



# Request for Review

Please note that Guidance on Submitting a Request for Review is available at the end of this form. This guidance explains the requirements for a Request for Review by DFO under the fish and fish habitat protection provisions of the *Fisheries Act*. All information requested must be provided. If you attach documents to your application with additional information, you must still provide appropriate summaries in the spaces provided on the application document or your application will be considered incomplete.

## A) Contact information

Name of Business/Company:

Select additional contact:

Contractor/Agency/Consultant (if applicable):

Name of Proponent:

Mailing address:

Mailing address:

City/Town:

City/Town:

Province/Territory:

Province/Territory:

Postal Code:

Postal Code:

Tel. No. :

Tel. No. :

Fax No.:

Fax No.:

Email:

Email:

Is the Proponent the main/primary contact?  Yes  No



If no, please enter information for the primary contact or any additional contact.

Larissa Darc, M.Sc., B.I.T  
ldarc@islengineering.com

## B) Description of Project

If your project has a title, please provide it.

Highway 7 and 11 Phase 2 Intersection Improvements

Is the project in response to an emergency circumstance\*?  Yes  No

Does your project involve work in water?  Yes  No

If yes, is the work below the High Water Mark\*?  Yes  No

What are you planning to do? Briefly describe all project components you are proposing in or near water.

Please see attached Supplemental Report for further details.

The Ministry of Transportation and Infrastructure (MoTI) is completing upgrades at the Highway 7 and 11 intersection in Mission, BC. The intersection upgrades will consist of drainage improvements which will require riparian disturbance in proximity to Watercourse A and Windebank Creek. The drainage improvements will consist of:

- Installation of four new stormwater outfalls;
- Replacement of four existing stormwater leads; and
- Installation of eight willow stake splash pads at the stormwater outfall outlets.

The new outfalls will discharge at the toe of slope and into Watercourse A and Windebank Creek. The existing stormwater outfalls at the project location are damaged, and do not provide enough road runoff relief. The outfall replacement and new outfalls are required to prevent water pooling on the highway to improve road safety.

How are you planning to do it? Briefly describe the construction materials, methods and equipment that you plan to use.

Engineering designs for the project are provided in Supplemental Report Appendix A. The outfall works will consist of installation of new 200 mm or 250 mm diameter outfall leads (pipes) and willow stake splash pads at the outlet.

Anticipated construction activities for the stormwater outfall construction and maintenance are outlined in Supplemental Report Table 6. The project will require the following materials and equipment to be successfully implemented:

- Flatbed trucks for hauling materials to the site;
- Excavators or crane for offloading pipes;
- Dump trucks for importing rip rap and substrate;
- Six 200 mm diameter CSP pipes
- Two 250 mm diameter CSP pipes
- Auger-type anchors
- Clean gravel (clear drain rock)
- Non-woven geotextile
- Hydraulically applied coastal reclamation seed mix;
- Live willow (*Salix* spp.) stakes
- Erosion and sediment control materials; including but not limited to, silt fence, erosion control blanket, polyethylene sheeting; and,
- Spill mitigation and control materials.

The project will not include the use of exotic chemicals or blasting.



Include a site plan (figure/drawing) showing all project components in and near water.

Are details attached?  Yes  No

Identify which work categories apply to your project.

- Aquaculture Operations
- Aquatic Vegetation Removal
- Beaches
- Berms
- Blasting / Explosives
- Boat Houses
- Boat Launches / Ramps
- Breakwaters
- Bridges
- Cable Crossings
- Causeways
- Culverts
- Dams
- Dewatering / Pumping
- Docks
- Dredging / Excavation
- Dykes
- Fishways / Ladders
- Flow Modification (hydro)
- Groundwater Extraction
- Groynes
- Habitat Restoration
- Ice Bridges
- Log Handling / Dumps
- Log Removal
- Moorings
- Open Water Disposal
- Piers
- Riparian Vegetation Removal
- Seismic Work
- Shoreline Protection
- Stormwater Management Facilities
- Surface Water Taking
- Tailings Impoundment Areas
- Temporary Structures
- Turbines
- Water Control Structures
- Water Intakes / Fish Screens
- Water Outfalls
- Watercourse Realignment
- Weirs
- Wharves
- Wind Power Structures
- Other Please Specify Stormwater outfalls

Was your project submitted for review to another federal or provincial department or agency?  Yes  No

If yes, indicate to whom and associated file number(s).

Submitted under Tracking #100439291 to the BC Ministry of Water, Land and Resource Stewardship as a Notification of Authorized Change under section 39(1)(l) of the provincial Water Sustainability Regulation

### C) Location of the Project

Coordinates of the proposed project Latitude  N Longitude  W

OR UTM zone  ;  Easting  
 Northing

Include a map clearly indicating the location of the project as well as surrounding features.

Name of Nearest Community (City, Town, Village): City of Mission





Municipality, District, Township, County, Province:

Name of watershed (if applicable):

Name of watercourse(s) or waterbody(ies) near the proposed project:

Provide detailed directions to access the project site:

The project site can be accessed using a 2 wheel drive vehicle. The site can be accessed by travelling east on Highway 7 from Maple Ridge or north on Highway 11 from Abbotsford. The project is located at the intersection of Highway 7 and 11 in Mission, BC.

### D) Description of the Aquatic Environment

Identify the predominant type of aquatic habitat where the project will take place.

- Estuary (Estuarine)
- Lake (Lacustrine)
- On the bank/shore at the interface between land and water (Riparian)
- River or stream (Riverine)
- Salt water (Marine)
- Wetlands (Palustrine)

Provide a detailed description of biological and physical characteristics of the proposed project site. This description should include information on aquatic species at risk\* (<https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry.html>), their residence\* and critical habitat\* if found in the area. An overview of the distribution of aquatic species at risk and the presence of their critical habitat within Canadian waters can be found here <http://dfo-mpo.gc.ca/species-especies/sara-lep/map-carte/index-eng.html>

Please see attached Supplemental Report for further details.

Windebank Creek has a bankfull width of 3 m, and originates from headwaters north of Highway 7, flows directly south under Highway 7 and discharges into the Fraser River, after passing through a flood box, approximately 800 m southwest of the project location. Windebank Creek is located approximately 70 m east of Highway 11 and is classified as Class A (red-coded), indicating the stream has year-round presence of fish (Mission WebMap, 2023). The following native species are present in Windebank Creek: coho salmon (*Oncorhynchus kisutch*), coastal cutthroat trout (*Oncorhynchus clarkii clarkii*), northern pikeminnow (*Ptychocheilus oregonensis*), threespine stickleback (*Gasterosteus aculeatus*), and rainbow trout (*Oncorhynchus mykiss*) (Habitat Wizard, 2023). There is no Critical Habitat for any aquatic Species at Risk mapped within Windebank Creek.

Approximately 30 m east of the Windebank Creek channel (and approximately 35 m downslope from Highway 11) we observed a low-lying area with pooling water and shrub vegetation consistent with a swamp, consisting of cattails (*Typha latifolia*), hardhack (*Spiraea douglasii*), and willows (Figure 3). Water pooling in this area was orange-brown in colour with iron precipitate buildup and a top layer of organic sheen, that we attribute to the breakdown of organic compounds within the swamp. This swamp was observed to discharge to the east into Windebank Creek.

Above the swamp, there is a 6 m wide bench. The canopy cover on the bench was 10%. The forest canopy was dominated by black cottonwood trees, with subdominant components of willow, red alder, and bigleaf maple (*Acer macrophyllum*). The flat areas of the bench had no shrub vegetation (Figure 4), however sloping areas were covered with 100% Himalayan blackberry. Herbaceous species consisted solely of horsetails (*Equisetum* spp.). Sandy material was observed as the main soil type on the bench.

Watercourse A flows south at the base of the slope on the west side of Highway 11. Watercourse A is located approximately 26 m downslope from the edge of the highway median. Watercourse A is classified as a Class B (yellow-coded) watercourse, indicating it is non-fish bearing, but provides significant food and nutrients to downstream fish habitat (Mission WebMap, 2023). ISL's observations noted no barriers to fish passage and as such portions of Watercourse A may be fish accessible under certain discharge conditions.



Watercourse A is unconfined in its headwaters and appears to be sourced by a spring located near the southwest corner of the intersection (see Figure 3). There is also a tributary to Watercourse A in the form of a stormwater outfall from under Highway 7 (ISL, 2016). The channel becomes more confined 35 m downstream from the spring. Watercourse A has an average bankfull width of 1.2 m and a substrate of 100% mineral fines, which had a sandy texture (Figure 5).

The tree canopy surrounding Watercourse A at the base of the slope (20% canopy cover) and was dominated by black cottonwood, with a subdominant component of willow and trace amounts of red alder. The shrub layer was more diverse and began at the base of the slope and consisted of salmonberry (*Rubus spectabilis*, 30%), red elderberry (*Sambucus racemose*; 5%), and Indian plum (*Oemleria cerasiformis*; 5%). Herbaceous species present consisted of horsetails, bracken fern (*Pteridium aquilinum*), swordfern (*Polystichum munitum*), and grasses.

Slopes with a 40-60% gradient slope are present immediately west and east of Highway 11. These areas have been historically cleared of trees, but young trees which have become re-established are near the toe of slope. The canopy cover on the slope was < 5%. All trees were < 30 years of age. Tree species present included black cottonwood (*Populus trichocarpa*), willows (*Salix* spp) and red alder (*Alnus rubra*). The shrub layer on the slopes consisted solely of non-native Himalayan blackberry (100% cover). No herbaceous layer was observed. Invasive plant species and weeds were observed upslope adjacent to the highway road edge and included: Canada goldenrod (*Solidago canadensis*), scotch broom (*Cytisus scoparius*), yarrow (*Achillea millefolium*), reed canary grass (*Phalaris arundinacea*), and Himalayan blackberry (*Rubus armeniacus*) (Figure 6).

Include representative photos of affected area (including upstream and downstream area) and clearly identify the location of the project.

### E) Potential Effects of the Proposed Project

Have you reviewed the Pathways of Effects (PoE) diagrams (<http://www.dfo-mpo.gc.ca/pnw-ppe/pathways-sequences/index-eng.html>) that describe the type of cause-effect relationships that apply to your project?

Yes  No

If yes, select the PoEs that apply to your project.

- |   |   |
|---|---|
| <input type="checkbox"/> Addition or removal of aquatic vegetation              | <input type="checkbox"/> Placement of material or structures in water |
| <input type="checkbox"/> Change in timing, duration and frequency of flow       | <input checked="" type="checkbox"/> Riparian Planting                 |
| <input type="checkbox"/> Cleaning or maintenance of bridges or other structures | <input type="checkbox"/> Streamside livestock grazing                 |
| <input type="checkbox"/> Dredging   | <input type="checkbox"/> Structure removal                            |
| <input checked="" type="checkbox"/> Excavation                                  | <input type="checkbox"/> Use of explosives                            |
| <input type="checkbox"/> Fish passage issues                                    | <input type="checkbox"/> Use of industrial equipment                  |
| <input type="checkbox"/> Grading  | <input checked="" type="checkbox"/> Vegetation Clearing               |
| <input type="checkbox"/> Marine seismic surveys                                 | <input type="checkbox"/> Wastewater management                        |
| <input type="checkbox"/> Organic debris management                              | <input type="checkbox"/> Water extraction                             |
| <input type="checkbox"/> Placement of marine finfish aquaculture site           |   |

Will there be changes (i.e., alteration) in the fish habitat\*?  Yes  No  Unknown

If yes, provide a description.

Is there likely to be a harmful alteration, disruption or destruction of habitat used by fish?  Yes  No  Unknown

Is there likely to be destruction or loss of habitat used by fish?  Yes  No  Unknown

What is the footprint (area in square meters) of your project that will take place below the high water mark\*?

None - all works are above the HWM in the riparian zone.

Is your project likely to change water flows or water levels?  Yes  No  Unknown

\*All definitions are provided in Section G of the Guidance on Submitting a Request for Review





If your project includes withdrawing water, provide source, volume, rate and duration.

If your project includes a water control structure, provide the % of flow reduction.

If your project includes discharge of water, provide source, volume and rate.

Will your project cause death of fish?  Yes  No  Unknown

If yes, how many fish will be killed (for multi-year project, provide average)? What species and lifestages?

What is the time frame of your project?

The construction will start on  and end by

If applicable, the operation will start on  and end by

If applicable, provide schedule for the maintenance

If applicable, provide schedule for decommissioning

Are there additional effects to fish and fish habitat that will occur outside of the time periods identified above?  Yes  No

(If yes, provide details)

Can you follow appropriate Timing Windows (<http://www.dfo-mpo.gc.ca/pnw-ppe/timing-periodes/index-eng.html>) for all your project activities below the High Water Mark\*?  Yes  No

(If no, provide explanations.)

There are no instream works below the high-water mark required for this project. The anticipated construction window for the project is June 1 to September 30, 2024. This construction window partially falls outside the reduced risk instream window for the region (August 1 – September 15), however the project does not pose a higher risk being constructed outside the reduced risk instream window as it does not require instream works.

Have you considered and incorporated all options for redesigning and relocating your project to avoid negative effects to fish and fish habitat?

Yes  No

If yes, describe.

The project cannot be relocated as there are already existing damaged stormwater outfalls present which will be replaced. The new stormwater outfalls cannot be relocated elsewhere as the existing highway section already does not have enough drainage conveyance. The project has been designed to utilize the footprint of the existing outfalls, and the new outfalls are designed to have minimal riparian disturbance. The design utilizes a biotechnical slope and outfall treatment in the form of willow stake splash pads rather than riprap to limit riparian effect, mitigate riparian disturbance, and mitigate access issues which would have been challenging if riprap were to be used. It is also anticipated the willow stake pads will provide some stormwater filtration.



Have you consulted DFO's Fish and Fish Habitat Protection Measures Habitat (<https://www.dfo-mpo.gc.ca/pnw-ppel/measures-mesures-eng.html>) to determine which measures apply to your project?  Yes  No

Will you be incorporating applicable measures into your project?  Yes  No

If yes, identify which ones. If No, identify which ones and provide reasons.

Yes: prevent the death of fish; carry out works, undertakings, and activities on land; maintain fish passage; ensure proper sediment control; prevent entry of deleterious substances in water.

No: Maintain riparian vegetation.

The outfalls will require riparian disturbance for the replacement and installation. However, the majority of the disturbance for outfall construction will be to non-native Himalayan blackberry bushes which does not provide significant shading or allochthonous inputs to the watercourses. Minimal disturbance to the herb layer will be required to install the willow stake splash pads. The project will not result in permanent loss of riparian vegetation. The riparian disturbance will be mitigated through the implementation of the site restoration plan in Supplemental Report Appendix B to prevent erosion. Himalayan blackberry cannot be replaced as it is non-native and invasive.

The project will avoid removal of large diameter (> 30 cm) trees. Any trees < 30 cm which may be potentially impacted by the project are young forest age (< 30 years) and do not provide significant shading to the watercourses.

Have you considered whether DFO standards and codes of practice apply to your project?  No  Yes

If Yes, include a list.

No standards and codes of practice apply to this project.

Have you considered other avoidance and mitigation measures?  No  Yes

If Yes, include a list.

See Supplemental Report Section 4.0 and 5.0 for details.

Are there any relevant measures that you are unable to incorporate?  Yes  No

(If yes, identify which ones.)

What harmful effects to fish and fish habitat do you foresee after taking into account the avoidance and mitigation measures described above?

None

Do these include effects on aquatic species at risk\*?  Yes  No

If yes, please describe, including how many individuals will be harmed, harassed, or otherwise affected by the project, and how?

Do these include effects on areas identified as their residence or critical habitat?  Yes  No

If yes, please describe



Are there any aquatic invasive species in the vicinity of your project area?

Yes  No

(If yes, identify which ones.)

Does your project aim to, or will it be likely to, effect any of these aquatic invasive species?

Yes  No

If yes, how?

### F) Signature

I, Larissa Darc (print name) certify that the information given on this form is to the best of my knowledge, correct and completed.

Signature

04/03/2024

Date

Information about the above-noted proposed work or undertaking is collected by DFO under the authority of the *Fisheries Act* for the purpose of administering the Fish and Fish Habitat protection provisions of the *Fisheries Act*. Personal information will be protected under the provisions of the *Privacy Act* and will be stored in the Personal Information Bank DFO-PPU-680. Under the *Privacy Act*, Individuals have a right to, and on request shall be given access to any personal information about them contained in a personal information bank. Instructions for obtaining personal information are contained in the Government of Canada's Info Source publications available at [www.infosource.gc.ca](http://www.infosource.gc.ca) or in Government of Canada offices. Information other than "personal" information may be accessible or protected as required by the provision of the *Access to Information Act*.

*\*All definitions are provided in Section G of the Guidance on Submitting a Request for Review*





Ministry of Transportation and Infrastructure

Highway 7 and 11 Drainage Upgrades

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## SUPPLEMENTAL PROJECT INFORMATION REPORT

March 2024





ISL Engineering and Land Services Ltd. Is an award-winning full-service consulting firm dedicated to working with all levels of government and the private sector to deliver planning and design solutions for transportation, water, and land projects.

At ISL your identity is part of our identity. Diversity, Equity, and Inclusion (DEI) speaks to our core values and provides space for our teams to bring their authentic selves to work. ISL believes DEI creates the best outcomes for our clients while sustaining a happy and thriving work environment that allows for career development opportunities for all staff. ISL is committed to a focused effort on continuous improvement and development of respectful and safe workplace.





[islengineering.com](http://islengineering.com)

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March 4, 2024

Our Reference: 33580

**Fish and Fish Habitat Protection Program**

Triage and Planning Unit  
Ecosystems Management Branch  
Fisheries and Oceans Canada  
200-401 Burrard Street  
Vancouver, BC V6C 3S4

Attention: Referrals Technician

Dear Sir/Madam:

**Reference: Supplemental Information Report – Highways 7 and 11 Phase 2 Intersection Improvements, Mission, BC**

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The Ministry of Transportation and Infrastructure (MoTI) requires drainage upgrades at the intersection of Highways 7 and 11 in Mission, BC. MoTI has retained ISL Engineering and Land Services Ltd. (ISL) to provide engineering design, environmental assessment, and environmental impact assessment for the upgrades.

The drainage upgrades will be in the form of replacement of four existing stormwater outfalls and installation of four additional stormwater outfalls. These outfalls will be constructed in the riparian zones of Watercourse A and Windebank Creek, which flow parallel on the west and east sides of Highway 11, respectively.

It is anticipated that the outfall construction and maintenance will be undertaken between June 1 to September 30, 2024. These proposed outfall upgrades are required to provide additional road runoff relief from the highway and repair the existing outfalls.

The work can be completed outside of the standard instream fish window, because the outfall works will not require any instream activities. The outfalls are designed to terminate at least 1 m upslope of or at the normal high-water mark of the stream.

The following Supplemental Information Report has been prepared in support of this authorized change application to help Fisheries and Oceans Canada (DFO) understand project rationale, design and construction approach, environmental conditions, mitigation, and best practices indication application.

The outfall construction and replacement for all 8 outfalls will require 220 m<sup>2</sup> of disturbance to non-native Himalayan blackberry and removal of 8 small diameter (< 30 cm DBH) trees. The project design has been adjusted to avoid the requirement to fell trees >30 cm DBH. The project will not result in any permanent change to instream fish habitat.



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## 1.0 PROJECT BACKGROUND, SETTING AND CONTACTS

ISL Engineering and Land Services (ISL) was retained by the Ministry of Transportation and Infrastructure (MoTI) for engineering design, environmental assessment, and environmental impact assessment for upgrades at the Highway 7 and 11 intersection in Mission, BC (**Figure 1**).

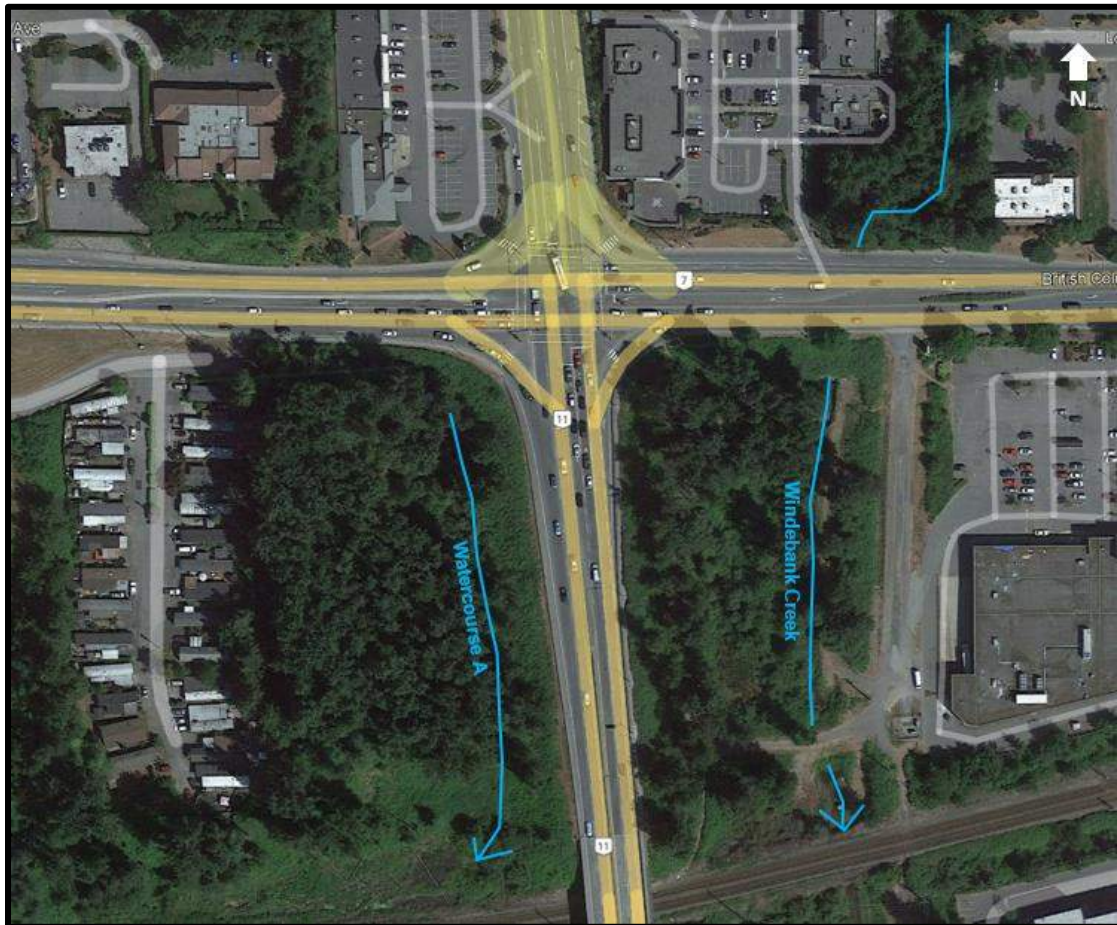


Figure 1. Imagery of the project location showing Highways 7 and 11 in proximity to watercourses.

The intersection upgrades will consist of drainage improvements which will require riparian disturbance in proximity to Watercourse A and Windebank Creek. The drainage improvements will consist of:

- Installation of four new stormwater outfalls;
- Replacement of four existing stormwater leads; and
- Installation of eight willow stake splash pads at the stormwater outfall outlets.

The new outfalls will discharge at the toe of slope and into Watercourse A and Windebank Creek. The following Supplemental Report has been prepared as a supplement to the Highway 7 and 11 Phase 2 Intersection Improvements Request for Project Review application and is intended to assist Fisheries and Oceans Canada (DFO) in their review.

## 1.1 Project Location Information

Information on project location and setting is provided in **Tables 1, 2, and 3**.

Table 1. Project location, setting, and stream information for outfalls on the west side of the intersection.

<b>Primary Region</b>	City of Mission, Fraser Valley, BC
<b>General Location</b>	Intersection of Highways 7 and 11
<b>Land Ownership at the works</b>	Applicant owns land
<b>Legal description of the lands</b>	PID 015-023-923 PID 015-023-915
<b>Stream Name</b>	Watercourse A
<b>Watershed Code</b>	None
<b>Source Flows Into</b>	Windebank Creek

Table 2. Project location, setting, and stream information for outfalls on the east side of the intersection.

<b>Primary Region</b>	City of Mission, Fraser Valley, BC
<b>General Location</b>	Intersection of Highways 7 and 11
<b>Land Ownership at the works</b>	Applicant owns land A third party owns the land but the applicant has written consent
<b>Legal description of the lands</b>	PID 015-023-923 PID 015-023-931 Unnamed land parcel (road dedication) immediately west of PID 011-507-616
<b>Stream Name</b>	Windebank Creek
<b>Watershed Code</b>	100-053200-11500
<b>Source Flows Into</b>	Fraser River

Table 3. Details of outfall locations for the Highway 7 and 11 Drainage Upgrades.

<b>Outfall</b>	<b>Location (UTM)</b>	<b>Location (Lat/Long)</b>	<b>Intersection Side</b>	<b>Description of work</b>
<b>CB701-5</b>	10 549121 m E 5442399 m N	49.132458 ° -122.326631 °	West	Outfall replacement with willow stake splash pad
<b>CB701-3</b>	10 549128 m E 5442355 m N	49.132062° -122.326541°	West	New outfall with willow stake splash pad
<b>CB24</b>	10 549135 m E 5442302 m N	49.131585° -122.326451°	West	Outfall replacement with willow stake splash pad
<b>CB701-1</b>	10 549137 m E 5442285 m N	49.131432° -122.326426°	West	New outfall with willow stake splash pad
<b>CB23</b>	10 549141 m E 5442257 m N	49.131179° -122.326374°	West	Outfall replacement with willow stake splash pad
<b>DCB701-1</b>	10 549195 m E 5442360 m N	49.132102° -122.325622°	East	New outfall with willow stake splash pad
<b>CB6</b>	10 549207 m E 5442313 m N	49.131678° -122.325463°	East	Outfall replacement with willow stake splash pad
<b>CB701-2</b>	10 549201 m E 5442294 m N	49.131507° -122.325547°	East	New outfall with willow stake splash pad



## 1.2 Contact Information

ISL is acting as agent and consultant to MoTI. Contact information for the applicant (Owner) is provided in **Table 4**. The Owner’s agent (consultant) information is provided in **Table 5**.

Table 4. Applicant’s contact information.

<b>Business Name</b>	Ministry of Transportation and Infrastructure
<b>Doing Business As</b>	Provincial Government
<b>Contact Name</b>	Sandy Lu, PMP
<b>Phone</b>	604-202-3691
<b>Email</b>	<a href="mailto:Sandy.Lu@gov.bc.ca">Sandy.Lu@gov.bc.ca</a>
<b>Mailing Address</b>	310 - 1500 Woolridge Street, Coquitlam, BC V3K 0B8

Table 5. Consultant contact information.

<b>Business Name</b>	ISL Engineering and Land Services Ltd.
<b>Doing Business As</b>	Consultant
<b>Contact Name</b>	Larissa Darc, M.Sc., B.I.T.
<b>Phone</b>	604-318-0533
<b>Email</b>	<a href="mailto:LDarc@islengineering.com">LDarc@islengineering.com</a>
<b>Mailing Address</b>	8506 200 Street #201, Langley, BC, V2Y 0M1

## 2.0 PROJECT DESCRIPTION

The following sections outline the project rationale, project activities and materials, and the anticipated construction schedule.

### 2.1 Rationale/Justification for the Proposed Project

The existing stormwater outfalls at the project location are damaged, and do not provide enough road runoff relief. The outfall replacement and new outfalls are required to prevent water pooling on the highway to improve road safety.

### 2.2 Description of Project Activities

Engineering designs for the project are provided in **Appendix A**. The outfall works will consist of installation of new 200 mm or 250 mm diameter outfall leads (pipes) and willow stake splash pads at the outlet.

#### 2.2.1 Construction Activities

Anticipated construction activities for the stormwater outfall construction and maintenance are outlined in **Table 6**.

Table 6. Construction activities for the Highway 7 and 11 Drainage Upgrades.

Activity	Description
Pre-construction meeting	The Contractor's Environmental Monitor (EM) will prepare a Construction Environmental Management Plan. The EM will also be onsite to host an environmental orientation meeting prior to the start of construction. The Contractor will meet with the Ministry Representative and Project Environmental Monitor to complete a Contractor Environmental Orientation Record (CEOR). This CEOR is an important step to ensure that the Contractor is fully aware of obligations set out in the regulatory Notification, as well as obligations to Environmental Protection set out in the Contract.
Nesting bird surveys	Vegetation removals are required during the nesting bird window for the region (March 12-August 17), a nesting bird survey completed by a QEP will be required prior to the removals.
Vegetation flagging	It is anticipated the project will use existing roadside shoulders or pre-existing trails for machinery and materials to be transported to the site. Areas and trees which are not required to be disturbed or removed will be flagged as no-disturbance zones prior to any site disturbance. Trees which are required to be removed for the project will be marked. The Environmentally Sensitive Areas (ESAs) ( <b>Appendix A</b> ) will be flagged as no disturbance zones.
Installation of erosion and sediment control measures	Erosion and sediment control (ESC) measures will be installed prior to ground disturbance to prevent sediments from being transported to Watercourse A or Windebank Creek. ESC BMPs which are installed may include, but are not limited to silt fencing, erosion control blanket, and polyethylene sheeting.
Site preparation and transport of materials to site	Materials and machinery will be transported to the site. Existing outfall leads will be exposed by Himalayan blackberry removal. Areas for the new outfall leads and splash pads will be cleared.
New outfall installation	Once the areas have been cleared, and new catchbasins installed above top-of-bank at the road edge, the new outfalls will be installed. Corrugated steel pipes (CSP) which will make up the outfall lead, will be connected to the installed catch basin. The pipes will be placed in the cleared and grubbed areas of the adjacent highway slopes and continue until the bottom of the slope. The outfall leads will be anchored on the surface of the slope using auger-style rod anchors, which will be hammered into the slope at a minimum of 900 mm.
Existing outfall replacement	The contractor will locate and expose the existing outfall leads and outlets. The existing leads will be removed and disposed of off site. New lead pipes will be installed and anchored within the existing footprint as per the new outfall installation methods. Splash pads will be installed at the outfall discharge as per above below.
Biotechnical slope and outfall treatment	At the base of the slope, where each new or replacement outfall lead will discharge, a biotechnical slope and outfall treatment in the form of a willow stake splash pad will be installed. The contractor will clear and grub occluding vegetation from the splash pad area, including removing any protruding shrub roots, tubules, or invasive plants. Once the area is cleared, the contractor will add soil amendments (as necessary) and level grade and lightly compact the soil. The soil will be hand seeded with grass seed (riparian area mix). The contractor will then place Erosion Control Blanket (ECB) within the splash pad footprint over the grass seed. Live willow ( <i>Salix</i> spp.) stakes will be installed per the project Planting Plan ( <b>Appendix B</b> ). Lastly, the ECB will be sprayed with hydraulic seed (mixture will include seed, tackifier, binder, fertilizer, and water).
Site restoration	All disturbed areas which are not part of the willow staking will be topped with erosion control blanket and hydraulic seed (riparian area mix) to mitigate riparian disturbance.

## 2.2.2 Equipment and Materials

The project will require the following to be successfully implemented:

- Flatbed trucks for hauling materials to the site;
- Excavators or crane for offloading pipes;
- Dump trucks for importing rip rap and substrate;
- Six 200 mm diameter CSP pipes
- Two 250 mm diameter CSP pipes
- Auger-type anchors

- Clean gravel (clear drain rock)
- Non-woven geotextile
- Hydraulically applied coastal reclamation seed mix;
- Live willow (*Salix* spp.) stakes
- Erosion and sediment control materials; including but not limited to, silt fence, erosion control blanket, polyethylene sheeting; and,
- Spill mitigation and control materials.

The project will not include the use of exotic chemicals or blasting.

### 2.2.3 Construction Schedule

The project is anticipated to take place between June 1 to September 30, 2024. See Section 4.2 for project timing rationale.

### 2.2.4 Project Personnel

The anticipated number of crew members is approximately 3-5 persons per outfall, although the number of construction personnel onsite at any time may vary depending on the contractor's construction methodology. Crews would include labourers and a site foreman. There will be a requirement for Qualified Professionals (QP) to provide monitoring for the repairs. QP's on this project would include an engineering inspector and Environmental Monitor (EM).

## 3.0 ENVIRONMENTAL ASSESSMENT

An Environmental Assessment (EA) was undertaken at the project site to assess environmental risks associated with the project. Both desktop and field methods were used to assess risks to aquatic, riparian, wildlife and terrestrial Species at Risk (SAR) habitats.

Desktop information included:

- Provincial Internet Mapping Services, iMapBC, and Habitat Wizard
- Provincial Conservation Data Center (BC CDC) databases
- City of Mission GIS (Mission WebMap)
- Google Earth Pro (2023)
- Fish Inventories Data Queries (FIDQ)
- Species at Risk Act (SARA) public registry
- Aquatic Species at Risk Map (DFO)
- Reports from ISL's previous assessments at the project site, including:
  - ISL Engineering [ISL]. 2016. Highway 7 and Highway 11 Intersection Preliminary Environmental Impact Assessment, Mission BC. Prepared for Ministry of Transportation and Infrastructure [ISL Project No. 31683].

The field investigation was undertaken by Larissa Darc, M.Sc., B.I.T of ISL on November 2 and 3<sup>rd</sup>, 2023. Weather during the assessment was light rain, with an ambient air temperature of 11°C and no

wind. The investigation included watercourse assessment of Watercourse A and Windebank Creek using standard 1:20,000 RISC methods. Riparian habitat was categorized according to the Field Manual for Describing Terrestrial Ecosystems, 2<sup>nd</sup> Edition.

An overview of features observed during the field investigation is provided in **Figure 2** below.



Figure 2. Map of the project area depicting environmental features observed.

### 3.1 Windebank Creek

Windebank Creek has a bankfull width of 3 m, and originates from headwaters north of Highway 7, flows directly south under Highway 7 and discharges into the Fraser River, after passing through a flood box, approximately 800 m southwest of the project location. Windebank Creek is located approximately 70 m east of Highway 11 and is classified as Class A (red-coded), indicating the stream has year-round presence of fish (Mission WebMap, 2023). The following native species are present in Windebank Creek: coho salmon (*Oncorhynchus kisutch*), coastal cutthroat trout (*Oncorhynchus clarkii clarkii*), northern pikeminnow (*Ptychocheilus oregonensis*), threespine stickleback (*Gasterosteus aculeatus*), and rainbow trout (*Oncorhynchus mykiss*) (Habitat Wizard, 2023). There is no Critical Habitat for any aquatic Species at Risk mapped within Windebank Creek.

Approximately 30 m east of the Windebank Creek channel (and approximately 35 m downslope from Highway 11) we observed a low-lying area with pooling water and shrub vegetation consistent with a



swamp, consisting of cattails (*Typha latifolia*), hardhack (*Spiraea douglasii*), and willows (**Figure 3**). Water pooling in this area was orange-brown in colour with iron precipitate buildup and a top layer of organic sheen, that we attribute to the breakdown of organic compounds within the swamp. This swamp was observed to discharge to the east into Windebank Creek.



Figure 3. View of the area of pooling water present downslope from Highway 11.

Above the swamp, there is a 6 m wide bench. The canopy cover on the bench was 10%. The forest canopy was dominated by black cottonwood trees, with subdominant components of willow, red alder, and bigleaf maple (*Acer macrophyllum*). The flat areas of the bench had no shrub vegetation (**Figure 4**), however sloping areas were covered with 100% Himalayan blackberry. Herbaceous species consisted solely of horsetails (*Equisetum* spp.). Sandy material was observed as the main soil type on the bench.





Figure 4. Representative conditions of the slope east of Highway 11 and the bench. Photograph facing north.

### 3.2 Watercourse A

Watercourse A flows south at the base of the slope on the west side of Highway 11. Watercourse A is located approximately 26 m downslope from the edge of the highway median. Watercourse A is classified as a Class B (yellow-coded) watercourse, indicating it is non-fish bearing, but provides significant food and nutrients to downstream fish habitat (Mission WebMap, 2023). ISL's observations noted no barriers to fish passage and as such portions of Watercourse A may be fish accessible under certain discharge conditions.

Watercourse A is unconfined in its headwaters and appears to be sourced by a spring located near the southwest corner of the intersection (see Figure 3). There is also a tributary to Watercourse A in the form of a stormwater outfall from under Highway 7 (ISL, 2016). The channel becomes more confined 35 m downstream from the spring. Watercourse A has an average bankfull width of 1.2 m and a substrate of 100% mineral fines, which had a sandy texture (Figure 5).





Figure 5. Representative instream conditions at Watercourse A. Photograph facing upstream (north).

The tree canopy surrounding Watercourse A at the base of the slope (20% canopy cover) and was dominated by black cottonwood, with a subdominant component of willow and trace amounts of red alder. The shrub layer was more diverse and began at the base of the slope and consisted of salmonberry (*Rubus spectabilis*, 30%), red elderberry (*Sambucus racemose*; 5%), and Indian plum (*Oemleria cerasiformis*; 5%). Herbaceous species present consisted of horsetails, bracken fern (*Pteridium aquilinum*), swordfern (*Polystichum munitum*), and grasses.

### 3.3 Terrestrial Condition

Slopes with a 40-60% gradient slope are present immediately west and east of Highway 11. These areas have been historically cleared of trees, but young trees which have become re-established are near the toe of slope. The canopy cover on the slope was < 5%. All trees were < 30 years of age. Tree species present included black cottonwood (*Populus trichocarpa*), willows (*Salix* spp) and red alder (*Alnus rubra*). The shrub layer on the slopes consisted solely of non-native Himalayan blackberry (100% cover). No herbaceous layer was observed. Invasive plant species and weeds were observed upslope adjacent to the highway road edge and included: Canada goldenrod (*Solidago canadensis*), scotch broom (*Cytisus scoparius*), yarrow (*Achillea millefolium*), reed canary grass (*Phalaris arundinacea*), and Himalayan blackberry (*Rubus armeniacus*) (Figure 6).





Figure 6. Invasive plant species present upslope adjacent to the highway. Photograph facing south.

### 3.4 Wildlife and Terrestrial Species at Risk

The project is located in the Coastal Western Hemlock dry maritime (CWHdm) biogeoclimactic subzone. This subzone is characterized by wet, mild climate with complex coniferous forests dominated by Douglas fir, western hemlock, and western redcedar (Meidinger and Pojar, 1991).

No wildlife trees, Bald Eagle (*Haliaeetus leucocephalus*), Great Blue Heron (*Ardea herodias*), or Osprey (*Pandion haliaetus*) nests are mapped within 1 km of the project location (Mission WebMap, 2023).

Polygons for two terrestrial species at Risk overlap the project site (BC CDC, 2023) (**Table 7**).

Table 7. Polygons for terrestrial Species at Risk which overlap the project location.

Species	Polygon Type	Provincial Status	SARA Status
Barn Owl ( <i>Tyto alba</i> )	Critical Habitat	Blue	1 - Threatened
Dun Skipper ( <i>Euphyes vestris</i> )	Historical Occurrence	Blue	1 - Threatened



### 3.4.1 Barn Owl

A Critical Habitat (CH) polygon overlaps the project location. Barn Owl require CH with open areas that support and abundance of small mammal prey and physically protected cavity sites for nesting and roosting. Barn Owl CH contains three key components: foraging habitats, nesting habitats, and roosting habitats. The required habitat attributes must be present on the ground for an area to be considered CH:

- Structures with elevated cavities at least 15 cm in diameter (dead or live trees; anthropogenic structures) for nesting and roosting
- Open areas for foraging, such as: grass or agricultural fields, naturalized meadows, marshland, grassy ditches or margins along rail tracks, or remnant linear strips (i.e. minimum 3 m wide) or patches of grass and/or green space in semi-urban to urban landscapes
- Availability of small mammal prey

No nesting or roosting habitat attributes for Barn Owl were observed at the project location. A remnant linear strip ranging in width from 2.6 m to 4.3 m is present between the road edge and top-of-bank on the west edge of Highway 11. The bench adjacent to the swamp has some limited flat, open areas.

There are no Orders for protection of Barn Owl CH on non-federal lands.

### 3.4.2 Dun Skipper

A Historical Element Occurrence polygon for a butterfly, the Dun Skipper, overlaps the project site (BC CDC, 2023). The records indicate that the last observation of Dun Skipper in this location was 1919. There is no mapped CH for Dun Skipper in the project location (iMapBC, 2023).

This species has often been observed utilizing disturbed habitats such as roadside edges, constructed drainages, utility corridors and other habitats wet enough to support sedge communities. However, Dun Skippers require host flowering plants for feeding, resting, and hiding from predators.

The outfall areas are dominated by dense areas of Himalayan blackberry. No sedges were observed in the project footprints.

## 4.0 ENVIRONMENTAL EFFECT MITIGATION

ISL has considered best management practices that are appropriate for implementation during the project. The following sections outline mitigation considered and to be implemented for the project.

### 4.1 Design Mitigation

The outfalls have been designed to minimize and mitigate potential environmental effects. The designs include the following mitigation to ensure environmental effects are minimized:

- the storm sewer outfall is designed by an engineering professional;
- the storm sewer outfall is constructed, maintained and used in a manner that does not obstruct the flow of water in the stream or cause erosion of the stream channel;
- the stormwater outfalls are designed to cause minimal riparian disturbance and minimize the number of large diameter trees (DBH > 30 cm) impacted.
- The splash pads have been designed to be biodegradable erosion and sediment control and stormwater filtration structure, and to mitigate the riparian disturbance. Rather than using traditional riprap, the splash pads will be constructed of biodegradable erosion control blanket and staked with willows (*Salix* spp.) (see Planting Plan in **Appendix B**).

### 4.2 Project Timing Mitigation

The anticipated construction window for the project is June 1 to September 30, 2024. This construction window partially falls outside the reduced risk instream window for the region (August 1 – September 15), however the project does not pose a higher risk being constructed outside the reduced risk instream window as it does not require instream works.

The project will take place within the nesting bird window for the region (March 12-August 17) and will require vegetation removal. To mitigate impacts to nesting birds, nesting bird surveys will be undertaken prior to vegetation clearing.

### 4.3 Construction Impact Mitigation

A project-specific Construction Environmental Management Plan (CEMP) will be prepared for the project by the Contractor's QEP. The CEMP will list mitigation measures to be implemented for the project and will include provisions for:

- Environmental monitoring requirements and schedule;
- Nesting bird surveys;
- Vegetation management, including tree and shrub protection;
- Erosion and sediment control;
- Deleterious substances control and hydrocarbon spill management;
- Wildlife and Species at Risk Protection;
- Post-construction site restoration.

Examples of construction impact mitigation best management practices which will be included in the CEMP are included in **Appendix C**. Otherwise, Environmental Protection will be governed using MoTI Supplemental Specification 165 Protection of the Environment:  
[https://www2.gov.bc.ca/assets/gov/driving-and-transportation/transportation-infrastructure/engineering-standards-and-guidelines/highway-specifications/volume\\_1\\_ss2020.pdf](https://www2.gov.bc.ca/assets/gov/driving-and-transportation/transportation-infrastructure/engineering-standards-and-guidelines/highway-specifications/volume_1_ss2020.pdf)

## 5.0 ENVIRONMENTAL IMPACT ASSESSMENT

Within the following sections, effects on riparian habitat associated with the project are outlined.

### 5.1 Footprint Analysis

The outfall installations will require some temporary riparian disturbance for installation and maintenance. No instream works for the project are required. The total temporary riparian disturbance for the outfall installations and maintenance will be 220 m<sup>2</sup>. The disturbance required for each outfall is outlined in **Table 8**.

Table 8. Temporary riparian disturbance required for each outfall.

Outfall	Temporary Disturbance (m <sup>2</sup> )	Description
CB701-5	20	Disturbance from willow splash pad installation
CB701-3	35	New outfall installation
CB24	20	Disturbance from willow splash pad installation
CB701-1	35	New outfall installation
CB23	20	Disturbance from willow splash pad installation
DCB701-1	35	New outfall installation
CB6	20	Disturbance from willow splash pad installation
CB701-2	35	New outfall installation

The project is not anticipating removal of large diameter (DBH > 30 cm) trees.

### 5.2 Effects Assessment

The following sections details effects of the projects on terrestrial components

#### 5.2.1 Riparian Disturbance

The outfalls will require riparian disturbance for the construction and maintenance. However, the majority of the disturbance for outfall construction will be to non-native Himalayan blackberry bushes which does not provide significant shading or allochthonous inputs to the watercourses. Maintenance of existing outfalls will only require minimal disturbance to the herb layer install the willow stake splash pads. The project will not result in permanent loss of riparian vegetation. The riparian

disturbance will be mitigated through the implementation of the site restoration plan in **Appendix B** to prevent erosion. Himalayan blackberry cannot be replaced as it is non-native and invasive.

### 5.2.2 Tree Removals and Nesting Birds

The project will avoid removal of large diameter (> 30 cm) trees. Any trees < 30 cm which may be potentially impacted by the project are young forest age (< 30 years) and do not provide significant shading to the watercourses.

We did not observe bird nests or cavities within the trees at the project location. Impacts to nesting birds will be avoided and mitigated at construction by conserving large diameter trees and performing nesting bird surveys prior to vegetation removal.

### 5.2.3 Species at Risk

There are areas adjacent to the highway road edge which are open areas with a grassy margin > 3m width, which are stated as foraging CH attributes for Barn Owl. However, the most impacted areas for the outfall installations and maintenance are to steep slopes which are densely vegetated in Himalayan blackberry, and it would appear to be difficult for Barn Owl to hunt small prey in these locations. There is low likelihood of Barn Owl foraging at the project site. There is no Order for Barn Owl protecting roadside habitats managed by MoTI, and the outfalls will not be located on federal land. Regardless, with the applicable project specific BMPs implemented, the project will have a low impact to habitat riparian conditions. The project will not affect foraging capabilities for Barn Owl on these roadside embankments, as risks stemming from a small footprint outfall project to Barn Owl are low.

There are historical detections for Dun Skipper in in the area from 1919. Given the significant conversion of the site since 1919, and the fact that host flowering plants were absent, the project is not anticipated to have an effect on Dun Skipper populations.

## 5.3 Conclusions

This outfall construction and maintenance in Mission are necessary to provide highway drainage relief to prevent potential public safety and transportation risks, and to bring the drainage on the Highways 7 and 11 current design standards.

We trust the information set out in this Supplemental Project Information Report outlines that the outfall construction and maintenance provides adequate information for DFO to complete the project review.



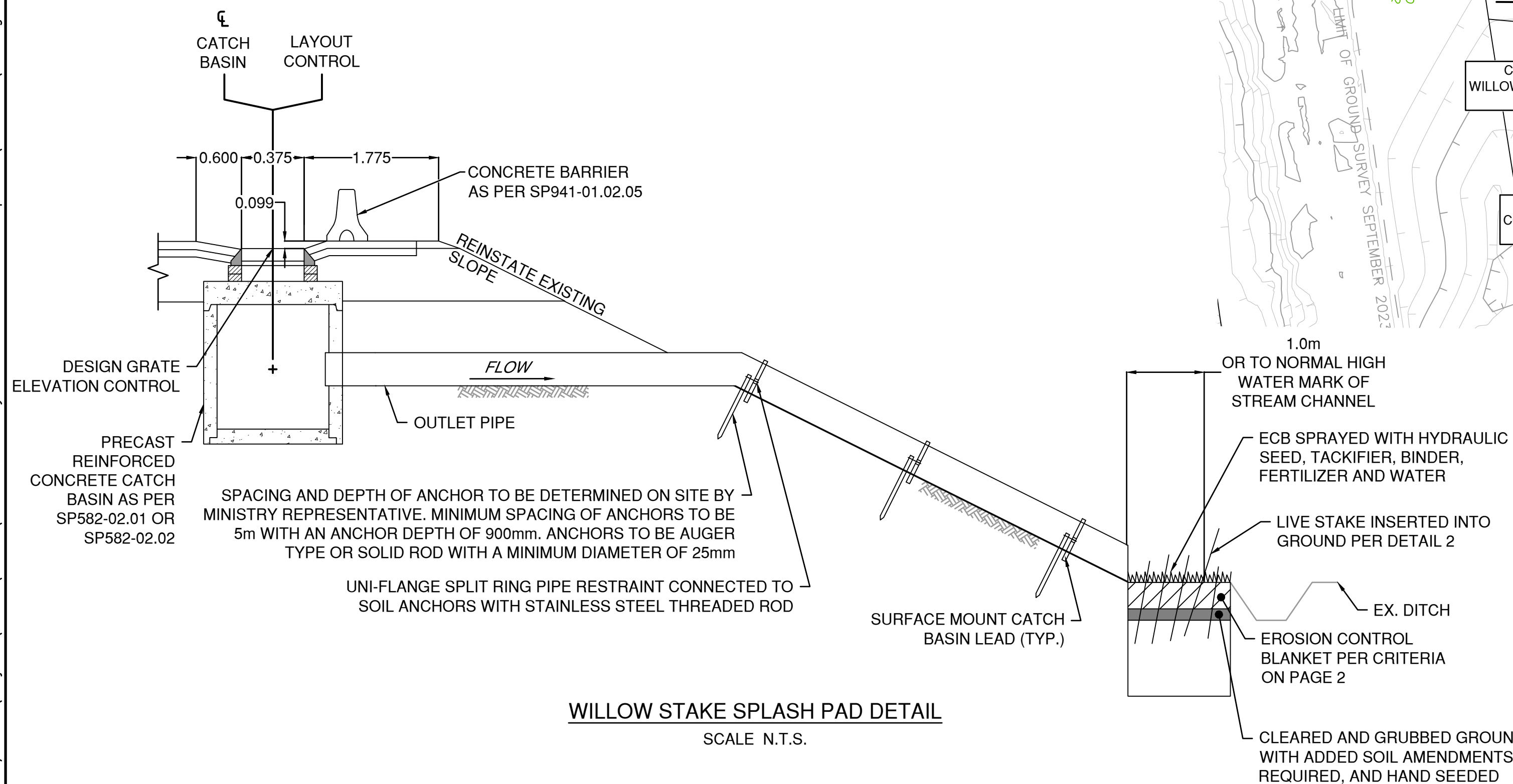


## APPENDIX A – Engineering Design Drawings

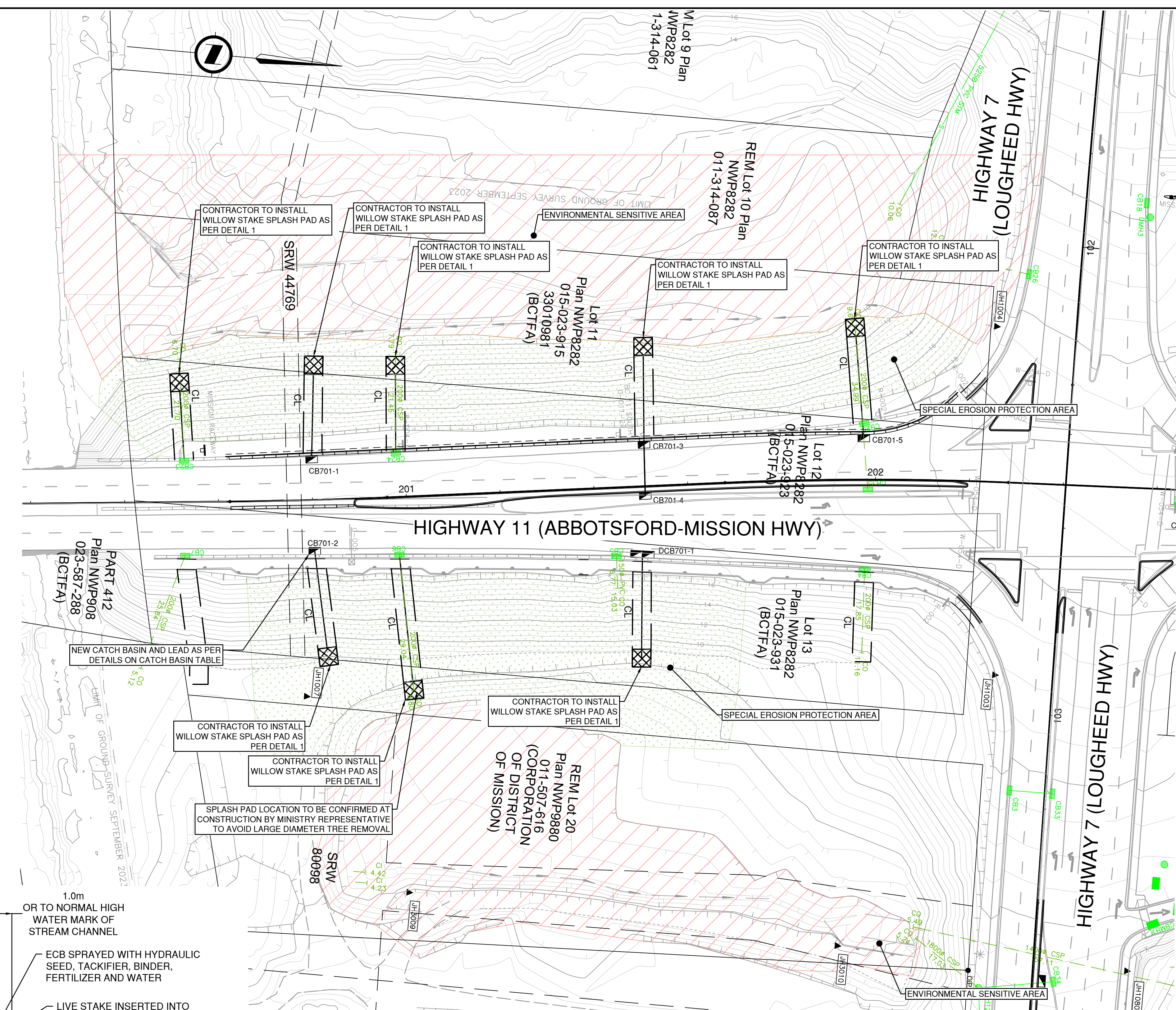


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CATCHBASIN TABLE							
CB NAME	STATION	OFFSET	NORTHING	EASTING	LEAD LENGTH	SPLASH PAD NORTHING	SPLASH PAD EASTING
CB701-1	200+80.061	8.569 LT	442287.120	549160.089	21.1m-200Ø CSP	442285.706	549139.939
CB701-2	200+80.186	10.874 RT	442289.539	549179.380	20.8m-200Ø CSP	442294.427	549201.536
CB701-3	201+51.046	8.848 LT	442357.311	549150.461	22.8m-250Ø CSP	442355.243	549129.640
CB701-4	201+50.852	2.050 RT	442358.576	549161.287	10.9m-200Ø CSP	-	-
CB701-5	201+97.511	8.794 LT	442403.808	549144.878	21.8m-200Ø CSP	442399.868	549121.541
DCB701-1	201+49.695	14.497 RT	442359.094	549173.777	22.1m-250Ø CSP	442360.924	549195.803



UTILITIES SHOWN ARE BASED ON BC ONE CALL INFORMATION RECEIVED BEFORE OR NEAR TIME OF SURVEY. FIELD LOCATES MUST BE COMPLETED PRIOR TO CONSTRUCTION BC ONE CALL MUST BE CALLED PRIOR TO EXCAVATION.



		SUITE 201, 8506 - 200 STREET LANGLEY, BRITISH COLUMBIA, V2Y 0M1 PH : 604.371.0091 FAX : 604.371.0098		MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE SOUTH COAST REGION HIGHWAY DESIGN AND GEOMATICS ENGINEERING	
SCALE 0 5 1:500 25m		CAD FILENAME SK-1107-700.DWG PLOT DATE 2024-02-22		ENVIRONMENTAL PERMITTING HIGHWAY 7 AND HIGHWAY 11 INTERSECTION IMPROVEMENTS	
REV	DATE	REVISIONS	NAME	DESIGNED	S. CLARK DATE 2024-03-15
PA	2023-12-15	ISSUED FOR ENVIRONMENTAL PERMITTING	L. DARIC	QUALITY CONTROL	C. CLARK DATE 2024-03-15
PB	2024-03-15	ISSUED FOR ENVIRONMENTAL PERMITTING	L. DARIC	QUALITY ASSURANCE	A. PELLAM DATE 2024-03-15
SENIOR DESIGNER				DRAWN B. LI DATE 2024-03-15	
FILE NUMBER	PROJECT NUMBER	REG	DRAWING NUMBER	REV	
33580	13252-0001	R1	ENV-SK3	PB	

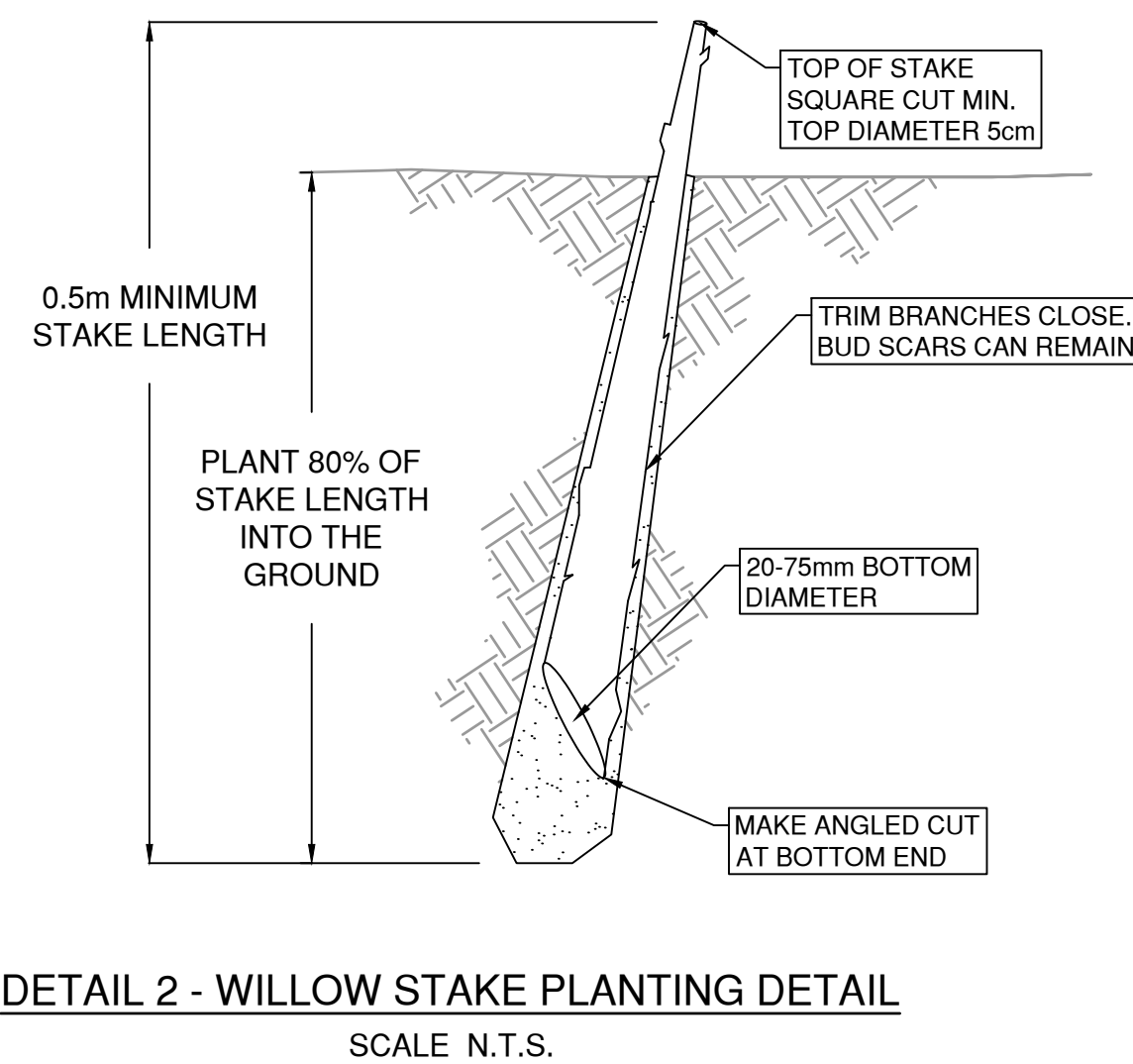
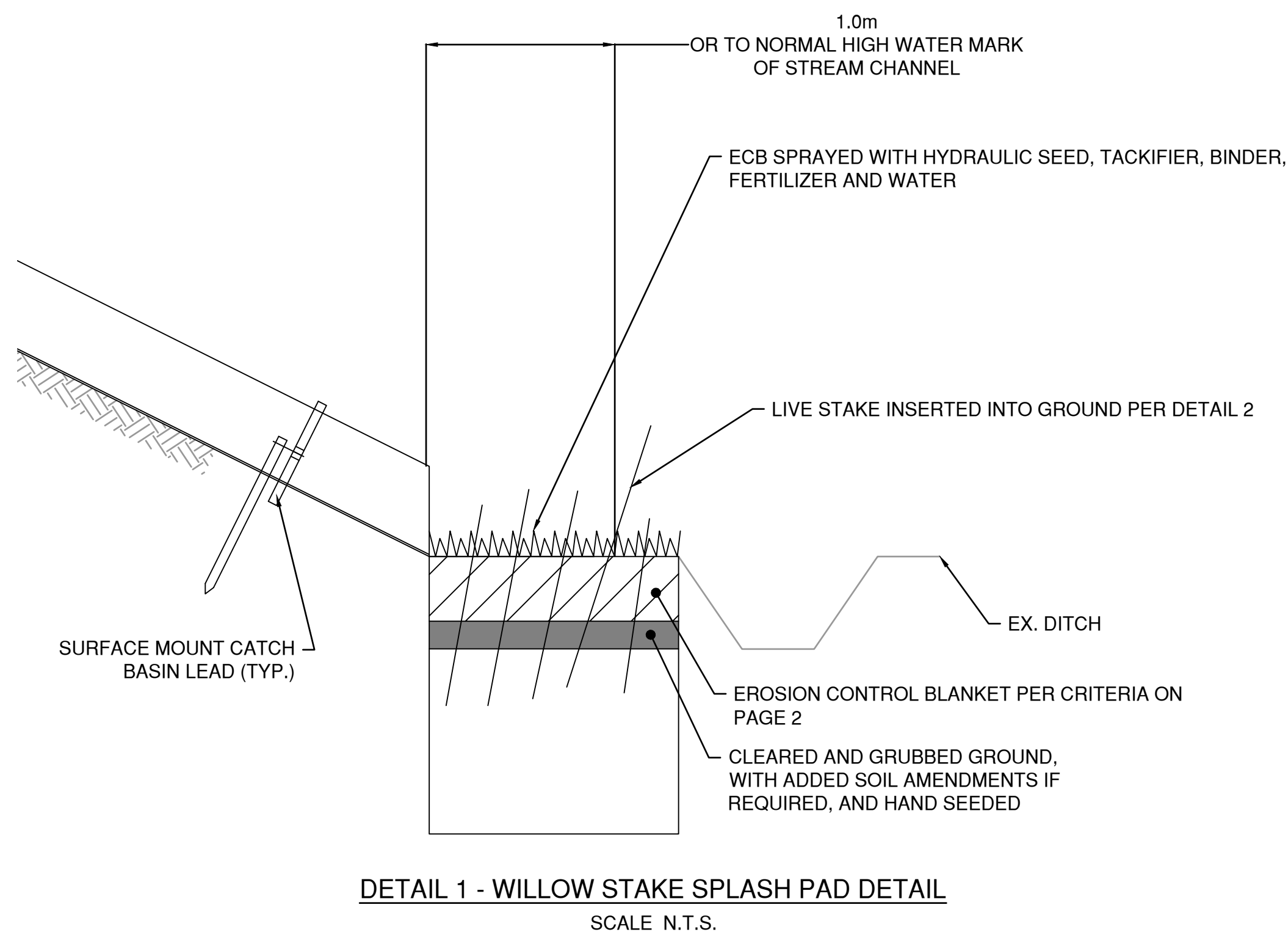


**APPENDIX B – Planting Plan**

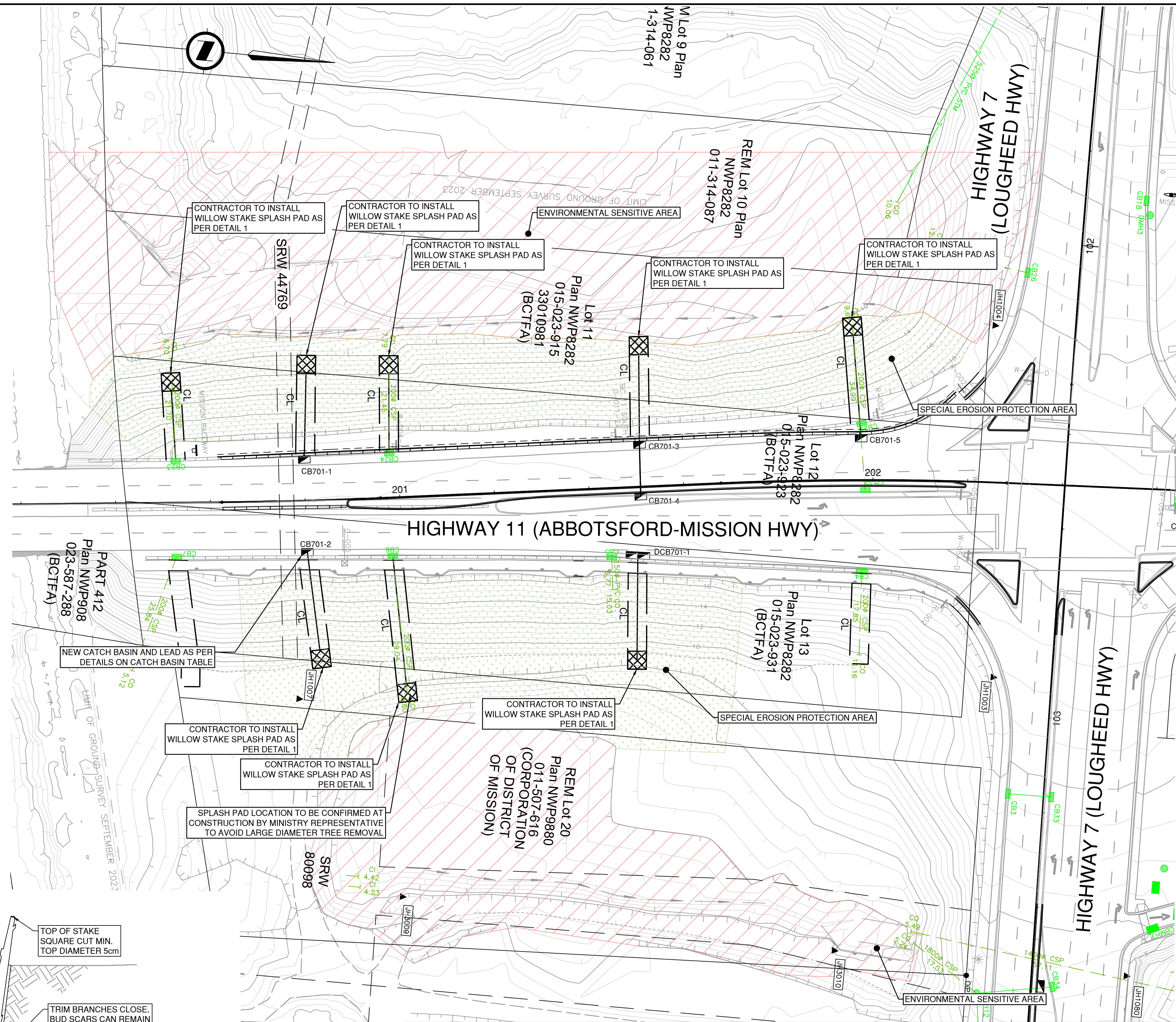


**TABLE 1: PLANT SPECIES AND NUMBERS**

Common Name	Latin Name	Microsite Condition (Wet = W, Moist = M, Dry = D)	Number of Plants per Splash Pad	Plant Size or Pot Size
<b>Shrubs to be planted with minimum 0.5m spacing</b>				
Hooker's Willow	<i>Salix Hookeriana</i>	M	8	Stakes
Pacific Willow	<i>Salix Lucida</i>	M	16	Stakes
Scouler's Willow	<i>Salix Scouleriana</i>	M	8	Stakes
Total Shrubs per Splash Pad			32	
<b>Total Shrubs for All Splash Pads</b>			<b>256</b>	



UTILITIES SHOWN ARE BASED ON BC ONE CALL INFORMATION RECEIVED BEFORE OR NEAR TIME OF SURVEY. FIELD LOCATES MUST BE COMPLETED PRIOR TO CONSTRUCTION BC ONE CALL MUST BE CALLED PRIOR TO EXCAVATION.



SUITE 201, 8506 - 200 STREET LANGLEY, BRITISH COLUMBIA, V2Y 0M1 PH : 604.371.0091 FAX : 604.371.0098		MINISTRY OF TRANSPORTATION AND INFRASTRUCTURE SOUTH COAST REGION HIGHWAY DESIGN AND GEOMATICS ENGINEERING	
SCALE 0 5 1:500 25m CAD FILENAME SK-1107-700.DWG PLOT DATE 2024-02-22		<b>WILLOW STAKE SPLASH PAD DETAIL AND PLANTING PLAN</b> HIGHWAY 7 AND HIGHWAY 11 INTERSECTION IMPROVEMENTS	
REV DATE REVISIONS NAME PA 2023-12-15 ISSUED FOR ENVIRONMENTAL PERMITTING L. DARIC PB 2024-03-15 ISSUED FOR ENVIRONMENTAL PERMITTING L. DARIC	DESIGNED S. CLARK DATE 2024-03-15 QUALITY CONTROL C. CLARK DATE 2024-03-15 QUALITY ASSURANCE A. PELLAM DATE 2024-03-15 DRAWN D. LI DATE 2024-03-15		
SENIOR DESIGNER DATE	FILE NUMBER 33580	PROJECT NUMBER 13252-0001	REG DRAWING NUMBER REV R1 ENV-SK1 PB

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## APPENDIX C – Construction Impact Mitigation

BMPs to be implemented concurrent with construction include:

- A QEP is to provide environmental monitoring;
- Nesting bird surveys;
- Vegetation management, including tree and shrub protection;
- Erosion and sediment control;
- Deleterious substances control and hydrocarbon spill management;
- Wildlife/Species at Risk Protection and wildlife passage
- Post-construction site restoration.

### Environmental Monitoring Requirements

A Qualified Environmental Professional (QEP) will need to provide environmental monitoring for the project. Key duties of the Environmental Monitor (EM) include:

- The EM will assure compliance with the relevant environmental legislation and the regulatory approvals / terms and conditions of the authorizing instrument.
- Activities and works must be monitored by an environmental monitor during any period where there is a risk that they may adversely impact the proper functioning of the stream, stream channel or aquatic ecosystem, or that they may be inconsistent with the terms and conditions of the authorizing instrument.
- The EM will have the authority to halt and modify work activity if it is necessary to prevent or manage a risk to the stream, stream channel, aquatic ecosystem, private property, or authorized uses of water.
- A copy of the regulatory Terms and Conditions and relevant BMPs related to the work must always be available at the worksite.
- A pre-construction meeting must be held between the approval holder or proponent, site manager, environmental monitor, and any contractors managing activities and works to ensure a common understanding of the legal requirements and relevant BMPs for the project.

### Erosion and Sediment Control Requirements

- Equipment must operate from outside the stream channel.
- Fill, excavated material, debris, or other erodible materials must be contained and placed at least thirty (30.0) metres outside of the bank of the stream and to an area where the material will not result in sediment run-off into the stream or another stream.
- Materials that are placed on the stream banks or within the active stream channel or floodplain (such as rock or riprap) must be free of fine particulates, overburden, debris, and or other substances that are potentially harmful to aquatic life and water quality.

- Machinery must be operated outside the bank of the stream and away from the edge of the streambank to avoid soil compaction, disturbance and potential transport of sediments to the stream channel.
- Sediment, runoff, and erosion control measures must be developed and implemented before activities and work begin, including details on the steps that will be taken to reduce sedimentation when significant precipitation or overland flow events occur. The efficacy of these measures is monitored during construction and adjustments are made, if needed.
- If activities or works occur during periods of heavy or persistent precipitation, these must be halted if sedimentation from them poses a significant risk of harm to the stream, stream channel or aquatic environment.
- Disturbance to existing vegetation on and adjacent to the stream or stream banks must be avoided.
- Where excavated or disturbed material remains within the work area, these must be graded to a stable angle of repose and sediment mobilization mitigation measures must be employed.
- All equipment, supplies, and non-biodegradable materials must be removed from the site and disposed of at an approved facility, including non-permanent sediment control works once they are no longer required, or any suspended sediment has settled (e.g., non- biodegradable silt fences)

### Deleterious Substances and Spill Management

- Equipment must operate from outside the watercourse. Mechanized equipment and machinery must not be operated within the water without appropriate mitigation measures.
- Steps must be taken to prevent the introduction of silt, debris, refuse, sediment or sediment-laden water, raw concrete or concrete leachate, or any other deleterious substances into the aquatic environment.
- Equipment and machinery must be clean and in good operating condition (e.g., power washed and free of leaks or excess oil and grease). Due to limiting space, all equipment refueling, or servicing must be completed with secondary containment and a spill kit on hand.
- Hydraulic machinery that is in and about a stream must use environmentally sensitive hydraulic fluids which are non-toxic to aquatic life and are biodegradable.
- All waste materials must be stored outside of the riparian area until appropriate disposal. All excess drilling mud, cuttings and other waste materials must be stored a minimum of thirty (30.0) metres away from the stream on flat ground to prevent sediment and other deleterious substances from entering the stream.
- To prevent the release of substances toxic to fish, there must be no use of treated wood products within the stream or stream channel or ditch lines.
- Fill, road crush, riprap or other materials used in or about the stream must be inert, clean and free of contaminants. Processed rock must not be acid generating or metal leaching.
- A spill response plan and spill kit suitable for all substances on-site must be readily accessible on-site in the event of a release of a deleterious substance to the environment.

## Work Area Access and Vegetation Management

Limited areas are required for the works. The following measures will be implemented during the works:

- Any areas of work and access routes which are required must be clearly marked onsite prior to starting work, e.g., for work, staging, storage, access, and the route taken must minimize disturbance to riparian vegetation.
- Vegetation clearing for site and work area access must be limited by using existing trails, roads or cut lines as access routes.
- No riparian vegetation is removed other than what is needed for site access.
- Removal of roots or trees that are embedded in the stream bank must be avoided, and root protection zones must be described in advance for any tree that can be retained. These trees must be delineated and protected at the onset of works.
- Trees and shrubs with roots embedded in the stream or stream channel are only removed if there are concerns about human safety or the activities or works cannot be completed without their removal.
- Falling or pruning of trees must occur in a manner that will not disturb aquatic organisms and does not damage the banks and the bed of the stream.
- If vegetation on both sides of the stream or stream channel must be cleared, strategies must be used to limit fording by equipment. Removal of trees used by birds and other wildlife while they are breeding, nesting, roosting or rearing young should be avoided to the greatest extent possible. Protected trees (e.g., raptor nest sites) must not be removed.
- Where proposing to top or remove trees, a person who is appropriately qualified to assess impacts to avian species must be consulted (e.g., a professional biologist).
- Micro-habitats such as tree snags, basking logs, and rock piles (hibernacula) must be retained on the landscape where it is safe to do so.
- Removal of riparian trees and shrubs using hand tools/saws is preferable over use of heavy equipment to minimize ground disturbance. Where equipment must be used, a machine-free zone adjacent to the stream or stream channel to protect the bank from ground compaction is followed, where practicable.

## Wildlife Protection Requirements

- If tree or vegetation removals are required within the nesting bird window (March 12- August 17), the EM will perform a nesting bird survey prior to any vegetation disturbance activities.
  - The nesting bird survey will be conducted a maximum of 48 hours prior to vegetation disturbance.
  - If an active bird nest is discovered, the EM will apply a 'no disturbance' buffer of appropriate species-specific size. The no disturbance buffer will remain in place until a second survey has confirmed that the nest is no longer active.



- The EM will be notified of any wildlife that is encountered onsite during construction activities. If wildlife is encountered, works shall be suspended to allow for wildlife to safely pass.
- Any chance discoveries of wildlife habitation during construction will be reported to the EM. It is the Contractor's responsibility to ensure their crew are aware of their wildlife reporting responsibilities.
- Pets will be prohibited from the construction site.
- The Contractor's crew **will not feed or handle wildlife**.
- Littering is prohibited and monitoring for this activity by the EM will be ongoing throughout the project.
- Food and food waste shall be stored in such a way that is not accessible by animals. Trash cans will be required with appropriate wildlife-proof lids for the disposal of crew-generated wastes.
- Trash cans shall be stored in a locked container (i.e., sea can) or removed from the site at the end of each day to avoid wildlife attraction.
- Disposal of solid wastes onto the site will not be permitted, including into ditches, road edges or private property.
- All solid waste will be either recycled or disposed of at approved waste disposal facilities.

### Post-Construction Site Restoration

- The topsoil must be protected from compaction and admixing. Replace topsoil over root networks at a stable angle of repose without compaction at the completion of the work.
- The planting of live stakes must be timed for the dormant season in the spring (prior to leaf out) or in the fall (once the leaves have dropped).
- Disturbed areas (including riparian areas) must be restored to an augmented or ecologically similar state with suitable species to restore the vegetative cover and prevent surface erosion and subsequent siltation of the stream. This may include hydroseeding the banks and areas adjacent to the stream with a heavy mulch, tackifier and local, ecologically suitable seed mix (i.e., does not include undesirable or invasive species).
- Revegetation must include a diverse mix of native ecologically suitable trees, shrubs, and herbaceous plants appropriate to the site conditions. In addition to tree replacement quantities, shrub and herbaceous species must be replaced on the landscape to their natural assemblage.
- Soil amendments and/or mulch must be used, where appropriate, to promote growth of newly planted vegetation, particularly in well drained soils. Regular watering is conducted, where appropriate, until plants and stakes become established.
- A plan must be in place to monitor the effectiveness of the restoration and site stability over time (e.g., over one or more growing seasons or one or more freshets).