Scott Boettcher

From: Scott Boettcher
Sent: Tuesday, July 3, 2018 4:03 PM
To: 'Rick Rouse'
Cc: Randall Mueller; colronjanaverill@comcast.net
Subject: RE: Port of Chehalis Application

Thank you Rick. Your proposal has been rec'd on time.
Scott

Scott Boettcher, Staff
Chehalis River Basin Flood Authority
360/480-6600
scottb@sbgh-partners.com

From: Rick Rouse <rrouse@portofchehalis.com>
Sent: Tuesday, July 3, 2018 3:50 PM
To: Scott Boettcher <scottb@sbgh-partners.com>
Cc: Randall Mueller <rmueller@portofchehalis.com>
Subject: Port of Chehalis Application

Scott:

Please see attached.

Rick Rouse
rrouse@portofchehalis.com
Senior Director of Operations
321 Maurin Road
Chehalis, WA 98532
360-748-9365 (O)
360-520-6694 (C)

2019-21 Local Projects Recruitment Form
Chehalis Basin Local Flood Relief

A. What are local flood relief projects? -- In general, local projects provide predominantly localized, quantifiable benefit, are capable of being completed within the funding cycle, are supported by the jurisdiction within which the project is proposed, and are vetted and advanced through a public entity like a City, County, Conservation District, Port, etc. Local projects are additionally envisioned as helping with local flood relief (reducing flood damage and impacts), not adverse to fish, wildlife, or habitat, and (where possible) providers of multiple, quantifiable benefits (per Part IV below).

B. What kinds of local flood relief projects are likely to be logical funding candidates for 2019-21?

- Projects that complete an effort previously funded/started.
- Projects that advance improved emergency response.
- Projects that advance improved public infrastructure protection.
- Projects that advance improvements in local or community flood hazard reduction, including local flood proofing projects (e.g., elevations, buy-outs, foundation venting, etc.).
- Projects that advance Conservation District initiated flood hazard reduction (e.g., farm pads, evacuation routes, bank erosion/bank stabilization, etc.)
- Projects that demonstrate innovation (e.g., thinking beyond traditional bank stabilization techniques in favor of natural system designs), partnerships, cost-sharing/leveraging resources, multiple benefits, public engagement and community planning, and proactive vetting with agencies and tribes.
- Projects that demonstrate informed decision-making through hydraulic analysis/understanding.
- Projects that demonstrate early planning involvement, information exchange with regulatory agencies.
- Projects typically not in excess of $3M for the stage/phase being funded.

C. Are there projects that would not be good candidates?

- Projects that seek to utilize State Capitol Budget dollars for uses not typically allowed (e.g., maintenance and repair work, cost-sharing under select circumstances, etc.).
- Projects likely to increase potential for flood damage upstream or downstream.
- Projects with unmitigable adverse environmental impacts, significant uncertainty regarding potential environmental impacts, or significant concerns about obtaining regulatory approval.
- Projects not sponsored by a public entity.
- Projects not located in the Chehalis Basin.
- Projects that do not show quantifiable benefit.

Instructions:

a. Please submit project requests (via this form) to scottb@sbgh-partners.com no later than 5:00 p.m., 7/03/2018.

b. Please submit one request form for each project proposed, even past projects previously or partially funded.

c. Note: Parts III and IV [marked by "(**)"] will be scored for review/evaluation. Parts I, II, and V will not be scored.

d. See Appendix A for overview of 2019-21 Local Projects Recruitment Process (and schedule), or https://www.ezview.wa.gov/site/alias__1492/37282/2019-21-Local-Projects-Recruitment-Process.aspx.

Part I General	
1. **Date:**	July 3rd, 2018
2. **Project Name:**	Berwick Creek Restoration Project, phase 1
3. **Project Location --** Please identify location of the project as precisely as possible, including providing decimal degree latitude/longitude coordinates.	46°37'10.45"N, 122°54'40.46"W
4. **Project Contact** -- Please identify who will be responsible for overseeing and managing the project (i.e., name, email, telephone number, etc.).	Rick Rouse, Senior Director of Operations 360-748-9365 rrouse@portofchehalis.com
5. **Sponsor --** Please identify the sponsor, lead organization, primary entity, etc. responsible for this project. Please identify key partners responsible for assisting in delivery or implementation of project.	Sponsor: Port of Chehalis Partner: The Industrial Commission

Part II Description, Timing, and Cost	
6. **Project Description --** Please describe the project, what is intended to be accomplished, the benefits to be accrued (flood hazard reduction and otherwise) and to whom. Please also identify what phase/stage of the project funding is being sought for (e.g., planning, preliminary engineering, final design and permitting, construction, etc.).	This project will restore habitat and stabilize the streambank along a stretch of Berwick Creek in the Chehalis Industrial Park. The two main benefits are (1) restoration and improvement of habitat, and (2) flood hazard reduction. Funds would be used for the entire project from preliminary planning all the way through construction. Later phases will include other sections of Berwick Creek.
7. **Project Timeline --** Please describe the timeline and phases for completion of the overall project and describe the timeline for completion of the phase to be funded by 19-21 funding.	11/2018, project funded. 12/2018-4/2019, engineering and permitting. 5/2019, project goes out to bid 7/2019-8/2019, construction
8. **Project Cost and Funding --** What is the cost of the overall project (or anticipated cost)? What is the cost of the phase to be funded by 19-21 funding? What are the on-going maintenance and operation requirements and costs? Is it clear who will be responsible for covering on-going maintenance and operation costs?	Anticipated project cost: $500,000 % to be funded by 19-21 funding: 100% As designed there should be no additional ongoing M&O requirements and costs.
9. **Other Funding --** Please explain the extent to which other funding sources, funding partners are available for this phase and any other phase of the project.	

Part III (**) Completion, Doability, Alternatives, and Impacts	
10. **Project Completion --** Does the funding requested complete, substantially complete, or continue a project already started? If so, please explain.	Yes, this funding fully completes a project planned by the Port of Chehalis and The Industrial Commission.
11. **Project Doable --** Can this project or the stage/phase for which funding is sought be completed by June 30, 2021? Please describe any circumstances with potential to impact the project's doability or timeline (e.g., permitting or regulatory unknowns, lack of availability of other cost-share funding resources, etc.). Please describe any advance coordination or vetting with agencies, tribes, other entities, etc. and the outcomes of that effort.	Yes, this project can be entirely completed by the end of the 2019 calendar year. If permitting issues or other delays arise it can be pushed back into the 2020 calendar year, still well before the June 2021 deadline.
12. **Project Alternatives --** Please describe alternatives to the project that were considered (including doing nothing), and the rationale for selecting the project described, proposed here.	Doing nothing would have negative outcomes for habitat and flood protection efforts. Other alternatives might only advance habitat or flood protection, this option does both and was selected as the best option.
13. **Project Impacts Avoided, Mitigated --** Please identify how project impacts will be avoided and mitigated, and if that mitigation will be accomplished by June 30, 2021?	Construction would take place during the summer construction window to minimize impacts to Berwick Creek, and best management practices would be used to minimize or eliminate other impacts.

Part IV (**) Benefits Stated and Quantified	
14. **Emergency Response Benefits --** Please describe (and quantify) how this project enhances emergency response in a flood emergency (e.g., does it keep critical access roads and transportation facilities open/functional, does it enable easy movement of cattle, equipment and farm chemicals out of harm's way, is it part of a larger hazard mitigation plan, etc.).	This project will increase flood storage capacity and improve in-steam and riparian habitat. Current stream capacity using standards models from Lewis County and WSDOT models indicates a stream bank to bank width of 10', depth of 3.5' and bottom width of 7'. This provides a stream capacity that barely accommodates 10 year predicted rainfall events. Visual inspection of the upper 300' of this project indicated the bank to bank stream width to be 8', depth 3' and stream bottom with 3'. The actual capacity of the stream is only 1/3 of that previously modeled. Additionally, the banks are heavily overgrown with invasive Reed Canary Grass which further reduces stream capacity and velocity. This creates bank overflow and flooding of adjacent properties.
15. **Essential Infrastructure Protection Benefits --** Please describe (and quantify) how this project protects essential infrastructure and the risks or consequences of not acting this funding cycle.	This project will provide flood protection to the Chehalis Natural Gas Power Generation Facility, a critical component of our national power grid.

16. **Public Health, Safety and Welfare Benefits --** Please describe (and quantify) how this project protects public health, safety, and welfare.	Water quality conditions within Berwick Creek are poor and has a Department of Ecology Category 4 assessment for fecal-coliform bacteria. Additionally, upstream farmlands, grazing, and agriculture pesticides and herbicides all combine to reduce water quality.
17. **Residential, Commercial and/or Agricultural Protection Benefits --** Please describe (and quantify) how this project protects residential communities, commercial, and/or agricultural interests and benefits of acting (or consequences of not acting) this funding cycle. Consider factors like number of structures and people at risk, historic frequency of flood damage, magnitude of benefit for the cost, etc.	Project will prevent frequent flooding of the residences at 1861 Bishop Road, 1869 Bishop Road and 1877 Bishop Road. Each of these residences have varying degrees of flooding on their properties, septic systems, and out buildings.
18. **Habitat Benefits –** Please describe (and quantify) how this project benefits or improves existing or future habitat conditions.	Project removes invasive species and restores native habitat along Berwick Creek, and makes it more passable for fish.
19. **Costs and Benefits –** Project funders (and the public they represent) value cost-effective, sound funding decisions. To that end, please describe (and quantify) in general terms benefits gained for funds requested and frequency, time-scale benefits will be realized. Please also describe (and quantify): a. Funds requested. b. Costs avoided if funded (and on what frequency, time-scale). c. Costs incurred if funded (and on what frequency, time-scale). d. Benefits gained if funded (and on what frequency, time-scale). e. Impacts incurred if funded (and on what frequency, time-scale). f. Impacts and implications of not funding (and on what frequency, time-scale). Guidance Note (1): For this question, it will be helpful to think in terms of what will be the dollar value of assets protected, dollar value of impacts avoided, dollar value of monies retained or recouped, etc. for the amount of public monies invested. Guidance Note (2): Part V is intended to help project reviewers concisely summarize, compare funding requests. Answers here (and in related questions on this form) should be consistent with Part V.	a. $500,000 b. Economic damages from a. road closures b. power plant closures c. flood damages to nearby businesses d. flood damages to nearby residents c. $500K project cost, one time d. Habitat restoration value (ongoing). There are two previously unknown fish barriers in this project areas. This project will remove those barriers Flood protection value (ongoing). Increasing the capacity of the stream by creating side channels will prevent flooding during 25-year rainfall events and provide capacity for 50 and 100-year events Water quality improvement (ongoing). e. Minimal habitat impact during construction as this will be done during the WDFW "fish window" under an approved HPA. f. Impacts of not funding a. Regular flooding and road closures on Bishop Road, Rush Road and Jackson Highway. b. Chance of flood damage to businesses and residents. c. Chance of disruption of operations at the Chehalis Natural Gas Power Plant, affecting the national power grid.
20. **Other Project Benefits --** Please describe (and quantify) any other project benefits not already	Berwick creek is a Type F stream meaning that it is fish bearing to endangered species such as Coho Salmon.

discussed. This could include how this project compliments, leverages, or implements another project or planning process already underway.	Other projects to design 100% fish passable culverts on Berwick Creek below this project area have been funded through the Aquatic Species Restoration Plan. This project will improve and enhance fish habitat in an area where the stream is heavily impacted by barriers, shallow water, and flooding of residential homes (septics, refuse containers, etc.).
21. **Anything Else --** Please offer any additional information (e.g., photos, maps, video, drawings, drone, etc.) that would help to better understand the scope, timing, and benefits of this project.	See attached narrative and photo plates.

Part V **Summary of Benefits, Impacts, Costs**			
	22. **Benefits –** Please summarize, tally project economic and non-economic benefits as described.	23. **Impacts --** Please summarize, tally project economic and non-economic impacts as described.	24. **Costs --** Please summarize, tally project economic and non-economic costs as described.
Quantify	1,000' of improved habitat for endangered fish species by removal of barriers and increasing stream capacity. Removal of invasive plant species. Prevention of flooding and power plant closures (est. $100,000/day). Increased stream capacity addresses climate change as required by law.	Flooding of homes and businesses will be prevented. Restoration of historic fish species habitat. Continuation of power plant operations during heavy rain events.	$500,000 project cost. Project benefits: $100,000 per day for power plant to remain in operation.
Describe	State and federal laws require that jurisdictions take necessary steps to protect and/or restore critical endangered species habitat and consider climate change scenarios in planned work. If we don't increase the stream capacity climate change scenarios will result in increased flooding over the coming years.	The creation of side channels and alcove along the project area will increase stream capacity to reduce or prevent flooding.	Construction cost estimate of $500,000. Power plant avoiding closure due to flooding avoids loss of $100,000/day during generation.

Appendix A

Process/Schedule Overview (current as of 6-12-2018)	
June 12, 2018	• Post and distribute local projects recruitment request. • Allow three weeks for project proposals/submittals (i.e., due no later than 5:00 p.m., Tuesday, July 3, 2018). • Due to Scott Boettcher, scottb@sbgh-partners.com.
July 3, 2018	• Receive proposals/submittals.
July 5, 2018 (or July 12, 2018)	• Update Chehalis Basin Board on numbers received, types of projects received, distribution, dollar value, etc.
July 19, 2018 (or August 16, 2018)	• Update Flood Authority on numbers received, types of projects received, distribution, dollar value, etc.
September 20, 2018	• Update Flood Authority on status of Projects Committee's effort to review, rank, discuss with Tribes, discuss with agencies, sort and rank, etc. • Review/discuss PRELIMINARY DRAFT ranked and prioritized list.
October 4, 2018	• Update Chehalis Basin Board on status of Projects Committee's effort to review, rank, discuss with Tribes, discuss with agencies, sort, and rank, etc. • Review/discuss DRAFT ranked and prioritized list.
October 18, 2018 (SPECIAL MEETING)	• Seek Flood Authority approval of FINAL ranked and prioritized list.
November 8, 2018	• Seek Chehalis Basin Board approval of FINAL ranked and prioritized list.

June 2018 through November 2018	• Work with agency, OCB, and CBB technical staff on refining and finalizing recruitment instrument, scoring criteria, scoring instrument, categorization, and ranking, developing draft and final lists, etc.

Legend:

Chehalis Basin Board	Flood Authority

Project Berwick Creek In-stream & Riparian Restoration

Proponent Port of Chehalis

Location Approximately 1,000-ft section of Berwick Creek, North of Bishop Road, Lewis County

Attachments Figures 1, 2, & 3; Photoplates 1 - 6

Project Scope

The Port of Chehalis (Port) seeks funding for stream habitat restoration along an approximately 1,000-foot reach of Berwick Creek, a Type F water, and adjoining riparian zone. The proposed stream restoration area is north of Bishop Road to the westerly boundary the Port's Rush Road Wetland Mitigation Site. The goal of the habitat restoration is two-fold:

1. **Increase Flood Storage Capacity.** The restoration area has limited flood storage capacity because of its shallow gradient within the stream channel and lack of storage in the floodplain. These deficiencies contribute to flooding of adjoining properties. For instance, the property to the northwest of the restoration area, which is owned by the Chehalis Generating Facility, regularly floods during the winter months.
2. **Improve In-stream and Riparian Habitat.** The stream has been channelized in the proposed restoration area and has a shallow gradient from accumulated sediment, which contributes to increased summer water temperatures. The existing riparian corridor lacks native plant diversity and habitat structure and has an abundance of invasive plants, such as Himalayan blackberry, Japanese knotweed, and reed canarygrass.

Conceptual Restoration Plan: Goals

To increase flood storage and improve in-stream and riparian habitat, the Port proposes remove accumulated sediment in the stream channel and create side channels, stream alcoves, and deeper emergent wetland habitat within the floodplain. The entire restoration area's floodplain will also be planted with native species to develop into a lowland deciduous riparian forest.

Restoring the approximately 1,000-foot reach of Berwick Creek is anticipated to:

- **Increase Flood Storage Capacity.** Improve flood storage capacity by dredging targeted segments of Berwick Creek's channel to restore its natural gradient and create side channels, stream alcoves, and emergent wetlands within the floodplain. All in-water work will be approved by the Washington Department of Fish & Wildlife and other appropriate regulatory agencies. The side channels, stream

alcoves, and emergent wetlands will serve the tandem function of slowing water velocity and increasing flood storage.

- **Increased Water Quality and Hydrologic Functions.** The restoration area will increase water quality/quantity functions by creating side channel and stream alcoves within the restoration area, controlling invasive plants, and planting native herbaceous plants, trees, and shrubs. These restoration measures will effectively increase the duration of inundation and reduce peak flows.
- **Riparian Zone Enhancement.** The riparian corridor will be planted with native species appropriate for a lowland deciduous riparian forest in SW Washington. Emergent wetlands in the floodplain will add plant diversity and improve amphibian habitat by creating depressional areas with native, persistent emergent plants. The creation of stream alcoves will increase riparian habitat and further enhance the riparian zones of the stream by increasing stream shading and native plant diversity and providing refuge habitat for juvenile fish.
- **Wildlife Enhancement.** Planting native species and installing large woody material will provide higher quality wildlife habitat than the predominately low quality habitat dominated by non-native and/or invasive species and lack of large woody material that currently exists in the restoration area.
- **Wetland Creation.** Deeper emergent wetlands with native herbaceous vegetation classes will be created in the floodplain to provide flood storage, decrease peak velocities, and diversify wildlife habitat, especially amphibian habitat.

Conceptual Restoration Plan: Construction Elements

The excavation work will be performed by excavating side channels, stream alcoves, and emergent wetlands in the floodplain, followed by installing large woody material and native trees, shrubs, and herbaceous plants in the riparian zone of the restoration area. Portions of the surrounding upland will be removed to connect Berwick Creek to re-established emergent wetlands.

Reconnecting the stream channel to the re-established emergent wetlands will provide the opportunity for seasonally and occasionally flooded/inundated and saturated water regimes to develop. The restoration area's hydrology will be maintained by seasonal high flows within Berwick Creek and seasonal high ground water levels.

PRELIMINARY ENGINEERING

Gibbs & Olson, Inc. engineers performed preliminary calculations to determine the flow in Berwick Creek at Rush Road using information from the Rush Road storm report prepared by Lewis County[1] and a 2010 report prepared by Gibbs & Olson. The information was used to develop an existing slope of the

[1] The Rush Road storm report prepared by Lewis County included cross sections from 0- to 300-feet downstream of Rush Road, which was averaged to determine an existing cross sectional area of Berwick Creek within the restoration area.

stream channel, which was estimated at 0.0037 ft/ft. Based on the assumed cross sectional area and assumed slope, the estimated capacity of the existing channel within the restoration area was preliminarily calculated at approximately 130 cfs. The estimated flow in Berwick Creek at Rush Road for 25-year and 100-year flooding events based on preliminary calculations is: Q25 = 290± cfs, Q100 = 420± cfs.

Based on the preliminary calculations, Gibbs & Olson engineers recommend that 8- to 10-foot side channels approximately 1.5-foot deep be created to provide additional flow for the channel, which would provide an approximate channel capacity of 380± cfs (8-foot wide) to 465± cfs (10-foot wide). If the Port receives funding for the proposed stream restoration, a professional land survey will be performed to collect current data for the stream channel width and elevations within the restoration area.

In-Stream & Riparian Habitat Conditions

HISTORIC

Prior to Euro-American settlement of the area and subsequent agricultural conversion, historic water quality and quantity conditions within the restoration area were likely high. Berwick Creek's riparian zone likely had densely vegetated surface water edges and cool hyporheic flows, which kept surface water temperatures cool and provided refuge habitats for salmonids. Water quality within Berwick Creek is assumed to be high (e.g., cool, clear, and low conductivity). The historic wetlands associated with the stream would have provided high water quality functions as the native habitat provided the full suite of physical, chemical, and biological processes that contribute to high water quality within the stream. Historic wetland vegetation obstructed surface water flow, enhancing sedimentation. The vegetation also provided an environment for algae, fungi, protozoa, and bacteria, the microbes that break down and remove substances from water, thereby enhancing water quality.

CURRENT

The Washington Department of Natural Resources stream-typing mapping maps Berwick Creek as a Type F stream. Water quality conditions within Berwick Creek are poor and the stream has a Category 4A assessment by Ecology[2] for fecal-coliform bacteria. Berwick Creek receives runoff from plowed fields and clear-cut areas in its upper watershed that carry high sediment loads and pollutants. Agricultural runoff conveys waste from livestock. In addition, pesticides and fertilizers that have been applied to agricultural and forest lands enter into the stream. Sediments settle into streambed gravels and disrupt or prevent fish from spawning and smother fish eggs. Other pollutants are often attached to sediments and cause further water contamination. Agricultural runoff often carries nutrients that can cause algal

[2] Washington Department of Ecology 2018: https://fortress.wa.gov/ecy/approvedwqa/ApprovedSearch.aspx

blooms and subsequent low levels of oxygen in the water; oxygen depletion can result in the death of fish and other aquatic life.

The existing stream channel has refuse and other obstructions negatively affecting water quality and water flow, such as a rock dam, foot-bridge, and miscellaneous garbage. The steam's riparian habitat is poor and is dominated by invasive plants, such as Japanese knotweed, Himalayan blackberry, and reed canarygrass. Little to no large woody material or other structural features beneficial to wildlife is present.

PROPOSED CONDITIONS

Water Quantity

The excavated side channel and stream alcoves and re-established wetlands adjacent to Berwick Creek will mutually benefit the wetlands and the stream, and provide an ecological lift in wetland and stream functions. The proposed features within the restoration area will lower peak flood flows by temporarily holding water and slowing water flow velocity to minimize downstream flooding and erosion by slowing floodwaters. They will also increase flood storage capacity and improve flood protection by retaining surface water from high flows and allowing it to be released slowly back into the stream channel or infiltrate into the ground.

As surface water is retained by the excavated features within the restoration area, groundwater recharge will be improved. As groundwater is slowly discharged, it will contribute to streamflow maintenance within Berwick Creek during dry summer months.

In addition, existing refuse and structures that impede flow and disrupt in-stream habitat, such as a rock dam and foot-bridge will be removed.

Water Quality

Slowing the flood waters will also provide water quality treatment functions that will benefit Berwick Creek. The improved surface and subsurface water storage will enhance water quality by filtering particulates and removing nutrients, pesticides, and bacteria. Water retention within the re-established wetlands will allow suspended sediments and particulate matter within the water to be filtered by wetland vegetation, reducing downstream sediment loading and improving water quality. Furthermore, water retained in the restored floodplain will improve wildlife habitat and provide increasing habitat diversity as the native plantings become established and mature.

The stream restoration area will provide opportunities for removing sediments, nutrients, and toxic substances by trapping sediments and removing excess nutrients and pollutants when the restoration area receives and impounds surface water from Berwick Creek during high flows. Slowing flow velocity within the re-established wetlands will provide opportunities for sediments and pollutants to drop out

of the water column and avoid being conveyed to stream channel. The re-established wetlands will also provide opportunities for removing excess nutrients as wetland plants metabolize nutrients and convert them to less harmful chemical form. In a function similar to nutrient removal, wetlands trap and bury the toxic chemicals.

Habitat

Through excavating side channels, stream alcoves, and emergent wetlands and placing large woody material and native plants, wildlife habitat will be diversified and improved as native plants become established and mature into a deciduous riparian forest. The lower elevational features (channels, stream alcoves, wetlands) within the floodoplain will especially benefit amphibians and off-channel refugia for juvenile fish.

Figures & Photoplates

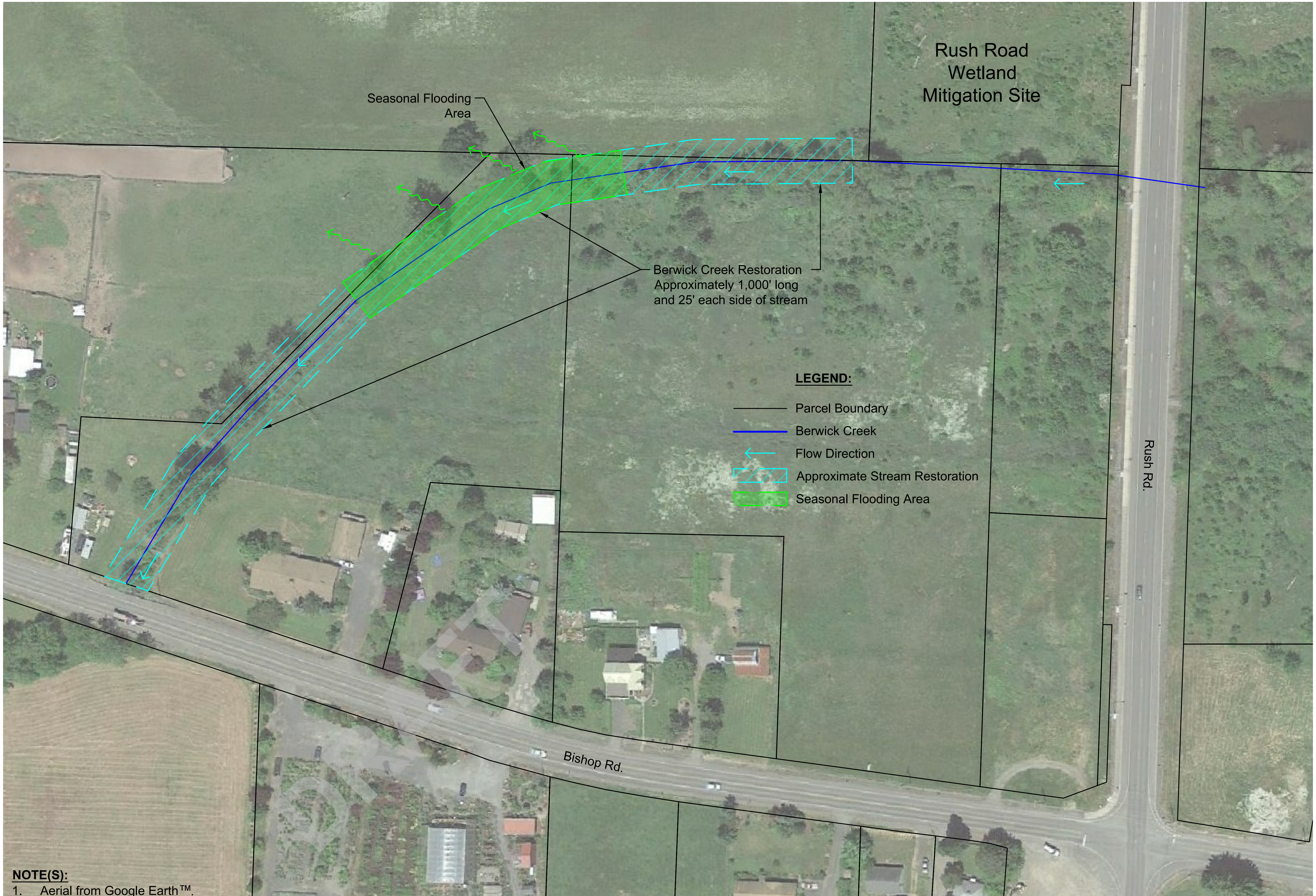


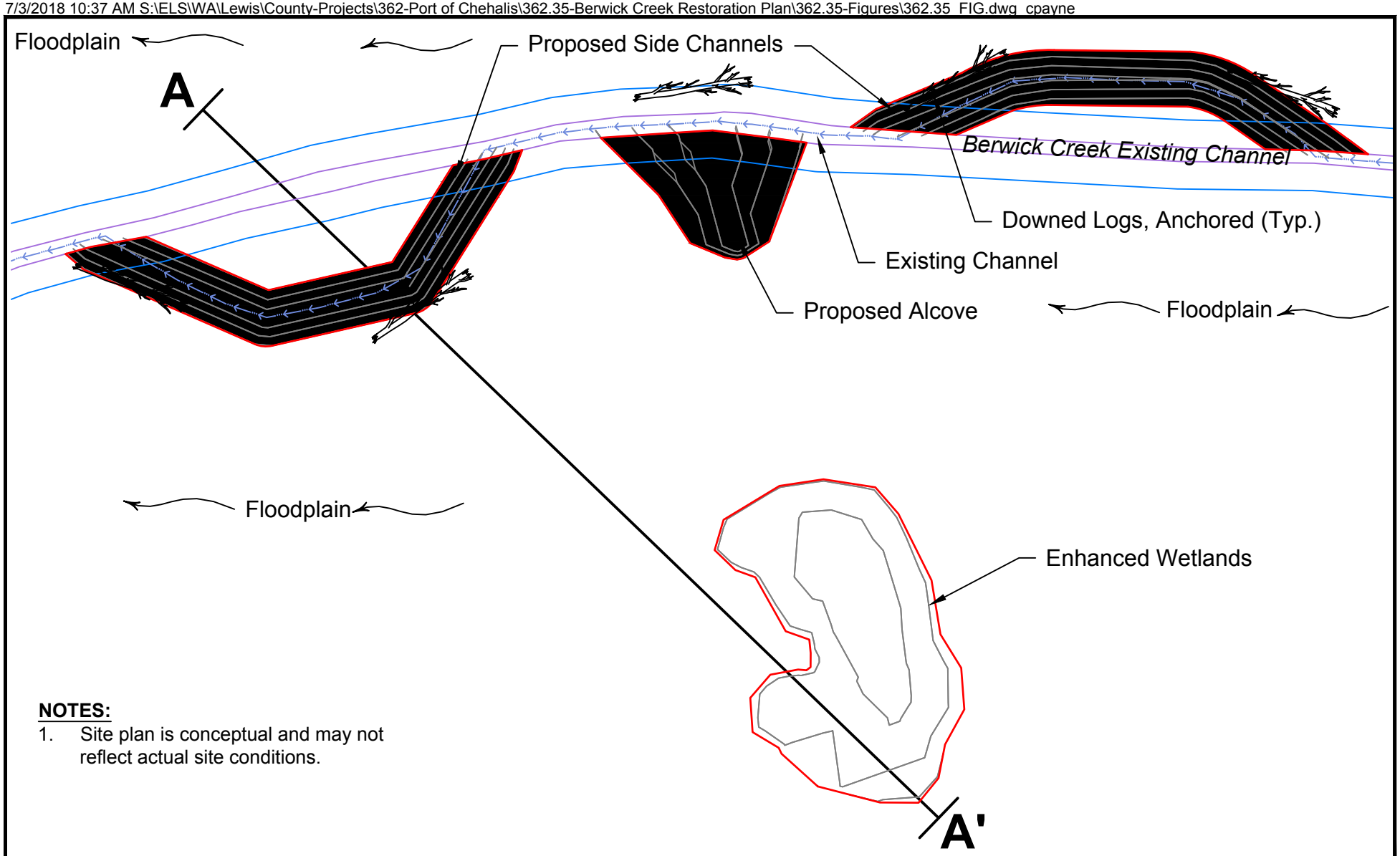
Figure 1
SITE MAP
Berwick Creek Restoration Plan
Port of Chehalis
Lewis County, Washington
Section 10, Township 13N, Range 2W, W.M.

DATE: 7/3/18
DWN: JKJ
REQ. BY: FN
PRJ. MGR: FN
CHK:
PROJECT NO: 362.35

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

NOTE(S):
1. Aerial from Google Earth™.

7/3/2018 11:02 AM S:\ELS\WA\Lewis\County-Projects\362-Port of Chehalis\362.35-Berwick Creek Restoration Plan\362.35-Figures\362.35 Site Map.dwg cpayne



NOTES:

1. Site plan is conceptual and may not reflect actual site conditions.

N
W E
S

0 100 200
SCALE IN FEET

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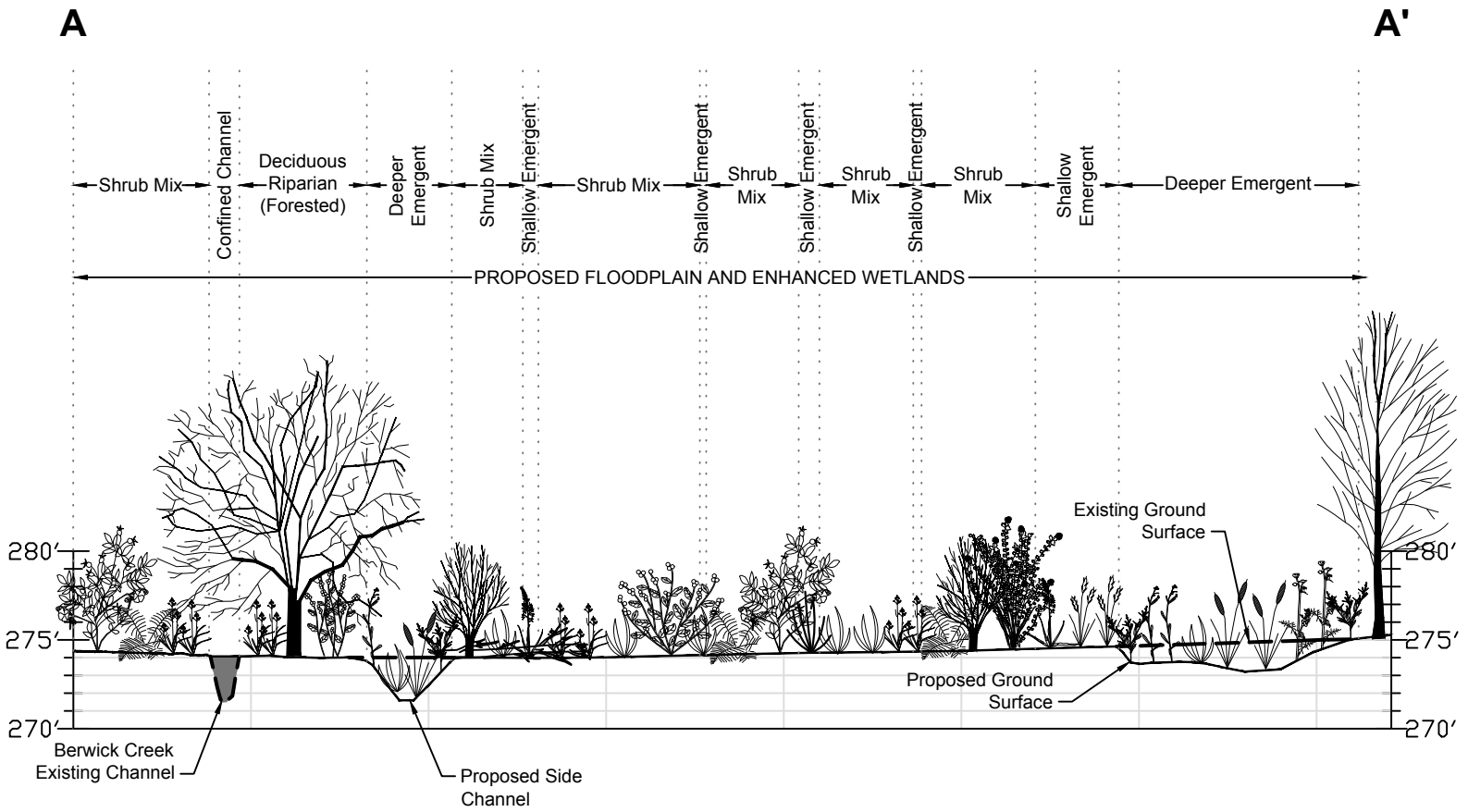
Figure 2
CONCEPTUAL SITE PLAN
Berwick Creek Restoration Plan
Port of Chehalis
Lewis County, Washington
Section 10, Township 13N, Range 2W, W.M.



NOTES:

1. Cross section is conceptual and may not reflect actual site conditions.

0 100 200
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Figure 3
CROSS SECTION
Berwick Creek Restoration Plan
Port of Chehalis
Lewis County, Washington
Section 10, Township 13N, Range 2W, W.M.

Above: Overview of Berwick Creek Stream Restoration Area.

Below: Overview of Berwick Creek Stream Restoration Area.

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Photoplate 1
Site Photos 6-28-18
Berwick Creek Stream Restoration
Port of Chehalis
Lewis County, Washington

Above: View northeast showing Berwick Creek Stream Restoration Area.

Below: View southwest showing restoration area. Bishop Road is in the background.

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Photoplate 2
Site Photos 6-28-18
Berwick Creek Stream Restoration
Port of Chehalis
Lewis County, Washington

Above: Berwick Creek Stream Restoration Area. Himalayan blackberry forms a thicket in the riparian zone. The Chehalis Generating Facility is in the top right.

Below: View east and close-up of restoration area. Rush Road is in the background.

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Photoplate 3
Site Photos 6-28-18
Berwick Creek Stream Restoration
Port of Chehalis
Lewis County, Washington

Above: Berwick Creek's existing channel and silty substrate. Reed canarygrass is a prominent herbaceous plant in the riparian zone.

Below: Debris in Berwick Creek's channel, with reed canarygrass abundant in the riparian zone.

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Photoplate 4
Site Photos 6-28-18
Berwick Creek Stream Restoration
Port of Chehalis
Lewis County, Washington

Above: Rock dam and other debris clogging Berwick Creek's channel.

Below: Existing foot-bridge spanning Berwick Creek's channel, with Japanese knotweed dominating the shrub layer..

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Photoplate 5
Site Photos 6-28-18
Berwick Creek Stream Restoration
Port of Chehalis
Lewis County, Washington

Above: Close-up of Berwick Creek and restoration area.

Below: Chehalis Generating Facility and area that receives flood waters from Berwick Creek.

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Photoplate 6
Site Photos 6-28-18
Berwick Creek Stream Restoration
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Lewis County, Washington