

Construction Stormwater General Permit (CSWGP)

Stormwater Pollution Prevention Plan (SWPPP)

for
JNPC Habitat Assessment

Prepared for:
Department of Ecology
Southwest Regional Office

Permittee / Owner	Developer	Operator / Contractor
Shannon Burgess	Shannon Burgess	TBD

Chehalis, Washington

Certified Erosion and Sediment Control Lead (CESCL)

Name	Organization	Contact Phone Number
Not required	N/A	N/A

SWPPP Prepared By

Name	Organization	Contact Phone Number
KT Wills	Ecological Land Services	360-578-1371

SWPPP Preparation Date

March 17, 2021

Project Construction Dates

Activity / Phase	Start Date	End Date
Addition of gravel	Upon receipt of permit	Within two weeks of start date

Table of Contents

List of Acronyms and Abbreviations	4
Project Information (1.0).....	5
Existing Conditions (1.1).....	5
Proposed Construction Activities (1.2)	6
Construction Stormwater Best Management Practices (BMPs) (2.0)	8
The 13 Elements (2.1).....	8
Element 2: Establish Construction Access (2.1.2).....	8
Element 3: Control Flow Rates (2.1.3)	8
Element 4: Install Sediment Controls (2.1.4).....	9
Element 5: Stabilize Soils (2.1.5).....	9
Element 6: Protect Slopes (2.1.6).....	10
Element 7: Protect Drain Inlets (2.1.7)	10
Element 8: Stabilize Channels and Outlets (2.1.8)	10
Element 9: Control Pollutants (2.1.9)	10
Element 10: Control Dewatering (2.1.10)	11
Element 11: Maintain BMPs (2.1.11).....	11
Element 12: Manage the Project (2.1.12).....	12
Element 13: Protect Low Impact Development (LID) BMPs (2.1.13).....	14
Pollution Prevention Team (3.0).....	14
Monitoring and Sampling Requirements (4.0).....	14
Site Inspection (4.1).....	15
Stormwater Quality Sampling (4.2).....	15
Turbidity Sampling (4.2.1).....	15
pH Sampling (4.2.2)	16
Discharges to 303(d) or Total Maximum Daily Load (TMDL) Waterbodies (5.0).....	17
303(d) Listed Waterbodies (5.1).....	17
TMDL Waterbodies (5.2).....	17
Record Keeping (6.1).....	18
Site Log Book (6.1.1).....	18
Records Retention (6.1.2)	18

Updating the SWPPP (6.1.3)..... 18
Reporting (6.2) 19
Discharge Monitoring Reports (6.2.1)..... 19
Notification of Noncompliance (6.2.2) 19

Appendix A – Site Plan

Appendix B – BMP Detail

Appendix C - Correspondence

List of Acronyms and Abbreviations

Acronym / Abbreviation	Explanation
303(d)	Section of the Clean Water Act pertaining to Impaired Waterbodies
BFO	Bellingham Field Office of the Department of Ecology
BMP(s)	Best Management Practice(s)
CESCL	Certified Erosion and Sediment Control Lead
CO₂	Carbon Dioxide
CRO	Central Regional Office of the Department of Ecology
CSWGP	Construction Stormwater General Permit
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	Dissolved Oxygen
Ecology	Washington State Department of Ecology
EPA	United States Environmental Protection Agency
ERO	Eastern Regional Office of the Department of Ecology
ERTS	Environmental Report Tracking System
ESC	Erosion and Sediment Control
GULD	General Use Level Designation
NPDES	National Pollutant Discharge Elimination System
NTU	Nephelometric Turbidity Units
NWRO	Northwest Regional Office of the Department of Ecology
pH	Power of Hydrogen
RCW	Revised Code of Washington
SPCC	Spill Prevention, Control, and Countermeasure
su	Standard Units
SWMMEW	Stormwater Management Manual for Eastern Washington
SWMMWW	Stormwater Management Manual for Western Washington
SWPPP	Stormwater Pollution Prevention Plan
TESC	Temporary Erosion and Sediment Control
SWRO	Southwest Regional Office of the Department of Ecology
TMDL	Total Maximum Daily Load
VFO	Vancouver Field Office of the Department of Ecology
WAC	Washington Administrative Code
WSDOT	Washington Department of Transportation
WWHM	Western Washington Hydrology Model

Project Information (1.0)

Project/Site Name: **Jesus Name Pentecostal Church/Create an additional parking area**

Street/Location: **1592 Bishop Road**

City: **Chehalis** State: **Washington** Zip code: **98532**

Subdivision: **N/A**

Receiving waterbody: **The roadside ditch between the site and Bishop Road as well as the large swale between the site and the northbound on-ramp of I-5 both feed into Dillenbaugh Creek.**

Existing Conditions (1.1)

Total acreage (including support activities such as off-site equipment staging yards, material storage areas, borrow areas).

Total acreage: **1.63 Acres**

Disturbed acreage: **New/replaced area of gravel is 0.88 acres**

Existing structures: **None**

Landscape topography:

Drainage patterns: **Site consists of existing fill area with all drainage directed to the roadside ditch between the site and Bishop Road as well as the large swale between the site and the northbound on-ramp of I-5.**

Existing Vegetation: **Vegetation found on the filled portion of the property consisted of Queen Anne's lace (*Daucus carota*), hairy cat's ear (*Hypochaeris radicata*), Canada thistle (*Cirsium arvense*), Himalayan blackberry (*Rubus armeniacus*), bluegrass species (*Poa. sp.*), common horsetail (*Equisetum arvense*), oxeye daisy (*Leucanthemum vulgare*), reed canarygrass (*Phalaris arundinacea*) and tufted hairgrass (*Deschampsia cespitosa*), with moss covering portions of the fill.**

Vegetation found within the riparian buffer onsite consisted of; Douglas fir (*Pseudotsuga menziesii*), Oregon ash (*Fraxinus latifolia*), red alder (*Alnus rubra*), Pacific crabapple (*Malus fusca*), common snowberry (*Symphoricarpus albus*), baldhip rose (*Rosa gymnocarpa*), and Himalayan blackberry (*Rubus armeniacus*).

Vegetation between the site and the roadside swale consists of dense weedy forbs and grasses.

Critical Areas (wetlands, streams, high erosion risk, steep or difficult to stabilize slopes):
The area southeast of the existing fill slopes moderately for approximately 45 feet down to Dillenbaugh Creek, a fish-bearing perennial stream with a defined channel greater than 10 feet which according to CMC 17.25.020(A)(2), makes it a Type F-A Water.

List of known impairments for 303(d) listed or Total Maximum Daily Load (TMDL) for the receiving waterbody: **There were no 303(d) listed waters within Dillenbaugh Creek, however, it contains a TMDL for bacteria.**

Table 1 includes a list of suspected and/or known contaminants associated with the construction activity.

List all known or suspected contaminants associated with this site in Table 1. Include contaminants previously remediated.

Table 1 – Summary of Site Pollutant Constituents

Constituent (Pollutant)	Location	Depth	Concentration
None			

Proposed Construction Activities (1.2)

Description of site development (example: subdivision):

Gravel parking lot

Description of construction activities (example: site preparation, demolition, excavation):
Minimal site preparation is needed as the construction area consists of nearly level fill. Silt fencing will be installed around the perimeter of the project demarcating clearing limits. Construction activities will consist of the addition of approximately 2,372 cubic yards of gravel over top of the existing fill pad to create an additional parking area for church services and activities. The graveled area will be graded to shed water to the western property boundary. Once grading is complete, a 6-inch deep, 6-inch wide interceptor swale will be excavated at the top of the slope along the southern extent of the project area to capture any potential runoff and route it west/southwest away from the Dillenbaugh Creek buffer. The interceptor swale will be filled with loose gravel. A gravel filter berm will be installed along the western extent of the parking area to filter runoff prior to flowing down the vegetated slope toward the roadside swale. Care will be taken not to compact the gravel within the interceptor swale and gravel filter berm to

ensure they function properly. Following construction activities, a split-rail fence will be installed along the top of the southern slope to demarcate the Dillenbaugh Creek buffer. Signage will be posted on the fence stating: **Critical Area Buffer. Please Retain in Natural State (or similar wording).** Construction equipment will consist of haul trucks, bulldozer, and/or backhoe as needed.

Description of site drainage including flow from and onto adjacent properties. Must be consistent with Site Map in Appendix A:

The roadside ditch between the site and Bishop Road as well as the large swale between the site and the northbound on-ramp of I-5 direct runoff south, towards Dillenbaugh Creek where they both discharge. The site will be graded so runoff sheet flows to the west/southwest through a gravel filter berm and then through approximately 35 feet of dense grasses to the roadside swale. The interceptor swale described above will capture potential runoff to the south and direct it westerly to the gravel filter berm and ultimately the roadside swale.

Description of final stabilization (example: extent of revegetation, paving, landscaping):

The project consists of spreading gravel over existing fill to create a parking area. Minimal stabilization is needed as the majority of the site will be graveled. Any potential bare areas will be seeded.

Contaminated Site Information:

Proposed activities regarding contaminated soils or groundwater (example: on-site treatment system, authorized sanitary sewer discharge):

Not applicable to this project.

Construction Stormwater Best Management Practices (BMPs) (2.0)

The SWPPP is a living document reflecting current conditions and changes throughout the life of the project. These changes may be informal (i.e. hand-written notes and deletions). Update the SWPPP when the CESCL has noted a deficiency in BMPs or deviation from original design.

The 13 Elements (2.1)

Element 1: Preserve Vegetation / Mark Clearing Limits (2.1.1)List and describe BMPs:

Prior to beginning construction activities, project limits will be clearly marked by installing silt fencing along the perimeter of the disturbance footprint. Minimal vegetation is present within the project footprint as it is located on fill. All vegetation outside the disturbance footprint will be preserved. Following construction, a split-rail fence will be installed along the edge of the Dillenbaugh Creek buffer with signage placed every 50 feet stating: Critical Area Buffer. Please Retain in Natural State (or similar wording). Silt fencing will be removed upon final site stabilization.

- **BMP C101: Preserving Natural Vegetation**
- **BMP C102: Buffer Zones**
- **BMP C233: Silt Fence**

Element 2: Establish Construction Access (2.1.2)

List and describe BMPs:

The existing access is currently graveled and will serve as the construction access. The project consists of placing gravel over existing fill so sediment tracking is unlikely. A street sweeper will be made available if necessary.

Element 3: Control Flow Rates (2.1.3)

Will you construct stormwater retention and/or detention facilities?

Not required

Will you use permanent infiltration ponds or other low impact development (example: rain gardens, bio-retention, porous pavement) to control flow during construction?

Not required

Element 4: Install Sediment Controls (2.1.4)

List and describe BMPs:

Silt fencing will be placed at the outer edge of disturbance prior to and for the duration of the construction activity. A six-inch-deep by six-inch-wide trench will be dug at the top of the slope between the disturbance footprint and the stream buffer to capture any runoff that may otherwise flow down the slope towards Dillenbaugh Creek. The trench will facilitate infiltration and will convey runoff to the vegetated area between the fill slope and the roadside swale to the west/southwest. The trench will be backfilled with loose gravel and will not be compacted to allow filtration. A gravel filter berm will be installed along the western extent of the parking area to filter runoff prior to flowing down the vegetated slope toward the roadside swale. The existing approximately 35-foot strip of dense grasses between the site and roadside swale will also function to further filter runoff from the parking area.

- **BMP C200: Interceptor Dike and Swale**
- **BMP C233: Silt Fence**
- **BMP C232: Gravel Filter Berm**
- **BMP C234: Vegetated Strip**

Element 5: Stabilize Soils (2.1.5)

West of the Cascade Mountains Crest

Season	Dates	Number of Days Soils Can be Left Exposed
During the Dry Season	May 1 – September 30	7 days
During the Wet Season	October 1 – April 30	2 days

Soils must be stabilized at the end of the shift before a holiday or weekend if needed based on the weather forecast.

Anticipated project dates:

Start date: Upon receipt of permit

End date: Two weeks after start date

Will you construct during the wet season?

No

List and describe BMPs:

Construction activities will only consist of the addition of gravel over top the existing fill pad; therefore, soils will remain stabilized. Any potential bare areas will be reseeded.

Element 6: Protect Slopes (2.1.6)

Will steep slopes be present at the site during construction?

No

List and describe BMPs: **There will be no work done on slopes.**

Element 7: Protect Drain Inlets (2.1.7)

List and describe BMPs:

There are no drain inlets present at this project site or along Bishop Road.

Element 8: Stabilize Channels and Outlets (2.1.8)

Provide stabilization, including armoring material, adequate to prevent erosion of outlets, adjacent stream banks, slopes, and downstream reaches, will be installed at the outlets of all conveyance systems.

List and describe BMPs:

The downstream end of the interceptor swale will discharge to the gravel filter berm.

Element 9: Control Pollutants (2.1.9)

The following pollutants are anticipated to be present on-site:

List and describe BMPs:

No pollutants are anticipated to be onsite; however, there may be potential fuel leaks from construction vehicles. Construction vehicles will be checked at the beginning of each day for fuel leaks.

Will maintenance, fueling, and/or repair of heavy equipment and vehicles occur on-site?

List and describe BMPs: **Not applicable**

Will wheel wash or tire bath system BMPs be used during construction?

No

List and describe BMPs: **Not applicable**

Will pH-modifying sources be present on-site?

No

Table 3 – pH-Modifying Sources

X	None
	Bulk cement
	Cement kiln dust
	Fly ash
	Other cementitious materials
	New concrete washing or curing waters
	Waste streams generated from concrete grinding and sawing
	Exposed aggregate processes
	Dewatering concrete vaults
	Concrete pumping and mixer washout waters
	Recycled concrete
	Other (i.e. calcium lignosulfate) [please describe]

List and describe BMPs: **Not applicable**

Concrete trucks must not be washed out onto the ground, or into storm drains, open ditches, streets, or streams. Excess concrete must not be dumped on-site, except in designated concrete washout areas with appropriate BMPs installed.

Element 10: Control Dewatering (2.1.10)

List and describe BMPs: **Dewatering is not needed.**

Element 11: Maintain BMPs (2.1.11)

All temporary and permanent Erosion and Sediment Control (ESC) BMPs shall be maintained and repaired as needed to ensure continued performance of their intended function.

Maintenance and repair shall be conducted in accordance with each particular BMP specification (see *Volume II of the SWMMWW* or *Chapter 7 of the SWMMEW*).

Visual monitoring of all BMPs installed at the site will be conducted at least once every calendar week and within 24 hours of any stormwater or non-stormwater discharge from the site. If the site becomes inactive and is temporarily stabilized, the inspection frequency may be reduced to once every calendar month.

All temporary ESC BMPs shall be removed within 30 days after final site stabilization is achieved or after the temporary BMPs are no longer needed.

Trapped sediment shall be stabilized on-site or removed. Disturbed soil resulting from removal of either BMPs or vegetation shall be permanently stabilized.

Additionally, protection must be provided for all BMPs installed for the permanent control of stormwater from sediment and compaction. BMPs that are to remain in place following completion of construction shall be examined and restored to full operating condition. If sediment enters these BMPs during construction, the sediment shall be removed and the facility shall be returned to conditions specified in the construction documents.

Element 12: Manage the Project (2.1.12)

The project will be managed based on the following principles:

- Projects will be phased to the maximum extent practicable and seasonal work limitations will be taken into account.
- Inspection and monitoring:
 - Inspection, maintenance and repair of all BMPs will occur as needed to ensure performance of their intended function.
 - Site inspections and monitoring will be conducted in accordance with Special Condition S4 of the CSWGP. Sampling locations are indicated on the Site Map. Sampling station(s) are located in accordance with applicable requirements of the CSWGP.
- Maintain an updated SWPPP.
 - The SWPPP will be updated, maintained, and implemented in accordance with Special Conditions S3, S4, and S9 of the CSWGP.

As site work progresses the SWPPP will be modified routinely to reflect changing site conditions. The SWPPP will be reviewed monthly to ensure the content is current.

Table 5 – Management

x	Design the project to fit the existing topography, soils, and drainage patterns
x	Emphasize erosion control rather than sediment control
x	Minimize the extent and duration of the area exposed
x	Keep runoff velocities low
x	Retain sediment on-site

x	Thoroughly monitor site and maintain all ESC measures
x	Schedule major earthwork during the dry season
	Other (please describe)



Table 6 – BMP Implementation Schedule		
Stormwater BMPs	Timeframe	Wet/Dry Season
C233 – Silt fence	First day of work	Dry
C101 – Preserve vegetation	Concurrent with project	Dry
C200 – Interceptor trench	Following addition of gravel	Dry
C232 – Gravel filter berm	Following addition of gravel	Dry

Element 13: Protect Low Impact Development (LID) BMPs (2.1.13)
 No LIDs are planned for this project.

Pollution Prevention Team (3.0)

Table 7 – Team Information

Title	Name(s)	Phone Number
Certified Erosion and Sediment Control Lead (CESCL)	Not applicable	Not applicable
Resident Engineer	Not applicable	Not applicable
Emergency Ecology Contact	SW Regional Office	(360) 407-6300
Emergency Permittee/ Owner Contact	Mr. Shannon Burgess	(360) 748-4977
Non-Emergency Owner Contact	Mr. Shannon Burgess	(360) 748-4977
Monitoring Personnel	Not applicable	Not applicable
Ecology Regional Office	SW Regional Office	(360) 407-6300

Monitoring and Sampling Requirements (4.0)

Monitoring is not currently required. In the event monitoring may be required for this project, the language below has been left in the SWPPP.

Monitoring includes visual inspection, sampling for water quality parameters of concern, and documentation of the inspection and sampling findings in a site log book. A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements
- Site inspections
- Stormwater sampling data

File a blank form under Appendix D.

The site log book must be maintained on-site within reasonable access to the site and be made available upon request to Ecology or the local jurisdiction.

Numeric effluent limits may be required for certain discharges to 303(d) listed waterbodies. See CSWGP Special Condition S8 and Section 5 of this template.

Complete the following paragraph for sites that discharge to impaired waterbodies for fine sediment, turbidity, phosphorus, or pH:

All stormwater and dewatering discharges from the site are subject to an **effluent limit** of **8.5 su** for pH and/or **25 NTU** for turbidity.

Site Inspection (4.1)

Site inspections will be conducted at least once every calendar week and within 24 hours following any discharge from the site. For sites that are temporarily stabilized and inactive, the required frequency is reduced to once per calendar month.

The discharge point(s) are indicated on the Site Map (see Appendix A) and in accordance with the applicable requirements of the CSWGP.

Stormwater Quality Sampling (4.2)

Turbidity Sampling (4.2.1)

Turbidity sampling is not required for this project as the disturbance footprint is less than an acre. It is highly unlikely there will be any discharge.

Requirements include calibrated turbidity meter or transparency tube to sample site discharges for compliance with the CSWGP. Sampling will be conducted at all discharge points at least once per calendar week.

Method for sampling turbidity:

Table 8 – Turbidity Sampling Method

x	Turbidity Meter/Turbidimeter (required for disturbances 5 acres or greater in size)
	Transparency Tube (option for disturbances less than 1 acre and up to 5 acres in size)

The benchmark for turbidity value is 25 nephelometric turbidity units (NTU) and a transparency less than 33 centimeters.

If the discharge's turbidity is 26 to 249 NTU **or** the transparency is less than 33 cm but equal to or greater than 6 cm, the following steps will be conducted:

1. Review the SWPPP for compliance with Special Condition S9. Make appropriate revisions within 7 days of the date the discharge exceeded the benchmark.
2. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible. Address the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period.
3. Document BMP implementation and maintenance in the site log book.

If the turbidity exceeds 250 NTU or the transparency is 6 cm or less at any time, the following steps will be conducted:

1. Telephone or submit an electronic report to the applicable Ecology Region's Environmental Report Tracking System (ERTS) within 24 hours.
<https://www.ecology.wa.gov/About-us/Get-involved/Report-an-environmental-issue>
 - Central Region (Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima): (509) 575-2490
 - Eastern Region (Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, Whitman): (509) 329-3400
 - Northwest Region (King, Kitsap, Island, San Juan, Skagit, Snohomish, Whatcom): (425) 649-7000
 - Southwest Region (Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Lewis, Mason, Pacific, Pierce, Skamania, Thurston, Wahkiakum,): (360) 407-6300
2. Immediately begin the process to fully implement and maintain appropriate source control and/or treatment BMPs as soon as possible. Address the problems within 10 days of the date the discharge exceeded the benchmark. If installation of necessary treatment BMPs is not feasible within 10 days, Ecology may approve additional time when the Permittee requests an extension within the initial 10-day response period
3. Document BMP implementation and maintenance in the site log book.
4. Continue to sample discharges daily until one of the following is true:
 - Turbidity is 25 NTU (or lower).
 - Transparency is 33 cm (or greater).
 - Compliance with the water quality limit for turbidity is achieved.
 - 1 - 5 NTU over background turbidity, if background is less than 50 NTU
 - 1% - 10% over background turbidity, if background is 50 NTU or greater
 - The discharge stops or is eliminated.

pH Sampling (4.2.2)

pH monitoring is not required for this project. In the event pH monitoring is required, this language has been left in the SWPPP.

pH monitoring is required for "Significant concrete work" (i.e. greater than 1000 cubic yards poured concrete or recycled concrete over the life of the project). The use of engineered soils (soil amendments including but not limited to Portland cement-treated base [CTB], cement kiln dust [CKD] or fly ash) also requires pH monitoring.

For significant concrete work, pH sampling will start the first day concrete is poured and continue until it is cured, typically three (3) weeks after the last pour.

For engineered soils and recycled concrete, pH sampling begins when engineered soils or recycled concrete are first exposed to precipitation and continues until the area is fully stabilized.

If the measured pH is 8.5 or greater, the following measures will be taken:

1. Prevent high pH water from entering storm sewer systems or surface water.
2. Adjust or neutralize the high pH water to the range of 6.5 to 8.5 su using appropriate technology such as carbon dioxide (CO₂) sparging (liquid or dry ice).
3. Written approval will be obtained from Ecology prior to the use of chemical treatment other than CO₂ sparging or dry ice.

Method for sampling pH:

Table 8 – pH Sampling Method

	pH meter
x	pH test kit
	Wide range pH indicator paper

Discharges to 303(d) or Total Maximum Daily Load (TMDL) Waterbodies (5.0)

303(d) Listed Waterbodies (5.1)

Is the receiving water 303(d) (Category 5) listed for turbidity, fine sediment, phosphorus, or pH?

The receiving water body (roadside swale) north of Dillenbaugh Creek are 303d listed.

TMDL Waterbodies (5.2)

Waste Load Allocation for CWSGP discharges: **Bacteria, temperature, dissolved oxygen, BOD5, and Ammonia-N**

The receiving water body (roadside swale) does not have a TMDL; however, Dillenbaugh Creek has a TMDL for bacteria. Runoff generated by the gravel parking area is not likely to contain bacteria and is anticipated to infiltrate prior to reaching roadside swale.

Discharges to TMDL receiving waterbodies will meet in-stream water quality criteria at the point of discharge.

The Construction Stormwater General Permit Proposed New Discharge to an Impaired Water Body form is included in Appendix F.

Reporting and Record Keeping (6.0)

Record Keeping (6.1)

The majority of this section is not relevant to the project as an CSGP is not required nor is stormwater monitoring. This SWPPP will be kept onsite or within reasonable access for the duration of construction. The SWPPP will be updated as needed if BMPs are found to be inadequate.

Site Log Book (6.1.1)

A site log book will be maintained for all on-site construction activities and will include:

- A record of the implementation of the SWPPP and other permit requirements
- Site inspections
- Sample logs

Records Retention (6.1.2)

Records will be retained during the life of the project and for a minimum of three (3) years following the termination of permit coverage in accordance with Special Condition S5.C of the CSWGP.

Permit documentation to be retained on-site:

- CSWGP
- Permit Coverage Letter
- SWPPP
- Site Log Book

Permit documentation will be provided within 14 days of receipt of a written request from Ecology. A copy of the SWPPP or access to the SWPPP will be provided to the public when requested in writing in accordance with Special Condition S5.G.2.b of the CSWGP.

Updating the SWPPP (6.1.3)

The SWPPP will be modified if:

- Found ineffective in eliminating or significantly minimizing pollutants in stormwater discharges from the site.
- There is a change in design, construction, operation, or maintenance at the construction site that has, or could have, a significant effect on the discharge of pollutants to waters of the State.

The SWPPP will be modified within seven (7) days if inspection(s) or investigation(s) determine additional or modified BMPs are necessary for compliance. An updated timeline for BMP implementation will be prepared.

Reporting (6.2)

Discharge Monitoring Reports (6.2.1)

Cumulative soil disturbance is less than one (1) acre; therefore, Discharge Monitoring Reports (DMRs) will not be submitted to Ecology because water quality sampling is not being conducted at the site.

Notification of Noncompliance (6.2.2)

A CSGP is not required; however, this language has been left in the SWPPP.

If any of the terms and conditions of the permit is not met, and the resulting noncompliance may cause a threat to human health or the environment, the following actions will be taken:

1. Ecology will be notified within 24-hours of the failure to comply by calling the applicable Regional office ERTS phone number (Regional office numbers listed below).
2. Immediate action will be taken to prevent the discharge/pollution or otherwise stop or correct the noncompliance. If applicable, sampling and analysis of any noncompliance will be repeated immediately and the results submitted to Ecology within five (5) days of becoming aware of the violation.
3. A detailed written report describing the noncompliance will be submitted to Ecology within five (5) days, unless requested earlier by Ecology.

Anytime turbidity sampling indicates turbidity is 250 NTUs or greater, or water transparency is 6 cm or less, the Ecology Regional office will be notified by phone within 24 hours of analysis as required by Special Condition S5.A of the CSWGP.

- Central Region at (509) 575-2490 for Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, or Yakima County
- Eastern Region at (509) 329-3400 for Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Spokane, Stevens, Walla Walla, or Whitman County
- Northwest Region at (425) 649-7000 for Island, King, Kitsap, San Juan, Skagit, Snohomish, or Whatcom County
- Southwest Region at (360) 407-6300 for Clallam, Clark, Cowlitz, Grays Harbor, Jefferson, Lewis, Mason, Pacific, Pierce, Skamania, Thurston, or Wahkiakum

Include the following information:

1. Your name and / Phone number
2. Permit number
3. City / County of project
4. Sample results
5. Date / Time of call
6. Date / Time of sample

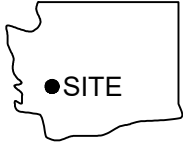
7. Project name

In accordance with Special Condition S4.D.5.b of the CSWGP, the Ecology Regional office will be notified if chemical treatment other than CO₂ sparging is planned for adjustment of high pH water.

Appendix A - Site Map

3/30/2021 4:58 PM C:\Users\jennifer\Box\ELIS\WALewis\Chehalis\3091-1-Jesus Name Pentecostal Church\3091.01-Figures\3091.01-DL.dwg Jennifer

WASHINGTON



Latitude: 46.6264°
Longitude: -122.9278°

LOCATION MAP

		R 2 W			
	6				1
T					
13					
N					
	31				36

NOTE:
USGS topographic quadrangle map reproduced using
MAPTECH Inc., Terrain Navigator Pro software.

PROJECT VICINITY MAP

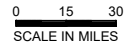
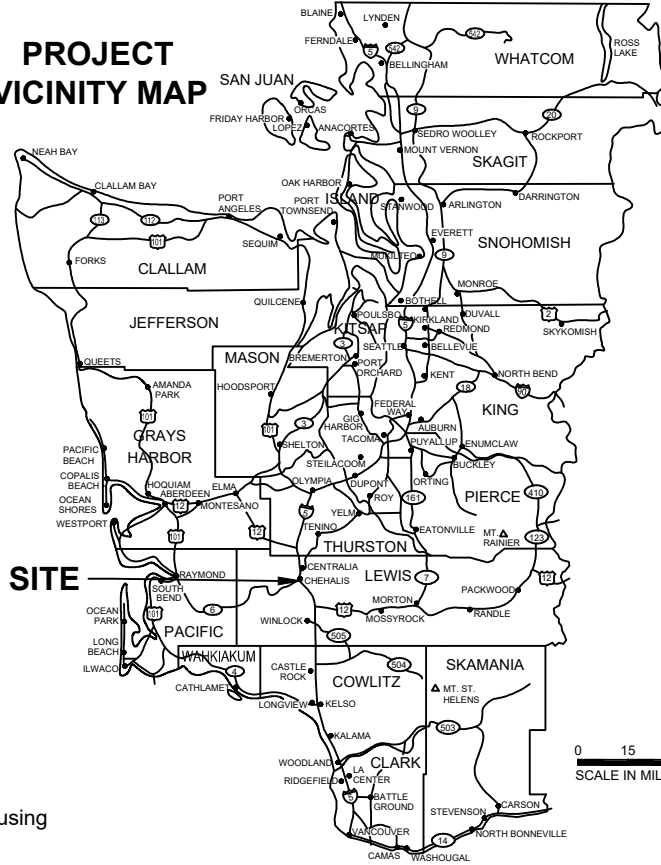
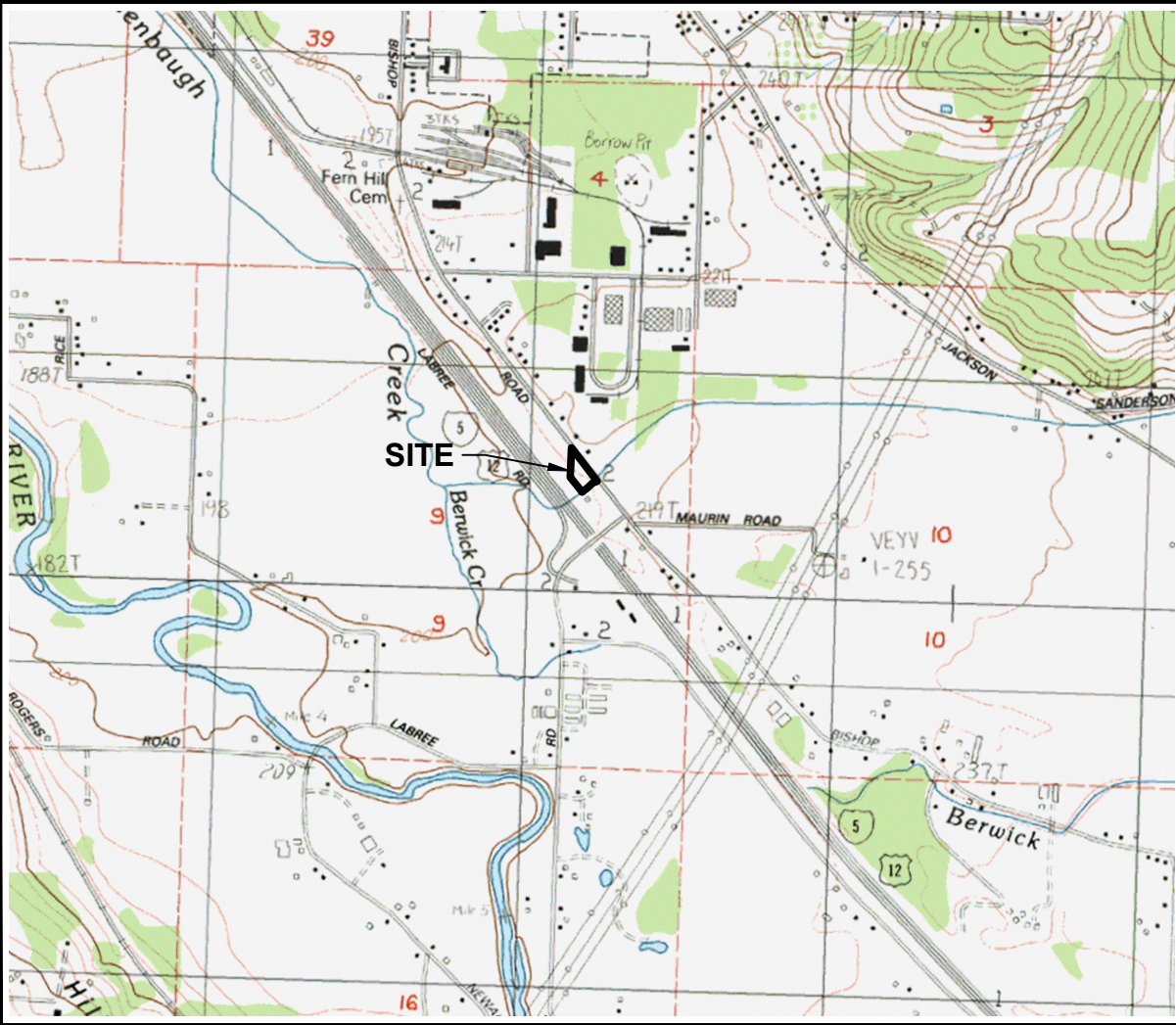
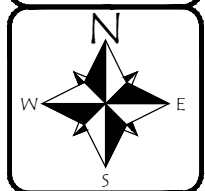
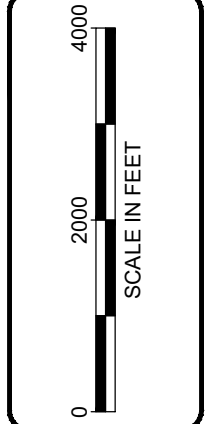
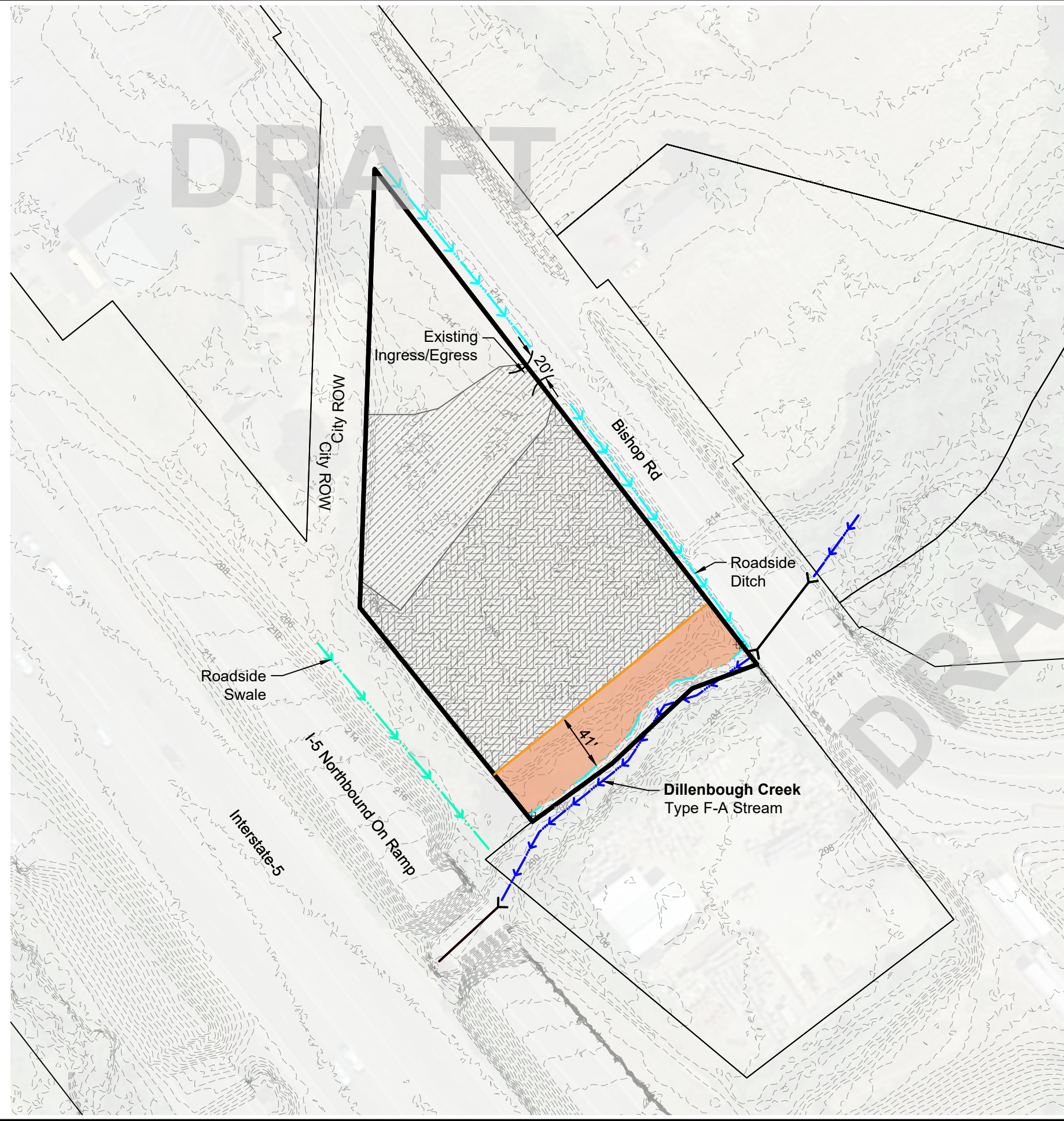


Figure 1
VICINITY MAP
JNPC Habitat Assessment
Shannon Burgess
Chehalis, Lewis County, Washington
Section 9, Township 13N, Range 2W, W.M.

DATE: 3/30/21
DWN: JJK
REQ. BY: KT
PRJ. MGR: KT
CHK: ST
PROJECT NO:
3091.01

1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371
Fax: (360) 414-9305
www.eco-land.com

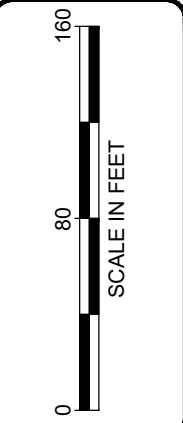




- LEGEND:**
- Site Boundary
 - Parcel Boundary
 - OHWM
 - Stream with Flow Direction
 - Swale with Flow Direction
 - Roadside Ditch with Flow Direction
 - Existing Fill
 - Existing Gravel Surface
 - Edge of Fill
 - Riparian Buffer
 - Culvert

NOTE(S):

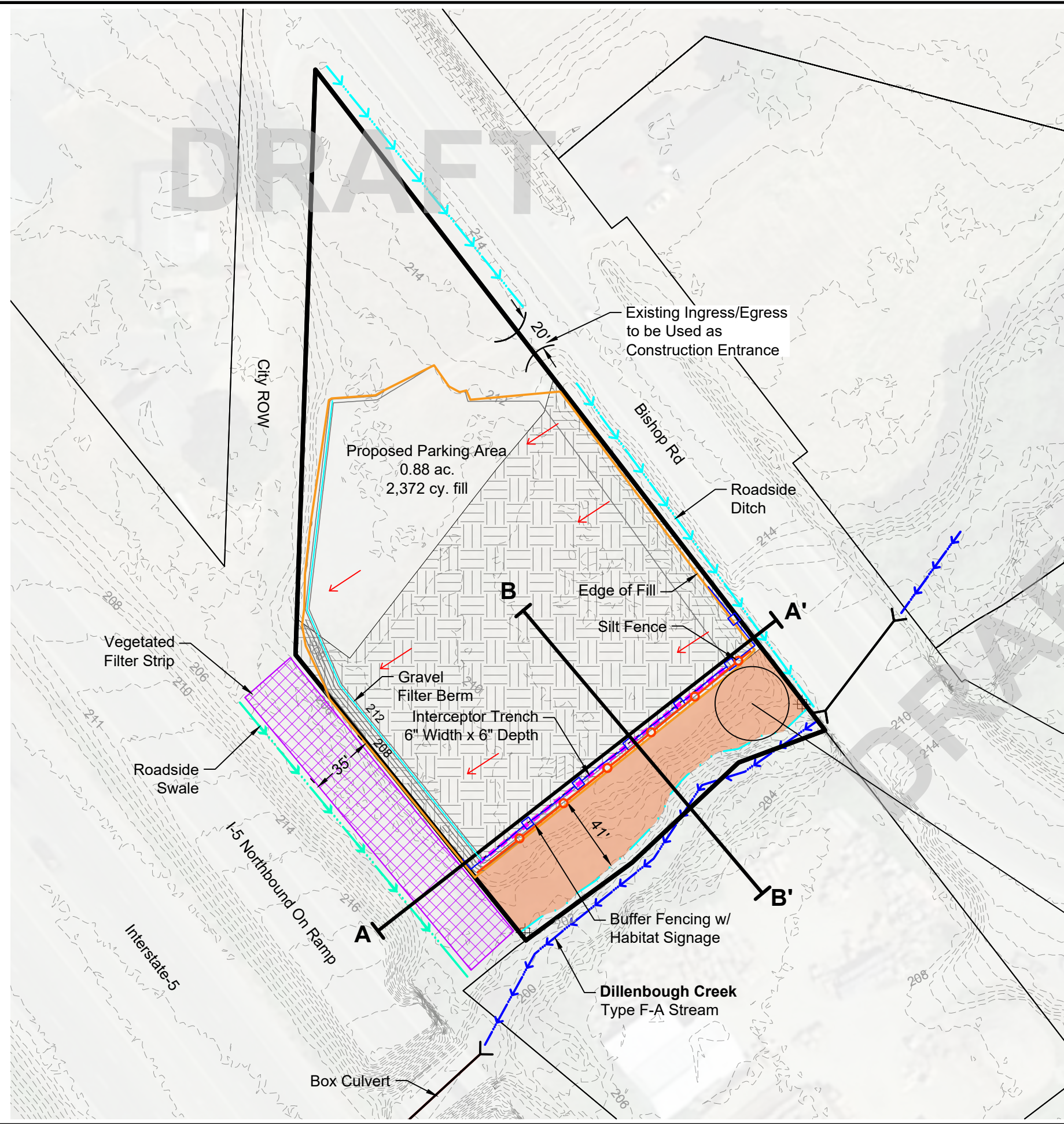
1. Aerial from Google Earth™.
2. OHWM was mapped by an ELS Biologist using a hand-held GPS unit with submeter accuracy.
3. Topography from OCM Partners, 2021: 2012 Puget Sound LiDAR Consortium (PSLC) Topographic LiDAR: Chehalis River Watershed Area, Washington, <https://www.fisheries.noaa.gov/inport/item/50165>.



1157 3rd Ave., Suite 220A
 Longview, WA 98632
 Phone: (360) 578-1371
 Fax: (360) 414-9305
www.eco-land.com

DATE: 3/30/21
 DWN: JKJ
 REQ. BY: KT
 PRJ. MGR: KT
 CHK: ST
 PROJECT NO: 3091.01

Figure 2
EXISTING CONDITIONS
 JNPC Habitat Assessment
 Shannon Burgess
 Chehalis, Lewis County, Washington
 Section 9, Township 13N, Range 2W, W.M.



LEGEND:

- Existing
- Site Boundary
 - Parcel Boundary
 - OHWM
 - Stream with Flow Direction
 - Swale with Flow Direction
 - Roadside Ditch with Flow Direction
 - Existing Fill
 - Riparian Buffer
 - Culvert
 - Existing Contours
- Proposed
- Proposed Edge of Fill
 - Proposed Contours
 - Silt Fencing
 - Flow Direction Arrow
 - Interceptor Trench (6" width, 6" depth)
 - Gravel Filter Berm
 - Vegetated Filter Strip
 - Buffer Fencing with Habitat Signage

NOTE(S):

- Aerial from Google Earth™.
- OHWM was mapped by an ELS Biologist using a hand-held GPS unit with submeter accuracy.
- Topography from OCM Partners, 2021: 2012 Puget Sound LiDAR Consortium (PSLC) Topographic LiDAR: Chehalis River Watershed Area, Washington, <https://www.fisheries.noaa.gov/inport/item/50165>.

Enhancement Objectives

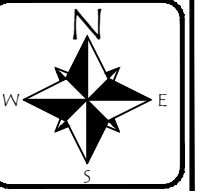
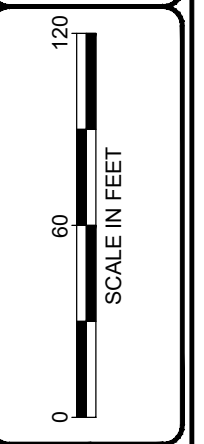
Key objectives for the riparian enhancement area include:

- Controlling any state and county-listed noxious weeds including, but not limited to, evergreen (*Rubus laciniatus*) or Himalayan blackberry, English ivy (*Hedera helix*), bittersweet nightshade (*Solanum dulcamara*), and Scot's broom (*Cytisus scoparius*), by spraying, by hand, or by other approved means.
- Removing garbage.

Figure 3
PROPOSED CONDITIONS
 JNPC Habitat Assessment
 Shannon Burgess
 Chehalis, Lewis County, Washington
 Section 9, Township 13N, Range 2W, W.M.

DATE: 3/30/21
 DWN: JKJ
 REQ. BY: KT
 PRJ. MGR: KT
 CHK: ST
 PROJECT NO: 3091.01

1157 3rd Ave., Suite 220A
 Longview, WA 98632
 Phone: (360) 578-1371
 Fax: (360) 414-9305
www.eco-land.com



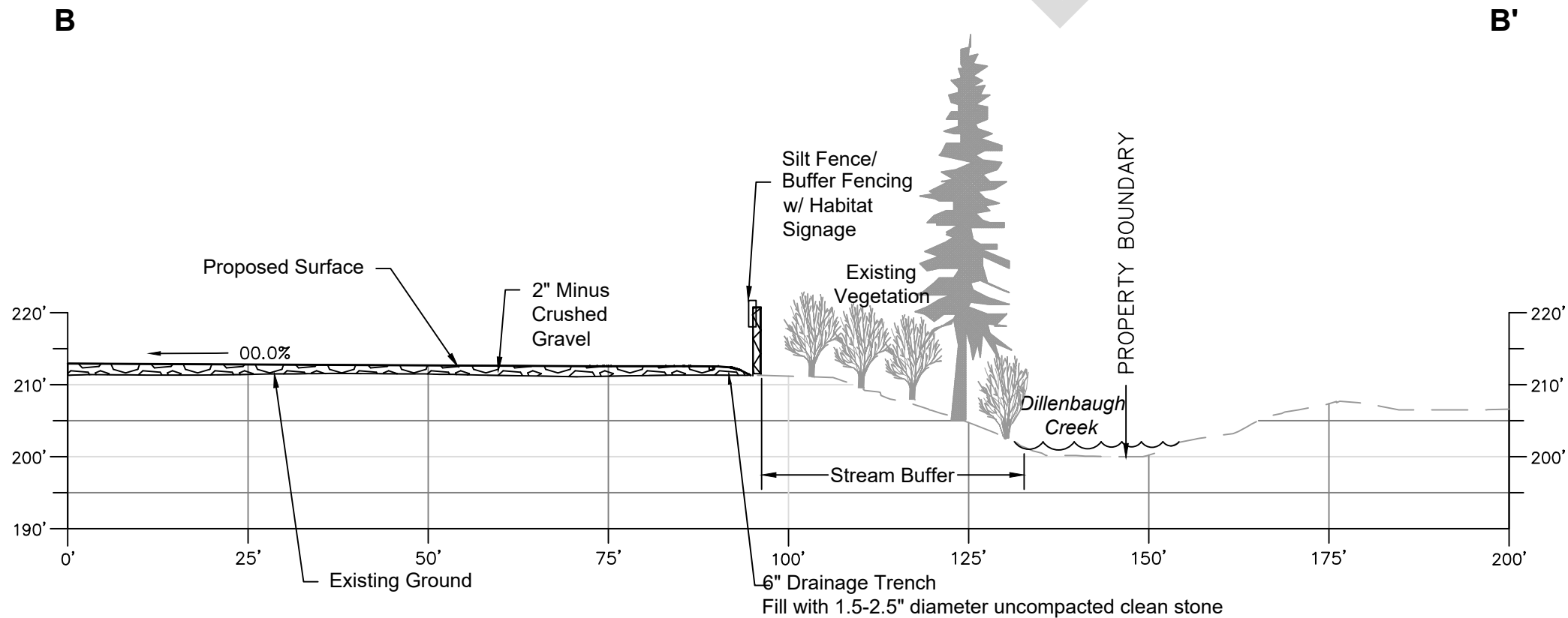
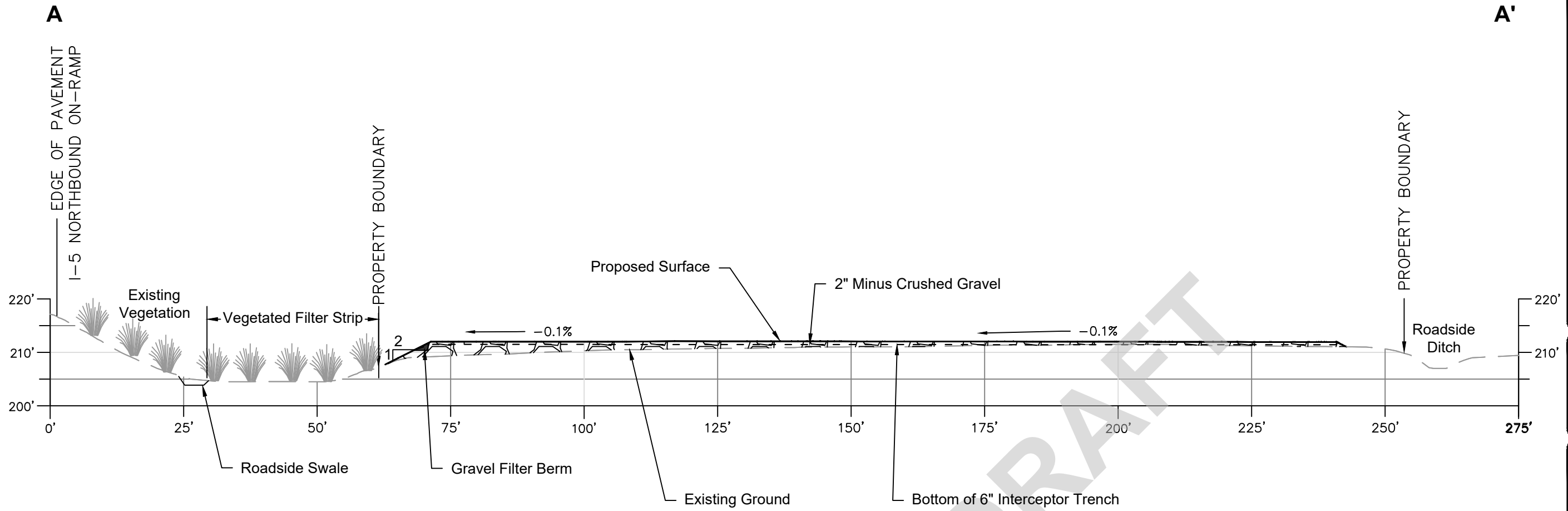
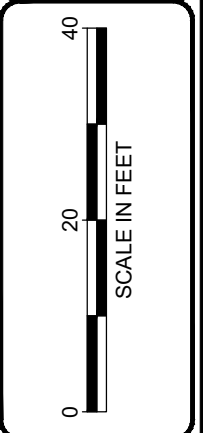


Figure 4
CROSS SECTIONS
JNPC Habitat Assessment
Shannon Burgess
Chehalis, Lewis County, Washington
Section 9, Township 13N, Range 2W, W.M.

DATE: 3/30/21
DWN: JJK
REQ. BY: KT
PRJ. MGR: KT
CHK: ST
PROJECT NO:
3091.01

1157 3rd Ave., Suite 220A
Longview, WA 98632
Phone: (360) 578-1371
Fax: (360) 414-9305
www.eco-land.com

**Ecological
Land Services**



Appendix B - BMP Detail

BMP C101: Preserving Natural Vegetation

Purpose

The purpose of preserving natural vegetation is to reduce erosion wherever practicable. Limiting site disturbance is the single most effective method for reducing erosion. For example, conifers can hold up to about 50 percent of all rain that falls during a storm. Up to 20-30 percent of this rain may never reach the ground but is taken up by the tree or evaporates. Another benefit is that the rain held in the tree can be released slowly to the ground after the storm.

Conditions of Use

Natural vegetation should be preserved on steep slopes, near perennial and intermittent water-courses or swales, and on building sites in wooded areas.

- As required by local governments.
- Phase construction to preserve natural vegetation on the project site for as long as possible during the construction period.

Design and Installation Specifications

Natural vegetation can be preserved in natural clumps or as individual trees, shrubs and vines.

The preservation of individual plants is more difficult because heavy equipment is generally used to remove unwanted vegetation. The points to remember when attempting to save individual plants are:

- Is the plant worth saving? Consider the location, species, size, age, vigor, and the work involved. Local governments may also have ordinances to save natural vegetation and trees.
- Fence or clearly mark areas around trees that are to be saved. It is preferable to keep ground disturbance away from the trees at least as far out as the dripline.

Plants need protection from three kinds of injuries:

- *Construction Equipment* - This injury can be above or below the ground level. Damage results from scarring, cutting of roots, and compaction of the soil. Placing a fenced buffer zone around plants to be saved prior to construction can prevent construction equipment injuries.
- *Grade Changes* - Changing the natural ground level will alter grades, which affects the plant's ability to obtain the necessary air, water, and minerals. Minor fills usually do not cause problems although sensitivity between species does vary and should be checked. Trees can typically tolerate fill of 6 inches or less. For shrubs and other plants, the fill should be less.

When there are major changes in grade, it may become necessary to supply air to the roots of plants. This can be done by placing a layer of gravel and a tile system over the roots before the fill is made. The tile system should be laid out on the original grade leading from a dry well

around the tree trunk. The system should then be covered with small stones to allow air to circulate over the root area.

Lowering the natural ground level can seriously damage trees and shrubs. The highest percentage of the plant roots are in the upper 12 inches of the soil and cuts of only 2-3 inches can cause serious injury. To protect the roots it may be necessary to terrace the immediate area around the plants to be saved. If roots are exposed, construction of retaining walls may be needed to keep the soil in place. Plants can also be preserved by leaving them on an undisturbed, gently sloping mound. To increase the chances for survival, it is best to limit grade changes and other soil disturbances to areas outside the dripline of the plant.

- *Excavations* - Protect trees and other plants when excavating for drainfields, power, water, and sewer lines. Where possible, the trenches should be routed around trees and large shrubs. When this is not possible, it is best to tunnel under them. This can be done with hand tools or with power augers. If it is not possible to route the trench around plants to be saved, then the following should be observed:
 - Cut as few roots as possible. When you have to cut, cut clean. Paint cut root ends with a wood dressing like asphalt base paint if roots will be exposed for more than 24-hours.
 - Backfill the trench as soon as possible.
 - Tunnel beneath root systems as close to the center of the main trunk to preserve most of the important feeder roots.

Some problems that can be encountered with a few specific trees are:

- Maple, Dogwood, Red alder, Western hemlock, Western red cedar, and Douglas fir do not readily adjust to changes in environment and special care should be taken to protect these trees.
- The windthrow hazard of Pacific silver fir and madrona is high, while that of Western hemlock is moderate. The danger of windthrow increases where dense stands have been thinned. Other species (unless they are on shallow, wet soils less than 20 inches deep) have a low windthrow hazard.
- Cottonwoods, maples, and willows have water-seeking roots. These can cause trouble in sewer lines and infiltration fields. On the other hand, they thrive in high moisture conditions that other trees would not.
- Thinning operations in pure or mixed stands of Grand fir, Pacific silver fir, Noble fir, Sitka spruce, Western red cedar, Western hemlock, Pacific dogwood, and Red alder can cause serious disease problems. Disease can become established through damaged limbs, trunks, roots, and freshly cut stumps. Diseased and weakened trees are also susceptible to insect attack.

Maintenance Standards

Inspect flagged and/or fenced areas regularly to make sure flagging or fencing has not been removed or damaged. If the flagging or fencing has been damaged or visibility reduced, it shall be repaired or replaced immediately and visibility restored.

If tree roots have been exposed or injured, “prune” cleanly with an appropriate pruning saw or loppers directly above the damaged roots and recover with native soils. Treatment of sap flowing trees (fir, hemlock, pine, soft maples) is not advised as sap forms a natural healing barrier.

BMP C102: Buffer Zones

Purpose

Creation of an undisturbed area or strip of natural vegetation or an established suitable planting that will provide a living filter to reduce soil erosion and stormwater runoff velocities.

Conditions of Use

Buffer zones are used along streams, wetlands and other bodies of water that need protection from erosion and sedimentation. Contractors can use vegetative buffer zone BMPs to protect natural swales and they can incorporate them into the natural landscaping of an area.

Do not use critical-areas buffer zones as sediment treatment areas. These areas shall remain completely undisturbed. The local permitting authority may expand the buffer widths temporarily to allow the use of the expanded area for removal of sediment.

The types of buffer zones can change the level of protection required as shown below:

Designated Critical Area Buffers - buffers that protect Critical Areas, as defined by the Washington State Growth Management Act, and are established and managed by the local permitting authority. These should not be disturbed and must be protected with sediment control BMPs to prevent impacts. The local permitting authority may expand the buffer widths temporarily to allow the use of the expanded area for removal of sediment.

Vegetative Buffer Zones - areas that may be identified in undisturbed vegetation areas or managed vegetation areas that are outside any Designated Critical Area Buffer. They may be utilized to provide an additional sediment control area and/or reduce runoff velocities. If being used for preservation of natural vegetation, they should be arranged in clumps or strips. They can be used to protect natural swales and incorporated into the natural landscaping area.

Design and Installation Specifications

- Preserving natural vegetation or plantings in clumps, blocks, or strips is generally the easiest and most successful method.
- Leave all unstable steep slopes in natural vegetation.
- Mark clearing limits and keep all equipment and construction debris out of the natural areas and buffer zones. Steel construction fencing is the most effective method to protect sensitive areas and buffers. Alternatively, wire-backed silt fence on steel posts is marginally effective. Flagging alone is typically not effective.
- Keep all excavations outside the dripline of trees and shrubs.
- Do not push debris or extra soil into the buffer zone area because it will cause damage by

Conditions of Use

The construction sequence schedule is an orderly listing of all major land-disturbing activities together with the necessary erosion and sedimentation control measures planned for the project. This type of schedule guides the contractor on work to be done before other work is started so that serious erosion and sedimentation problems can be avoided.

Following a specified work schedule that coordinates the timing of land-disturbing activities and the installation of control measures is perhaps the most cost-effective way of controlling erosion during construction. The removal of ground cover leaves a site vulnerable to erosion. Construction sequencing that limits land clearing, provides timely installation of erosion and sedimentation controls, and restores protective cover quickly can significantly reduce the erosion potential of a site.

Design Considerations

- Minimize construction during rainy periods.
- Schedule projects to disturb only small portions of the site at any one time. Complete grading as soon as possible. Immediately stabilize the disturbed portion before grading the next portion. Practice staged seeding in order to revegetate cut and fill slopes as the work progresses.

II-3.3 Construction Runoff BMPs

BMP C200: Interceptor Dike and Swale

Purpose

Provide a dike of compacted soil or a swale at the top or base of a disturbed slope or along the perimeter of a disturbed construction area to convey stormwater. Use the dike and/or swale to intercept the runoff from unprotected areas and direct it to areas where erosion can be controlled. This can prevent storm runoff from entering the work area or sediment-laden runoff from leaving the construction site.

Conditions of Use

Use an interceptor dike or swale where runoff from an exposed site or disturbed slope must be conveyed to an erosion control BMP which can safely convey the stormwater.

- Locate upslope of a construction site to prevent runoff from entering the disturbed area.
- When placed horizontally across a disturbed slope, it reduces the amount and velocity of runoff flowing down the slope.
- Locate downslope to collect runoff from a disturbed area and direct it to a sediment BMP (e.g. [BMP C240: Sediment Trap](#) or [BMP C241: Sediment Pond \(Temporary\)](#)).

Design and Installation Specifications

- Dike and/or swale and channel must be stabilized with temporary or permanent vegetation or other channel protection during construction.
 - Steep grades require channel protection and check dams.
 - Review construction for areas where overtopping may occur.
 - Can be used at the top of new fill before vegetation is established.
 - May be used as a permanent diversion channel to carry the runoff.
 - Contributing area for an individual dike or swale should be one acre or less.
 - Design the dike and/or swale to contain flows calculated by one of the following methods:
 - Single Event Hydrograph Method: The peak volumetric flow rate calculated using a 10-minute time step from a Type 1A, 10-year, 24-hour frequency storm for the worst-case land cover condition.
- OR
- Continuous Simulation Method: The 10-year peak flow rate, as determined by an approved continuous runoff model with a 15-minute time step for the worst-case land cover condition.

Worst-case land cover conditions (i.e., producing the most runoff) should be used for analysis (in most cases, this would be the land cover conditions just prior to final landscaping).

Interceptor Dikes

Interceptor dikes shall meet the following criteria:

- Top Width: 2 feet minimum.
- Height: 1.5 feet minimum on berm.
- Side Slope: 2H:1V or flatter.
- Grade: Depends on topography, however, dike system minimum is 0.5%, and maximum is 1%.
- Compaction: Minimum of 90 percent ASTM D698 standard proctor.
- Stabilization: Depends on velocity and reach. Inspect regularly to ensure stability.
- Ground Slopes <5%: Seed and mulch applied within 5 days of dike construction (see [BMP C121: Mulching](#)).
- Ground Slopes 5 - 40%: Dependent on runoff velocities and dike materials. Stabilization should be done immediately using either sod or riprap, or other measures to avoid erosion.
- The upslope side of the dike shall provide positive drainage to the dike outlet. No erosion shall

occur at the outlet. Provide energy dissipation measures as necessary. Sediment-laden runoff must be released through a sediment trapping facility.

- Minimize construction traffic over temporary dikes. Use temporary cross culverts for channel crossing.
- See [Table II-3.8: Horizontal Spacing of Interceptor Dikes Along Ground Slope](#) for recommended horizontal spacing between dikes.

Table II-3.8: Horizontal Spacing of Interceptor Dikes Along Ground Slope

Average Slope	Slope Percent	Flowpath Length
20H:1V or less	3-5%	300 feet
(10 to 20)H:1V	5-10%	200 feet
(4 to 10)H:1V	10-25%	100 feet
(2 to 4)H:1V	25-50%	50 feet

Interceptor Swales

Interceptor swales shall meet the following criteria:

- Bottom Width: 2 feet minimum; the cross-section bottom shall be level.
- Depth: 1-foot minimum.
- Side Slope: 2H:1V or flatter.
- Grade: Maximum 5 percent, with positive drainage to a suitable outlet (such as [BMP C241: Sediment Pond \(Temporary\)](#)).
- Stabilization: Seed as per [BMP C120: Temporary and Permanent Seeding](#), or [BMP C202: Riprap Channel Lining](#), 12 inches thick riprap pressed into the bank and extending at least 8 inches vertical from the bottom.

Maintenance Standards

- Inspect diversion dikes and interceptor swales once a week and after every rainfall. Immediately remove sediment from the flow area.
- Damage caused by construction traffic or other activity must be repaired before the end of each working day.
- Check outlets and make timely repairs as needed to avoid gully formation. When the area below the temporary diversion dike is permanently stabilized, remove the dike and fill and stabilize the channel to blend with the natural surface.

BMP C232: Gravel Filter Berm

Purpose

A gravel filter berm retains sediment by filtering runoff through a berm of gravel or crushed rock.

Conditions of Use

Use a gravel filter berm where a temporary measure is needed to retain sediment from construction sites.

Do not place gravel filter berms in traffic areas; gravel filter berms are not intended to be driven over.

Place gravel filter berms perpendicular to the flow of runoff, such that the runoff will filter through the berm prior to leaving the site.

Design and Installation Specifications

- Berm material shall be $\frac{3}{4}$ to 3 inches in size, washed well-grade gravel or crushed rock with less than 5 percent fines. Do not use crushed concrete.
- Spacing of berms:
 - Every 300 feet on slopes less than 5 percent
 - Every 200 feet on slopes between 5 percent and 10 percent
 - Every 100 feet on slopes greater than 10 percent
- Berm dimensions:
 - 1 foot high with 3H:1V side slopes
 - 8 linear feet per 1 cfs runoff based on the 10-year, 24-hour design storm
- See [Figure II-3.21: Gravel Filter Berm](#) for a photo of a gravel filter berm application.

Maintenance Standards

Regular inspection is required. Sediment shall be removed and filter material replaced as needed.

Figure II-3.21: Gravel Filter Berm



Gravel Filter Berm

Revised July 2017

Please see <http://www.ecy.wa.gov/copyright.html> for copyright notice including permissions, limitation of liability, and disclaimer.

Maintenance Standards

- Repair any damage immediately.
- Intercept and convey all evident concentrated flows uphill of the silt fence to a sediment trapping BMP.
- Check the uphill side of the silt fence for signs of the fence clogging and acting as a barrier to flow and then causing channelization of flows parallel to the fence. If this occurs, replace the fence and remove the trapped sediment.
- Remove sediment deposits when the deposit reaches approximately one-third the height of the silt fence, or install a second silt fence.
- Replace geotextile fabric that has deteriorated due to ultraviolet breakdown.

BMP C234: Vegetated Strip

Purpose

Vegetated strips reduce the transport of coarse sediment from a construction site by providing a physical barrier to sediment and reducing the runoff velocities of overland flow.

Conditions of Use

- Vegetated strips may be used downslope of all disturbed areas.
- Vegetated strips are not intended to treat concentrated flows, nor are they intended to treat substantial amounts of overland flow. Any concentrated flows must be conveyed through the drainage system to [BMP C241: Sediment Pond \(Temporary\)](#) or other sediment trapping BMP. The only circumstance in which overland flow can be treated solely by a vegetated strip, rather than by a sediment trapping BMP, is when the following criteria are met (see [Table II-3.12: Contributing Drainage Area for Vegetated Strips](#)):

Table II-3.12: Contributing Drainage Area for Vegetated Strips

Average Contributing Area Slope	Average Contributing Area Percent Slope	Max Contributing area Flowpath Length
1.5H : 1V or flatter	67% or flatter	100 feet
2H : 1V or flatter	50% or flatter	115 feet
4H : 1V or flatter	25% or flatter	150 feet
6H : 1V or flatter	16.7% or flatter	200 feet
10H : 1V or flatter	10% or flatter	250 feet

Design and Installation Specifications

- The vegetated strip shall consist of a continuous strip of dense vegetation with topsoil for a minimum of a 25-foot length along the flowpath. Grass-covered, landscaped areas are generally not adequate because the volume of sediment overwhelms the grass. Ideally, vegetated strips shall consist of undisturbed native growth with a well-developed soil that allows for infiltration of runoff.
- The slope within the vegetated strip shall not exceed 4H:1V.
- The uphill boundary of the vegetated strip shall be delineated with clearing limits.

Maintenance Standards

- Any areas damaged by erosion or construction activity shall be seeded immediately and protected by mulch.
- If more than 5 feet of the original vegetated strip width has had vegetation removed or is being eroded, sod must be installed.
- If there are indications that concentrated flows are traveling across the vegetated strip, storm-water runoff controls must be installed to reduce the flows entering the vegetated strip, or additional perimeter protection must be installed.

BMP C235: Wattles

Purpose

Wattles are temporary erosion and sediment control barriers consisting of straw, compost, or other material that is wrapped in netting made of natural plant fiber or similar encasing material. They reduce the velocity and can spread the flow of rill and sheet runoff, and can capture and retain sediment.

Conditions of Use

- Wattles shall consist of cylinders of plant material such as weed-free straw, coir, wood chips, excelsior, or wood fiber or shavings encased within netting made of natural plant fibers unaltered by synthetic materials.
- Use wattles:
 - In disturbed areas that require immediate erosion protection.
 - On exposed soils during the period of short construction delays, or over winter months.
 - On slopes requiring stabilization until permanent vegetation can be established.
- The material used dictates the effectiveness period of the wattle. Generally, wattles are effective for one to two seasons.

BMP C233: Silt Fence

Purpose

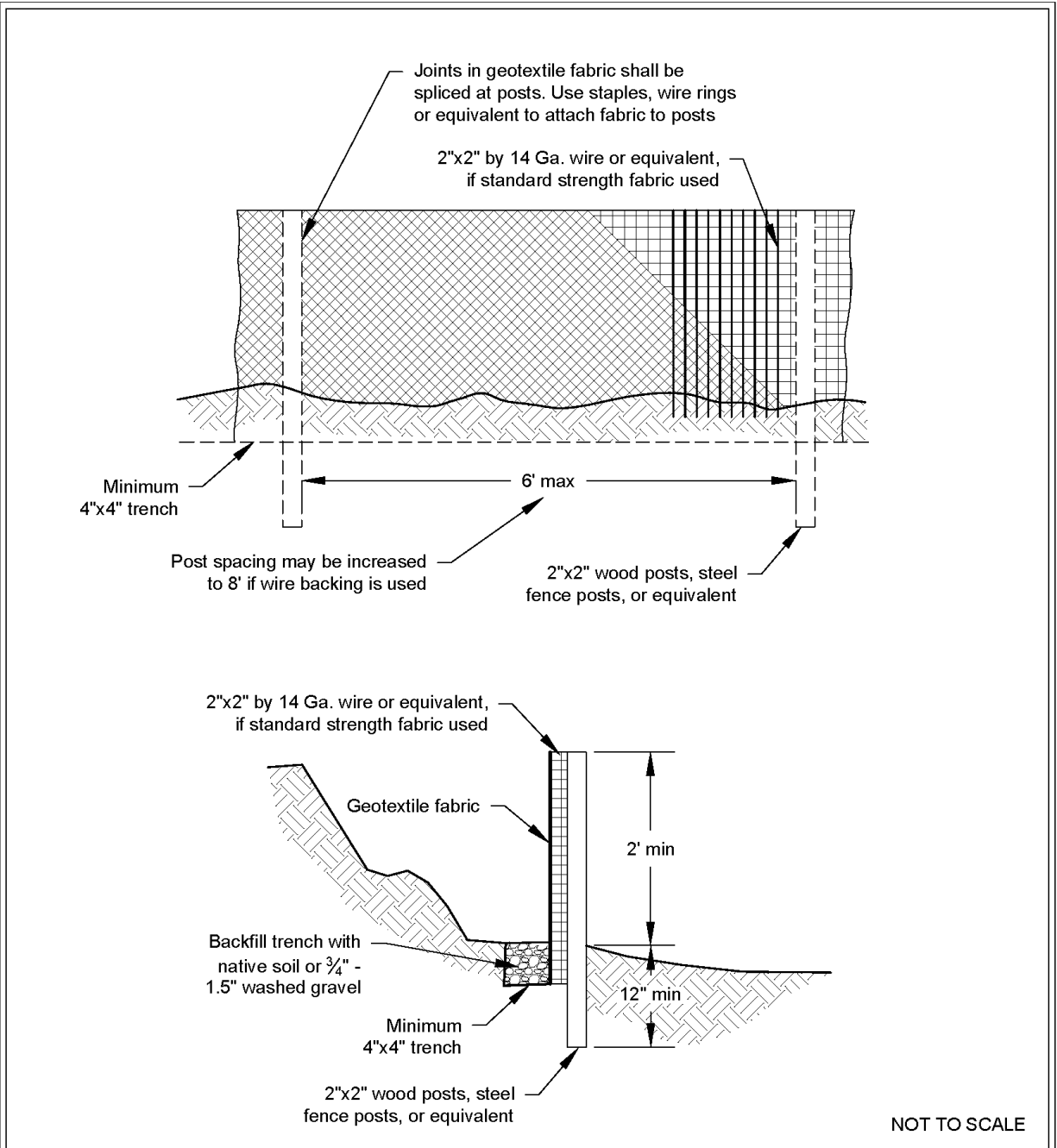
Silt fence reduces the transport of coarse sediment from a construction site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow.

Conditions of Use

Silt fence may be used downslope of all disturbed areas.

- Silt fence shall prevent sediment carried by runoff from going beneath, through, or over the top of the silt fence, but shall allow the water to pass through the fence.
- Silt fence is not intended to treat concentrated flows, nor is it intended to treat substantial amounts of overland flow. Convey any concentrated flows through the drainage system to a sediment trapping BMP.
- Do not construct silt fences in streams or use in V-shaped ditches. Silt fences do not provide an adequate method of silt control for anything deeper than sheet or overland flow.

Figure II-3.22: Silt Fence



Silt Fence

Revised July 2017

Please see <http://www.ecy.wa.gov/copyright.html> for copyright notice including permissions, limitation of liability, and disclaimer.

Design and Installation Specifications

- Use in combination with other construction stormwater BMPs.
- Maximum slope steepness (perpendicular to the silt fence line) 1H:1V.
- Maximum sheet or overland flow path length to the silt fence of 100 feet.
- Do not allow flows greater than 0.5 cfs.
- Use geotextile fabric that meets the following standards. All geotextile properties listed below are minimum average roll values (i.e., the test result for any sampled roll in a lot shall meet or exceed the values shown in [Table II-3.11: Geotextile Fabric Standards for Silt Fence](#)):

Table II-3.11: Geotextile Fabric Standards for Silt Fence

Geotextile Property	Minimum Average Roll Value
Polymeric Mesh AOS (ASTM D4751)	0.60 mm maximum for slit film woven (#30 sieve). 0.30 mm maximum for all other geotextile types (#50 sieve). 0.15 mm minimum for all fabric types (#100 sieve).
Water Permittivity (ASTM D4491)	0.02 sec ⁻¹ minimum
Grab Tensile Strength (ASTM D4632)	180 lbs. Minimum for extra strength fabric. 100 lbs minimum for standard strength fabric.
Grab Tensile Strength (ASTM D4632)	30% maximum
Ultraviolet Resistance (ASTM D4355)	70% minimum

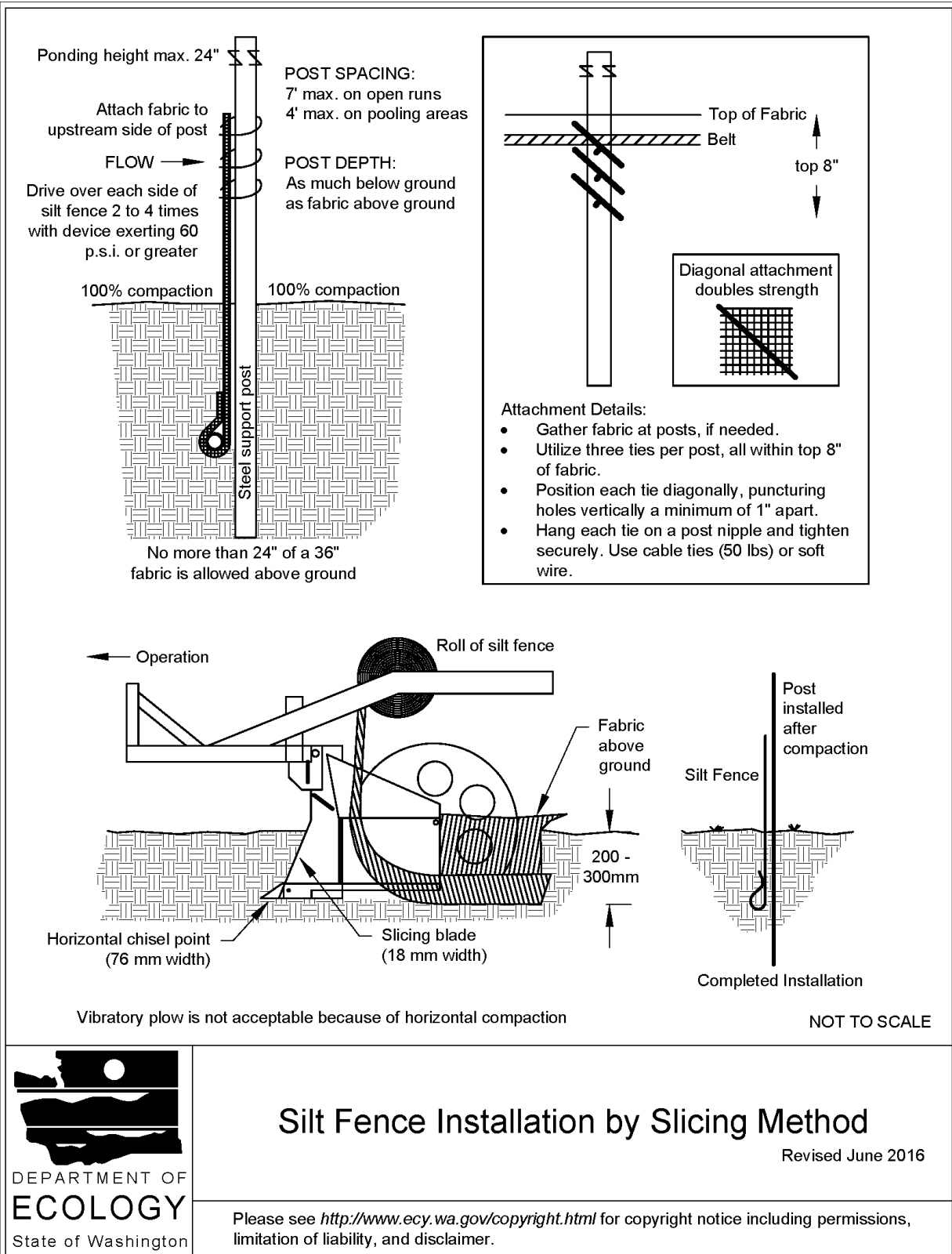
- Support standard strength geotextiles with wire mesh, chicken wire, 2-inch x 2-inch wire, safety fence, or jute mesh to increase the strength of the geotextile. Silt fence materials are available that have synthetic mesh backing attached.
- Silt fence material shall contain ultraviolet ray inhibitors and stabilizers to provide a minimum of six months of expected usable construction life at a temperature range of 0°F to 120°F.
- One-hundred percent biodegradable silt fence is available that is strong, long lasting, and can be left in place after the project is completed, if permitted by the local jurisdiction.
- Refer to [Figure II-3.22: Silt Fence](#) for standard silt fence details. Include the following Standard Notes for silt fence on construction plans and specifications:
 1. The Contractor shall install and maintain temporary silt fences at the locations shown in the Plans.
 2. Construct silt fences in areas of clearing, grading, or drainage prior to starting those activities.

3. The silt fence shall have a 2-foot min. and a 2½-foot max. height above the original ground surface.
4. The geotextile fabric shall be sewn together at the point of manufacture to form fabric lengths as required. Locate all sewn seams at support posts. Alternatively, two sections of silt fence can be overlapped, provided that the overlap is long enough and that the adjacent silt fence sections are close enough together to prevent silt laden water from escaping through the fence at the overlap.
5. Attach the geotextile fabric on the up-slope side of the posts and secure with staples, wire, or in accordance with the manufacturer's recommendations. Attach the geotextile fabric to the posts in a manner that reduces the potential for tearing.
6. Support the geotextile fabric with wire or plastic mesh, dependent on the properties of the geotextile selected for use. If wire or plastic mesh is used, fasten the mesh securely to the up-slope side of the posts with the geotextile fabric up-slope of the mesh.
7. Mesh support, if used, shall consist of steel wire with a maximum mesh spacing of 2-inches, or a prefabricated polymeric mesh. The strength of the wire or polymeric mesh shall be equivalent to or greater than 180 lbs. grab tensile strength. The polymeric mesh must be as resistant to the same level of ultraviolet radiation as the geotextile fabric it supports.
8. Bury the bottom of the geotextile fabric 4-inches min. below the ground surface. Backfill and tamp soil in place over the buried portion of the geotextile fabric, so that no flow can pass beneath the silt fence and scouring cannot occur. When wire or polymeric back-up support mesh is used, the wire or polymeric mesh shall extend into the ground 3-inches min.
9. Drive or place the silt fence posts into the ground 18-inches min. A 12-inch min. depth is allowed if topsoil or other soft subgrade soil is not present and 18-inches cannot be reached. Increase fence post min. depths by 6 inches if the fence is located on slopes of 3H:1V or steeper and the slope is perpendicular to the fence. If required post depths cannot be obtained, the posts shall be adequately secured by bracing or guying to prevent overturning of the fence due to sediment loading.
10. Use wood, steel or equivalent posts. The spacing of the support posts shall be a maximum of 6-feet. Posts shall consist of either:
 - Wood with minimum dimensions of 2 inches by 2 inches by 3 feet. Wood shall be free of defects such as knots, splits, or gouges.
 - No. 6 steel rebar or larger.
 - ASTM A 120 steel pipe with a minimum diameter of 1-inch.
 - U, T, L, or C shape steel posts with a minimum weight of 1.35 lbs./ft.
 - Other steel posts having equivalent strength and bending resistance to the post sizes listed above.
11. Locate silt fences on contour as much as possible, except at the ends of the fence,

where the fence shall be turned uphill such that the silt fence captures the runoff water and prevents water from flowing around the end of the fence.

12. If the fence must cross contours, with the exception of the ends of the fence, place check dams perpendicular to the back of the fence to minimize concentrated flow and erosion. The slope of the fence line where contours must be crossed shall not be steeper than 3H:1V.
 - Check dams shall be approximately 1-foot deep at the back of the fence. Check dams shall be continued perpendicular to the fence at the same elevation until the top of the check dam intercepts the ground surface behind the fence.
 - Check dams shall consist of crushed surfacing base course, gravel backfill for walls, or shoulder ballast. Check dams shall be located every 10 feet along the fence where the fence must cross contours.
- Refer to [Figure II-3.23: Silt Fence Installation by Slicing Method](#) for slicing method details. The following are specifications for silt fence installation using the slicing method:
 1. The base of both end posts must be at least 2- to 4-inches above the top of the geotextile fabric on the middle posts for ditch checks to drain properly. Use a hand level or string level, if necessary, to mark base points before installation.
 2. Install posts 3- to 4-feet apart in critical retention areas and 6- to 7-feet apart in standard applications.
 3. Install posts 24-inches deep on the downstream side of the silt fence, and as close as possible to the geotextile fabric, enabling posts to support the geotextile fabric from upstream water pressure.
 4. Install posts with the nipples facing away from the geotextile fabric.
 5. Attach the geotextile fabric to each post with three ties, all spaced within the top 8-inches of the fabric. Attach each tie diagonally 45 degrees through the fabric, with each puncture at least 1-inch vertically apart. Each tie should be positioned to hang on a post nipple when tightening to prevent sagging.
 6. Wrap approximately 6-inches of the geotextile fabric around the end posts and secure with 3 ties.
 7. No more than 24-inches of a 36-inch geotextile fabric is allowed above ground level.
 8. Compact the soil immediately next to the geotextile fabric with the front wheel of the tractor, skid steer, or roller exerting at least 60 pounds per square inch. Compact the upstream side first and then each side twice for a total of four trips. Check and correct the silt fence installation for any deviation before compaction. Use a flat-bladed shovel to tuck the fabric deeper into the ground if necessary.

Figure II-3.23: Silt Fence Installation by Slicing Method



Silt Fence Installation by Slicing Method

Revised June 2016

Please see <http://www.ecy.wa.gov/copyright.html> for copyright notice including permissions, limitation of liability, and disclaimer.

Maintenance Standards

- Repair any damage immediately.
- Intercept and convey all evident concentrated flows uphill of the silt fence to a sediment trapping BMP.
- Check the uphill side of the silt fence for signs of the fence clogging and acting as a barrier to flow and then causing channelization of flows parallel to the fence. If this occurs, replace the fence and remove the trapped sediment.
- Remove sediment deposits when the deposit reaches approximately one-third the height of the silt fence, or install a second silt fence.
- Replace geotextile fabric that has deteriorated due to ultraviolet breakdown.

BMP C234: Vegetated Strip

Purpose

Vegetated strips reduce the transport of coarse sediment from a construction site by providing a physical barrier to sediment and reducing the runoff velocities of overland flow.

Conditions of Use

- Vegetated strips may be used downslope of all disturbed areas.
- Vegetated strips are not intended to treat concentrated flows, nor are they intended to treat substantial amounts of overland flow. Any concentrated flows must be conveyed through the drainage system to [BMP C241: Sediment Pond \(Temporary\)](#) or other sediment trapping BMP. The only circumstance in which overland flow can be treated solely by a vegetated strip, rather than by a sediment trapping BMP, is when the following criteria are met (see [Table II-3.12: Contributing Drainage Area for Vegetated Strips](#)):

Table II-3.12: Contributing Drainage Area for Vegetated Strips

Average Contributing Area Slope	Average Contributing Area Percent Slope	Max Contributing area Flowpath Length
1.5H : 1V or flatter	67% or flatter	100 feet
2H : 1V or flatter	50% or flatter	115 feet
4H : 1V or flatter	25% or flatter	150 feet
6H : 1V or flatter	16.7% or flatter	200 feet
10H : 1V or flatter	10% or flatter	250 feet

Appendix C - Correspondence