

Port of Skamania Stevenson Shoreline Restoration and Enhancement Project

Critical Areas Habitat Mitigation Plan

The following report provides the Critical Areas Habitat Mitigation Plan for the Port of Skamania Stevenson Shoreline Restoration and Enhancement Project designed to protect and enhance designated fish and wildlife conservation areas.



Table of Contents

List of Figures	iii
List of Tables.....	iii
Introduction	2
Site Assessment.....	2
Existing Infrastructure and Developments.....	5
Utilities and Shoreline Structures.....	5
Existing Vegetation.....	5
Adjacent Land Uses	5
Existing Habitat Conditions	8
Habitat Mitigation Plan	10
HABITAT CONSERVATION AREA DELINIATION	10
Off-Site Mitigation - Slaughter House Point.....	11
Access Routes, Stockpile and Staging Areas	13
Construction Sequencing	13
Goals and Objectives for the Project and Proposed Mitigation.....	17
Monitoring	17
Contingency Plan.....	18
Shoreline Restoration.....	18
References.....	20
Attachment A - Project Plans	21
Attachment B – Maps 11X17 Figures 1, 2, 3, 4, 9,10,11 &12.....	22
Attachment C – Photo Points & Photos	23
Applicant Qualifications	32



List of Figures

Figure 1. Project Area Map. Port of Skamania Stevenson Shoreline Restoration and Enhancement Project. Stevenson, Washington.....	3
Figure 2. Project Property Parcel Map. Port of Skamania Stevenson Shoreline Restoration and Enhancement Project. Stevenson, Washington.....	4
Figure 3. Project Utilities and Structure Map. Port of Skamania Stevenson Shoreline Restoration and Enhancement Project. Stevenson, Washington.....	6
Figure 4. Existing Vegetation Map. Port of Skamania Stevenson Shoreline Restoration and Enhancement Project. Stevenson, Washington.....	7
Figure 5. Looking East from Leavens Point: Rip-Rap Bank Revetment - 680 linear feet. Port of Skamania Stevenson Shoreline Restoration and Enhancement Project Area. Stevenson, Washington.....	8
Figure 6. Looking West at Leavens Point: Sheet Pile bank revetment – 120 linear feet. Port of Skamania Stevenson Shoreline Restoration and Enhancement Project Area. Stevenson, Washington.....	9
Figure 7. Looking West from Leavens Point – Bank Erosion – 450 linear feet. Port of Skamania Stevenson Shoreline Restoration and Enhancement Project Area. Skamania County, Washington.	9
Figure 8. Slaughter House Point Off-Site Mitigation Area. City of Stevenson, Skamania County, Washington.....	11
Figure 9. Proposed Project Actions and Habitat Conservation Area Map. Port of Skamania Stevenson Shoreline Restoration and Enhancement Project. Stevenson, Washington.	12
Figure 10. Project Area Access, Staging and Stockpile Areas. Port of Skamania Stevenson Shoreline Restoration and Enhancement Project. Stevenson, Washington.....	14
Figure 11. Adjusted Habitat Conservation Area. Stevenson Shoreline Restoration and Enhancement Project. Stevenson, Washington.....	15
Figure 12. Project Area Planting Plan. Stevenson Shoreline Restoration and Enhancement Project. Stevenson, Washington.....	16

List of Tables

Table 1. Physical Restoration Performance Standards for the Port of Skamania Shoreline Restoration and Enhancement Project. Skamania County, Washington.....	17
Table 2. Riparian Vegetation Performance Standards for the Port of Skamania Shoreline Restoration and Enhancement Project. Skamania County, Washington.....	18



Port of Skamania Stevenson Shoreline
Restoration and Enhancement Project
Critical Areas Habitat Mitigation Plan

By

BAIR L.C.C and Associates

For

The Port of Skamania



Port of Skamania Stevenson Shoreline Restoration and Enhancement Project

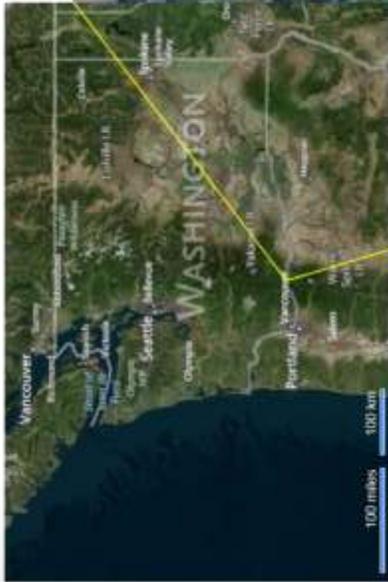
Critical Areas Habitat Mitigation Plan

Introduction

The Port of Skamania proposes to restore and enhance 1,250 feet of shoreline along the Stevenson, Washington waterfront. The project area is located between points 45.6195 N, 121.8817 W and 45.6930 N, 121.8779 W within the city limits Section 31, T.3N. , R.8E. The parcels, ownership and areas bounded within the project area are: Parcel 02070111610000, City of Stevenson , 0.11 Acres and Port of Skamania property parcels 02070111580000, 02070111570000, 02070111560000, 02070111630100, 02070111630000, 02070111620000, 02070111540000, 02070110370000, 02750622010000, 02750622050000, 02750622060000 totaling 17.9 acres (see Figures 1 and 2).

Site Assessment

The project area was surveyed on October 14 and 15, 2013 by Brian Bair of BAIR L.L.C. and Associates to assess site conditions and to identify and map sensitive areas, significant trees, drainage paths and existing infrastructure. The project area includes the Columbia River which is classified by Washington Department of Wildlife as a Type "S" Fish Bearing Stream. SMC 18.13.095.E requires Type S riparian buffer widths of 150 feet measured from the ordinary high water mark. Total area of the Habitat Conservation Area (HCA) buffer within the project area is 4.06 Acres. The project area does not have any designated geological, landslide, erosion or seismic hazards.



PORT OF SKAMANIA STEVENSON SHORELINE RESTORATION AND ENHANCEMENT PROJECT



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Project: Port of Skamania Stevenson Shoreline Restoration and Enhancement
 Figure: 1. Project Area Map
 File: PskShoreline_101413
 Layout: 11X17
 Date: 10/14/2013
 Sheet: 1 of 6, Page 3

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PORT OF SKAMANIA STEVENSON SHORELINE RESTORATION AND ENHANCEMENT PROJECT



PORT OF SKAMANIA PROPERTIES

PARCELS:

0207011580000
0207011570000
0207011560000
0207011630100
0207011630000
0207011620000
0207011540000
02070110370000
02750622010000
02750622050000
02750622060000

CITY OF STEVENSON
PARCEL 0207011610000
AREA 0.11 ACRES
PERIMETER 411.19 FEET
LOT DIMENSIONS 180.4' X 28.9'

COLUMBIA RIVER

SCALE: 1:8,918



	Port of Skamania Stevenson Shoreline Restoration & Enhancement Project
	SAIR: 181 McEwen Lane Stevenson, WA 98048 Tel: 360.335.8307 Email: bairstk@northwestair.com
Project: Port of Skamania Stevenson Shoreline Restoration and Enhancement Figure: 2. Project Property Parcel Map File: Pshoreline_101413 Layout: 113317 Date: 10/14/2013 Sheet: 2 of 6, Page 4	

BASE MAP SOURCE: [HTTP://SKAMANIA.WA.GOV/INTERMEDIA/DEFAULT.ASPX](http://skamania.wa.gov/intermedia/default.aspx)



Existing Infrastructure and Developments

The project area is zoned for commercial and industrial. Buildings within the HCA area include a section of a multipurpose industrial building, a restaurant, maintenance building and a residence. Total area of buildings within the HCA is 0.35 acres. Paved parking area associated with the existing buildings within the HCA totals 1.34 acres. In addition to the buildings and paved parking areas, a paved accessible recreation trail parallels 829.5 feet of the shoreline covering an area of 0.25 acres. Leavens Street, which extends from Cascade Avenue south to the shoreline, covers an additional 0.07 acres. Total area and percent area covered by buildings and paving within the HCA buffer are 1.87 acres and 46% respectively. The remaining 2.19 acres, 54% of the HCA, are dedicated to water dependent public recreation: The Russell Street Development Lot, East Point Kite Board Beach and Leavens Point Park.

Utilities and Shoreline Structures

A utility corridor borders the HCA running under and adjacent to Cascade Avenue. Utilities within the corridor are: a natural gas pipeline, storm water catchment and culvert, fiber optic cable line, sanitary waste pipeline, water pipeline, and overhead power lines. Shoreline structures within the project area include 102 feet of sheet pile and 679 feet of rip-rap (See Figure 3).

Existing Vegetation

Vegetation within the HCA is a mix of native and non-native plant species. Significant trees within the HCA were surveyed, mapped and identified on October 14, 2013 (Figure 4). The native tree species within the project area HCA are: (*Thuja plicata*) western red cedar, (*Acer macrophyllum*) big leaf maple, (*Pseudotsuga menziesii*) Douglas fir, (*Populus trichocarpa*) black cottonwood (*Alnus rubra*) red alder, (*Acer circinatum*) vine maple. Non-native tree species within the project area HCA are: (*Populus sp.*) poplar, (*Prunus sp.*) cherry and (*Acer sp.*) maple. Poplar was planted for aesthetic improvements and quick growing characteristics for the park and hiking trail. Cherry and Maple within the area were likely planted by historic residence for aesthetic values. Canopy cover within the project area HCA is currently 0.46 acres or 11% canopy cover (See Figure 4).

Adjacent Land Uses

Land use surrounding the project area includes the following water dependent recreation facilities: the Cascade Avenue Small Craft Boat Ramp (to the east) and the Stevenson Landing large vessel pier at Russell Street (to the west). Activities at these facilities include boating, fishing, swimming, windsurfing and kiteboarding, hiking, wildlife viewing, historic interpretation and picnicking. Additional adjacent uses include a lodge, private residences and a significant railway transportation corridor.



PORT OF SKAMANIA STEVENSON SHORELINE RESTORATION AND ENHANCEMENT PROJECT

EXISTING VEGETATION – SIGNIFICANT TREES

COLUMBIA RIVER



KEY

- DOUGLAS FIR
- BLACK COTTONWOOD
- WESTERN RED CEDAR
- ALDER SPP.
- POPLAR SPP.
- MAPLE SPP.
- CHERRY SPP.
- BIG LEAF MAPLE



Part of Skamania Stevenson
Shoreline Restoration &
Enhancement Project

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Project: Port of Skamania Stevenson Shoreline Restoration
Figure: 4. Existing Vegetation
File: Pastoraline_101413
Layer: 11X17
Date: 10/14/2013
Sheet: 4 of 6, Page 7



Existing Habitat Conditions

The existing riparian and aquatic habitat conditions within the project HCA are degraded. Forty-six percent (1.87 acres) of the HCA buffer area is either paved or occupied by structures. Just over 10% of the HCA contains significant tree canopy cover. Shoreline aquatic habitat has been compromised by past river bank hardening and bank erosion; 54% (680 feet) of the project area shoreline is covered with rip-rap, 10% (120 feet) sheet pile and 36% (450 feet) actively eroding. The rip-rap and sheet pile provide limited aquatic habitat and prevent native vegetation establishment. The accelerated bank erosion within the project area increases fine sediment, which can reduce aquatic macro invertebrate production and degrade aquatic habitat. In addition, the accelerated bank erosion within the project area prematurely recruits significant trees and reduces riparian canopy cover and riparian and aquatic habitat diversity.



FIGURE 5. LOOKING EAST FROM LEAVENS POINT: RIP-RAP BANK REVETMENT - 680 LINEAR FEET. PORT OF SKAMANIA STEVENSON SHORELINE RESTORATION AND ENHANCEMENT PROJECT AREA. STEVENSON, WASHINGTON.



FIGURE 6. LOOKING WEST AT LEAVENS POINT: SHEET PILE BANK REVETMENT – 120 LINEAR FEET. PORT OF SKAMANIA STEVENSON SHORELINE RESTORATION AND ENHANCEMENT PROJECT AREA. STEVENSON, WASHINGTON.



FIGURE 7. LOOKING WEST FROM LEAVENS POINT – BANK EROSION – 450 LINEAR FEET. PORT OF SKAMANIA SHORELINE RESTORATION AND ENHANCEMENT PROJECT AREA. SKAMANIA COUNTY, WASHINGTON.



Habitat Mitigation Plan

The Stevenson Shoreline Restoration and Enhancement Project propose to arrest 450 feet of severe bank erosion and restore aquatic habitat along 1,250 feet of Columbia River bank. The project entails extending the shoreline on average 78 feet to the south. An estimated 18,730 cubic yards of rock and soil would be placed to restore the shoreline and enhance aquatic and riparian habitats. The proposed project restores the footprint of the historic river bank, which expands the riparian area by 2.15 acres (53%). The upper zone of the project area would be restored with native species increasing riparian canopy cover by 25% or by 1.5 additional acres.

SMC 18.13.095.E requires riparian buffer widths of 150 feet on the Columbia River a Type S fish bearing system. Base riparian habitat buffers can be reduced by 30% (reduced to 105 feet) through enhancement of degraded buffers. Buffer widths can be further reduced with off-site mitigation. This project proposes to expand the buffer by 2.15 acres by restoration of the shoreline and degraded areas. In addition 2.02 acres of off-site mitigation, vegetation rehabilitation on Slaughter House Point will also be accomplished (figure 8). Therefore HCA buffer width would be reduced to 50 feet from the North edge of the shoreline restoration project area extending south. The restored shoreline within the buffer will be re-vegetated with native shrubs and grasses at densities of twenty shrubs per 1,000 ft² within the HCA (see Figures 9-12).

The HCA buffer and transition zone is near shore riparian and, therefore, replanted with the following native species:

(Salix lucida) Pacific Willow

(Salix scouleriana) Scouler Willow

(Salix fluviatilis) Columbia River Willow

(Cornus sericea) Red osier dogwood

(Rosa pisocarpa) Cluster or Swamp Rose

The restored shoreline above the ordinary pool elevation to the vegetated HCA buffer will be planted with native shrubs and forbs to reduce beach erosion from waves in a manner consistent with water related recreation use. The lower planting limit or stream bank toe upslope to the HCA Buffer will be planted with seasonally submerged hydrophilic shrubs and forbs.

420 *(Salix fluviatilis Nutt.)* Multnomah Columbia River Willow

HABITAT CONSERVATION AREA DELINIATION

The Habitat Conservation stream buffer will have a permanent physical demarcation of logs, a tree or hedgerow, wood or wood like fencing, which will be approved by the City of Stevenson Planning Department. In addition, a sign (minimum size 1 foot x 1 foot and posted 3.5 feet



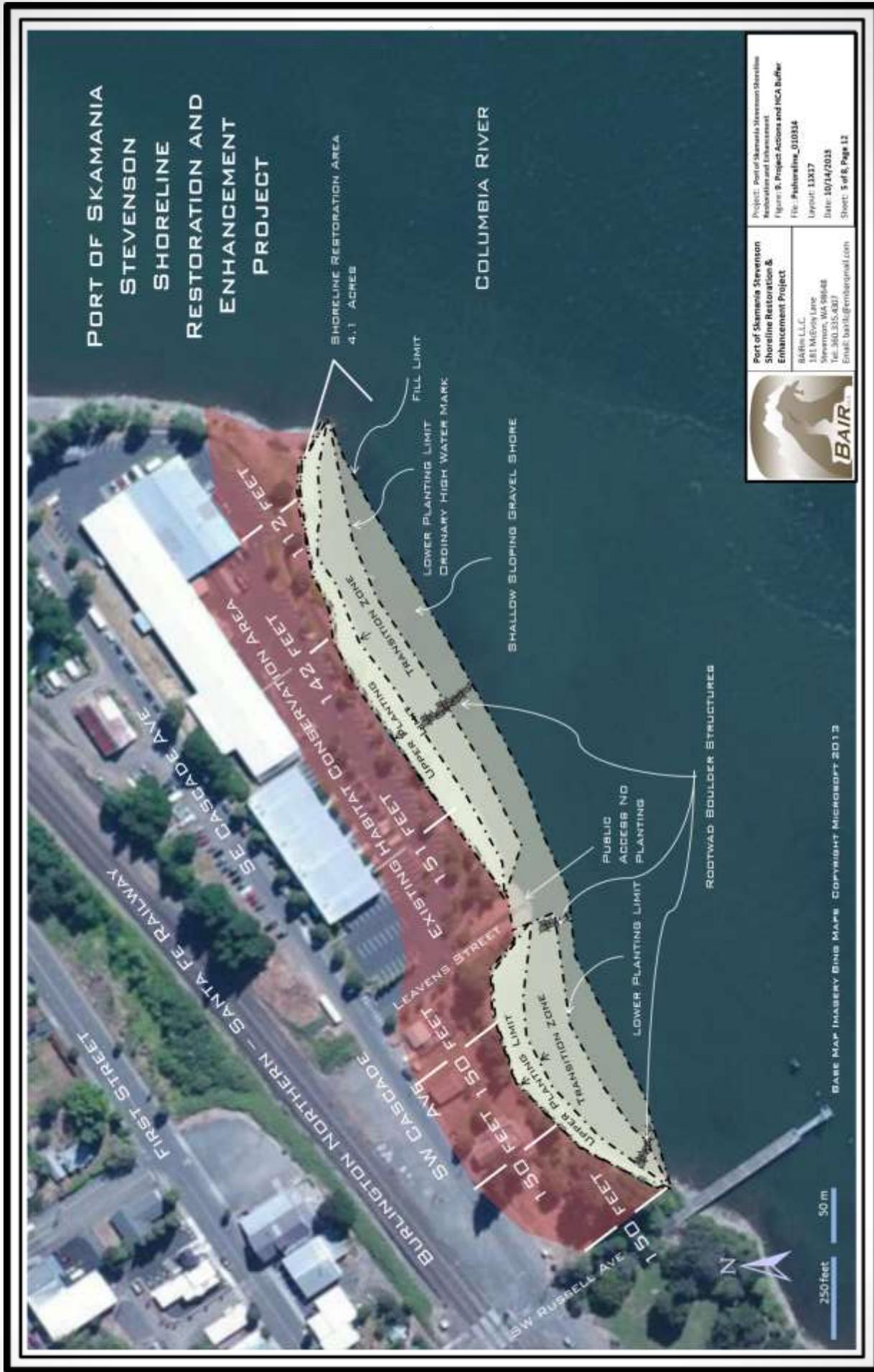
above grade) worded: WILDLIFE HABITAT BUFFER – PLEASE RETAIN IN A NATURAL STATE will be posted along the outer perimeter of the habitat buffer.

Off-Site Mitigation - Slaughter House Point

Slaughter House point would be rehabilitated by removal and treatment of invasive plant species. Himalayan black berries will be spot treated, cutting back the above-ground blackberry bramble as close to the ground as possible and then applying glyphosate based herbicide directly to freshly cut canes. Do to the proximity of Foster Creek, only herbicides containing glyphosate such as Rodeo (Dow) or Aquamaster (Monsanto) with LI-700 surfactant will be used. Herbicide will not be applied within 10 feet of the ordinary high water mark; all black berries within 10 feet of the stream will be manually extracted, no herbicide will be applied. Black berry eradication will occur at least once a year for five years.



FIGURE 8. SLAUGHTER HOUSE POINT OFF-SITE MITIGATION AREA. CITY OF STEVENSON, SKAMANIA COUNTY, WASHINGTON.



**PORT OF SKAMANIA
STEVENSON
SHORELINE
RESTORATION AND
ENHANCEMENT
PROJECT**

COLUMBIA RIVER

SHORELINE RESTORATION AREA
4.1 ACRES

FILL LIMIT
LOWER PLANTING LIMIT
ORDINARY HIGH WATER MARK

SHALLOW SLOPING GRAVEL SHORE

ROOTWAD BOULDER STRUCTURES

PUBLIC
ACCESS NO
PLANTING

EXISTING HABITAT CONSERVATION AREA

BURINGTON NORTHERN - SANTA FE RAILWAY

SE CASCADE AVE

SW CASCADE AVE

LEAVENS STREET

SW RUSSELL AVE

112 FEET

142 FEET

151 FEET

150 FEET

150 FEET

150 FEET



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Project: Port of Skamania Stevenson Shoreline
Restoration and Enhancement
Figure 6: Project Actions and HCS Buffer
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Date: 10/14/2013
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BAIR MAP INVENTORY BINS MAPS - COPYRIGHT MICROSOFT 2013

250 feet 50 m



Access Routes, Stockpile and Staging Areas

Construction of access routes and stockpile areas will disturb the minimum amount of vegetation practicable. Project access roads on unpaved areas within the existing HCA buffer total 412 feet with average widths of 14 feet (5,768 square feet). To construct the access route approaches four non-native cherry trees will be removed, stockpiled and then incorporated into the restoration project. Two Port of Skamania buildings within the stockpile areas will be demolished to maximize the stockpile area for the project. These structures maybe rebuilt in the future. The limits of stockpile areas will be flagged and located on areas occupied by grass. Potential stockpile sites will occupy a total area of 0.42 acres. The staging area will be located east of Leavens Street on 0.17 acres of the paved parking lot (see Figure 9).

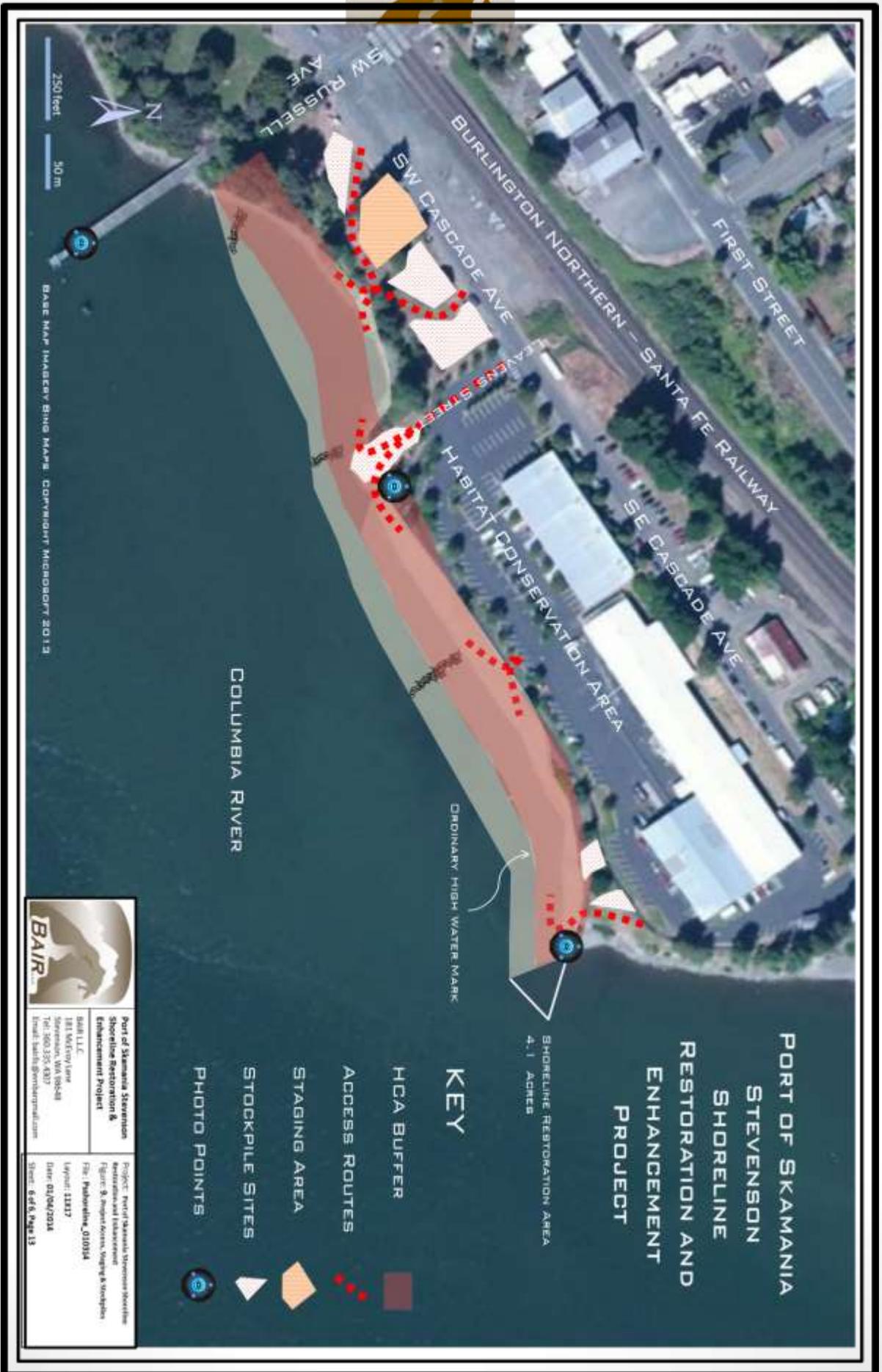
Construction Sequencing

Construction will begin by preparing the staging area and pioneering access routes. Sediment curtains will be installed in the Columbia River in 200 foot sections to isolate the work areas, contain fine sediment and turbidity. Boulder cobble fill will initially be imported and placed parallel to the shoreline at an elevation of at least 1 foot above the existing water level elevation forming the base layer. The base layer boulder and cobble fill will continue in vertical and horizontal lifts until the project fill limit to the South is achieved. Rootwad - boulder structures will be constructed and incorporated into the base layer. Gravel and fines will then be imported in lifts to fill the interstitial spaces of the boulders and cobble layer. The gravel-fine lifts will continue, sloping north to the upper limits of the project area (top of bank elevation). Gravel will be imported and placed along the toe of the project limits (southern edge) to create a gradual sloping gravel beach. Top soil will then be imported and spread throughout the planting area. Top soil will be applied in lifts with minimum depths of 6 inches. Top soil will be covered with coir fabric and then planted. Tree survival will be assessed every year for 10 years. Dead trees/shrubs will be replaced species specifically. Access routes will be rehabilitated immediately following restoration and then de-compacted, mulched and seeded. Silt fence would be left in place and maintained until green-up the following spring.

Detailed site diagrams, grading and excavation details are provided in Attachment A Project Plans. The contractor will provide an erosion control and spill prevention plan before mobilization to the site.

The specific efforts to avoid and minimize impacts to priority habitats and their buffers will include minimizing buffer area and significant tree disturbance to the maximum extent practicable. All significant trees will be left in place and protected with the exception of four non-native cherry trees within the access corridor. The only foreseeable exception would be in the advent of hazard trees and potential compromise of worker safety (per OSHA).

In summary the riparian area will be significantly improved due to the increase in area (2.15 acres, a 53% increase in HCA), increase in riparian canopy cover (1.5 additional acres and a 25% increase), increase in bank stability (450 feet stabilized), removal of 120 feet of sheet pile and



**PORT OF SKAMANIA
STEVENSON
SHORELINE
RESTORATION AND
ENHANCEMENT
PROJECT**

SHORELINE RESTORATION AREA
4.1 ACRES



KEY

- SHORELINE RESTORATION AREA
- ADJUSTED HCA
- ROOTWAD BOULDER STRUCTURES
- PHOTO POINTS



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Project: Port of Skamania Stevenson Shoreline
Restoration and Enhancement
Figure: 11. Adjusted Hazardous Consideration Area
File: Pshoreline_010334
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Date: 01/04/2014
Sheet: 7 of 8, Page 15

BASE MAP: IMAGERY BING MAPS. COPYRIGHT MICROSOFT 2013





Goals and Objectives for the Project and Proposed Mitigation

The goals of the Port of Skamania Shoreline Restoration and Enhancement Project are to restore the historic shoreline, enhance fish and wildlife habitat and provide additional water and non-water related recreation opportunities.

The objectives to meet these goals are:

1. Restore 4.1 acres of historic shoreline.
2. Increase the Riparian Area by 2.15 acres (53%) within the project area.
3. Restore 1.5 acres of HCA and increase riparian vegetation and canopy cover by greater than 20%.
4. Restore 450 feet of eroding river bank.
5. Remove 120 feet of sheet pile.
6. Rehabilitate 680 feet of rip-rapped shoreline.
7. Eradicate all Himalayan black berries and accelerate the recovery of the riparian vegetation on 2.02 acres on the Slaughter House Point property.

Monitoring

Monitoring of this project will be guided by the established quantitative objectives and the following performance standards.

TABLE 1. PHYSICAL RESTORATION PERFORMANCE STANDARDS FOR THE PORT OF SKAMANIA SHORELINE RESTORATION AND ENHANCEMENT PROJECT. SKAMANIA COUNTY, WASHINGTON.

Performance Standard	Target	Timeframe
Acres of shoreline restored	4.0 Acres	1-5 years
Acres of riparian habitat increased	1.0 Acres	1-10
Feet of stabilized river bank	450 Feet	1-5
Feet of sheet pile removed	120 Feet	1-5
Feet of rip-rapped river bank rehabilitated	680 Feet	1-5



TABLE 2. RIPARIAN VEGETATION PERFORMANCE STANDARDS FOR THE PORT OF SKAMANIA SHORELINE RESTORATION AND ENHANCEMENT PROJECT. SKAMANIA COUNTY, WASHINGTON.

Year	% Planted Woody Species Survival	% Herbaceous Vegetation Canopy Cover	% Total Ground Cover of Non Weed Perennial Vegetation	Erosion
1	90	98	90	No Significant Rills or Gullies
2	90	98	95	No Significant Rills or Gullies
3	90	98	98	No Significant Rills or Gullies
4	90	98	98	No Significant Rills or Gullies
5	90	98	98	No Significant Rills or Gullies
6	90	98	N/A	No Significant Rills or Gullies
7	90	98	N/A	No Significant Rills or Gullies
8	90	98	N/A	No Significant Rills or Gullies
9	90	98	N/A	No Significant Rills or Gullies
10	90	98	N/A	No Significant Rills or Gullies

Contingency Plan

Shoreline Restoration

Twenty willows (cuttings or rooted stock) per 1,000ft² and native grasses will be planted in the HCA. Native grasses and willows will also be planted from the boundary of the HCA down to the ordinary high water mark. The majority of willows planted outside of the HCA will be concentrated around the rootwad boulder structures. Willow survival will be assessed every year for ten years. Dead willows will be replaced species specifically with 90% survival maintained. To prevent overland flow surface erosion and prevent compaction, all exposed soil will be mulched with certified weed free straw. Soil surface conditions will also be assessed on a yearly basis for ten years. In the advent that rills begin to develop from precipitation run-off, straw roll or coir log check dams will be placed perpendicular to the slope at a frequency of 3:1 (three feet horizontal for every one foot of vertical drop). Rills would be filled in with top soil, seeded with native grass seed mix and mulched.





References

Bing Maps

<http://www.bing.com/maps/default.aspx?q=north+arrow+symbol+png&mkt=en&FORM=HDRSC4#Y3A9NDUuNTQ0NzAxfi0xMjEuMTU0Mjk3Jmx2bD00JnN0eT1yJnE9bm9ydGgIMjUyMGFycm93JTl1MjBzeW1ib2wIMjUyMHBuZw==>. Accessed October 15-20, 2013

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Pojar, J. and D. MacKinnon., 2007. Plants of the Pacific Northwest Coast: Oregon, Washington, British Columbia and Alaska. Publisher: Lone Pine Publications.

Skamania County Terra MapSifter. <http://skamaniawa.mapsifter.com/default.aspx>. Accessed October 15, 2013.



Attachment A - Project Plans



Attachment B – Maps 11X17 Figures 1, 2, 3, 4, 9,10,11 &12



Attachment C – Photo Points & Photos



Stevenson Landing Photo Point – End of dock at anemometer45.69124, -121.8816. Photo taken at 320° on January 17, 2014, 12:12 PM.



Stevenson Landing Photo Point – End of dock at anemometer. 45.69124, -121.8816. Photo taken at 15° at 12:12 PM.



Stevenson Landing Photo Point – End of dock at anemometer. 45.69124, -121.8816. Photo taken at 45° on January 17, 2014, 12:13 PM.



Stevenson Landing Photo Point Panoramic Collage. 45.69124, -121.8816. Photos taken January 17, 2014 12:12 – 12:13 PM.



Middle Project Area Photo Point – East of Leavens Street at Kiosk. 45.69241, -121.8802. Photo taken at 62° on January 17, 2014, 12:27 PM.



Middle Project Area Photo Point – East of Leavens Street at Kiosk. 45.69241, -121.8802. Photo taken at 260° on January 17, 2014, 12:27 PM.



East Point Photo Point – West of Big Boulder (Kite Rock). 45.69299, -121.8780. Photo taken at 315° on January 17, 2014, 12:32 PM.



East Point Photo Point – West of Big Boulder (Kite Rock). 45.69299, -121.8780. Photo taken at 260° on January 17, 2014, 12:32 PM.



East Point Photo Point Panoramic Collage. 45.69299, -121.8780. Photos taken January 17, 2014 12:32 PM.



Applicant Qualifications

This document was completed by Brian Bair Owner and Projects Director of BAIR L.L.C.

Education

Bachelor of Science, Biology, Montana State University

Certifications

USDA National Construction Certification for engineering related activities in watershed restoration and construction management.

Experience

Brian has worked throughout the Continental United States, Alaska, and Canada on large-scale watershed restoration and rehabilitation projects. Brian's primary responsibilities for the past 22 years have been to assess, design, and implement watershed and stream corridor rehabilitation projects. Brian has an extensive heavy equipment and project management background.