.73	4.85	0.11	5.9	Nightshift-dewatering and instream works
WQ-2	Silda Ditch MS	03/11/2020	11:00	10.7	7.00	0.31	6.69	0.15	36.2	Heavy rain while sampling
WQ-12	Fortis Culvert DS	02/11/2020	01:00	9.6	4.38	0.35	4.75	0.17	3.0	Sampling done during night shift
WQ-3	Silda Ditch DS	03/11/2020	10:50	10.6	6.99	0.32	6.67	0.16	64.5	Heavy rain while sampling. Sand washouts noticed ~6 m US. Observed turbidity passing through straw waddle into stream from washout direction. Dispatched crew to re-build washout, remove sediment in runoff path, and install ESC measures.
WQ-4	Fraser Rr Inlet	03/11/2020	10:00	10.6	8.77	0.16	8.00	0.08	95.5	High tide, going out. Heavy rain while sampling.
WQ-11	Fortis Culvert US	03/11/2020	10:30	9.6	5.60	0.10	5.32	0.05	8.5	Heavy rain while sampling. No instream works.
WQ-12	Fortis Culvert DS	03/11/2020	10:30	9.1	8.21	0.10	5.29	0.05	3.4	Heavy rain while sampling. No instream works.
WQ-2	Silda Ditch MS	04/11/2020	13:05	10.9	4.23	0.28	6.73	0.12	19.8	Heavy rain during sampling and Fraser River high tide moving out had an impact on the turbidity as water levels were higher than normal.
WQ-3	Silda Ditch DS	04/11/2020	13:00	11.1	6.17	0.22	6.82	0.16	25.6	Heavy rain during sampling and Fraser River high tide moving out had an impact on the turbidity as water levels were higher than normal.
WQ-4	Fraser Rr Inlet	04/11/2020	10:30	11.5	7.85	0.14	7.95	0.07	70.6	High tide, going out. Heavy rain while sampling.
WQ-11	Fortis Culvert US	04/11/2020	11:15	11.2	5.76	0.11	5.22	0.06	4.8	No instream works.

Site Code	Site	Date	Time	Water Temp (°C)	Dissolved Oxygen (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
WQ-12	Fortis Culvert DS	04/11/2020	11:15	11.0	7.22	0.10	5.06	0.05	2.6	No instream works.
WQ-2	Silda Ditch MS	05/11/2020	11:25	9.6	4.97	0.13	6.79	0.08	5.9	
WQ-3	Silda Ditch DS	05/11/2020	11:30	9.5	5.21	0.13	6.92	0.08	7.1	Spillway installed at previous washouts on nightshift prior to sampling
WQ-4	Fraser Rr Inlet	05/11/2020	10:30	9.2	8.49	0.04	7.59	0.04	70.6	High tide
WQ-11	Fortis Culvert US	05/11/2020	10:50	9.2	5.09	0.10	5.46	0.05	2.9	No instream works.
WQ-12	Fortis Culvert DS	05/11/2020	10:45	9.4	4.07	0.10	4.83	0.05	3.2	No instream works.
WQ-2	Silda Ditch MS	06/11/2020	10:00	9.4	4.77	0.14	6.65	0.07	6.4	
WQ-3	Silda Ditch DS	06/11/2020	10:05	9.2	5.96	0.16	6.68	0.08	6.8	
WQ-4	Fraser Rr Inlet	06/11/2020	10:20	9.2	8.49	0.04	7.59	0.04	1.8	High tide
WQ-11	Fortis Culvert US	06/11/2020	10:55	9.2	4.87	0.10	5.50	0.05	2.5	No instream works
WQ-12	Fortis Culvert DS	06/11/2020	11:00	9.5	3.59	0.09	4.65	0.04	1.4	No instream works
WQ-2	Silda Ditch MS	08/11/2020	13:00	7.1	5.87	0.13	6.59	0.06	5.9	-
WQ-3	Silda Ditch DS	08/11/2020	13:05	7.6	4.69	0.15	6.98	0.08	11.6	-
WQ-4	Fraser Rr Inlet	08/11/2020	12:00	8.9	9.12	0.06	7.94	0.05	92.4	High tide
WQ-11	Fortis Culvert US	08/11/2020	12:10	7.4	4.11	0.10	5.23	0.06	3.7	-
WQ-12	Fortis Culvert DS	08/11/2020	12:15	7.5	3.90	0.10	4.99	0.05	3.6	Sampling location in grass along bank
WQ-2	Silda Ditch MS	09/11/2020	12:00	7.4	6.06	0.33	6.58	0.16	8.9	-
WQ-3	Silda Ditch DS	09/11/2020	11:55	7.4	9.06	0.34	6.54	0.17	13.4	-
WQ-4	Fraser Rr Inlet	09/11/2020	10:45	8.7	9.54	0.14	7.23	0.07	80.2	Mid-tide, coming in
WQ-11	Fortis Culvert US	09/11/2020	11:15	7.4	5.59	0.10	5.20	0.05	4.1	-
WQ-12	Fortis Culvert DS	09/11/2020	11:10	6.7	5.22	0.09	4.71	0.05	1.8	Sampling location in grass along bank
WQ-2	Silda Ditch MS	12/11/2020	12:25	6.9	6.57	0.29	6.42	0.16	12.4	Raining while sampling
WQ-3	Silda Ditch DS	12/11/2020	12:30	7.0	8.73	0.32	6.71	0.16	20.1	Raining while sampling
WQ-4	Fraser Rr Inlet	12/11/2020	8:00	7.9	9.66	0.15	7.86	0.06	81.7	Low tide, coming in
WQ-2	Silda Ditch MS	13/11/2020	14:55	9.1	7.77	0.16	6.46	0.08	12.2	Ditch running high ~50mm of rain in 24 hrs
WQ-3	Silda Ditch DS	13/11/2020	15:00	10.3	6.73	0.15	6.41	0.07	14.3	Ditch running high ~50mm of rain in 24 hrs
WQ-4	Fraser Rr Inlet	13/11/2020	13:40	7.7	9.05	0.15	7.18	0.07	47.0	High tide, coming in
WQ-2	Silda Ditch MS	16/11/2020	14:25	8.1	7.83	0.07	5.52	0.04	4.3	Ditch running high, raining
WQ-3	Silda Ditch DS	16/11/2020	14:30	8.7	6.73	0.08	5.66	0.04	5.2	Ditch running high, raining
WQ-4	Fraser Rr Inlet	16/11/2020	13:30	8.9	9.14	0.19	7.04	0.10	27.3*	High-tide, coming in, raining
WQ-2	Silda Ditch MS	17/11/2020	12:30	7.9	7.13	0.19	5.67	0.09	4.0	Ditch running high, raining
WQ-3	Silda Ditch DS	17/11/2020	12:25	8.2	5.84	0.18	5.92	0.09	5.8	Ditch running high, raining
WQ-4	Fraser Rr Inlet	17/11/2020	12:15	8.4	8.99	0.24	7.26	0.12	43.8*	High-tide, coming in, raining
WQ-2	Silda Ditch MS	18/11/2020	15:35	9.2	6.24	0.11	5.99	0.05	9.7	Ditch running high, raining

Site Code	Site	Date	Time	Water Temp (°C)	Dissolved Oxygen (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
WQ-3	Silda Ditch DS	18/11/2020	15:30	9.5	6.39	0.12	6.23	0.06	14.2	Ditch running high, raining
WQ-4	Fraser Rr Inlet	18/11/2020	14:00	8.1	8.16	0.15	6.91	0.07	23.3*	High tide, coming in, raining
WQ-2	Silda Ditch MS	19/11/2020	14:40	9.0	6.03	0.11	5.95	0.06	9.2	-
WQ-3	Silda Ditch DS	19/11/2020	14:35	9.6	4.51	0.12	6.17	0.06	6.9	-
WQ-4	Fraser Rr Inlet	19/11/2020	14:00	8.9	8.49	0.12	6.76	0.06	17.5*	High tide going out
WQ-2	Silda Ditch MS	20/11/2020	11:45	8.6	6.27	0.11	6.01	0.06	9.7	-
WQ-3	Silda Ditch DS	20/11/2020	11:50	8.4	5.12	0.11	6.12	0.05	8.7	-
WQ-4	Fraser Rr Inlet	20/11/2020	11:00	8.8	9.01	0.13	7.06	0.06	30.1*	Mid-tide, coming in
WQ-2	Silda Ditch MS	23/11/2020	16:00	8.2	7.16	0.25	6.35	0.12	12.1	
WQ-3	Silda Ditch DS	23/11/2020	16:05	8.7	5.38	0.24	6.28	0.12	8.3	
WQ-4	Fraser Rr Inlet	23/11/2020	12:30	8.4	4.03	0.13	7.05	0.07	20.4	High tide
WQ-3	West Ditch (Area I3)	23/11/2020	15:50	10.2	4.53	0.12	6.14	0.06	6.7	
WQ-2	Silda Ditch MS	24/11/2020	13:20	8.9	3.95	0.24	6.33	0.12	11.0	
WQ-3	Silda Ditch DS	24/11/2020	13:15	9.4	4.25	0.22	6.58	0.11	10.0	
WQ-4	Fraser Rr Inlet	24/11/2020	11:50	8.7	6.33	0.14	7.17	0.07	13.8	High tide coming in
WQ-2	Silda Ditch MS	25/11/2020	9:00	8.7	4.12	0.24	6.29	0.13	7.6	
WQ-3	Silda Ditch DS	25/11/2020	9:05	9.1	5.06	0.23	6.48	0.12	8.2	
WQ-4	Fraser Rr Inlet	25/11/2020	8:30	8.6	8.97	0.14	7.03	0.07	14.9	Mid-tide, coming in
WQ-2	Silda Ditch MS	26/11/2020	14:40	10.1	9.24	0.23	6.13	0.11	8.3	Raining while sampling
WQ-3	Silda Ditch DS	26/11/2020	14:35	11.1	4.69	0.23	6.29	0.11	7.3	Raining while sampling
WQ-4	Fraser Rr Inlet	26/11/2020	13:45	10.9	8.35	0.13	6.93	0.07	11.2	High tide coming in. Raining while sampling.
WQ-2	Silda Ditch MS	27/11/2020	7:45	8.8	4.59	0.24	6.24	0.12	7.6	
WQ-3	Silda Ditch DS	27/11/2020	7:50	9.0	5.19	0.23	6.51	0.12	8.4	
WQ-4	Fraser Rr Inlet	27/11/2020	8:00	8.6	9.06	0.14	7.09	0.07	19.7	Mid-tide going out
WQ-2	Silda Ditch MS	01/12/2020	9:45	8.8	4.59	0.24	6.24	0.12	7.6	
WQ-3	Silda Ditch DS	01/12/2020	9:50	9.0	5.19	0.23	6.51	0.12	8.4	
WQ-4	Fraser Rr Inlet	01/12/2020	9:00	8.6	9.06	0.14	7.09	0.07	19.7	High tide coming in
WQ-2	Silda Ditch MS	03/12/2020	11:15	8.6	4.61	0.23	6.16	0.12	7.1	
WQ-3	Silda Ditch DS	03/12/2020	11:20	8.5	5.94	0.24	6.43	0.12	7.9	
WQ-4	Fraser Rr Inlet	03/12/2020	10:45	8.7	8.77	0.13	7.39	0.07	22.5	Mid tide going out
WQ-2	Silda Ditch MS	08/12/2020	14:40	10.1	9.24	0.23	6.13	0.11	8.3	-
WQ-3	Silda Ditch DS	08/12/2020	14:35	11.1	4.69	0.23	6.29	0.11	7.3	-
WQ-4	Fraser Rr Inlet	08/12/2020	13:45	10.9	8.35	0.13	6.93	0.07	11.2	Mid tide going out
WQ-2	Silda Ditch MS	10/12/2020	12:30	10.4	8.71	0.24	6.19	0.12	9.1	-
WQ-3	Silda Ditch DS	10/12/2020	12:35	11.3	5.43	0.23	6.33	0.11	6.9	-
WQ-4	Fraser Rr Inlet	10/12/2020	13:15	11.2	9.12	0.14	6.98	0.07	13.9	High tide
WQ-2	Silda Ditch MS	15/12/2020	15:10	9.4	6.69	0.30	6.41	0.15	10.9	

Site Code	Site	Date	Time	Water Temp (°C)	Dissolved Oxygen (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
WQ-3	Silda Ditch DS	15/12/2020	15:15	11.1	4.84	0.31	6.35	0.16	22.2*	L kely due to rain/wind with potential to disturb sediment & turbid river at high tide mixing at Site interface. No work occurring between mid-& downstream locations.
WQ-4	Fraser Rr Inlet	15/12/2020	15:30	8.1	5.67	0.17	7.30	0.08	37.1*	High tide
WQ-2	Silda Ditch MS	17/12/2020	13:45	10.2	7.12	0.20	6.34	0.10	11.1	
WQ-3	Silda Ditch DS	17/12/2020	13:40	11.0	7.01	0.19	6.37	0.09	10.40	
WQ-4	Fraser Rr Inlet	17/12/2020	14:00	7.3	13.81	0.13	7.25	0.06	47.4*	Mid tide, in flow
WQ-2	Silda Ditch MS	22/12/2020	12:40	6.9	12.28	0.15	6.31	0.08	3.8	
WQ-3	Silda Ditch DS	22/12/2020	12:35	7.2	6.92	0.26	6.44	0.13	7.77	
WQ-4	Fraser Rr Inlet	22/12/2020	12:10	7.3	8.34	0.13	6.50	0.06	11.2	High tide
2	Silda ditch midstream	05/01/2021	10:45	7.0	9.63	0.12	6.77	0.06	8.7	
3	Silda ditch downstream	05/01/2021	10:30	7.5	7.70	0.16	6.64	0.08	10.30	
4	Fraser River	05/01/2021	10:20	7.6	7.82	0.36	7.01	0.18	37.4	Mid tide coming in
-	S4 pump intake	06/01/2021	7:30	8.29	-	-	-	-	-	-
-	S4 pump discharge after passing through channel	06/01/2021	7:35		10.6	-	-	-	-	-
-	Cougar Creek upstream of effluent	06/01/2021	8:30		2.36	-	-	-	-	-
-	Cougar Creek downstream of effluent	06/01/2021	9:00		3.60	-	-	-	-	-
2	Silda ditch midstream	07/01/2021	13:35	7.2	4.99	0.14	6.93	0.07	42.2	High tide
3	Silda ditch downstream	07/01/2021	13:30	7.9	5.82	0.18	6.71	0.09	7.94	
4	Fraser River	07/01/2021	13:00	7.6	8.71	0.34	6.86	0.17	9.21	High tide
2	Silda ditch midstream	2021/01/12	9:00	7.2	3.67	0.12	6.58	0.06	10.4	
3	Silda ditch downstream	2021/01/12	9:05	7.8	4.83	0.16	6.79	0.08	7.94	
4	Fraser River	2021/01/12	8:30	7.6	7.21	0.32	7.08	0.16	36.3	Mid tide going out
13	Cougar Creek US	2021/01/13	13:30	-	-	-	-	-	3.64	no pumping from S4 for past 48 hours
14	Cougar Creek DS	2021/01/13	13:40	-	-	-	-	-	2.04	no pumping from S4 for past 48 hours
N/A	96 Street Upstream	17-JAN-21	20:00	9.2	6.25	0.19	6.23	0.25	2.8	Dewatering activities
N/A	96th Street Downstream	17-JAN-21	20:15	9.5	6.20	0.10	6.67	0.36	3.0	Dewatering activities
2	Silda Ditch Midstream	18-JAN-21	10:00	6.4	6.67	0.37	6.50	0.18	8.36	-
3	Silda Ditch Downstream	18-JAN-21	10:00	6.6	8.22	0.18	6.74	0.09	13.10	-
4	Fraser River	18-JAN-21	10:30	5.4	11.03	0.13	7.19	0.06	9.58	Mid-tide going out

Site Code	Site	Date	Time	Water Temp (°C)	Dissolved Oxygen (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
5	96 Street Upstream	18-JAN-21	11:15	6.4	7.12	0.03	4.51	0.02	1.30	No dewatering activities
6	96th Street Downstream	18-JAN-21	11:00	6.4	12.42	0.05	5.24	0.02	1.54	No dewatering activities
13	Cougar Creek Upstream	18-JAN-21	10:15	6.8	9.64	0.20	6.98	0.10	1.34	No dewatering activities
14	Cougar Creek Downstream	18-JAN-21	10:20	6.9	9.24	0.21	7.02	0.11	2.24	No dewatering activities
TEMP	A	18-JAN-21	11:30	6.4	8.39	0.02	4.29	0.01	0.77	-
TEMP	B	18-JAN-21	11:20	6.8	4.85	0.21	5.57	0.10	6.02	-
TEMP	C	18-JAN-21	11:50	7.0	6.40	0.11	5.64	0.06	2.14	-
TEMP	D	18-JAN-21	11:55	6.7	9.27	0.10	5.72	0.05	5.66	-
TEMP	E	18-JAN-21	12:00	7.3	10.60	0.10	5.52	0.05	2.29	-
TEMP	F	18-JAN-21	12:30	7.6	3.36	0.14	5.72	0.07	3.38	-
TEMP	G	18-JAN-21	12:40	7.1	5.97	0.37	5.75	0.18	9.89	-
TEMP	H	18-JAN-21	13:00	9.2	6.36	0.19	5.81	0.09	7.83	-
TEMP	I	18-JAN-21	12:55	8.2	8.28	0.08	5.37	0.04	1.14	-
TEMP	J	18-JAN-21	13:30	8.0	6.43	0.06	5.34	0.03	1.14	-
TEMP	K	18-JAN-21	13:20	7.4	5.24	0.11	5.69	0.05	4.20	-
TEMP	L	18-JAN-21	13:40	7.9	3.72	0.04	3.94	0.02	1.74	-
TEMP	M	18-JAN-21	13:35	9.6	4.80	0.20	5.64	0.10	1.90	-
TEMP	N	18-JAN-21	14:00	8.5	5.63	0.09	5.31	0.05	1.02	-
N/A	96 Street Upstream	18-JAN-21	23:30	4.8	6.66	0.85	6.63	0.15	3.6	Dewatering activities
N/A	96th Street Downstream	18-JAN-21	23:45	4.2	5.59	0.59	6.69	0.16	4.3	Dewatering activities
N/A	96 Street Upstream	19-JAN-21	23:45	5.1	6.00	0.23	6.60	0.45	4.6	Dewatering activities
N/A	96th Street Downstream	19-JAN-21	23:15	5.3	5.23	0.22	6.45	0.46	7.3	Dewatering activities
N/A	Fraser River Inlet	20-JAN-21	10:20	6.9	5.29	0.13	6.91	0.06	8.78	-
N/A	Cougar Creek Downstream	20-JAN-21	10:20	8.8	6.93	0.22	6.64	0.11	1.38	No dewatering activities
N/A	Cougar Creek Upstream	20-JAN-21	10:15	9.4	6.62	0.22	6.43	0.11	1.67	No dewatering activities
N/A	96th Street Downstream	20-JAN-21	13:30	7.3	0.48	0.04	5.50	0.02	0.96	-
N/A	96 Street Upstream	20-JAN-21	13:45	7.4	0.24	0.04	5.12	0.02	0.93	-
N/A	Silda Ditch Midstream	20-JAN-21	12:35	9.0	2.70	0.42	6.31	0.21	7.87	-
N/A	Silda Ditch Downstream	20-JAN-21	12:40	7.6	2.95	0.26	6.50	0.13	9.26	-
N/A	96 Street Upstream	21-JAN-21	00:30	5.9	7.01	0.75	6.03	0.35	1.8	Dewatering activities
N/A	96th Street Downstream	21-JAN-21	00:55	4.7	6.25	0.34	6.17	0.46	1.3	Dewatering activities
N/A	96 Street Upstream	21-JAN-21	21:30	3.8	3.45	0.95	5.67	0.32	1.90	Dewatering activities
N/A	96th Street Downstream	21-JAN-21	22:00	3.6	4.05	0.72	6.04	0.35	1.25	Dewatering activities
NA	96 Street US	24-Jan-21	23:30	2.3	3.00	0.23	6.33	0.75	1.8	Dewatering activities
NA	96 Street DS	24-Jan-21	23:55	2.5	2.45	0.19	6.37	0.86	2.3	Dewatering activities
NA	Silda Ditch DS	25-Jan-21	11:05	6.8	6.01	0.51	6.39	0.26	9.27	
NA	Silda Ditch MS	25-Jan-21	11:00	6.8	8.21	0.52	6.45	0.26	9.75	
NA	Fraser River Inlet	25-Jan-21	11:40	6.1	13.93	1.17	6.87	0.59	4.98	Mid-tide going out

Site Code	Site	Date	Time	Water Temp (°C)	Dissolved Oxygen (mg/L)	Conductivity (mS/cm)	pH	TDS (ppt)	Turbidity (NTU)	Comments
NA	96 Street DS	25-Jan-21	12:00	5.5	9.21	0.06	5.65	0.03	0.78	
NA	96 Street US	25-Jan-21	12:15	5.0	5.91	0.05	5.11	0.03	0.99	
NA	Cougar Ck DS	25-Jan-21	10:35	7.5	13.25	0.43	6.56	0.21	4.46	
NA	Cougar Ck US	25-Jan-21	10:40	8.2	14.02	0.41	6.35	0.21	4.02	
NA	96 Street US	26-Jan-21	13:30	2.1	1.11	0.33	6.63	0.88	0.9	Dewatering activities
NA	96 Street DS	26-Jan-21	13:55	2.1	1.98	0.32	6.39	0.79	1.3	Dewatering activities
NA	96 Street DS	27-Jan-21	00:25	2.5	7.31	0.17	5.95	0.63	2.90	Dewatering activities
NA	96 Street US	27-Jan-21	00:45	2.3	6.51	0.25	5.74	0.53	1.95	Dewatering activities
NA	96 Street DS	28-Jan-21	02:00	4.1	4.44	0.22	6.13	0.33	3.90	Dewatering activities
NA	96 Street US	28-Jan-21	02:35	4.3	7.90	0.14	6.00	0.48	2.10	Dewatering activities
NA	Silda Ditch DS	29-Jan-21	11:05	8.4	8.38	0.24	6.27	0.12	7.56	
NA	Silda Ditch MS	29-Jan-21	11:10	7.7	3.28	0.50	6.30	0.25	15.60	
NA	Fraser Rr Inlet	29-Jan-21	11:30	6.0	7.91	0.66	6.71	0.33	8.37	
NA	96 Stream DS	29-Jan-21	11:45	6.0	0.90	0.05	5.65	0.03	1.32	Dewatering activities
NA	96 Stream DS	29-Jan-21	21:00	6.4	2.41	0.04	5.19	0.02	1.12	Dewatering activities