



DEVELOPMENT SERVICES DEPARTMENT
ENVIRONMENTAL COORDINATOR
450 110th Ave NE., P.O. BOX 90012
BELLEVUE, WA 98009-9012

OPTIONAL DETERMINATION OF NON-SIGNIFICANCE (DNS) NOTICE MATERIALS

The attached materials are being sent to you pursuant to the requirements for the Optional DNS Process (WAC 197-11-355). A DNS on the attached proposal is likely. This may be the only opportunity to comment on environmental impacts of the proposal. Mitigation measures from standard codes will apply. Project review may require mitigation regardless of whether an EIS is prepared. A copy of the subsequent threshold determination for this proposal may be obtained upon request.

File No. 10-120843-XE
Project Name/Address: Horizon Heights Open Space Upper Vasa Creek Check Dam Repair / 4445 152nd Place SE Tract A (Generally)
Planner: David Pyle / dpyle@bellevuewa.gov
Phone Number: 425-452-2973

Minimum Comment Period: September 23, 2010

Materials included in this Notice:

- Blue Bulletin
- Checklist
- Vicinity Map
- Plans
- Other:

City of Bellevue Submittal Requirements

Horizon Heights Open Space Upper Vasa Creek Check Dam
Repair
4445 152nd Place SE Tract A(Generally)

ENVIRONMENTAL CHECKLIST

SEPA Checklist Reviewed By:
David Pyle, Land Use Planner
425-452-2973 - dpyle@bellevuewa.gov

If you need assistance in completing the checklist or have any questions during the permit process, please visit or call the Permit Center (425-452-6864) between 8 a.m. and 4 p.m., Monday through Friday (Wednesday, 10 to 4). Our TTY number is 425-452-4636.

BACKGROUND INFORMATION

Property Owner: City of Bellevue
Proponent: City of Bellevue
Contact Person: Stephen H. Noeske, PE
(If different from the owner. All questions and correspondence will be directed to the individual listed.)
Address: PO Box 9012
Bellevue WA 98009-9012
Phone: (425) 452-5271 snoeske@bellevuewa.gov

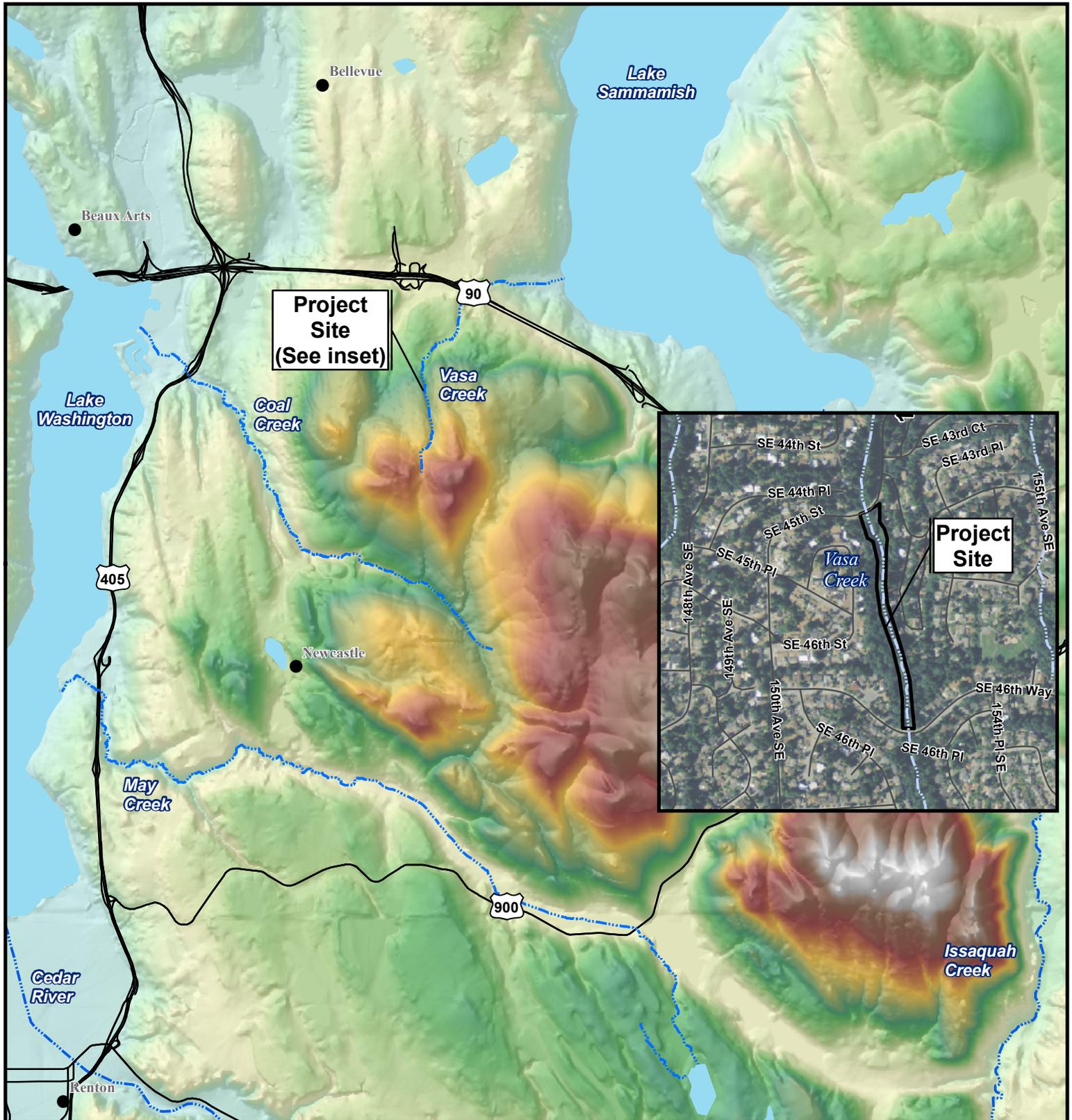
Proposal Title: Upper Vasa Creek Check Dam Repair Phase 2
Proposal Location: Between 151st Avenue SE and 152nd Place SE and between SE 46th Way and SE 45th Street, a.k.a. Horizon Heights Open Space
(Street address and nearest cross street or intersection)

Provide a legal description if available.

- Parcel #3459400500
HORIZON HEIGHTS NO 1
- Parcel #1424059099
NE 1/4 OF SW 1/4 LESS N 20 AC LESS S 420 FT OF E 661 FT LESS POR PLATTED HORIZON HEIGHTS NOS 1 2 & 3
- Parcel #3459420200
HORIZON HEIGHTS # 3
- Parcel #9346920520
WHISPERING HEIGHTS DIV # 3

Please attach an 8 1/2" x 11" vicinity map that accurately locates the proposal site.

See Figure 1 (next page)

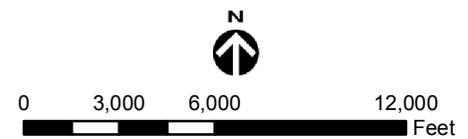


Legend

- City
- Highway
- · · · Stream



Figure 1. Vicinity map for the Vasa Creek Restoration Project, Bellevue, WA.



HERRERA
 ENVIRONMENTAL CONSULTANTS

Give an accurate, brief description of the proposal's scope and nature:

1. General description:

Funding for the project will be provided by FEMA and the City of Bellevue CIP funds. Previously installed (2001) rock check dams were damaged in a storm event in 2007. The check dams will be reconstructed with approximately 80 to 90 cubic yards of larger rock (i.e. riprap and quarry spall) and include the placement of 35 pieces of large woody debris (LWD). See attached plan set.

Installation of rock check dams, and LWD and anchors will require excavation and fill above and below the ordinary high water mark. The work will include installation of appropriate temporary erosion and sediment control BMPs, such as sandbags to direct the stream flow to an existing and temporary bypass system and silt fencing, as well as a temporary creek crossing, in order to prevent adverse impacts to water quality. There is a small existing pedestrian bridge that is too small and light to carry the loads needed for construction, so use of a steel plate or other temporary stream crossing is anticipated to facilitate construction access from the single construction entrance off of SE 45th Street.

The creek channel on the project site will be de-watered during construction using an existing bypass pipe that was previously installed, and a temporary bypass pipe.

2. Acreage of site: 5.1 acres

3. Number of dwelling units/buildings to be demolished: None

4. Number of dwelling units/buildings to be constructed: None

5. Square footage of buildings to be demolished: Not applicable

6. Square footage of buildings to be constructed: Not applicable

7. Quantity of earth movement (in cubic yards): Approximately 600 cubic yards of earth movement for the installation of rock check dams, logs, and ecology blocks

8. Proposed land use: No change from current use.

9. Design features, including building height, number of stories and proposed exterior materials:

No buildings are being constructed. Work for this proposal involves placement of rock materials to repair existing rock check dams, and the installation of approximately 35 pieces LWD with anchors.

10. Other: None

Estimated date of completion of the proposal or timing of phasing:

The project will last approximately eight (8) weeks during the summer/fall of 2011. Construction timing will match fish windows determined by the Washington Department of Fish and Wildlife (WDFW) and other regulating agencies.

Do you have any plans for future additions, expansion, or further activity related to or connected with this proposal? If yes, explain.

May require additional permits at the point of maintenance depending on the scope of work proposed.

Yes, future maintenance activities on the check dams may be required after unusually heavy storm events.

List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

- Critical Areas Report (supporting documentation for Critical Areas Land Use Permit per City of Bellevue guidance). Report includes wetland assessment, stream assessment, habitat assessment, geologic hazard assessment, and a vegetation management plan.
- Endangered Species Act Assessment, No Effect Letter
- Joint Aquatic Resource Permit Application (JARPA)

Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain. List dates applied for and file numbers, if known.

There are no known applications pending approval that would directly affect the property covered by this proposal.

List any government approvals or permits that will be needed for your proposal, if known. If permits have been applied for, list application date and file numbers, if known.

- City of Bellevue Critical Areas Land Use
- City of Bellevue Clearing and Grading
- City of Bellevue Right of Way Use Permit
- Washington State Department of Fish and Wildlife, Hydraulic Project Approval
- United States Army Corps of Engineers, Section 404 Permit
- Washington State Department of Ecology, Section 401 water quality certification and Coastal Zone Management Concurrence
- U.S. Fish and Wildlife Service and National Marine Fisheries Service, ESA consultation
- King County Dewatering Permit

Please provide one or more of the following exhibits, if applicable to your proposal.

(Please check appropriate box(es) for exhibits submitted with your proposal):

- Land Use Reclassification (rezone) Map of existing and proposed zoning
- Preliminary Plat or Planned Unit Development
Preliminary plat map See attached plan set.
- Clearing & Grading Permit
Plan of existing and proposed grading
Development plans
- Building Permit (or Design Review)
Site plan
Clearing & grading plan
- Shoreline Management Permit
- Site plan

A. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site: Flat Rolling Hilly Steep slopes Mountains Other

b. What is the steepest slope on the site (approximate percent slope)?

The project involves work in a stream which is situated in ravine bounded steep slopes on either side. The longitudinal stream slope in the project site is approximately 5.2%. The ravine walls adjacent to the stream are sloped approximately 40%. The ravine walls are not part of the work associated with this proposal.

c. What general types of soil are found on the site (for example, clay, sand, gravel, peat, and muck)? If you know the classification of agricultural soils, specify them and note any prime farmland.

The United States Department of Agriculture, Natural Resources Conservation Service classifies the soils within the project as Alderwood gravelly sandy loam (6 to 15 % slopes); Alderwood and Kitsap Soils, very steep; Arents, Alderwood material (6 to 15% slopes) [NRCS 2010].

d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

Yes, there are currently existing surface indications of erosion and there is a history of erosion in the immediate vicinity of the project.

This is a stream stabilization project.

Several large landslides and heavy rain events in the 1990s resulted in damage to both the project area and property downstream. Damage included debris (including trees, soil, and gravel) deposited in Vasa Creek from slide activity and movement of debris and sediment that plugged culverts and damaged infrastructure downstream. The sewer pipe buried within the substrate of Vasa Creek, and portions of several manholes were also exposed and damaged. To prevent further damage to the creek, the sewer pipe, culverts, and properties downstream, fourteen check dams were constructed in Vasa Creek in summer of 2001. The check dams were constructed to prevent erosion; thereby protecting the sanitary sewer main in the creek bed, minimizing the potential for landslides and damage to homes sited on the top of the ravine, reducing risk of damage to downstream infrastructure, minimizing long-term maintenance costs for the sewer main, and to improving water quality and downstream habitat for fish species.

In December of 2007, a storm event generated a stream flow with a magnitude greater than a 100-year return interval, damaging 12 of the check dams that were constructed in 2001. Because of the unstable soils and potential for more storm events in the future, this project will repair dams identified as being damaged from the December 2007 storm. In addition to habitat enhancement, the installation of large woody debris (LWD) will also help minimize bank and slope erosion.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

Project activities that involve filling and grading include the repair of existing rock check dams; installation of large wood debris; removal of one damaged gabion check dam and replacement with a rock check dam; and the placement of temporary quarry spall or other materials to stage equipment, alter the existing trail, develop a temporary materials chute, and for a stream crossing. Contractors will acquire imported materials from a source(s) approved by the City of Bellevue. The following text describes each of the project activities associated with filling and grading and approximate quantities. Please see drawings C-1 through C-3 Site Plan for existing conditions, and locations of proposed activities; drawing C-4 which shows details of rip rap and quarry spall placement; C-5 and C-6 showing check dam details and photos; and drawings C-7 and C-8 for details of LWD placement.

Check Dam Repair

The purpose of placing rock fill into the stream is to repair the existing rock check dams damaged by unusually heavy storm flows during the winter of 2007. Imported materials will consist of approximately 80 to 90 cubic yards of quarry spall and riprap. The contractor will excavate approximately 20 cubic yards of loose rock and organic debris from the footprint areas of the

damaged check dams and stockpile suitable materials on site for reuse. Imported material will be placed into the original check dams but in such a manner as to prevent future damage of the structures. Stockpiled streambed sediment and organic material will be placed on the face of the check dams or in the stream channel.

LWD Installation

The purpose of installing large wood debris is to create habitat diversity in the stream system and to help minimize bank and slope erosion. Imported materials will consist of 35 pieces of large wood. The 35 pieces of large wood will be approximately 12 inches in diameter and approximately 15 to 30 feet long. The root wads associated with the large wood will vary in size. The individual logs that will be placed are approximately 0.75 cubic yards each, totaling approximately 30 cubic yards for all 35 logs. The total volume of material that will be excavated for the placement of LWD is approximately 200 cubic yards. Excavated materials will be used for backfill after the logs are put in place. Excess material will be distributed evenly on the edge of the channel. No material for the installation of LWD will be taken off site.

Placement of Temporary Quarry Spall and Wood Mulch

The contractor will place temporary quarry spall and wood mulch to allow access of equipment and materials to project activities in various locations throughout the project extent. This could include expanding the width or flattening the access trail to allow equipment passage and prevent damage, developing temporary material and equipment staging areas, developing a stabilized construction ingress-egress, developing a temporary materials chute to move materials to check dam #3, and developing a temporary creek crossing to avoid damaging the existing pedestrian bridge during construction activities. The volume of temporary quarry spall and wood mulch is approximately 50 to 100 cubic yards. All temporary quarry spall will be removed by the contractor and integrated into the check dams or hauled off site. All wood mulch will be integrated into the trail or restoration plantings following construction, or hauled offsite.

The trail will be restored to its original condition after construction. The original condition will be based on photos of the trail taken by the City prior to construction.

Placement of Permanent Wood Mulch

The contractor will place up to approximately 170 cy of permanent wood mulch for vegetation restoration following construction. It is anticipated that approximately 60 cy of wood mulch used during construction will be reused, and approximately 120 cy will be imported.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

The purpose of this project is to prevent the recurrence of stream bed incision and channel erosion. Steep slopes (40% or greater) consisting of erodible soils on either side of the project area are outside the project footprint; thereby protecting the slopes against further erosion. Erosion due to Contractor's construction activities within the project footprint could occur but will be minimized with the required implementation of appropriate Best Management Practices (BMP's) which will be outlined in the temporary erosion and sedimentation control (TESC) plan and Stormwater Pollution Prevention Plan (SWPPP) for the project.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

This project does not propose to construct any impervious surfaces. The placement of LWD, rip rap, and quarry spall are not considered impervious as defined by Bellevue Code 20.50.026.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

The following TESC BMPs and other measures, including compliance with permit requirements, will be taken to reduce or control erosion, or other impacts to the earth during construction:

- Establish a temporary construction exit at the site entrance in accordance with City of Bellevue standard detail EC-001.

- Limit areas of vegetation clearing to areas within the approved disturbance limits.
- Preserve natural vegetation to be cleared for as long as possible.
- Install reinforced silt fence as shown in the plans (approximately 300 linear feet) and in accordance with City of Bellevue standard detail EC-005.
- Cover exposed soils at the end of each working day when working from October 1 through April 30. From May 1st through September 30, cover exposed soils within 7 days of exposure and also at the threat of rain. Exposed soil will be covered using plastic, erosion control blankets, straw or mulch.
- Begin work on the upstream most check dam and work from upstream to downstream in order to minimize impacts to the channel.
- Install geotextile and temporary quarry spalls or wood mulch on the existing access trail in order to stabilize the trail during construction.
- TESC BMPs will be monitored and maintained in accordance with the CSWPPP approved by the City of Bellevue prior to the start of work. At a minimum, this will include daily system inspection and monitoring of system performance, visual observation of water quality, water quality sampling to monitor for turbidity and pH in accordance with the City approved monitoring plan, and maintenance as necessary.

2. AIR

- a. What types of emissions to the air would result from the proposal (i.e., dust, automobile odors, and industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.**

Heavy equipment used during construction of this project will emit exhaust and create dust that could contribute to ambient concentrations of suspended particulate matter during project construction. However, these emissions will be short term. Consequently, as long as construction equipment is properly maintained and operated to minimize emissions, no significant air quality impacts are expected to result from construction activities.

Dust from clearing, grading, and other construction activities will be minimized at all times.

The completed project would not produce any additional emissions of carbon monoxide, sulfur, and particulate matter, nor would it produce additional green house gas emissions.

- b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.**

There are no known off-site sources of emissions or odors that may affect this proposed project.

- c. Proposed measures to reduce or control emissions or other impacts to the air, if any:**

Possible construction impacts on air quality would be addressed through the use of construction BMPs. BMPs that could reduce carbon monoxide, sulfur, and particulate matter during construction include the following:

- Use relatively new, well maintained equipment
- Require appropriate emission-control devices on all construction equipment
- Avoid prolonged periods of vehicle idling
- Comply with Puget Sound Clean Air Agency regulations requiring reasonable precautions to minimize odor and dust impacts

Best management practices for the control of windborne construction dust could include the following:

- Apply water to the roadway
- Avoid tracking dirt onto adjacent roadways
- Plant vegetative cover as soon as possible after grading
- Use dust suppressants that have been approved by the director
- Apply water to the site for dust suppression in a manner that keeps sediment out of the creek and public drainage system in a manner that keeps sediment out of the creek and public drainage system.

3. WATER

a. Surface

(1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

The project is located adjacent and within approximately 1,400 linear feet of the upper reach of Vasa Creek and located adjacent and within riparian and slope wetlands paralleling the creek. See attached Critical Areas Report for a description of the water bodies within the project.

Vasa Creek. Vasa creek is located in the greater Vasa Creek Basin in water resource inventory area (WRIA) 8 of the Cedar/Sammamish watershed. This reach of Vasa Creek is classified by the Washington Department of Natural Resources as a non-fish perennial (type “NP”) stream. According to Washington Department of Fish and Game, this portion of Vasa Creek is located approximately 5,000 linear feet south of an impassible fish barrier at I-90. The barrier at I-90 consists of a sedimentation pond, and a gravel-filled channel that lacks perennial surface flow.

Wetlands. A total of six wetlands have been delineated within the project limits, totaling 17,684 square feet. The wetlands within the project limits include 914 square feet of slope wetlands, 16,395 square feet of riverine flow through (and slope) wetlands, and 375 square feet of riverine wetland.

(2) Will the project require any work over, in, or adjacent to (within 200 feet) the described waters? If yes, please describe and attach available plans.

Excavation, fill, and grading activities to install large wood, repair check dams, and replace gabions would occur above and below the OHWM of Vasa Creek, and within wetlands. All work would occur within 200 feet of waterbodies described in 3.a(1). The following table outlines the impacts to Vasa Creek, wetlands, and buffers in the project area. Please see Figure 6 of the attached Critical Areas Report showing the temporary and permanent impacts to wetlands, and streams above and below the ordinary high water mark and within the critical area buffers.

Table 1. Impacts to Vasa Creek Stream Channel, Wetlands, and Buffers in the Vasa Creek Restoration project area.

Resource	Temporary Impacts (square feet)	Permanent Impacts (square feet)
Total Vasa Creek channel impacts (i.e. impacts below OHWM)	9,776	560
Total Wetland Impacts	3,446	0
Wetland A	0	0
Wetland B	0	0
Wetland C	0	0
Wetland D	365	0
Wetland E	375	0
Wetland F	2,706	0
Total buffer impacts (i.e. impacts to stream buffers and wetland buffers)	10,209	0
Total impacts	26,877	560

The appropriate work window would be determined during the permitting process by the WDFW and other regulating agencies to avoid affecting fish in the downstream reaches of the stream. See attached Critical Areas Report for an understanding of project activities over and adjacent to waterbodies described in 3.a(1).

(3) Estimate the amount of fill and dredge material that would be placed in or removed from surface water or wetlands and indicate the area of the site that would be affected. Indicate the source of fill material.

Approximately 110 to 120 cubic yards of new materials will be placed below the OHWM of Vasa Creek described in 3.a(1). The temporary impacts to the wetlands would be the result of temporary clearing to provide construction access and placement of large wood. The project would not permanently affect wetlands. The fill would come from a combination of onsite areas excavated as part of the project and from outside resources. Imported large woody debris, quarry spalls, ecology blocks, wood mulch, and riprap would come from a source(s) approved by the City of Bellevue. See Table 2 for descriptions of fill and excavation quantities above and below the OHWM within Vasa Creek and adjacent wetlands.

Table 2. Excavation and fill quantities above and below the OHWM.

Type of Activity	Excavation below OHWM (cubic yards)	Excavation in wetlands above the OHWM (cubic yards)	Excavation in wetlands below the OHWM (cubic yards)	Total Excavation (cubic yards) ²	Fill in wetlands above the OHWM (cubic yards)	Fill in wetlands below the OHWM (cubic yards)	Fill below OHWM (cubic yards)	Total Fill (cubic yards) ³
Check Dam Repair	20	0	0	20	0	0	80 to 90	80 to 90
LWD Installation ⁴	120	2	20	200	0	0	30	30
Placement of Temporary Quarry Spall ¹	0	0	0	0	20	0	0	50
Placement of Temporary Wood mulch	0	0	0	0	20	0	0	50
Placement of Permanent Wood mulch ⁵	0	0	0	0	170	0	0	170
TOTAL	140	2	20	220	210	0	110 to 120	380 to 390

1. Estimated quantity for temporary construction exit and temporary trail stabilization
2. Includes excavation totals outside of the OHWM, and outside of wetlands
3. Includes fill totals outside of OHWM, and outside of wetlands
4. Fill quantities include the approximate volume of logs and ecology blocks placed below the ordinary high water mark.
5. Placed during planting.

(4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

The contractor will install a temporary bypass system, in accordance with the CSWPPP, to convey water around the work area during construction to that work can occur in dry conditions. The attached design plans (drawings C-1 through C3) detail the temporary bypass system.

In order to isolate the channel from the stream flow, a buried bypass pipe from the original check dam installation in 2001 will be used, augmented with an additional section of bypass pipe in the lower portion of the project area, which extends beyond the limit of the existing bypass pipe. A temporary dam composed of sand bags will be built in the stream at the upstream limit of the project area. Flow collected by this dam will be directed to the bypass pipe inlet for the duration of the project. A temporary rock splash pad will be installed at the downstream end of the bypass pipe for energy dissipation while the bypass pipe is in use.

Some dewatering may be required during installation of LWD due to the depth of excavation required to embed the logs and anchor systems. Water encountered during LWD installation will be treated on site to a level that meets the water quality requirements of the Department of Ecology using temporary sedimentation tanks and filter systems, or directly pumped and discharged to sanitary sewer line that parallels the site.

A sandbag check dam will be installed at the downstream end of the project site (upstream of the outlet of the bypass pipe) in order to collect any hyphoreic flow or seepage that occurs at the downstream end of the project site. This will form a small pond at the downstream end of the project

site and provide an opportunity for inspection of the water quality. If water collected above this check dam is turbid, then the turbid water can be pumped to the sanitary sewer system until the source of turbidity can be identified and corrected. When flow is gradually returned to the channel upon completion of construction, flow may be temporarily pumped from this small pond into the sanitary sewer system that parallels the project site until the water runs clear in order to prevent water quality impacts downstream.

The temporary bypass system will be monitored and maintained in accordance with the CSWPPP approved by the City of Bellevue prior to the start of work. At a minimum, this will include daily system inspection and monitoring of system performance, visual observation of water quality, water quality sampling to monitor for turbidity and pH in accordance with the City approved monitoring plan, and maintenance as necessary.

Turbid water will not be discharged from the site. In the event that Department of Ecology turbidity limits cannot be met, the contractor will pump the turbid water to the sanitary sewer paralleling the site until the source of turbidity can be identified and corrected. However, pumping to the sanitary sewer will only be used a last resort and will not be used as the primary method of streamflow bypass or TESC.

(5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

No, this proposal does not lie within a 100-year flood plain.

(6) Does the proposal involve any discharges of waste materials to surface waters? If so, describe the type of waste and anticipated volume of discharge.

No waste materials will be discharged to surface waters as a result of the proposed project. Flow from the bypass pipe will be slowly reintroduced to the stream when stabilized. Minor surface erosion of restored bed and bank areas will occur during site rewatering, and during the "first flush" of the project area during initial exposure to storm flows. Site rewatering will be monitored and treatment or diversion to the sewer may be used to ensure streamflow meets the Department of Ecology turbidity limits.

b. Ground

(1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description.

Some dewatering may be required during installation of LWD due to the depth of excavation required to embed the logs and anchor systems. Water encountered during LWD installation will be treated on site to a level that meets the water quality requirements of the Department of Ecology using temporary sedimentation tanks and filter systems, or directly pumped and discharged to sanitary sewer line that parallels the site.

(2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: Domestic sewage; industrial, containing the following chemicals...; agricultural; etc.) Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Not applicable.

c. Water Runoff (Including storm water)

(1) Describe the source of runoff (including storm water) and method of collection and disposal, if any (include quantities, if known). Where will this water flow? Will this water flow into other waters? If so, describe.

This proposal involves repairing existing manmade stream features (check dams) with the sole purpose to prevent erosion. Water will continue to flow in its current direction towards Lake Sammamish. Runoff from surrounding streets and residential developments are directed towards the stream and this proposal does not propose to change this existing discharge.

(2) Could waste materials enter ground or surface waters? If so, generally describe.

During construction, waste materials (e.g. gasoline and diesel fuel) from construction equipment could enter Vasa Creek, and could enter groundwater areas of exposed soils. However, a construction spill prevention control and countermeasure plan (CSPCC) would be developed, and BMPs would be implemented for spill control and prevention. Waste materials will not be discharged from the project once completed. During construction, the contractor will implement the following BMPs:

- Pothole prior to excavation whenever excavating within 3 feet of the existing sanitary sewer pipe, or when directed by the City engineer to prevent encountering the sanitary sewer line during installation of LWD and anchors.
- Inspect all equipment at the start of each work day and before any work below the ordinary high water mark to ensure the equipment is free of external petroleum-based products while working near or in any surface waters.
- Use vegetable oil based hydraulic fluid in construction equipment or another approved non-toxic equivalent.
- Adhere to spill prevention measures in accordance with the City approved CSPCC plan.

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

The following Construction Stormwater Pollution Prevention Plan (CSWPPP) BMPs and other measures, including compliance with permit requirements, will be taken to reduce or control surface, ground, and runoff water impacts:

- Install catch basin inserts
- Install reinforced silt fence as shown in the plans (approximately 300 linear feet) and in accordance with City of Bellevue standard detail EC-005
- Install reinforced silt fencing downstream of major disturbance areas, such as LWD installation, until work in those areas is complete, in addition to the reinforced silt fencing shown in the attached plans
- Stage a sweeper on site during earthwork to immediately remove soil that has been tracked onto paved areas
- Remove accumulation of soils or debris from the drive mechanisms (wheels, tracks, tires, etc.) and undercarriage of equipment prior to its working below the ordinary high water line of surface waters, and before leaving the site.
- Monitor and maintain TESC BMPs in accordance with the CSWPPP approved by the City of Bellevue prior to the start of work. At a minimum, this will include daily system inspection and monitoring of system performance, visual observation of water quality, water quality sampling to monitor for turbidity and pH in accordance with the City approved monitoring plan, and maintenance as necessary.

4. Plants

a. Check or circle types of vegetation found on the site:

- deciduous tree: red alder, big leaf maple, Oregon ash
- evergreen tree: fir, western red cedar, pine, western hemlock
- shrubs: vine maple, beaked hazelnut, black elderberry, red-osier dogwood, Indian plum, salmonberry, red huckleberry
- grass
- pasture
- crop or grain
- wet soil plants: cattail, buttercup, bulrush, skunk cabbage, other: red-osier dogwood, salmonberry, giant horsetail, creeping buttercup, maidenhair fern, lady fern
- water plants: water lily, eelgrass, milfoil, other
- other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

The proposed project will result in temporary disturbance of approximately 10,000 square feet (0.23 acres) of riparian vegetation and 3,500 square feet (0.08 acres) of wetland vegetation. The type of vegetation that will be removed consists of herbaceous vegetation, small shrubs, and small trees less than 8" in diameter. No significant trees per City of Bellevue Land Use Code 20.50.046 will be removed or harmed during the process.

c. List threatened or endangered species known to be on or near the site.

There are no threatened or endangered plant species known to be on or near the proposed project site.

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

All vegetation disturbed will be replaced following completion of the check dam repairs in accordance with the landscape planting plans in Appendix A of the Critical Areas Report (see Sheets L-1 through L-4). All planting will occur during the dormant season (October through January). Two distinct planting zones will be planted including wetland and buffer areas consisting of shrub, emergent, and fern plants. Prior to planting, all disturbed soils will be decompacted by tilling. Shrubs will be planted five feet on center, whereas emergents and ferns will be planted 1.5 feet on center. All of the planting areas will be covered with a 4-inch thick layer of wood chip mulch to prevent weed growth and retain soil moisture. Landscape planting plans are included.

The wetland planting areas will include red-osier dogwood (*Cornus sericea*), swamp gooseberry (*Ribes lacustre*), thimbleberry (*Rubus parviflorus*), salmonberry (*Rubus spectabilis*), and slough sedge (*Carex obnupta*). The buffer planting areas will include vine maple (*Acer Circinatum*), indian plum (*Oemleria cerasiformis*), red elderberry (*Sambucus racemosa*), snowberry (*Symphoricarpos albus*), lady fern (*Athyrium filix-femina*) and sword fern (*Polystichum munitum*).

5. ANIMALS

a. Check or circle any birds and animals which have been observed on or near the site or are known to be on or near the site:

- Birds: hawk, heron, eagle, songbirds, pileated woodpecker
- Mammals: deer, raccoon, mountain beaver, fox, coyote, squirrels, bats
- Fish: bass, salmon, trout, herring, shellfish, other:

This section of Vasa Creek is a non-fish bearing stream via the Final Report, City of Bellevue Stream Typing Inventory, Watershed Company, August 14, 2001; and the Washington Department of Fish and Wildlife, SalmonScape (information obtained from their website on May 12, 2010) (WDFW 2010).

b. List any threatened or endangered species known to be on or near the site.

There are no threatened or endangered species known to be on or near the proposed project site. There is good habitat for pileated woodpeckers and it is assumed that breeding habitat is present as well due to the presence of suitably sized trees and observations of adults with fledglings during site visits in May, 2010. The pileated woodpecker is a species of local importance under Bellevue Code LUC 20.25H.150.

c. Is the site part of a migration route? If so, explain.

Yes. The project is within a principal route of the North American Pacific Flyway, an important trans-continent migration route for birds.

d. Proposed measures to preserve or enhance wildlife, if any:

The proposed installation of LWD will result in improved habitat conditions to the affected reach. The installation of wood will absorb the highly erosive forces of large streamflow events thereby protecting the streambank from erosion. This will likely improve turbidity levels in the downstream reach of Vasa Creek nearest to Lake Sammamish. The lower reach contains fish species including cutthroat trout, late run kokanee, coho, and sockeye salmon.

Although project activities are located in an area of Vasa Creek that is non-fish bearing, installation of LWD is also beneficial to other wildlife species. The LWD will provide food and shelter for macroinvertebrates which become prey for birds, amphibians, and riparian animals. It will also provide shelter and habitat for insects, birds, and small animals; including the pileated woodpecker (a species of local importance).

6. Energy and Natural Resources

a. What kinds of energy (electric, natural gas, oil, wood stove, solar) will be used to meet the completed project's energy need? Describe whether it will be used for heating, manufacturing, etc.

No energy will be needed for the completed project.

b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

This proposal will not affect the use of solar energy.

c. What kinds of energy conservation features are included in the plans of the proposal? List other proposed measures to reduce or control energy impacts, if any:

Not applicable (see item A.6.a.)

7. Environmental Health

a. Are there any environmental health hazards, including exposure to toxic chemicals, risk of fire and explosion, spill, or hazardous waste, that could occur as a result of this proposal? If so, describe.

Potentially hazardous materials likely to be present during construction include gasoline and diesel fuels, oils, and lubricants. A spill of one of these substances could occur during construction as a result of either equipment failure or worker error. All hydraulic fluid in construction equipment will be vegetable oil based or another approved non-toxic equivalent.

No environmental health hazards will occur once the proposal is completed.

(1) Describe special emergency services that might be required.

Emergency fire or medic services could be required during construction and possibly during maintenance of the completed project. No special emergency services will be required once the proposal is completed.

(2) Proposed measures to reduce or control environmental health hazards, if any.

The contractor will implement the following measures to reduce or control environmental health hazards:

- Submit a Health and Safety Plan before work commences. This plan will provide information on any toxic substances that may be associated with the project and outline safe procedures for handling any of these substances.
- Implement appropriate BMPs which will be outlined in the TESC plan, CSPCC plan, and CSWPPP for the project.

- Contain and dispose of contaminated materials that are encountered during construction in a manner consistent with the level of contamination, in accordance with federal, state and local regulatory requirements, by a qualified contractor(s).

Because no environmental health hazards would be created once the proposed project is completed, no measures to reduce or control health hazards are proposed.

b. Noise

(1) What types of noise exist in the area which may affect your project (for example, traffic, equipment, operation, other)?

Per City of Bellevue Code (9.18.030) and the Washington State Department of Ecology, the loudest permissible sound for a residential zone is 60 A-weighted decibels (dBA). The background noise existing in the project would not affect the proposed project.

(2) What types and levels of noise would be created by or associated with the project on a short-term or long-term basis (for example, traffic, construction, operation, other)? Indicate what hours noise would come from the site.

Noise levels within the project area would temporarily increase during construction activities from construction vehicles and equipment. Pursuant to Bellevue City Code (BCC) 9.18.020, sounds created by construction and emanating from the construction site are exempt from the provisions of the Bellevue Noise Ordinance between the hours of 7:00 a.m. and 6:00 p.m. on weekdays, and 9:00 a.m. and 6:00 p.m. on Saturdays which are not legal holidays. Sounds emanating from construction sites on Sundays or legal holidays or outside of the exempt work hours are prohibited pursuant to BCC 9.18.040 unless expanded hours of operation are authorized by the applicable department director subject to specific criteria.

Long terms noises will remain unchanged.

(3) Proposed measures to reduce or control noise impacts, if any:

In the short term, noises from the Contractor's equipment will only occur during the permissible work hours per Bellevue City Code 9.18.020. Additional noise abatement measures that could be implemented include the following:

- Install and maintain effective mufflers.
- Locate equipment and vehicle staging areas as far from residential areas as possible.
- Minimize idling of power equipment.
- Modify backup alarms to reduce noise impacts.

8. Land and Shoreline Use

a. What is the current use of the site and adjacent properties?

The site is currently being used as an open space by the City of Bellevue Parks department. Adjacent properties are being used as single family residences.

b. Has the site been used for agriculture? If so, describe.

It is unknown whether this site was used for agriculture. It appears to be unlikely given the topography.

c. Describe any structures on the site.

There is an existing wooden foot bridge within the proposed project boundaries.

d. Will any structures be demolished? If so, what?

No structures are being demolished under this proposal.

e. What is the current zoning classification of the site?

The current zoning classification for the site is R-5.

f. What is the current comprehensive plan designation of the site?

The current comprehensive designation for this site is single family.

g. If applicable, what is the current shoreline master program designation of the site?

N/A

h. Has any part of the site been classified as an “environmentally sensitive” area? If so, specify.

Identified environmentally sensitive areas include Vasa Creek and associated buffer, wetlands and wetland buffers, and a geologic hazards area. The stream and wetlands and their buffers are considered habitats associated with species of local importance. The environmentally sensitive areas are described in the Critical Areas Report attached to this checklist.

i. Approximately how many people would reside or work in the completed project?

N/A

j. Approximately how many people would the completed project displace?

N/A

k. Proposed measures to avoid or reduce displacement impacts, if any:

N/A

i. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:

N/A

9. Housing

a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low-income housing.

N/A

b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low-income housing.

N/A

c. Proposed measures to reduce or control housing impacts, if any:

N/A

10. Aesthetics

- a. **What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?**

N/A

- b. **What views in the immediate vicinity would be altered or obstructed?**

No views in the immediate vicinity would be altered or obstructed.

- c. **Proposed measures to reduce or control aesthetic impacts, if any:**

Because the project would not include aesthetic impacts, no measures reduce or control impacts are proposed.

11. Light and Glare

- a. **What type of light or glare will the proposal produce? What time of day would it mainly occur?**

No light or glare will result from the proposed project.

- b. **Could light or glare from the finished project be a safety hazard or interfere with views?**

No light or glare from the finished project would be a safety hazard or interfere with views.

- c. **What existing off-site sources of light or glare may affect your proposal?**

No existing off-site sources of light or glare would affect the proposed project.

- d. **Proposed measures to reduce or control light or glare impacts, if any:**

No light or glare impacts would occur; therefore, no measures are proposed to reduce or control impacts.

12. Recreation

- a. **What designated and informal recreational opportunities are in the immediate vicinity?**

The project site is known as Horizon Heights Open Space. The site contains Vasa Creek Trail which is used by neighboring residents to walk adjacent to the creek.

- b. **Would the proposed project displace any existing recreational uses? If so, describe.**

The project would temporarily displace recreational use. The existing pathway will be utilized by the contractor to transport construction materials to the various check dam repair locations and for the safety of the public; those areas will be temporarily closed.

- c. **Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:**

Implementing and applying measures reducing or controlling impacts to recreational use will be difficult and dangerous to the public. The paths around the work sites will be cordoned off to protect people from harm. Informational signs will be utilized to inform users the trail is temporarily closed.

13. Historic and Cultural Preservation

- a. **Are there any places or objects listed on, or proposed for, national, state, or local preservation registers known to be on or next to the site? If so, generally describe.**

There are no known national, state, or locally listed historic sites on or next to the site.

- b. **Generally describe any landmarks or evidence of historic, archeological, scientific, or cultural importance known to be on or next to the site.**

The 1999 SEPA threshold determination for installation of the original check dams that were destroyed in the 2007 storm indicated that there was no potential for impact to any potentially significant site (City of Bellevue 1999). In addition, the City of Bellevue Historic and Cultural Resources Survey (Tobin, Pendergrass 1993) indicates no historic or cultural resources on or next to the site.

- c. **Proposed measures to reduce or control impacts, if any:**

Should evidence of cultural remains, either historic or prehistoric, be encountered during excavation, work in the immediate area will be suspended, and the find will be examined and documented by a professional archaeologist in accordance with State law. Decisions regarding appropriate mitigation and further action would be made at that time.

14. Transportation

- a. **Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.**

The project site is bounded to the south by SE 46th Way, to the north by SE 45th Street, to the west by 151st Avenue SE, and to the east by 152nd Avenue SE.

- b. **Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?**

The project site is currently served by King County METRO bus service. The nearest bus stop (bus route #208) is located several properties west on SE 46th Street along the southerly boundary of the site.

- c. **How many parking spaces would be completed project have? How many would the project eliminate?**

N/A

- d. **Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).**

There is no roadway work proposed for this project.

- e. **Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.**

No water, rail or air transportation will be used for this proposed project.

- f. **How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.**

No daily vehicular trips will be generated by the completed project.

- g. **Proposed measures to reduce or control transportation impacts, if any:**

N/A

15. Public Services

- a. **Would the project result in an increased need for the public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.**

The completed project will not result in an increase in public services.

- b. **Proposed measures to reduce or control direct impacts on public services, if any.**

N/A

16. Utilities

- a. **Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other,**

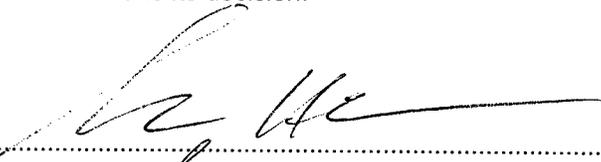
A sanitary sewer pipe is located adjacent and underneath Vasa Creek.

- b. **Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.**

No new utilities are being proposed for this project.

Signature

The above answers are true and complete to the best of my knowledge. I understand that the lead agency is relying on them to make its decision.

Signature 

Date Submitted *August 30, 2010*

References

City of Bellevue. 1999. SEPA Determination of Non Significance, File #PSEPA 99 266, May 27, 1999.

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Tobin, Caroline C., Pendergass, Lee, F. 1993. City of Bellevue Historic and Cultural Resources Survey. March 1993. Survey Updated in July 1997.

WDFW. 2010. SalmonScape. Washington Department of Fish and Wildlife. Obtained May 12, 2010, from agency website: <<http://wdfw.wa.gov/mapping/salmonscape/index.html>>.

CRITICAL AREAS REPORT

Upper Vasa Creek Check Dam Repairs Phase II Project

Prepared for

City of Bellevue
Utilities Department

August 2010

Note:

Some pages in this document have been purposefully skipped or blank pages inserted so that this document will copy correctly when duplexed.

CRITICAL AREAS REPORT

Upper Vasa Creek Check Dam Repairs Phase II Project

Prepared for

City of Bellevue
Utilities Department
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Bellevue, Washington 98004

Prepared by

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August 9, 2010

Disclaimer

Herrera Environmental Consultants, Inc. has prepared this report for use by the City of Bellevue. The results and conclusions in this report represent the professional opinion of Herrera Environmental Consultants, Inc. They are based in part upon (1) site reconnaissance, and (2) examination of public domain information concerning the study area.

The work was performed according to critical area studies and reporting standards required by the City of Bellevue Land Use Code (Part 20.25H) and the accepted standards in the field of jurisdictional wetland determination and delineation using the Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987), the Interim Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region (Environmental Laboratory 2008), and the Washington State Wetlands Identification and Delineation Manual (Ecology 1997). However, final determination of jurisdictional wetland boundaries pertinent to Section 404 of the Clean Water Act is the responsibility of the Seattle District of the U.S. Army Corps of Engineers. Various agencies of the state of Washington and local jurisdictions may require a review of final site development plans that could potentially affect zoning, buffer requirements, water quality, and/or habitat functions of lands in question. Therefore, the findings and conclusions in this report should be reviewed by appropriate regulatory agencies before any detailed site planning and/or construction activities.

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Critical Area Report—Upper Vasa Creek Check Dam Repairs Phase II Project

1.0 Report Summary

The Vasa Creek Restoration Project is a City of Bellevue Utilities Department project that involves restoration of rock check dams, installed in 2001, that were damaged during extremely high stream flows during a storm in 2007. The rock check dams stabilize the stream bed which is prone to erosion due to both its location in a steep ravine and the stormwater flows that are conveyed by the channel. The work proposed to occur will improve the design of the check dams to withstand higher flows than the previous design. The check dams will be repaired by placement of approximately 80 to 90 cubic yards of rock (i.e., riprap and quarry spalls). The project will also include the placement of approximately 35 pieces of large woody debris (LWD) to enhance in-stream habitat conditions. Funding for the project will be provided by the Federal Emergency Management Agency (FEMA) and City of Bellevue Capital Improvement Program.

The project is located within, and directly adjacent to, the channel of Vasa Creek in the City of Bellevue. The project extends from the culvert outlet at SE 46th Street downstream to the culvert inlet at SE 45th Street.

Critical areas within the project area include Vasa Creek (stream), six wetlands, buffers for these aquatic resources, geologic hazards (steep slopes/landslide hazards), and habitats for wildlife species of local significance. The project will have no impacts to geologic hazards or habitats for species of local significance. The project will have temporary and permanent impacts on the Vasa Creek stream bed, and temporary impacts to adjacent wetlands wetland buffers and stream buffers. These impacts are summarized in Table S-1 and described below.

Table S-1. Impacts to Vasa Creek stream channel, wetlands, and buffers in the Vasa Creek Restoration Project Area.

Resource	Temporary Impacts (square feet)	Permanent Impacts (square feet)
Total Vasa Creek channel impacts (i.e., impacts below OHWM)	9,776	560
Total Wetland Impacts	3,446	0
Wetland A	0	0
Wetland B	0	0
Wetland C	0	0
Wetland D	365	0
Wetland E	375	0
Wetland F	2,706	0
Total buffer impacts (i.e., impacts to stream buffers and wetland buffers)	10,209	0
Total impacts	26,877	560

Temporary impacts to the Vasa Creek stream bed will result from construction access and excavation outside of permanent in-stream structure footprints, and from activities associated with placement of large wood in the channel. Permanent impacts to the Vasa Creek stream bed will result from rock placement to restore the check dams.

Critical Area Report—Upper Vasa Creek Check Dam Repairs Phase II Project

Temporary impacts to wetlands will result from temporary clearing to provide construction access and for placement of large wood.

Temporary impacts to wetland and stream buffers will result from temporary construction access.

Project impacts were evaluated during the design process to reduce impacts to Vasa Creek and associated wetlands, and their buffers. Consistent with the City of Bellevue Land Use Code (LUC) 20.25H.055.C.3.m, design scenarios such as “soft-site” restoration techniques (e.g., coir matting, aggressive riparian planting efforts) were considered and not selected for the following reasons:

- The extremely high flows that occur would generate forces greater than these materials could withstand
- The heavily shaded nature of the project site would reduce the vigor of most planting stock designed for those conditions (e.g., willows)

However, all temporarily impacted wetlands and buffers will be restored by planting native shrubs, emergents, and ferns.

2.0 Introduction

The Vasa Creek Restoration Project (hereafter, “the project”) is a restoration of rock check dams, installed in 2001, that were damaged during extremely high stream flows during a storm in 2007. The rock check dams stabilize the stream bed which is prone to erosion due to both its location in a steep ravine and the stormwater flows that are conveyed by the channel. The proposed project will improve the design of the check dams to withstand higher flows than the previous design. The check dams will be repaired by placement of approximately 80 to 90 cubic yards of rock (i.e., riprap and quarry spalls) in accordance with the engineering design developed for the project. The project will also include the placement of 35 pieces of LWD to enhance in-stream habitat conditions. Funding for the project will be provided by FEMA and City of Bellevue Capital Improvement Program.

2.1 Project History

Several large landslides and heavy rain events in the 1990s resulted in damage to both the project area and property downstream. Damage included slide activity that deposited debris (including trees, soil, and gravel) in Vasa Creek, and movement of debris and sediment within the creek that plugged culverts and damaged infrastructure downstream. The damaged property included an elementary school, a church, and two King County sediment basins. A sewer pipe buried within the substrate of Vasa Creek and portions of several manholes also were exposed and damaged. To prevent further damage, 14 check dams were constructed in Vasa Creek in summer of 2001. The check dams were constructed to prevent erosion, thereby protecting the sanitary sewer main in the stream bed, minimizing the potential for landslides and damage to homes sited on the top of the ravine, reducing risk of damage to downstream infrastructure, minimizing long-term maintenance costs for the sewer main, and improving water quality and downstream habitat for fish species.

In December of 2007, a storm event generated a stream flow with a magnitude greater than a 100-year return interval, damaging 12 of the check dams. FEMA provided funding to repair damages to 10 of the check dams. In 2008, interim repairs were applied to the three check dams that were the most badly damaged. The interim repairs prevented further damage from occurring until the City of Bellevue could design repairs for all the check dams and acquire the necessary permits, solicit bids, award a contract, and construct the repairs. This report describes that design and the effects on critical areas that will result from implementing the project.

The project includes repairs on two of the three check dams that received interim repairs in 2008, and repairs on the remaining seven check dams covered by FEMA funding for damages incurred from the December 2007 storm. In addition to repairing the check dams, the City of Bellevue will install 35 pieces of LWD in the stream bed to create habitat diversity in the stream system.

2.2 Project Setting

The project is located within and directly adjacent to Vasa Creek in the City of Bellevue (Figure 1). The project extends from the culvert outlet at SE 46th Street downstream to the culvert inlet at SE 45th Street. The project is located entirely within property owned by the City of Bellevue Parks Department, in the Horizon Heights Open Space (parcel #: #3459400500, 1424059099, 3459420200, and 9346920520). The project is located within the southwest ¼ of Section 14, Township 24 North, Range 6 East.

Vasa Creek flows through a steep, forested ravine in the project area. Residential homes are located at the tops of steep slopes that confine the ravine. The watershed of Vasa Creek upstream of the project area is heavily developed. Stormwater from the watershed is conveyed through streets, city and county stormwater infrastructure, ad hoc stormwater diversions (i.e., the many unpermitted residential stormwater discharges), and direct runoff to Vasa Creek. Storm events result in the discharge of large volumes of stormwater to the channel, with very little desynchronization between the storms and runoff. Therefore, storm flows are high and have a very flashy hydroperiod in which stream levels rise rapidly during storm events and fall quickly once rain has subsided. The result is maximum erosion rates during storms, very little base-flow between storms, and reduced opportunities for the establishment of a stable stream bed and riparian vegetation. These erosive conditions in Vasa Creek were addressed with the original check dam project in 2001, the emergency repairs following the 2007 flood, and the current proposed project.

2.3 Project Description

The project will include the following elements:

1. Site preparation [including installation of Temporary Erosion and Sediment Control (TESC) measures, implementation of best management practices (BMPs), and stream flow routing through a bypass system]
2. Check dam repair and LWD installation
3. Site restoration, including replanting of disturbed wetland and buffer areas and restoration of the trail
4. Removal of TESC measures and reintroduction of stream flow to the restored channel

These steps of the project are discussed in detail below, along with a description of anticipated temporary and permanent impacts of the project.

2.3.1 Site Preparation

Site preparation activities include:

1. Staking the limits of disturbance, locations of construction access points, and staging areas, and documenting baseline conditions
2. Establishing traffic control (including exclusion of public trail access for duration of project)
3. Contractor mobilization
4. Installing TESC and implementing other BMPs
5. Developing the access route, stream crossing, staging areas, and a temporary materials/rock handling chute
6. Preparing and activating temporary stream bypass system

2.3.1.1 Staking the Limits of Disturbance, Locations of Construction Access Points, and Staging Areas, and Documenting Baseline Conditions

Prior to arrival of the contractor onsite, the City of Bellevue will stake the limits of disturbance, the clearing limits, the existing wetlands, and the locations of the primary construction elements. The primary construction elements of the project include the check dams to be repaired, location of LWD structures in the stream channel, and locations of TESC and other BMPs. The City of Bellevue will take photos of the site (including the existing native vegetation) to document the condition of wetlands and buffer vegetation before the contractor begins work on the project.

2.3.1.2 Establishing Traffic Control

Prior to mobilization, the contractor will establish traffic control at the construction access point on NE 46th Street as well as at any locations between the construction access point and arterials, as dictated by the traffic control plan and right-of-way use permit. In addition, the contractor will block pedestrian access to the project site for the duration of the project.

2.3.1.3 Contractor Mobilization

Once traffic control is established, the contractor will mobilize to the site. This includes the transportation of the equipment required for the project, support vehicles, TESC and spill prevention control and countermeasures plan (SPCC plan) materials. The contractor will establish a construction access entrance at the existing trail entrance along SE 45th Street, composed of geotextile fabric overlain with quarry spalls to control export of sediment for the

Critical Area Report—Upper Vasa Creek Check Dam Repairs Phase II Project

site. The construction access entrance will include barriers to vehicle access, as well as a gate to allow passage of construction vehicles.

2.3.1.4 Installing Temporary Erosion and Sediment Control (TESC) and Implementing Other Best Management Practices (BMPs)

The contractor will be required to implement the measures in the construction stormwater pollution prevention plan (CSWPPP), SPCC plan and traffic control plan, including installation of all components of the TESC plan and streamflow bypass system (described in additional detail in Section 2.3.1.6) as soon as work commences on the project. The engineering plans (Appendix A) identify the minimum requirements for TESC and also define the streamflow bypass system to be used by the contractor. If the contractor elects to use alternative TESC measures or bypass system, then these must be defined in the CSWPPP and approved by the City of Bellevue prior to starting work on the project. All BMPs and other measures described in this section will be inspected by the City of Bellevue engineer after installation to ensure they are installed according to the CSWPPP.

The following TESC BMPs and other measure will be taken to protect water quality and stabilize the site during construction:

- A temporary construction entrance will be established accordance with City of Bellevue standard detail EC-001.
- Vegetation clearing will be limited to areas within the approved disturbance limits.
- Natural vegetation to be cleared will be preserved for as long as possible.
- Catch basin inserts will be installed.
- Reinforced silt fence will be installed as shown in the plans (approximately 300 linear feet) and in accordance with City of Bellevue standard detail EC-005.
- In addition to the reinforced silt fencing shown in the attached plans, the contractor will install reinforce silt fencing downstream of major disturbance areas, such as LWD installation, until work in those areas is complete
- Exposed soils will be covered at the end of each working day when working from October 1 through April 30. From May 1 through September 30, exposed soils will be covered within 7 days of exposure and also at the threat of rain. Exposed soil will be covered using plastic, erosion control blankets, straw or mulch.

Critical Area Report—Upper Vasa Creek Check Dam Repairs Phase II Project

- A sweeper will be staged on site during earthwork to immediately remove soil that has been tracked onto paved areas.
- The contractor will begin work on the upstream-most check dam and work from upstream to downstream in order to minimize impacts to the channel.
- The contractor may install approximately 50 to 100 cubic yards of temporary quarry spalls or wood mulch on the existing access trail in order to stabilize the trail during construction. The material will be removed at the conclusion of the project.
- Accumulation of soils or debris shall be removed from the drive mechanisms (wheels, tracks, tires, etc.) and undercarriage of equipment prior to working below the ordinary high water line of surface waters, and before leaving the site.
- TESC BMPs will be monitored and maintained in accordance with the CSWPPP approved by the City of Bellevue prior to the start of work. At a minimum, this will include daily system inspection and monitoring of system performance, visual observation of water quality, water quality sampling to monitor for turbidity and pH in accordance with the City of Bellevue approved monitoring plan, and maintenance as necessary.

Other BMPs to be implemented at the site include:

- In order to prevent encountering the sanitary sewer line during installation of LWD and anchors, the contractor will pothole prior to excavation whenever excavating within 3 feet of the existing sanitary sewer pipe, or when directed by the City of Bellevue engineer.
- The contractor will be prohibited from using the small existing pedestrian bridge for crossing the creek with equipment or materials because it is too small and light to carry the loads needed for construction. A steel plate will be used to facilitate construction access to the upstream portion of the project site from the single construction exit off of SE 45th Street.
- The contractor will inspect all equipment at the start of each work day and before any work below the ordinary high water mark to ensure the equipment is free of external petroleum-based products while working near or in any surface waters.
- All hydraulic fluid in construction equipment will be vegetable oil based or another approved non-toxic equivalent.
- Spill prevention measures will be taken in accordance with the City of Bellevue approved SPCC plan.

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2.3.1.5 *Developing Access Route, Stream Crossing, Staging Areas, and a Temporary Materials/Rock Handling Chute*

Once TESC and other BMP measures are in place, the contract will develop the access route to the project restoration sites. The primary access route will follow the path of the existing foot trail. In addition, an existing access route to the culvert under SE 45th Street will be re-established (see Appendix A). Access for the construction equipment will require temporary clearing of trail-side vegetation and installation of a temporary access road (approximately 10 feet wide). If site conditions are too unstable for equipment access, the trail and adjacent cleared areas may be covered in geotextile fabric and buried in quarry spalls or wood mulch to provide a drivable surface for construction equipment.

Once the access route is developed to the stream crossing, a temporary bridge will be installed, using metal plates, augmented with quarry spalls outside of the ordinary high water mark. The access route will then be established to the southern end of the project area.

Once the access route is completed, access areas between the access route and check dam repair sites as well as material staging areas will be cleared and stabilized. The project access entrance will serve as the primary staging area. Several smaller construction staging areas will be located upstream of the existing pedestrian foot bridge. The temporary creek crossing will be located north of the existing pedestrian bridge and will only be used while the creek is bypassed. The materials/rock handling chute will be installed between the existing trail and the creek. See drawing sheets C-1 through C-3 for proposed staging locations and drawing sheet ES-1 for proposed TESC details. A temporary materials/rock handling chute will be installed near check dam #3 to deliver construction materials down the steep embankment between the trail and the check dam.

2.3.1.6 *Preparing and Activating Temporary Stream Bypass System*

All in-channel work will be sequenced to occur in dry conditions while the creek flow is bypassed around the work area. The contractor will install a temporary bypass system, in accordance with the CSWPPP, to convey water around the work area during construction. The design plans (see Appendix A) detail the temporary bypass system.

In order to isolate the channel from the stream flow, a buried bypass pipe leftover from the original check dam installation in 2001 will be used, augmented with an additional section of bypass pipe in the lower portion of the project area which extends beyond the limit of the existing bypass pipe. A temporary dam composed of sand bags will be built in the stream at the upstream limit of the project area. Flow collected by this dam will be directed to the bypass pipe inlet for the duration of the project. A temporary rock splash pad will be installed at the downstream end of the bypass pipe for energy dissipation while the bypass pipe is in use.

Some dewatering may be required during installation of LWD due to the depth of excavation required to embed the logs and anchor systems. Water encountered during LWD installation will be treated on site to a level that meets Washington State water quality standards using temporary

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sedimentation tanks and filter systems, or directly pumped and discharged to sanitary sewer line that parallels the site.

A sandbag check dam will be installed at the downstream end of the project site (upstream of the outlet of the bypass pipe) in order to collect any hyporheic flow or seepage that occurs at the downstream end of the project site. This will form a small pond at the downstream end of the project site and provide an opportunity for inspection of the water quality. If water collected above this check dam is turbid, then the turbid water can be pumped to the sanitary sewer system until the source of turbidity can be identified and corrected. When flow is gradually returned to the channel upon completion of construction, flow may be temporarily pumped from this small pond into the sanitary sewer system that parallels the project site until the water runs clear in order to prevent water quality impacts downstream.

The temporary bypass system will be monitored and maintained in accordance with the CSWPPP approved by the City of Bellevue prior to the start of work. At a minimum, this will include daily system inspection and monitoring of system performance, visual observation of water quality, water quality sampling to monitor for turbidity and pH in accordance with the City of Bellevue approved monitoring plan, and maintenance as necessary.

Turbid water will not be discharged from the site. In the event that water quality standards for turbidity cannot be achieved, the contractor will pump the turbid water to the sanitary sewer paralleling the site until the source of turbidity can be identified and corrected. However, pumping to the sanitary sewer will only be used as a last resort and will not be used as the primary method of streamflow bypass or TESC.

2.3.2 Check Dam Repair and LWD Installation

Once the project site has been prepared for construction, the check dam repair process will begin. The following sections describe the equipment to be used, material staging and transportation locations and methods, in-channel check dam repair work, and LWD installation.

2.3.2.1 Equipment

Motorized equipment will be selected by the contractor based on site constraints. The width of the access trail will limit potential equipment choices to small excavators, small tractors, skid steers, mini skid steers, or motorized wheelbarrows. The volume and depth of excavation will require the use of an excavator or tractor with a backhoe.

2.3.2.2 Material Staging and Transportation

The contractor will receive materials (e.g., riprap, quarry spalls, LWD) for check dam repair at the project site entrance and will use designated staging areas and other areas approved by the City of Bellevue engineer for temporary storage of materials. The contractor will use motorized equipment to transport the material along the construction access route to staging areas adjacent

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to the channel prior to check dam repair. The engineering specifications will place limits on the size of equipment and methods used in order to minimize impacts to the existing trail, wetlands, and the stream channel.

Material may be stockpiled in the area surrounding the site entrance or adjacent to the trail (above the ordinary high water mark of the stream and outside of wetlands). The trail may also be used for temporary stockpiling for riprap, quarry spalls, logs, ecology blocks, and other miscellaneous materials. See the attached plan sheets for designated staging areas. Staging areas identified on the plans may be used for the duration of the project.

2.3.2.3 Rock Check Dam Repair

Repairs will be performed on check dams #1, #2, #3, #4, #6, #9, #11, #12, and #13. Prior to placing the new rock in the check dams, the channel will be dewatered using the City of Bellevue approved temporary streamflow bypass system (see Section 2.3.1.6 above). A small excavator or other machinery will be used to remove stream sediment and organic debris that has accumulated on the damaged check dams. It is expected that 1 to 2 yards of sediment and organic debris will be temporarily removed from each check dam prior to repair. These materials will be removed from below the ordinary high water mark and will be stockpiled within the limits of disturbance during work on the check dams. The machinery will then be used to place the riprap into the check dams to repair areas that were damaged during December 2007. Due to the heavy nature of some of the riprap pieces (300 to 2,000 pounds each), the small machinery may need to occupy area within the ordinary high water mark of the stream channel in order to reach the check dams for riprap placement. After placement of the riprap, quarry spall pieces will be placed by hand in voids between the riprap to provide additional stability of the check dam structure. After completion of the repair at each check dam, the stream sediment and organic debris will be placed back in the channel and on the face of the check dam. Approximately 80 to 90 cubic yards of riprap and quarry spalls will be placed in the channel. All new rock will be placed below the ordinary high water mark. Attached drawing sheet C-4 shows the details of riprap and quarry spall placement, and drawing sheets C-5 and C-6 show check dam details, photos, and quantities of riprap and quarry spall that will be placed in each check dam.

Repair of check dam #1 differs slightly from repair of other check dams. Check dam #1 was originally constructed of three wire gabion baskets that spanned the width of the channel. The basket in the center of the channel was completely destroyed and the other two baskets were damaged. The remaining damaged baskets will be removed from the channel and disposed of offsite by the contractor. Riprap and quarry spall will be used to rebuild check dam #1 without the use of gabion baskets. The ends of check dams #1 will be benched into firm, undisturbed soil or existing riprap. See drawing sheet C-4 for the details of check dam #1 repair.

2.3.2.4 Large Woody Debris Installation

Thirty-five (35) pieces of LWD will be added to the channel in order to provide in-water habitat for fish and other aquatic species. The LWD installation is mitigation for the placement of rock below the ordinary high water mark during the check dam repairs described above. Installation

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of most LWD and associated anchors will require excavation below the ordinary high water mark. The LWD pieces will be approximately 12 inches in diameter and approximately 15 to 30 feet long. The root wads associated with the large wood will vary in size. The individual logs are approximately 0.75 cubic yards each totaling approximately 30 cubic yards for all 35 logs. On average, approximately one third of each log will be in the low flow area of the stream channel.

The contractor will procure the logs and transport them to staging areas prior to installation. Log transport will be performed using equipment described in the previous section. The logs will be anchored using cabled duckbill anchors or ecology block anchors. See drawing sheets C-7 and C-8 for detailed illustrations of proposed anchoring systems and installation of log structures that are composed of three or more logs. Installation of the LWD will involve excavation of 10 to 20 cubic yards of soil per log structure in order to provide adequate embedment of the LWD and anchors. Ecology block anchors will be installed with adequate cover to prevent the blocks from becoming uncovered in the future.

The total volume of material that will be excavated for the placement of all LWD, including excavation for logs and anchors, is approximately 200 cubic yards. Excavated materials will be used for backfill after the logs are put in place. Excess material will be distributed evenly on the edge of the low flow channel. No excavated material will be taken offsite.

2.3.3 Vegetation Restoration

Once check dam repair work and LWD installation is complete, temporarily disturbed vegetation will be restored (see Section 3.6 Restoration Plan). The City of Bellevue will take photos of the site (including the native vegetation) to document the condition of the wetlands and buffer vegetation before the contractor begins work on the project. At the conclusion of the project, the contractor will restore the site to pre-project conditions by restoring the original grades, soils, and vegetation (i.e., planting native vegetation). Some of these restoration activities will occur after the removal of TESC measures (described in the following section), as some of the TESC measures will be occupying the locations of restoration sites (e.g., along the existing trail).

2.3.4 Removal of TESC Measures, Reintroduction of Stream Flow, and Trail Restoration

Removal of TESC measures will occur in stages. Following completion of all work, including vegetation restoration, TESC measures that isolate work areas (e.g., silt fencing) will be removed. Sand bag dams at both ends of the project and the bypass system will be removed when streamflow is reintroduced to the channel. Once these dams are removed, the temporary access route materials (quarry spalls, geotextile, stream-crossing metal plates) will be removed, starting from the upstream (south) end of the project area and proceeding north, ending at the removal of the construction entrance. The foot trail will be restored to pre-construction conditions. Site access restrictions (including pedestrian access) will be removed. Pending final inspection by the City of Bellevue engineer, the project will then be considered complete.

3.0 Critical Areas Assessment

Consistent with LUC 20.25H.245, the supporting information upon which this report is based was developed by qualified professionals in the areas of wetlands and fisheries biology, and geomorphology using the best available science and guidance. This report provides Critical Area Report (CAR) information needs specified in LUC 20.25H. For ease of reference, this report includes separate sections for each critical area evaluated for this project: wetlands and streams (Section 3.3), geologic hazards (Section 3.4), and habitats associated with species of local importance (Section 3.5). Each section complies with reporting requirements specific to the critical area and the general CAR reporting requirements provided in LUC 20.25H.250.B.4 through B.8. The report also covers information needs specified under general CAR reporting requirements LUC 20.25H.250.B.1 through B.3 (see Sections 3.1 and 3.2 below).

3.1 Identification and Classification of Critical Areas and Critical Area Buffers

This subsection addresses LUC 20.25H.250.B, subsections 1 and 2. Identified critical areas and critical area buffers within and adjacent to the impact area include the following (Figure 2):

- ***Streams and stream buffers*** (Type O waters [LUC 20.25H.075])
- ***Wetlands and wetland buffers*** (Categories II, III, and IV [LUC 20.25H.095])
- ***Geologic hazards*** (Landslide hazard, steep slopes [LUC 20.25H.120])
- ***Habitats associated with species of local importance*** (Breeding habitat for Pileated woodpecker, habitat for protected bat species [LUC 20.25H.150])

3.2 Regulations and Codes

The proposed action is classified as an allowable use and development identified in LUC 20.25H.055.B under “stabilization measures.” The uses are allowed if certain performance standards are met for each critical area identified in the project area. Consistent with the CAR guidance (LUC 20.25H.230 - 270), relevant performance standards are discussed in detail under Sections 3.3 Wetland and Stream Assessment, 3.4 Geologic Hazard Area Assessment, and 3.5 Habitat Assessment.

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The proposed action meets or will meet the Critical Areas Land Use Permit approval criteria identified in LUC 20.30P. The proposal also meets the general mitigation and restoration plan standards identified in LUC 20.25H.210 - 225, and mitigation standards identified in LUC 20.25H.085 and LUC 20.25H.105. Section 3.6 Restoration Plan outlines the mitigation proposed under this project for Vasa Creek, wetlands, and buffers. A state environmental policy act (SEPA) checklist will also be submitted for the project.

3.3 Wetland and Stream Assessment

The contents of this section satisfies CAR requirements for wetlands and streams specified under LUC 20.25H.110.B and CAR reporting requirements provided in LUC 20.25H.250.B4 – B8. This section describes the conditions of wetlands and streams in the study area, wetland and stream ratings, and required buffer widths.

During the wetland and stream assessment, the project study area and vicinity was inspected for the presence of wetlands and streams.

The objectives of the study were to:

- Delineate (flag) all wetlands in the study area
- Classify all delineated wetlands using the U.S. Fish and Wildlife Service classification system (Cowardin et al. 1979)
- Classify all delineated wetlands using the hydrogeomorphic classification system (Brinson 1993)
- Classify all delineated wetlands and assess their functions using the *Washington State Wetland Rating System for Western Washington—Revised* (Hruby 2004), which is the classification system required by LUC 20.25H.095
- Determine the applicable wetland buffer widths required by LUC 20.25H.095
- Delineate (flag) the OHWM of all streams in the study area
- Classify all stream using the classification system required by LUC 20.25H.075
- Determine the applicable stream buffer widths required by LUC 20.25H.075

3.3.1 Methods and Materials

Evaluating the presence, extent, and type of wetlands and streams requires a review of available information about the site (e.g., surveys, studies), followed by an onsite wetland and stream delineation. The following sections describe the research methods and field protocols for the wetland and stream evaluations. More information about the methodology used in the wetland delineation performed for this project is available in Appendix B.

3.3.1.1 Review of Available Information

A literature review was performed to determine the historical and current presence of wetlands and streams in and near the study area. The sources of information are:

- Aerial photographs of the Vasa Creek project vicinity (USDA 2010)
- Topographic map of the project vicinity (PSLC 2010; Bellevue 2009)
- National Wetlands Inventory map of wetland areas in the project vicinity (USFWS 2010)
- City of Bellevue and King County wetland inventories (Bellevue 2010; King County 2010)
- Hydrography data (stream locations) for City of Bellevue (Bellevue 2010)
- A Catalog of Washington Streams and Salmon Utilization (WDF 1975)
- SalmonScape computer mapping system (WDFW 2010)
- Washington State priority habitat and species (PHS) data (WDFW 2010)
- Washington State Natural Heritage data (WDNR 2010)
- King County area soil survey maps for the project vicinity (NRCS 2010)
- Soil descriptions for the project vicinity (NRCS 2010)
- Hydric soils list for Washington (NRCS 2010)

3.3.1.2 Wetland Delineation

This wetland delineation was performed in accordance with the *Washington State Wetlands Identification and Delineation Manual* (Ecology 1997) and the *Interim Supplement to the U.S. Army Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast*

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Region (Environmental Laboratory 2008), both of which are consistent with the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987).

The methods in these guidance manuals use a three-parameter approach for identifying and delineating wetlands, and rely on the presence of field indicators for hydrophytic vegetation, hydric soils, and hydrology. The methods for evaluating these three parameters are described in Appendix B. This wetland delineation was performed according to procedures specified under the routine wetland determination method (Ecology 1997).

To identify potential wetlands, wetland biologists evaluated field conditions by traversing the study area and noting wetlands, streams and other aquatic features. The biologists evaluated conditions in the area within 300 feet of the study area boundary through observations from within the study area boundaries because they did not have permission to access these properties.

A test plot was established for each area that appeared to have potential wetland characteristics. For each test plot, data on dominant plant species, soil conditions in test plots, and evidence of hydrologic conditions were recorded on wetland determination data forms (see Appendix C). Plants, soils, and hydrologic conditions were also analyzed and documented in adjacent upland areas. Based on collected data, a determination of wetland or upland was made for each area examined.

Following confirmation of wetland conditions in a given area, the wetland boundary was delineated by placing sequentially-numbered, flagging along the wetland perimeter. Test plot locations were also marked with flagging. The locations of wetland boundaries and test plots were subsequently surveyed by CTS Engineers, Inc.

3.3.1.3 Wetland Classification, Rating, and Functional Assessment

This section provides information on the methods used to classify the wetlands, determine rating categories, and assess functions provided by the wetlands.

3.3.1.3.1 Wetland Classification

Wetlands observed on the study area were classified according to the U.S. Fish and Wildlife Service classification system (Cowardin et al. 1979). This system is based on an evaluation of attributes such as vegetation class, hydrologic regime, salinity, and substrate. The wetlands were also classified according to the hydrogeomorphic (HGM) system, which is based on an evaluation of attributes such as the position of the wetland within the surrounding landscape, the source and location of water just before it enters the wetland, and the pattern of water movement in the wetland (Brinson 1993).

3.3.1.3.2 Wetland Rating

Wetlands were rated using the *Washington State Wetland Rating System for Western Washington-Revised* (Hruby 2004), hereafter referred to as the Ecology rating system. The Ecology rating system categorizes wetlands according to specific attributes such as rarity;

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sensitivity to disturbance; hydrologic, water quality, and habitat functions, and special characteristics (e.g., mature forested wetland, bog). The total score for all functions determines the wetland rating. The rating system consists of four categories, with Category I wetlands exhibiting outstanding functions and/or special characteristics and Category IV wetlands exhibiting minimal attributes and functions. The rating categories are used to identify permitted uses in the wetland and its buffer, to determine the width of buffers needed to protect the wetland from adjacent development, and to identify the mitigation ratios required to compensate for potential impacts on wetlands. The City of Bellevue requires the use of the Ecology rating system [LUC 20.25H.095].

3.3.1.3.3 Wetland Functional Assessment

Wetland functions are those processes that occur within a wetland, such as the storage of water, cycling of nutrients, and maintenance of diverse plant communities and habitat which benefits wildlife. Wetland functions can be grouped into three broad categories: habitat functions, hydrologic functions, and water quality functions.

Habitat functions include providing food, water, and shelter for fish, shellfish, birds, amphibians, and mammals. Wetlands also serve as a breeding ground and nursery for numerous species. Hydrologic functions include reducing the velocity of stormwater, recharging and discharging groundwater, and providing flood storage. Water quality functions include the potential for removing sediment, nutrients, heavy metals, and toxic organic compounds.

Wetland functions were assessed using the *Washington State Wetland Rating System for Western Washington-Revised* (Hruby 2004), which is approved by the Washington State Department of Ecology for evaluating wetland functions in Washington. This system generates a score for each function based on the wetland's potential and opportunity for providing the function. Using the scores on the wetland rating forms, a qualitative functional rating (high, moderate, or low) was derived for each of the functions (water quality, hydrology, and habitat) provided by each wetland, based on supplemental guidance provided by Ecology (2008a).

3.3.1.4 Stream Delineation and Classification

Streams are considered to be one type of regulated water body according to LUC 20.25H.075. Stream boundaries and buffers were determined according to guidance in the Bellevue Land Use Code.

The ordinary high water mark (OHWM) of streams within the study area were delineated using the definition provided in the Washington Administrative Code (WAC) Section 222-16-010, which has been adopted by the City of Bellevue. According to this definition, the OHWM of streams is “that mark that will be found by examining the bed and banks and ascertaining where the presence and action of waters are so common and usual, and so long continued in all ordinary years, as to mark upon the soil a character distinct from that of the abutting upland, in respect to vegetation.” In addition, methods in the publication *Determining the Ordinary High Water mark on Streams in Washington State* (2008) were applied.

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To delineate the OHWM, the bed and adjacent banks of streams in the study area were examined for indications of regular high water events. Factors considered when assessing changes in vegetation include:

- Scour (removal of vegetation and exposure of gravel, sand, or other soil substrate)
- Drainage patterns
- Elevation of floodplain benches
- Changes in sediment texture across the floodplain
- Sediment layering
- Sediment or vegetation deposition
- Changes in vegetation communities across the floodplain

Herrera placed flagging on the site, indicating the horizontal and vertical location of the OHWM along the stream(s). The locations of OHWM flags were subsequently surveyed by CTS Engineers, Inc.

Streams on the site were classified using the criteria in LUC 20.25H.075. This system is based primarily on fish, wildlife, and human use, and consists of four stream types: Type S, F, N, or O. Type S streams are those surface waters which are inventoried as “Shorelines of the State” under the Shoreline Management Master Program for the City of Bellevue, pursuant to RCW Chapter 90.58. Type S waters contain salmonid fish habitat. Type F streams are those surface waters which contain habitat for salmonid fish, game fish, and other anadromous fish. Type N streams are those surface waters which do not contain fish habitat, but are connected to Type F waters through an above-ground channel. Type O streams are those surface waters which do not contain fish habitat, and are not connected to Type F waters through an above-ground channel.

3.3.2 Results

This section discusses the results of the wetland and stream delineations, including a review of information obtained from various references, and an analysis of wetland and stream conditions in the study area as observed during field investigations.

3.3.2.1 Analysis of Available Information

The available existing information compiled for this wetland and stream delineation is summarized in the following subsections.

3.3.2.1.1 Previously Mapped Wetlands and Streams

The National Wetlands Inventory, King County Wetland Inventory, and City of Bellevue Critical Areas mapping do not indicate any previously mapped wetlands in the project area or vicinity.

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The hydrography geographic information system (GIS) data for the study area indicates a stream (Vasa Creek) flowing north through the study area (Figure 2). The stream then continues generally north until it flows through a culvert under Interstate 90 (Bellevue 2010).

3.3.2.1.2 Mapped Soils

Three types of soil are mapped within the study area (NRCS 2010) (Figure 2):

- Alderwood gravelly sandy loam (6 to 15 percent slopes)
- Alderwood and Kitsap Soils, very steep
- Arents, Alderwood material (6 to 15 percent slopes)

Alderwood gravelly sandy loam is a moderately well-drained soil formed in glacial till and outwash. This soil occurs primarily on uplands. A typical soil profile includes a 27-inch-deep topsoil composed of very dark brown (10 YR 2/2), dark brown (10 YR 3/3), and/or grayish brown (10 YR 5/2) sandy loam, which lies over a grayish brown (10 YR 5/2) substratum composed of consolidated glacial till. This soil is not considered a hydric soil by the NRCS (NRCS 2010).

Alderwood and Kitsap soils (very steep) is a soil mapping unit composed of approximately 50 percent Alderwood gravelly sandy loam (see description above), 25 percent Kitsap silt loam (described later in this section), and 25 percent of other inclusions. Kitsap silt loam is a moderately well-drained soil formed in glacial lake deposits that occur on terraces. A typical soil profile includes a 5 inch-deep topsoil composed of a dark brown (10 YR 3/3) silt loam, which lies over a 20-inch subsoil composed of dark yellowish brown (10 YR 3/4) silt loam. This soil is not considered a hydric soil by the NRCS (NRCS 2010).

Arents (Alderwood material) are Alderwood soils (see description above) that have been disturbed by urbanization to such a degree that they can no longer be classified with the Alderwood series. The parent material and typical profiles are considered that same, but loss of topsoil and disruption of soil horizons may occur. This soil is not considered a hydric soil by the NRCS (NRCS 2010).

3.3.2.1.3 Topography

The project area ranges in elevation from 680 feet at the southern (upper) end of the project to 600 feet at the northern (lower) project limit (Figure 3). The project is located at the bottom of a steep ravine, with slopes in excess of 40 percent and some sections nearly vertical due to slumping.

3.3.2.2 Analysis of Wetland and Stream Conditions

Wetland and stream delineation field activities were conducted by Herrera biologists Josh Wozniak and Crystal Elliot. The biologists are certified by the Society of Wetland Scientists as Professional Wetland Scientists (PWS). The wetland delineation was conducted on January 24, 2010. The weather conditions during the fieldwork consisted of: daytime high temperatures of

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approximately 45 degrees Fahrenheit (°F), with cloudy conditions. It was determined that the growing season (as defined in Appendix B) had not yet begun, because no non-woody annual plant species were observed, and the soil temperature approximately 19 inches below the surface was 39 to 40 degrees Fahrenheit.

Herrera biologists delineated six wetlands in the project area: Wetlands A through F (Table 1) and one stream, Vasa Creek (Table 2). The locations and extents of the wetlands, stream and their buffers are shown in Figure 4 and on engineering plans in Appendix A. Detailed descriptions of the wetlands are provided in Tables 3 through 8. The biologists completed wetland delineation data forms (see Appendix C) and a Department of Ecology wetland rating form (Appendix D) for each of the wetlands delineated in the project area. Representative photographs of the wetlands in the project area are included in Tables 3 through 8.

3.3.3 Probable Cumulative Impacts

As a result of the proposed Vasa Creek Restoration Project, there will be temporary and permanent effects on the Vasa Creek stream bed, and temporary impacts to adjacent wetlands and the buffers. These effects are summarized in Table 9, depicted graphically in Figure 5, and described in more detail below.

Temporary impacts to Vasa Creek will result from construction access and excavation outside of permanent in-stream structure footprints, and from activities associated with placement of large wood in the channel. Permanent impacts to Vasa Creek will result from rock placement to restore the check dams.

Temporary impacts to wetlands will result from temporary clearing to provide construction access and placement of large wood.

Temporary impacts to wetland and stream buffers will result from temporary construction access.

3.3.4 Wetland and Stream Functions and Values Protection Assessment

3.3.4.1 Existing Functions and Values Provided by Affected Wetlands and Streams

3.3.4.1.1 Wetland Functions

Wetland functions for each wetland within the project area were evaluated according to data in the Ecology wetland rating forms (Hruby 2004), and supplemental qualitative ratings (high, medium, low) were determined based on Ecology guidance (Ecology 2008a). A summary of the function scores, the total wetland score, and the associated rating (category) for each wetland is provided (Table 10). Qualitative and quantitative scores for both potential and opportunity for each wetland to provide water quality, hydrologic, and habitat functions is provided.

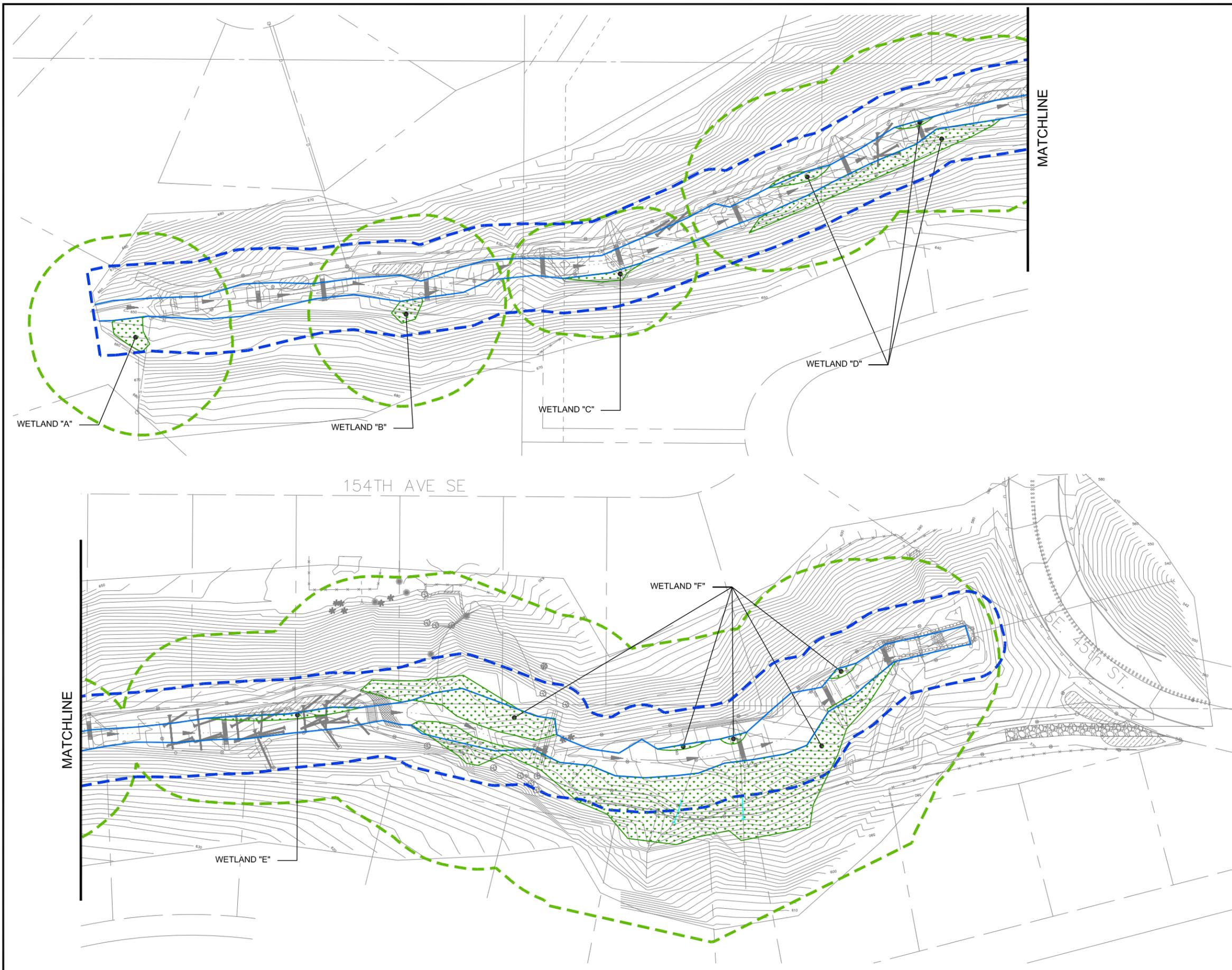


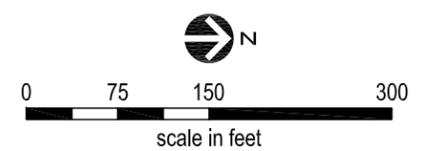
Figure 5.
Wetlands, Stream Ordinary High
Water Mark, and Buffers in the Vasa
Creek Restoration Project

Legend

-  WETLAND AREA
-  WETLAND BUFFER
-  STREAM BUFFER
-  ORDINARY HIGH WATER MARK (OHWM)

WETLAND AREAS

	AREA (SF)
A	427.64
B	257.96
C	228.24
D	2,218.54
E	375.24
F	14,176.33



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Table 1. Wetlands delineated in the study area for the Vasa Creek Restoration Project.

Wetland Name	Wetland Size (square feet)	USFWS Classification ^a	Hydrogeomorphic Classification ^b	Department of Ecology Rating Category ^c	City of Bellevue Buffer Width (feet) ^d
A	428	PSS	Slope	III	60
B	258	PSS	Slope	III	60
C	228	PEM	Slope	IV	40
D	2219	PFO, PSS	Riverine flow-through (and slope)	III	60
E	375	PEM	Riverine flow-through	III	60
F	14,176	PFO, PSS	Riverine flow-through (and slope)	II	75

^a U.S. Fish and Wildlife Service classification is based on Cowardin et al. (1979): palustrine forested (PFO), palustrine scrub-shrub (PSS), and palustrine emergent (PEM)

^b Hydrogeomorphic classification is based on Brinson (1993).

^c Wetland category is based on the Department of Ecology wetland rating system (Hruby 2004), which is required by the City of Bellevue.

^d Wetland buffer widths are based on the Department of Ecology wetland rating, per the City of Bellevue Code.

Table 2. Vasa Creek stream summary table.

Stream Name	Vasa Creek		
WRIA Stream Catalog #	08-0056		
	Local Jurisdiction	City of Bellevue	
	DNR Stream Type	Type Ns	
	Local Stream Rating	Type O (based on no fish use and lack of open channel connection to Type F waters)	
	Local Jurisdiction Buffer Width	40	
Documented Fish Use	No known fish use (Watershed Company 2001). Culvert under I-90 acts as a barrier. Stream channel is dry during late summer.		
Riparian/Buffer Condition	The buffer of Vasa Creek contains forested, scrub-shrub, and emergent wetlands, as well as mature forested uplands. Dominant vegetation is composed of red alder (<i>Alnus rubra</i>), western red cedar (<i>Thuja plicata</i>), big-leaf maple (<i>Acer macrophyllum</i>), salmonberry (<i>Rubus spectabilis</i>), and red-osier dogwood (<i>Cornus sericea</i>). The riparian buffer provides shading and is generally of high quality. Residential areas occur along the top of the ravine, which reduce buffer quality by the noise and lighting disturbance, discharge of stormwater and yard waste into buffer, and presence of domesticated animals (cats and dogs). A trail runs through the buffer, which introduces human and pet disturbances to the buffer.		

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Table 3. Summary for Wetland A.

Wetland name	Wetland A		
Location	South end of project area, right bank		
	Local Jurisdiction	City of Bellevue	
	WRIA	08	
	Wetland rating	Category III	
	City of Bellevue buffer width	60 feet	
	Cowardin classification	Palustrine scrub-shrub	
	Hydrogeomorphic classification	Slope	
	Wetland data form(s)	Appendix C, TP-A-WET	
	Upland data form(s)	Appendix C, TP-A-UPL	
Size of entire wetland	428 square feet		
Dominant vegetation	Wetland A is dominated by a shrub/scrub community of salmonberry and western redcedar saplings.		
Soils	Soils were examined to at least a 16-inch depth and exhibited hydric characteristics. Soils are very to extremely gravelly sandy loams. Typical soil colors are black (10 YR 2/1) for the matrix and dark brown (10 YR 3/3) for redoximorphic concentrations. This profile meets the criteria for the hydric soil indicator of redoximorphic dark surface (F6).		
Hydrology	Soils were saturated to the surface with a surface water depth of approximately 0.5 inches. Hydrologic input to this wetland is primarily groundwater discharge from the toe of the slope. The wetland discharges into Vasa Creek.		
Rationale for delineation	All three wetland parameters are met.		
Rationale for local rating	The City of Bellevue Code classifies wetlands according to the current Department of Ecology rating system, which rates Wetland A as a Category III.		
Buffer condition	Buffers surrounding the wetland consist of native mixed coniferous-deciduous forest with a shrub and herbaceous understory. Existing buffers provide moderate to high wildlife habitat and moderate water quality functions. Nearby houses limit the habitat functions. The adjacent road (SE 46th Way) reduces habitat functions due to traffic and human disturbances.		

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Table 4. Summary for Wetland B.

Wetland name	Wetland B		
Location	South end of project area, right bank		
	Local Jurisdiction	City of Bellevue	
	WRIA	08	
	Wetland rating	Category III	
	City of Bellevue buffer width	60 feet	
	Cowardin classification	Palustrine scrub-shrub	
	Hydrogeomorphic classification	Slope	
	Wetland data form(s)	Appendix C, TP-B-WET	
	Upland data form(s)	Appendix C, TP-B-UPL	
Size of entire wetland	258 square feet		
Dominant vegetation	Wetland B is dominated by a shrub/scrub community of salmonberry, vine maple (<i>Acer circinatum</i>), and creeping buttercup (<i>Ranunculus repens</i>).		
Soils	Soils were examined to at least a 16-inch depth and exhibited hydric characteristics. Soils are very gravelly sandy loams. Typical colors are very dark brown (10 YR 2/2) for the matrix and brown (10 YR 4/3) for redoximorphic concentrations. This profile meets the criteria for the hydric soil indicator of redoximorphic dark surface (F6).		
Hydrology	Soils were saturated to the surface with a surface water depth of approximately 0.5 inches. Hydrologic input to this wetland is primarily groundwater discharge from the toe of the slope. The wetland discharges into Vasa Creek.		
Rationale for delineation	All three wetland parameters are met.		
Rationale for local rating	The City of Bellevue Code classifies wetlands according to the current Department of Ecology rating system, which rates Wetland B as a Category III.		
Buffer condition	Buffers surrounding the wetland consist of native mixed coniferous-deciduous forest with a shrub and herbaceous understory. Existing buffers provide moderate to high wildlife habitat and moderate water quality functions. Nearby houses limit the habitat functions.		

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Table 5. Summary for Wetland C.

Wetland name	Wetland C		
Location	South end of project area, right bank		
	Local Jurisdiction	City of Bellevue	
	WRIA	08	
	Wetland rating	Category IV	
	City of Bellevue buffer width	40 feet	
	Cowardin classification	Palustrine emergent	
	Hydrogeomorphic classification	Slope	
	Wetland data form(s)	Appendix C, TP-C-WET	
	Upland data form(s)	Appendix C, TP-C-WET	
Size of entire wetland	228 square feet		
Dominant vegetation	Wetland C is dominated by maiden-hair fern (<i>Adiantum pedatum</i>), fringed cup (<i>Tellima grandiflora</i>), and herb Robert (<i>Geranium robertianum</i>), an invasive annual species.		
Soils	Soils were examined to at least a 16-inch depth and exhibited problematic hydric soil characteristics. The soils are exposed parent material (basal till) with abundant groundwater expression supporting the hydrophytic plants. Soils are slumping, and therefore no typical hydric soil development has occurred. However, the aquic moisture regime and unweathered nature of the soils meet the criteria for a problematic hydric soil		
Hydrology	Soils were saturated to the surface with a surface water depth of approximately 0.5 inches. Hydrologic input to this wetland is primarily groundwater discharge from the toe of the slope. The wetland discharges into Vasa Creek.		
Rationale for delineation	All three wetland parameters are met.		
Rationale for local rating	The City of Bellevue Code classifies wetlands according to the current Department of Ecology rating system, which rates Wetland C as a Category IV.		
Buffer condition	Buffers surrounding the wetland consist of native mixed coniferous-deciduous forest with a shrub and herbaceous understory. Existing buffers provide moderate to high wildlife habitat and moderate water quality functions. Nearby houses limit the habitat functions.		

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Table 6. Summary for Wetland D.

Wetland name	Wetland D		
Location	Center of project area, both banks (primarily right bank)		
	Local Jurisdiction	City of Bellevue	
	WRIA	08	
	Wetland rating	Category III	
	City of Bellevue buffer width	60 feet	
	Cowardin classification	Palustrine forested/ palustrine scrub-shrub	
	Hydrogeomorphic classification	Riverine flow-through/ slope	
	Wetland data form(s)	Appendix C, TP-D-WET	
	Upland data form(s)	Appendix C, TP-D-UPL	
Size of entire wetland	2,219 square feet		
Dominant vegetation	Wetland D is dominated by a forested community of red alder, salmonberry, maiden-hair fern, and lady fern (<i>Athyrium filix-femina</i>) in the understory. Some portions of the wetland lack the forested canopy, and are therefore considered to be scrub/shrub habitat.		
Soils	Soils were examined to at least a 16-inch depth and exhibited hydric characteristics. Soils are gravelly silt loams. Typical colors are very dark grayish brown (2.5 Y 3/2) for the matrix and light olive brown (2.5 Y 5/3) and dark yellowish brown (10 YR 4/4) for redoximorphic concentrations. This profile meets the criteria for the hydric soil indicator of redoximorphic dark surface (F6).		
Hydrology	Soils were saturated to the surface with a surface water depth of approximately 0.5 inches. Hydrologic input to this wetland a combination of groundwater discharge from the hill slope (for the sloped portion) and high water tables and flooding from Vasa Creek (for the riverine flow-through portion). The wetland discharges into Vasa Creek.		
Rationale for delineation	All three wetland parameters are met.		
Rationale for local rating	The City of Bellevue Code classifies wetlands according to the current Department of Ecology rating system, which rates Wetland D as a Category III.		
Buffer condition	Buffers surrounding the wetland consist of native mixed coniferous-deciduous forest with a shrub and herbaceous understory. Existing buffers provide moderate to high wildlife habitat and moderate water quality functions. Nearby houses limit the habitat functions.		

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Table 7. Summary for Wetland E.

Wetland name	Wetland E		
Location	Center of project area, left bank		
	Local Jurisdiction	City of Bellevue	
	WRIA	08	
	Wetland rating	Category III	
	City of Bellevue buffer width	60 feet	
	Cowardin classification	Palustrine emergent	
	Hydrogeomorphic classification	Riverine flow-through	
	Wetland data form(s)	Appendix C, TP-E-WET	
	Upland data form(s)	Appendix C, TP-E-UPL	
Size of entire wetland	375 square feet		
Dominant vegetation	Wetland E is dominated by an emergent community composed of creeping buttercup.		
Soils	Soils were examined to at least a 16-inch depth and exhibited hydric characteristics, consistent with a fluvial entisol (alluvial deposits). Soils are composed of stream gravels, with a minor sand component. Hydric soils criteria is based on aquic moisture regime and fluvial nature of gravels.		
Hydrology	Soils were saturated to the surface with a surface water depth of approximately 0.5 inches. Hydrologic input to this wetland is high water tables and flooding associated with Vasa Creek. The wetland discharges back into Vasa Creek.		
Rationale for delineation	All three wetland parameters are met.		
Rationale for local rating	The City of Bellevue Code classifies wetlands according to the current Department of Ecology rating system, which rates Wetland E as a Category III.		
Buffer condition	Buffers surrounding the wetland consist of native mixed coniferous-deciduous forest with a shrub and herbaceous understory. Existing buffers provide moderate to high wildlife habitat and moderate water quality functions. Nearby houses limit the habitat functions.		

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Table 8. Summary for Wetland F.

Wetland name	Wetland F		
Location	South end of project area, both banks		
	Local Jurisdiction	City of Bellevue	
	WRIA	08	
	Wetland rating	Category II	
	City of Bellevue buffer width	75 feet	
	Cowardin classification	Palustrine forested/ palustrine scrub-shrub	
	Hydrogeomorphic classification	Riverine flow-through/ slope	
	Wetland data form(s)	Appendix C, TP-F-WET	
	Upland data form(s)	Appendix C, TP-F-UPL	
Size of entire wetland	14,176 square feet		
Dominant vegetation	Wetland F is dominated by a forested community of red alder, salmonberry, red-osier dogwood, lady fern, and creeping buttercup. The scrub-shrub community, located near the center of the wetland, is dominated by red-osier dogwood, salmonberry, and lady fern.		
Soils	Soils were examined to at least a 16-inch depth and exhibited hydric characteristics. Soils are very gravelly sandy loams. Typical colors are black (10 YR 2/1) for the matrix and dark brown (10 YR 3/3) for redoximorphic concentrations. This profile meets the criteria for the hydric soil indicator of redoximorphic dark surface (F6).		
Hydrology	Soils were saturated to the surface with a surface water depth of approximately 0.5 inches. Hydrologic input to this wetland a combination of groundwater discharge from the hill slope (for the sloped portion) and high water tables and flooding from Vasa Creek (for the riverine flow-through portion). The wetland discharges into Vasa Creek.		
Rationale for delineation	All three wetland parameters are met.		
Rationale for local rating	The City of Bellevue Code classifies wetlands according to the current Department of Ecology rating system, which rates Wetland F as a Category II.		
Buffer condition	Buffers surrounding the wetland consist of native mixed coniferous-deciduous forest with a shrub and herbaceous understory. Existing buffers provide moderate to high wildlife habitat and moderate water quality functions. Nearby houses limit the habitat functions. The adjacent road (SE 45th Street) reduces habitat functions due to traffic and human disturbances.		

*Critical Area Report—Upper Vasa Creek Check Dam Repairs Phase II Project***Table 9. Impacts to Vasa Creek Stream Channel, Wetlands, and Buffers in the Vasa Creek Restoration project area.**

Resource	Temporary Impacts (square feet)	Permanent Impacts (square feet)
Total Vasa Creek channel impacts (i.e., impacts below OHWM)	9,776	560
Total Wetland Impacts	3,446	0
Wetland A	0	0
Wetland B	0	0
Wetland C	0	0
Wetland D	365	0
Wetland E	375	0
Wetland F	2,706	0
Total buffer impacts (i.e., impacts to stream buffers and wetland buffers)	10,209	0
Total impacts	22,944	560

Table 10. Individual wetland function scores for wetlands in the study area for the Vasa Creek Restoration Project

Wetland Name	Water Quality Functions – Qualitative Rating ^a (numerical score in parentheses)		Hydrologic Functions – Qualitative Rating ^a (numerical score in parentheses)		Habitat Functions – Qualitative Rating ^a (numerical score in parentheses)		Total Score	Department of Ecology Rating Category ^b
	Potential	Opportunity	Potential	Opportunity	Potential	Opportunity		
A	Low (3)	Yes	Low (4)	Yes	Low (4)	Moderate (13)	31	III
B	Moderate (7)	Yes	Low (2)	Yes	Low (3)	Moderate (13)	34	III
C	Low (0)	Yes	Low (0)	Yes	Low (2)	Moderate (13)	15	IV
D	Low (4)	Yes	Low (5)	Yes	Moderate (10)	Moderate (13)	41	III
E	Moderate (8)	Yes	Moderate (8)	Yes	Low (2)	Moderate (13)	47	III
F	Moderate (10)	Yes	Moderate (9)	Yes	Moderate (12)	Moderate (13)	57	II

^a Qualitative ratings are based on the Department of Ecology “Using the Wetland Rating System in Compensatory Mitigation” focus sheet (Ecology 2008a)

^b Wetland category is based on the Department of Ecology rating system (Hruby 2004).

Wetlands A through D provide low levels of water quality and hydrologic functions, primarily due to their small size, minimal structure, and sloped nature. Habitat functions are low for Wetlands A through C due to the small size and lack of habitat features. Wetland D is larger, has a forested component, and therefore provides more habitat functions. Wetland E, despite its small size, provides moderate water quality and hydrology functions due to its location within the ordinary high water mark of Vasa Creek and therefore its close interaction with stream base flow and flood waters. Habitat functions for Wetland E are low due to the small size and lack of habitat features. Wetland F provides moderate functions in all categories due to its larger size, interaction with Vasa Creek (on both banks) and variety of habitat features.

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3.3.4.1.2 Stream Functions

Vasa Creek in the project area provides flow support to downstream sections of the stream. The lower portions of the stream support a variety of native fish species, including anadromous salmonids. The stream in the project area also provides some food sources to aquatic species downstream. These include macroinvertebrates, leaf litter, and other organic inputs. The existing channel provides some water velocity reductions (hydrologic function) and sediment processing (water quality function).

3.3.4.2 Projected Future Conditions: Proposed Action Permitted

If the project is approved, there will be temporary disturbances to Vasa Creek and adjacent wetlands and buffers during construction. These temporary impacts will be restored as part of the project. The vegetation proposed for temporary disturbance is primarily salmonberry and creeping buttercup. This vegetation will be salvaged and retained on site for replanting following repair work.

If the project is approved, there will be permanent impacts to the Vasa Creek channel as a result of the check dam repairs. These effects are designed to enhance stream functions in Vasa Creek by stabilizing the channel, reducing the risk of severe erosion, and thereby enhancing the potential for the establishment of riparian vegetation. The channel will be dewatered during construction, and all flow will be bypassed directly to the downstream outlet culvert. Therefore no effects to downstream resources are expected.

3.3.4.3 Projected Future Conditions: Proposed Action Denied

If the project is denied, there will be no temporary or permanent impacts to the Vasa Creek or the adjacent wetlands and buffers. Vasa Creek will remain at risk of major channel erosion in the event of a large storm.

3.3.4.4 Applicable Performance Standards

None of the required general performance standards provided in LUC 20.25H.080 (Streams) or LUC 20.25H.100 (Wetlands) are applicable to the project largely because the project does not represent a new development project. For example, the project does not involve installation of permanent lighting, creation of permanent sources of noise (e.g., parking lots), introduction of runoff from impervious surfaces, or permanent use of pesticides, insecticides, or fertilizers. The project involves modifications to an existing stream channel; however, the project does not involve relocating an open channel or closing a channel through use of pipes or culverts.

3.3.4.5 Restoration Requirements

All temporarily cleared vegetation areas within wetlands and buffers will be replanted with native vegetation (see Section 3.6 Restoration Plan). Thirty-five logs will be placed in the stream as in-stream habitat features to offset the placement of rock in the stream.

3.3.5 Impact Avoidance, Minimization, and Mitigation Measures

The project impacts were evaluated during the design process to reduce impacts to Vasa Creek, the wetlands, and their buffers. As per LUC 20.25H.055.C.3.m, alternative design scenarios, such as “soft-site” restoration techniques (e.g., coir matting, aggressive riparian planting efforts) were considered and not selected due to: the extremely high flows that occur which would generate forces greater than these materials could withstand, and the heavily shaded nature of the project site which would reduce the vigor of most planting stock designed for those conditions (e.g., willows). However, several mitigation measures will be implemented including avoidance, minimization, and restoration measures (see Section 3.6 Restoration Plan).

In accordance with preference of stream mitigation actions (LUC 20.25H.085), temporary and permanent impacts to Vasa Creek will be mitigated on-site by adding habitat structure to the channel in the form of wood. Temporary impact to vegetation within the stream buffer will be restored through replanting. All stream impacts will be mitigated such that functions are replaced at a minimum ratio of one-to-one.

In accordance with preference of wetland mitigation actions (LUC 20.25H.105), temporary impacts to wetland buffers will be mitigated on-site by restoring native vegetation.

3.4 Geologic Hazard Area Assessment

The contents of this subsection satisfies CAR requirements specified under LUC 20.25H.140.B and CAR reporting requirements provided in LUC 20.25H.250.B4 through B8.

The Vasa Creek Restoration project occurs within areas designated as steep slopes, landslide hazards, and erosion hazards areas identified by the City of Bellevue (Figure 4). However, all work will occur in the channel and there will be no disturbance to the vegetation or soils on the steep slopes. The project goal is to stabilize the channel, which will reduce the ongoing toe slope erosion evident at the site. Geotechnical analyses of the project area confirmed that the proposed work will enhance the stability of the steep slopes and landslide hazard areas by reducing toe-of-slope erosion (Golder 1997; AGRA 1999).

Therefore, the project will have no negative effect on geologic hazards, and will reduce risks to these hazards by reducing channel and slope erosion in the long-term.

3.5 Habitat Assessment

The contents of this subsection satisfies habitat assessment report requirements specified under LUC 20.25H.165.A and CAR reporting requirements provided in LUC 20.25H.250.B4 through B8.

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3.5.1 Introduction

To evaluate habitat conditions in the project area and vicinity, biologists surveyed the area to identify dominant species, forest maturity, concentrations of native and invasive plant populations, other habitat features (e.g., snags, logs), habitat potential to support protected wildlife species and indications of use by these species. In addition, Herrera reviewed information provided by WDFW's Priority Habitats and Species (PHS) Program (WDFW 2010), fish usage information from the Salmonscape mapping program (WDFW 2010b), and fish survey data collected in 2001 (Watershed Company 2001).

There are no PHS areas or documented occurrences of protected species in the project vicinity (WDFW 2010a).

Fish usage is restricted to the portion of Vasa Creek downstream of the culvert under Interstate 90 (about 1/2 mile downstream). No anadromous or resident fish occur in the section of Vasa Creek proposed for restoration (WDFW 2010b, Watershed Company 2001).

3.5.2 Vegetation On and Adjacent to the Site

The site is located within a ravine that is vegetated with a diverse, mature, native forested community. Dominant species are big-leaf maple, red alder, western hemlock (*Tsuga heterophylla*), Douglas-fir (*Pseudotsuga menziesii*), western redcedar, indian plum (*Oemleria cerasiformis*), salmonberry, and sword fern (*Polystichum munitum*). A number of large trees and snags occur in the ravine. Vegetation along Vasa Creek is dominated by salmonberry and creeping buttercup.

There are some patches of invasive species, primarily English ivy (*Hedera helix*), with isolated occurrences of English holly (*Ilex aquifolium*) and cherry laurel (*Prunus laurocerasus*).

3.5.3 Species of Local Importance with Primary Habitat Association

Herrera examined the presence of species of local importance with a primary association with habitats occurring in the project area. The following species may occur based on the presence of suitable habitat:

- Bat species: There is good habitat for the protected bat species (western big-eared bat, Keen's Myotis, long-legged Myotis, and long-eared Myotis). These species roost in cavities in large trees and snags which are present and forage over a variety of habitats for prey (insects).
- Vaux's swift: There is potential nesting habitat for Vaux's swifts in hollows of snags at the site.
- Pileated woodpecker: There is good habitat for pileated woodpeckers and it is assumed that breeding habitat is present as well due to the presence of

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suitably sized trees and observations of adults with fledglings during site visits in May 2010.

Several species are not expected to occur either because the species are not present or because suitable habitat is not present. There is no habitat for bald eagles, peregrine falcons, merlins, osprey, or red-tailed hawks due to the closed canopy and dense vegetation that precludes access. In addition, these species are not associated with small stream habitat. There is no habitat for common loons, purple martins, or western grebes which requires lake-shore habitat. There is poor habitat for great blue and green herons. They can hunt along riparian corridors; however, their primary food source, fish, is not present. There is no breeding or congregation habitats for these species. There is no habitat for Oregon spotted frogs or western pond turtles, both of which require perennial water sources and pools. There is foraging and dispersal habitat for western toads in the project area, but no breeding habitat, due to the lack of pools and ponds. There is no fish access or habitat in the project area. Migratory fish are blocked by a long culvert under Interstate 90. Resident fish are precluded by summer drying of the channel. Fish surveys conducted in this section of Vasa Creek confirm these conditions (Watershed Company 2001).

3.5.4 Federal, State, or Local Management Recommendations

The habitat for bats, Vaux's swift, and pileated woodpecker will not be disturbed; therefore, management recommendations are not relevant.

3.5.5 Direct and Indirect Impacts

There will be no direct impacts to the habitats and species described above. No trees or standing snags will be removed. The only vegetation removal (temporary) will be restricted to trees, shrubs, ferns, emergents, and herbs along narrow construction access routes adjacent to the existing trail and the stream. All temporarily disturbed vegetation will be restored following construction. Work will occur in the summer, after pileated woodpecker breeding is complete. The addition of LWD as part of the project will enhance pileated woodpecker foraging habitat, as downed logs are a common feeding location for this species. Noise impacts from the project are not expected to be of sufficient magnitude or duration to disturb wildlife species. Sensitive species may move away from construction activity during active work periods, but are expected to return once work is completed.

During construction the channel will be dewatered and all flow bypassed to the outlet culvert. After construction, water quality will be monitored and turbid water will be discharged to the sewer. Only after turbidity has been reduced to meet water quality standards will the flow be directed to downstream receiving waters. Therefore no effect on downstream water quality will occur.

3.5.6 Probable Cumulative Impacts

There are no cumulative impacts anticipated as a result of the proposed project.

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3.5.6.1 Projected Future Conditions: Proposed Action Permitted

If the project is permitted, no negative effects on protected wildlife species are expected. The addition of large wood to the stream channel will enhance in-stream habitat conditions which will improve downstream conditions by providing a potential food source (aquatic insects and other fauna) for aquatic species (including fish) that occur downstream.

3.5.6.2 Projected Future Conditions: Proposed Action Denied

If the project is denied, the channel will continue to be at risk of extensive erosion, which will degrade habitat functions in the project area, as well as downstream. In addition, there will continue to be no wood in the channel, limiting the habitat potential for this area.

3.6 Restoration Plan

In accordance with LUC 20.25H.210 through 20.25H.225, the City of Bellevue will mitigate for all permanent and temporary impacts to Vasa Creek, wetlands, and buffers.

3.6.1 Mitigation Sequencing

According to LUC 20.25H.215, the City of Bellevue has conducted mitigation sequencing to reasonably avoid and minimize impacts to Vasa Creek, wetlands, and buffers. Unavoidable impacts will be mitigated through restoration efforts.

3.6.1.1 Avoidance

The project avoids impacts to habitat potentially used by wildlife species of local importance by avoiding clearing of trees and standing snags in the project area. Construction during the summer will avoid the pileated woodpecker breeding season.

3.6.1.2 Minimization

Several measures will be implemented to minimize impacts to Vasa Creek, wetlands, and buffers.

- To prevent unnecessary vegetation clearing, an existing trail will be utilized as a construction access route. The smallest equipment possible will be used to complete the project. Additional clearing on either side of the trail has been minimized by limiting the width of construction access routes to the minimum necessary for equipment.
- Impacts beyond construction areas will be minimized by designating and clearly marking the limits of all aspects of the project including

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construction access routes, temporary stream crossing, staging areas, temporary materials/rock handling chute, and clearing limits (see Section 2.3 Project Description).

- Impacts are minimized to wetlands by locating all staging areas outside of wetlands.
- Downstream effects during construction will be minimized by maintaining existing base flow and preventing turbidity releases by following an approved construction stormwater pollution control plan (CSPCC) and spill prevention and countermeasures plan (SPCC). Sedimentation and turbidity will be controlled by installing temporary erosion and sediment control (TESC) measures (see Section 2.3 Project Description). The project will be constructed during summer and fall months during dry conditions to sedimentation and erosion within construction areas.

3.6.1.3 Rectification

Temporary construction impacts to wetlands and buffers will be rectified by restoring these areas with native vegetation.

3.6.1.4 Reduction

One of the objectives of the project is to reduce impacts to wetlands and buffers over time by stabilizing Vasa Creek and thereby preventing further erosion of stream banks and adjacent wetlands and buffers. The City of Bellevue will continue to monitor Vasa Creek over time and if necessary, conduct additional maintenance.

3.6.1.5 Compensation

Introduction of angular rock to the channel for stabilization purposes represents a permanent impact, which will be compensated for by introducing instream habitat in the form of LWD with attached rootwads.

3.6.1.6 Monitoring

The City of Bellevue will continue to monitor the stabilization project over time and will take additional corrective measures if the stabilization structures do not succeed. In addition, the City of Bellevue will monitor the success of replanted areas for a minimum of 5 years.

3.6.2 Goal, Objective, and Success Criteria

The goal of the restoration plan is to restore the temporary disturbance areas of the project to pre-project conditions such that temporarily affected water quality, hydrologic, and wildlife

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functions are replaced. To meet this goal, the objective is to replant all temporarily disturbed wetland and buffer areas.

All areas that are restored will be subject to the following success criteria, which will be monitored for a period of at least 5 years.

3.6.2.1 Year 1 Success Criterion (2012)

By the end of the first growing season, 100 percent of the plantings will be alive as demonstrated by budding leaves. The planting contract stipulates that the contractor must replant all plants that did not survive by the end of the first year. The percentage of area covered by nonnative species (e.g., Himalayan blackberry, ivy) will not exceed 10 percent throughout the restoration areas.

3.6.2.2 Year 2 Success Criterion (2013)

By the end of the second growing season, at least 80 percent of the plantings will be alive demonstrated by budding leaves. The percentage of area covered by nonnative species (e.g., Himalayan blackberry, ivy) will not exceed 10 percent throughout the restoration areas.

3.6.2.3 Year 3 Success Criterion (2014)

By the end of the third growing season, native shrubs will cover at least 20 percent of the restoration areas; and emergent and fern understory plants will cover at least 30 percent of the restoration areas. The percentage of area covered by nonnative species (e.g., Himalayan blackberry, ivy) will not exceed 10 percent throughout the restoration areas.

3.6.2.4 Year 5 Success Criterion (2016)

By the end of the fifth growing season, native shrubs will cover at least 50 percent of the restoration areas; and emergent and fern understory plants will cover at least 50 percent of the restoration areas. The percentage of area covered by nonnative species (e.g., Himalayan blackberry, ivy) will not exceed 10 percent throughout the buffer mitigation areas.

3.6.3 Planting Plan

All vegetation disturbed will be replaced following completion of the check dam repairs. All planting will occur during the dormant season (October through January). Two distinct planting zones will be planted including wetland and buffer areas consisting of shrub, emergent, and fern plants. Prior to planting, all disturbed soils will be decompacted by tilling. Shrubs will be planted 5 feet on center, whereas emergents and ferns will be planted one foot on center. All of the planting areas will be covered with a four-inch thick layer of wood chip mulch to prevent weed growth and retain soil moisture. Landscape planting plans are included in Appendix A (see drawings sheets L-1 through L-4).

Critical Area Report—Upper Vasa Creek Check Dam Repairs Phase II Project

The wetland planting areas will include red-osier dogwood, swamp gooseberry (*Ribes lacustre*), thimbleberry (*Rubus parviflorus*), salmonberry, and slough sedge (*Carex obnupta*). The buffer planting areas will include vine maple, indian plum, red elderberry (*Sambucus racemosa*), snowberry (*Symphoricarpos albus*), sword fern, and lady fern (*Athyrium filix-femina*).

3.6.4 Monitoring Plan

Construction disturbance areas will be monitored to evaluate the success of revegetation measures in support of replacing functions that were affected during construction. During construction, the project engineer and biologist will monitor the site to ensure that BMPs are implemented such that there are no unanticipated impacts to wetlands or buffers.

The success of restoration will be determined by monitoring the site and determining if success criteria are achieved. The City of Bellevue will arrange to have the mitigation site monitored by a biologist for a minimum of 5 years. Monitoring visits to the site will take place during Years 1, 2, 3, and 5 after construction. For the purpose of measuring plant cover, monitoring transects within the restoration areas. During monitoring visits, representative photographs will be taken from established photo points. After each monitoring visit, a report presenting the results of the site inspection will be submitted to the City of Bellevue Planning and Community Development department.

During Years 1 and 2, the survival of plantings and cover of invasive vegetation will be assessed within the revegetation areas. In addition, the extent of natural colonization in terms of percent cover of herbaceous (e.g., ferns) and woody shrubs will be measured. During Years 2, 3, and 5, percent plant cover will be evaluated including native and invasive vegetation.

During each monitoring year, in addition to assessing conditions along monitoring transects, observations of overall conditions will be made throughout the restoration areas. Within the monitoring report, the biologist responsible for monitoring will make recommendations for annual maintenance of the restoration areas such as replanting, watering, weeding, and removal of trash. If plants are not succeeding, the biologist may make recommendations for suitable plant substitutions based on site conditions.

3.7 Conclusions

The proposed Vasa Creek restoration project will stabilize the stream channel, providing long-term habitat protection within the project area and downstream. In addition, the placement of large wood in the stream will enhance habitat conditions in the stream.

Although there will be temporary effects on adjacent vegetation, these areas will be restored following construction. There will be only temporary effects on wetlands due to the placement of logs. There will not be any permanent impacts to wetlands.

Critical Area Report—Upper Vasa Creek Check Dam Repairs Phase II Project

The project will be adjacent to steep slopes and landslide hazards, but the project will not disturb these areas. Further, the proposed channel stabilization will reduce long-term risks to these areas by reducing toe-of-slope erosion.

The project will occur adjacent to a number of wildlife habitat features, but these features will not be disturbed. Downstream fish habitats will be protected by bypassing stream flow during the project, and preventing turbid water from reaching downstream areas. No adverse effects are anticipated on wildlife species of local importance.

4.0 References

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Critical Area Report—Upper Vasa Creek Check Dam Repairs Phase II Project

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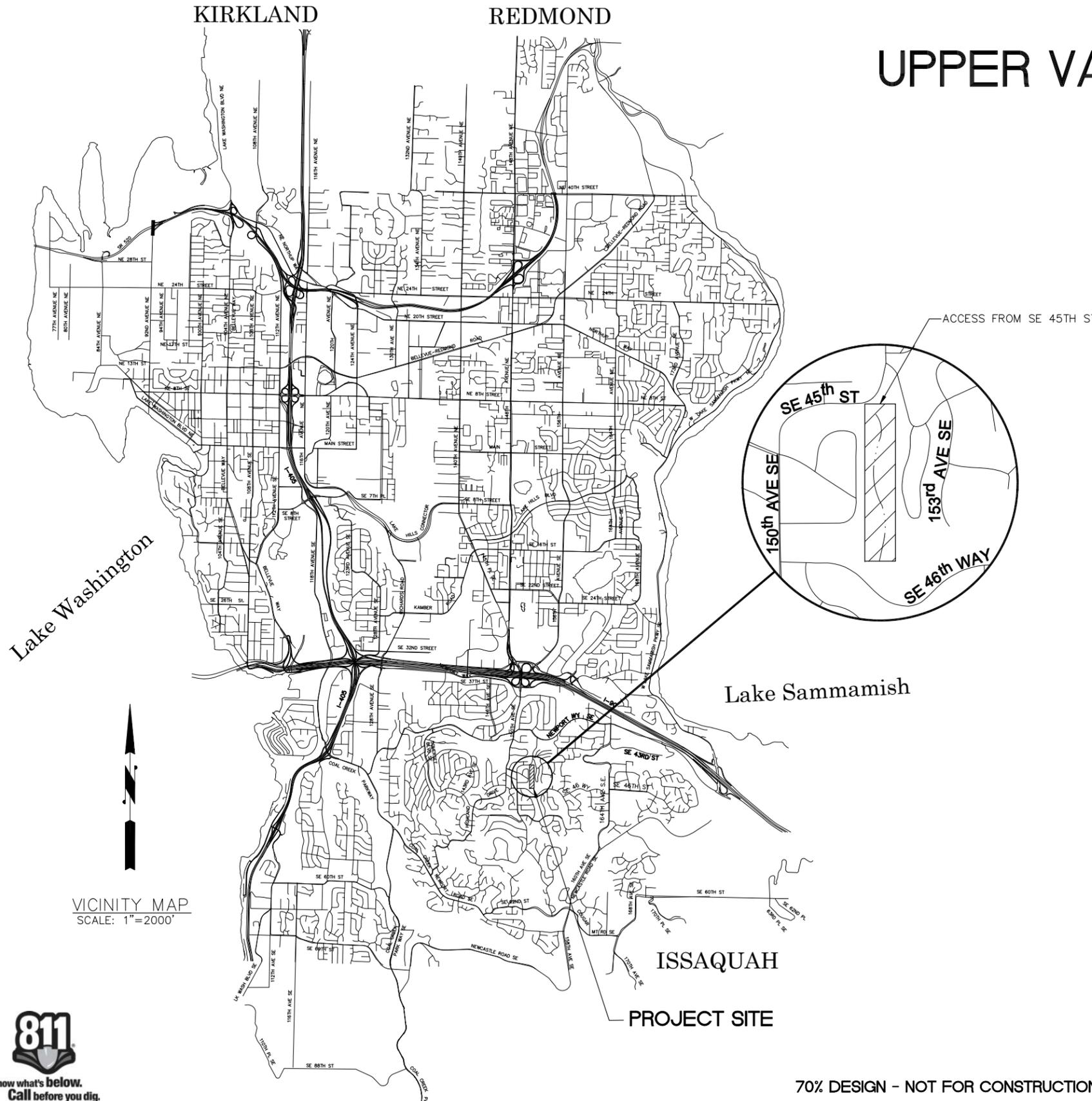
APPENDIX A

Project Engineering Plans

CITY OF BELLEVUE

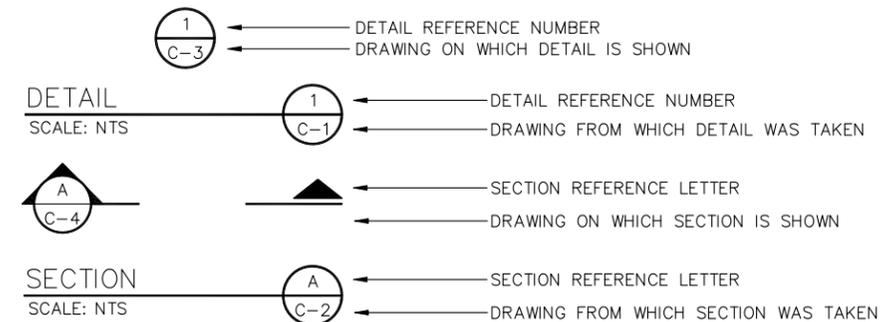
UPPER VASA CREEK CHECK DAM REPAIR, PHASE 2

(S.E. 46th WAY TO S.E. 45th ST.)
BELLEVUE, WASHINGTON
S-32 / D-59



VICINITY MAP
SCALE: 1"=2000'

SHEET INDEX		
SHT NO.	DWG NO.	SHEET DESCRIPTION
1	G-1	VICINITY MAP AND SHEET INDEX
2	G-2	GENERAL NOTES
3	C-1	SITE PLAN - SHEET 1 OF 3
4	C-2	SITE PLAN - SHEET 2 OF 3
5	C-3	SITE PLAN - SHEET 3 OF 3
6	C-4	CHECK DAM DETAILS - SHEET 1 OF 3
7	C-5	CHECK DAM DETAILS/PHOTOS - SHEET 2 OF 3
8	C-6	CHECK DAM DETAILS/PHOTOS - SHEET 3 OF 3
9	C-7	LOG STRUCTURE DETAILS - SHEET 1 OF 2
10	C-8	LOG STRUCTURE DETAILS - SHEET 2 OF 2
11	ES-1	TESC PLAN
12	L-1	PLANTING PLAN - SHEET 1 OF 3
13	L-2	PLANTING PLAN - SHEET 2 OF 3
14	L-3	PLANTING PLAN - SHEET 3 OF 3
15	L-4	PLANT MATERIAL SCHEDULE



"-" INDICATES THAT THE DETAIL/SECTION IS SHOWN ON THE SAME SHEET

"TYP" INDICATES THAT THE DETAIL/SECTION IS UNIFORMLY TYPICAL THROUGHOUT PROJECT EXCEPT WHERE OTHERWISE NOTED

"VAR" SPECIFIES THAT DETAIL/SECTION WAS TAKEN FROM SEVERAL DRAWINGS

NOTE AND DETAIL/SECTION REFERENCING

70% DESIGN - NOT FOR CONSTRUCTION

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 Cad User: Laura Turnidge



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 98121-1820
 206-441-9080
 206-441-9108 FAX

**UPPER VASA CREEK
 CHECK DAM REPAIR
 PHASE 2**

Approved By	
DESIGN MANAGER	DATE
PROJECT MANAGER	DATE

M. FONTAINE	08/2010
DESIGNED BY	DATE
L. TURNIDGE	08/2010
DRAWN BY	DATE
M. EWBANK	08/2010
CHECKED BY	DATE



**City of
 Bellevue**
 UTILITIES

VICINITY MAP AND SHEET INDEX	
DRAWING G-1	SHT 1 OF 15



ONE INCH
 AT FULL SIZE, IF NOT ONE
 INCH SCALE ACCORDINGLY

STORM DRAINAGE GENERAL NOTES

- ALL WORK SHALL CONFORM TO THE CURRENT EDITION OF THE CITY OF BELLEVUE UTILITIES DEPARTMENT ENGINEERING STANDARDS.
- THE LOCATIONS OF ALL EXISTING UTILITIES SHOWN HEREON HAVE BEEN ESTABLISHED BY FIELD SURVEY OR OBTAINED FROM AVAILABLE RECORDS AND SHOULD THEREFORE BE CONSIDERED APPROXIMATE ONLY AND NOT NECESSARILY COMPLETE. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO INDEPENDENTLY VERIFY THE ACCURACY OF ALL UTILITY LOCATIONS SHOWN, AND TO FURTHER DISCOVER AND AVOID ANY OTHER UTILITIES NOT SHOWN HEREON WHICH MAY BE AFFECTED BY THE IMPLEMENTATION OF THIS PLAN.
- ALL TEMPORARY EROSION AND SEDIMENT CONTROL BMPs AND STREAMFLOW DIVERSION SYSTEM SHALL BE INSTALLED, MONITORED, AND MAINTAINED IN ACCORDANCE WITH THE PROJECT SPECIFIC STORMWATER POLLUTION PREVENTION PLAN THAT HAS BEEN APPROVED BY THE CITY, PRIOR TO THE START OF WORK.
- PRIOR TO FINAL INSPECTION AND ACCEPTANCE OF STORM DRAINAGE WORK, PIPES AND STORM DRAIN STRUCTURES SHALL BE CLEANED AND FLUSHED. ANY OBSTRUCTIONS TO FLOW WITHIN THE STORM DRAIN SYSTEM, (SUCH AS RUBBLE, MORTAR AND WEDGED DEBRIS), SHALL BE REMOVED AT THE NEAREST STRUCTURE. WASH WATER OF ANY SORT SHALL NOT BE DISCHARGED TO THE STORM DRAIN SYSTEM OR SURFACE WATERS.
- PAVEMENT MARKERS AND MARKINGS DAMAGED BY CONTRACTOR'S ACTIVITIES SHALL BE REPLACED WITH TEMPORARY REFLECTIVE TAPE PER SECTION 8-23 OF THE STANDARD SPECIFICATIONS.
- PAVEMENT REPAIR SHALL BE IN ACCORDANCE WITH THE RIGHT-OF-WAY USE PERMIT. CONTRACTOR SHALL USE CLASS B AC FOR TRENCH PAVING. THE TOP TWO (2) INCHES MUST BE MACHINE PLACED. SEE CONTRACT SPECIFICATIONS FOR PERMIT REQUIREMENTS.
- TURBID WATER SHALL NOT BE DISCHARGED FROM THE SITE. IN THE EVENT THAT DOE TURBIDITY LIMITS CANNOT BE MET, THE CONTRACTOR MAY PUMP TURBID WATER TO THE SANITARY SEWER PARALLELING THE SITE. CONSULT CITY ENGINEER REGARDING SPECIFIC PUMPING AND DISCHARGE LOCATIONS.
- ALL AREAS DISTURBED BY THE CONTRACTOR'S OPERATIONS WHICH ARE OUTSIDE THE CLEARING, GRUBBING, OR CONSTRUCTION ACCESS LIMITS SHALL BE RESTORED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE CITY.
- A PERMANENT DIVERSION PIPE WAS INSTALLED IN A SHALLOW TRENCH ALONG THE ORIGINAL CHANNEL BOTTOM FROM THE UPSTREAM END OF THE PROJECT TO CHECK DAM #4. USE THIS PIPE AS NECESSARY FOR BYPASSING FLOWS.
- FISH ARE NOT KNOWN TO BE PRESENT WITHIN THE WORK AREA. THE CONTRACTOR WILL NOTIFY THE ENGINEER IF FISH ARE SEEN AND THE CITY WILL TAKE APPROPRIATE ACTION.

CONSTRUCTION REQUIREMENTS

- ALL MATERIALS CLEARED AND GRUBBED FROM THE CHANNEL AREA SHALL BE STOCKPILED AND REUSED AS FILL IN THE CHANNEL AND WOODY DEBRIS ON COMPLETED DAM FACES.
- CHECK DAMS WILL BE REPAIRED FROM UPSTREAM TO DOWNSTREAM. HOG FUEL OR OTHER SPECIFIED EROSION CONTROL MULCH WILL BE SPREAD ON ALL DISTURBED AREAS ABOVE THE PLACED ROCK OR OHWM.
- EXISTING ACCESS TRAIL IS APPROXIMATELY 4 FT WIDE AT ITS NARROWEST POINT.
- QUARRY SPALLS MAY BE PLACED ADJACENT TO EXISTING ACCESS TRAIL WHERE TRAIL IS NOT SUFFICIENTLY WIDE OR FLAT AND TO PROVIDE ACCESS TO CHECK DAMS FOR REPAIR.
- ACCESS TO UPSTREAM END OF CHECK DAMS #6, #9, #11, #12, AND #13 REQUIRES LITTLE OR NO CLEARING OR GRADING OF EXISTING GROUND FROM EXISTING ACCESS TRAIL.
- SALVAGE AND REPLACE ANY VEGETATION THAT IS DISTURBED IN ACCESSING CHECK DAMS #6, #9, #11, #12, AND #13.
- REMOVE ANY QUARRY SPALLS PLACED FOR ACCESS DURING CHECK DAM REPAIR AND INCORPORATE INTO CHECK DAMS OR REMOVE FROM SITE.
- STOCKPILE AND REPLACE ANY WOODY DEBRIS REMOVED FROM CHECK DAMS DURING REPAIR ACTIVITIES.
- REMOVE AND STOCKPILE ANY ROUNDED ALLUVIAL MATERIAL WITHIN CHECK DAMS WHERE LIGHT LOOSE RIPRAP OR QUARRY SPALLS ARE PLACED. PLACE STOCKPILED ALLUVIAL MATERIAL ON CHECK DAM FACES FOLLOWING REPAIR.
- CONTRACTOR SHALL UNCOVER/LOCATE FLOW BYPASS PIPE INLET AND OUTLET.
- EXISTING TREE SURVEY SHOWN ON PLANS BASED ON 2000 CONSTRUCTION SURVEY. CONTRACTOR SHALL VERIFY TREE LOCATIONS AND EXTENTS IN THE FIELD.

CLEARING AND GRADING STANDARD NOTES

- ALL CLEARING & GRADING CONSTRUCTION MUST BE IN ACCORDANCE WITH CITY OF BELLEVUE (COB) CLEARING & GRADING CODE, CLEARING & GRADING DEVELOPMENT STANDARDS, LAND USE CODE, INTERNATIONAL BUILDING CODE, PERMIT CONDITIONS, AND ALL OTHER APPLICABLE CODES, ORDINANCES, AND STANDARDS. THE DESIGN ELEMENTS WITHIN THESE PLANS HAVE BEEN REVIEWED ACCORDING TO THESE REQUIREMENTS. ANY VARIANCE FROM ADOPTED EROSION CONTROL STANDARDS IS NOT ALLOWED UNLESS SPECIFICALLY APPROVED BY THE CITY OF BELLEVUE DEVELOPMENT SERVICES (DSD) PRIOR TO CONSTRUCTION.

IT SHALL BE THE SOLE RESPONSIBILITY OF THE PROFESSIONAL CIVIL ENGINEER TO CORRECT ANY ERROR, OMISSION, OR VARIATION FROM THE ABOVE REQUIREMENTS FOUND IN THESE PLANS. ALL CORRECTIONS SHALL BE AT NO ADDITIONAL COST OR LIABILITY TO THE COB.
- APPROVAL OF THIS EROSION/SEDIMENTATION CONTROL (ESC) PLAN DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT ROAD OR DRAINAGE DESIGN (E.G.. SIZE AND LOCATION OF ROADS, PIPES, RESTRICTORS, CHANNELS, RETENTION FACILITIES, UTILITIES, ETC.).
- A COPY OF THE APPROVED PLANS MUST BE ON-SITE DURING CONSTRUCTION. THE APPLICANT IS RESPONSIBLE FOR OBTAINING ANY OTHER REQUIRED OR RELATED PERMITS PRIOR TO BEGINNING CONSTRUCTION.
- THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND VEGETATION/LANDSCAPING IS ESTABLISHED.
- THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO INSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT ENTER THE CREEK DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.
- THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO INSURE THAT SEDIMENT AND SEDIMENT-LADEN WATER DO NOT LEAVE THE SITE.
- ALL LOCATIONS OF EXISTING UTILITIES HAVE BEEN ESTABLISHED BY FIELD SURVEY OR OBTAINED FROM AVAILABLE RECORDS AND SHOULD, THEREFORE, BE CONSIDERED ONLY APPROXIMATE AND NOT NECESSARILY COMPLETE. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO INDEPENDENTLY VERIFY THE ACCURACY OF ALL UTILITY LOCATIONS AND TO DISCOVER AND AVOID ANY OTHER UTILITIES NOT SHOWN WHICH MAY BE AFFECTED BY THE IMPLEMENTATION OF THIS PLAN.
- THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY FLAGGED IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE FLAGGED CLEARING LIMITS SHALL BE PERMITTED. THE FLAGGING SHALL BE MAINTAINED BY THE CONTRACTOR FOR THE DURATION OF CONSTRUCTION.
- CLEARING SHALL BE LIMITED TO THE AREAS WITHIN THE APPROVED DISTURBANCE LIMITS. EXPOSED SOILS MUST BE COVERED AT THE END OF EACH WORKING DAY WHEN WORKING FROM OCTOBER 1ST THROUGH APRIL 30TH. FROM MAY 1ST THROUGH SEPTEMBER 30TH, EXPOSED SOILS MUST BE COVERED AT THE END OF EACH CONSTRUCTION WEEK AND ALSO AT THE THREAT OF RAIN.
- AT NO TIME SHALL MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A TRAPPED CATCH BASIN. ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE CLEANED PRIOR TO PAVING. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT-LADEN WATER INTO THE DOWNSTREAM SYSTEM.
- A STABILIZED CONSTRUCTION EXIT SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT.
- THE CONTRACTOR MUST MAINTAIN A SWEEPER ON SITE DURING EARTHWORK AND IMMEDIATELY REMOVE SOIL THAT HAS BEEN TRACKED ONTO PAVED AREAS AS RESULT OF CONSTRUCTION.
- THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTION.
- ANY EXCAVATED MATERIAL REMOVED FROM THE CONSTRUCTION SITE AND DEPOSITED ON PROPERTY WITHIN THE CITY LIMITS MUST BE DONE IN COMPLIANCE WITH A VALID CLEARING & GRADING PERMIT. LOCATIONS FOR THE MOBILIZATION AREA AND STOCKPILED MATERIAL MUST BE APPROVED BY THE CLEARING AND GRADING INSPECTOR AT LEAST 24 HOURS IN ADVANCE OF ANY STOCKPILING.
- THE ESC FACILITIES ON INACTIVE SITES SHALL BE INSPECTED AND MAINTAINED A MINIMUM OF ONCE A MONTH OR WITHIN THE 48 HOURS FOLLOWING A MAJOR STORM EVENT.
- FINAL SITE GRADING MUST DIRECT DRAINAGE AWAY FROM ALL BUILDING STRUCTURES AT A MINIMUM 5% SLOPE, PER THE INTERNATIONAL RESIDENTIAL CODE (IRC) R401.3.

CONSTRUCTION NOISE STANDARD NOTES

- CONSTRUCTION NOISE OUTSIDE THE ALLOWABLE HOURS IS PROHIBITED PER BCC 9.18.040. TO BE CONSIDERED A VIOLATION, THE CONSTRUCTION-RELATED NOISE MUST BE AUDIBLE ACROSS A PROPERTY LINE OR AT LEAST 75 FEET FROM THE SOURCE. ANY VIOLATION IS A CIVIL INFRACTION AND THE CITY MAY ASSESS A MONETARY PENALTY TO THE INDIVIDUAL CREATING THE NOISE. THE PENALTIES ARE:
 - A WARNING WILL BE ISSUED IF NO CONSTRUCTION NOISE VIOLATION HAS BEEN COMMITTED BY THE SAME PERSON WITHIN THE PREVIOUS TWO YEARS AT ANY LOCATION WITHIN THE CITY.
 - A CITATION WILL BE ISSUED AND A \$125 FINE IMPOSED IF ONE PREVIOUS VIOLATION HAS BEEN COMMITTED BY THE SAME PERSON WITHIN THE PREVIOUS TWO YEARS AT ANY LOCATION WITHIN THE CITY.
 - A CITATION WILL BE ISSUED AND A \$250 FINE IMPOSED IF TWO OR MORE PREVIOUS VIOLATIONS HAVE BEEN COMMITTED BY THE SAME PERSON WITHIN THE PREVIOUS TWO YEARS AT ANY LOCATION WITHIN THE CITY.
- CONSTRUCTION-RELATED NOISE IS NOT ALLOWED:
- OUTSIDE OF ALLOWABLE HOURS
 - LEGAL HOLIDAYS
 - SUNDAYS

MOBILIZATION/STOCKPILE AREA NOTES:

- ANY EXCAVATED MATERIAL REMOVED FROM THE CONSTRUCTION SITE AND DEPOSITED ON PROPERTY WITHIN THE CITY LIMITS MUST BE DONE IN COMPLIANCE WITH A VALID CLEARING & GRADING PERMIT. LOCATIONS FOR THE MOBILIZATION AREA AND STOCKPILED MATERIAL MUST BE APPROVED BY THE PCD INSPECTOR AT LEAST 24 HOURS IN ADVANCE OF ANY DUMPING.

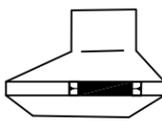
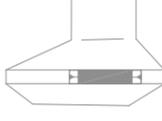
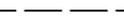
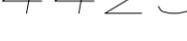
STREET SWEEPING NOTE

- CONTRACTOR SHALL IMMEDIATELY SWEEP THE PAVED CITY RIGHT-OF-WAY WHEN DIRT OR OTHER CONSTRUCTION RELATED DEBRIS IS DEPOSITED.

DUST SUPPRESSION

- DUST FROM CLEARING, GRADING, AND OTHER CONSTRUCTION ACTIVITIES SHALL BE MINIMIZED AT ALL TIMES. ANY DUST SUPPRESSANTS USED SHALL BE APPROVED BY THE DIRECTOR. PETROCHEMICAL DUST SUPPRESSANTS ARE PROHIBITED. WATERING THE SITE TO SUPPRESS DUST IS ALSO PROHIBITED UNLESS IT CAN BE DONE IN A WAY THAT KEEPS SEDIMENT OUT OF THE CREEK AND PUBLIC DRAINAGE SYSTEM.

LEGEND

	EXISTING ACCESS		EXISTING MAPLE
	EXISTING WETLAND		EXISTING CEDAR
	TEMPORARY CREEK CROSSING		EXISTING DECIDUOUS TREE
	STAGING AREA		EXISTING EVERGREEN TREE
	TEMPORARY CONSTRUCTION EXIT		EXISTING ROCK
	CHECK DAM (REPAIRS REQUIRED)		PROPOSED ROCK
	CHECK DAM (NO REPAIRS)		EXISTING CONTOUR
	LOG (PLAN VIEW)		CREEK ALIGNMENT
	HIGH VISIBILITY FENCE		ORDINARY HIGH WATER MARK
	SILT FENCE		PARCEL BOUNDARY
	TEMPORARY SANDBAG BYPASS DAM		RIGHT OF WAY
	TEMPORARY BYPASS PIPE		EXISTING FENCE
			EXISTING SANITARY SEWER
			LIMITS OF DISTURBANCE
			PLAT NUMBER
			ADDRESS NUMBER

70% DESIGN - NOT FOR CONSTRUCTION

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UPPER VASA CREEK
CHECK DAM REPAIR
PHASE 2

Approved By	
DESIGN MANAGER	DATE
PROJECT MANAGER	DATE



City of
Bellevue
 UTILITIES

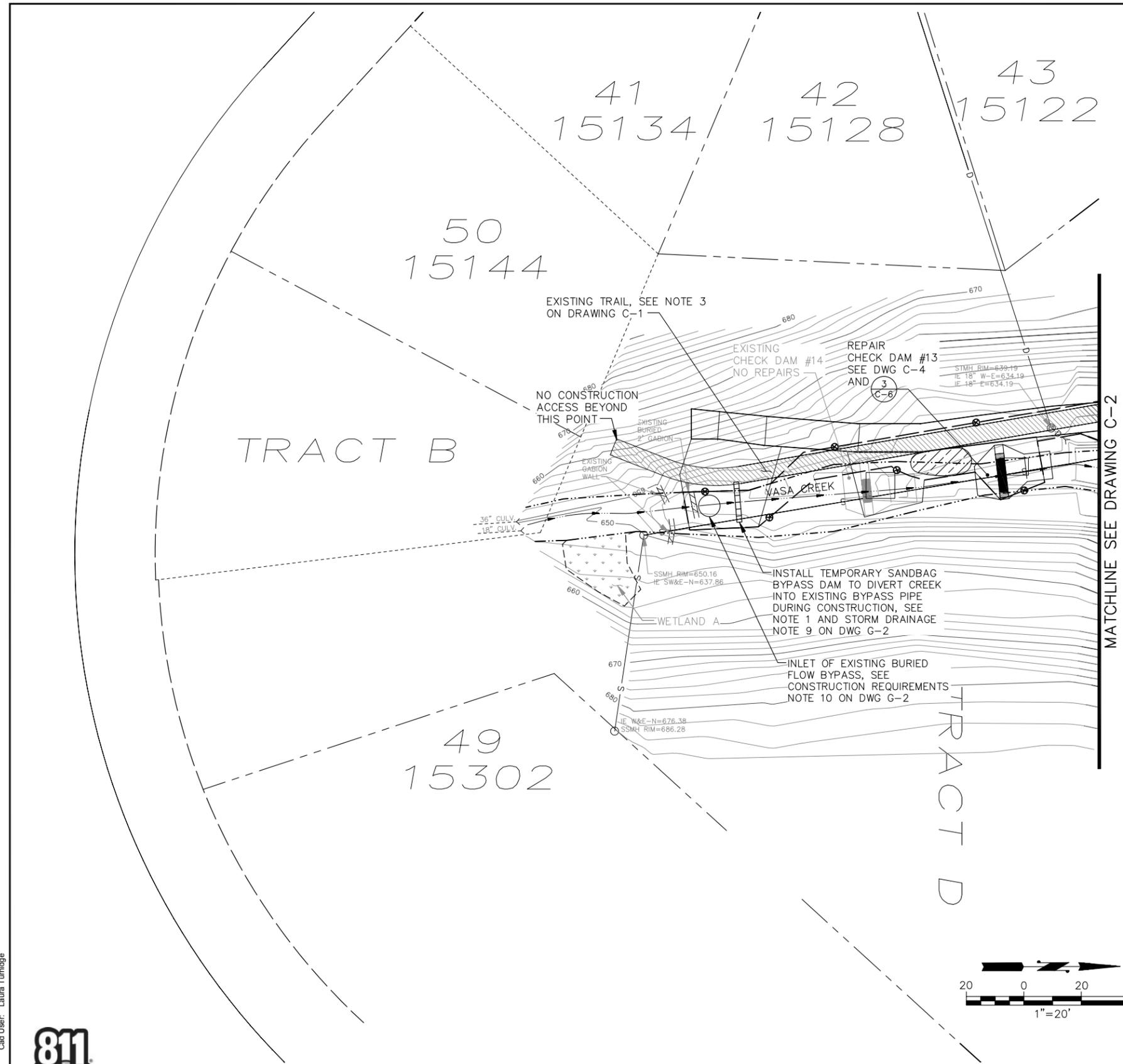
GENERAL NOTES	
DRAWING G-2	SHT 2 OF 15



ONE INCH
 AT FULL SIZE, IF NOT ONE
 INCH SCALE ACCORDINGLY

NOTES:

- BURIED FLOW BYPASS INTAKE IS LOCATED APPROXIMATELY 20 FEET DOWNSTREAM FROM EXISTING GABION WALL. CONTRACTOR SHALL EXCAVATE AND CONSTRUCT TEMPORARY SANDBAG DAM TO DIVERT FLOW.



MATCHLINE SEE DRAWING C-2

TRACT D



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AT FULL SIZE, IF NOT ONE
INCH SCALE ACCORDINGLY

NO	DATE	BY	APPR	REVISIONS

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**UPPER VASA CREEK
CHECK DAM REPAIR
PHASE 2**

Approved By

DESIGN MANAGER _____ DATE _____

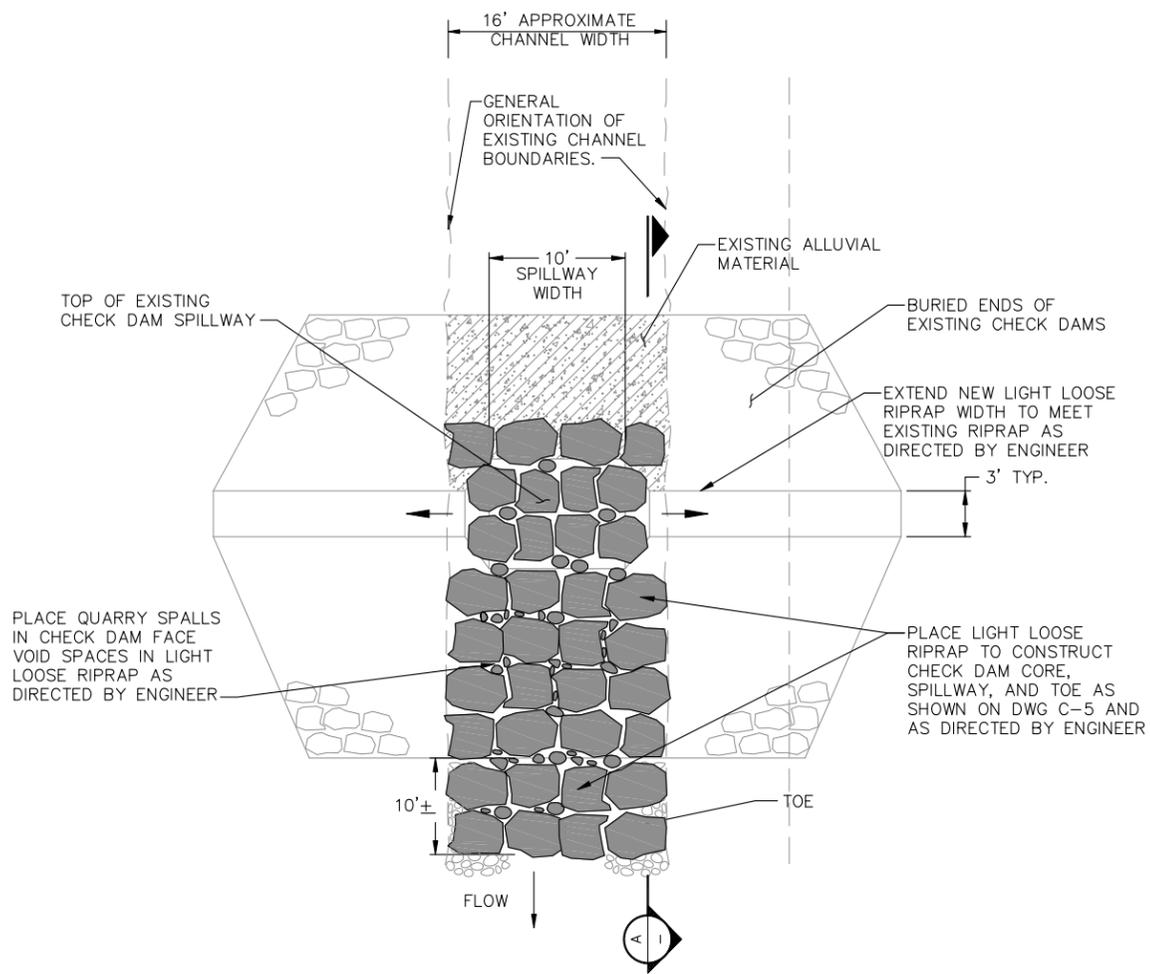
PROJECT MANAGER _____ DATE _____

M. FONTAINE 08/2010
DESIGNED BY DATE
L. TURNIDGE 08/2010
DRAWN BY DATE
M. EWBANK 08/2010
CHECKED BY DATE

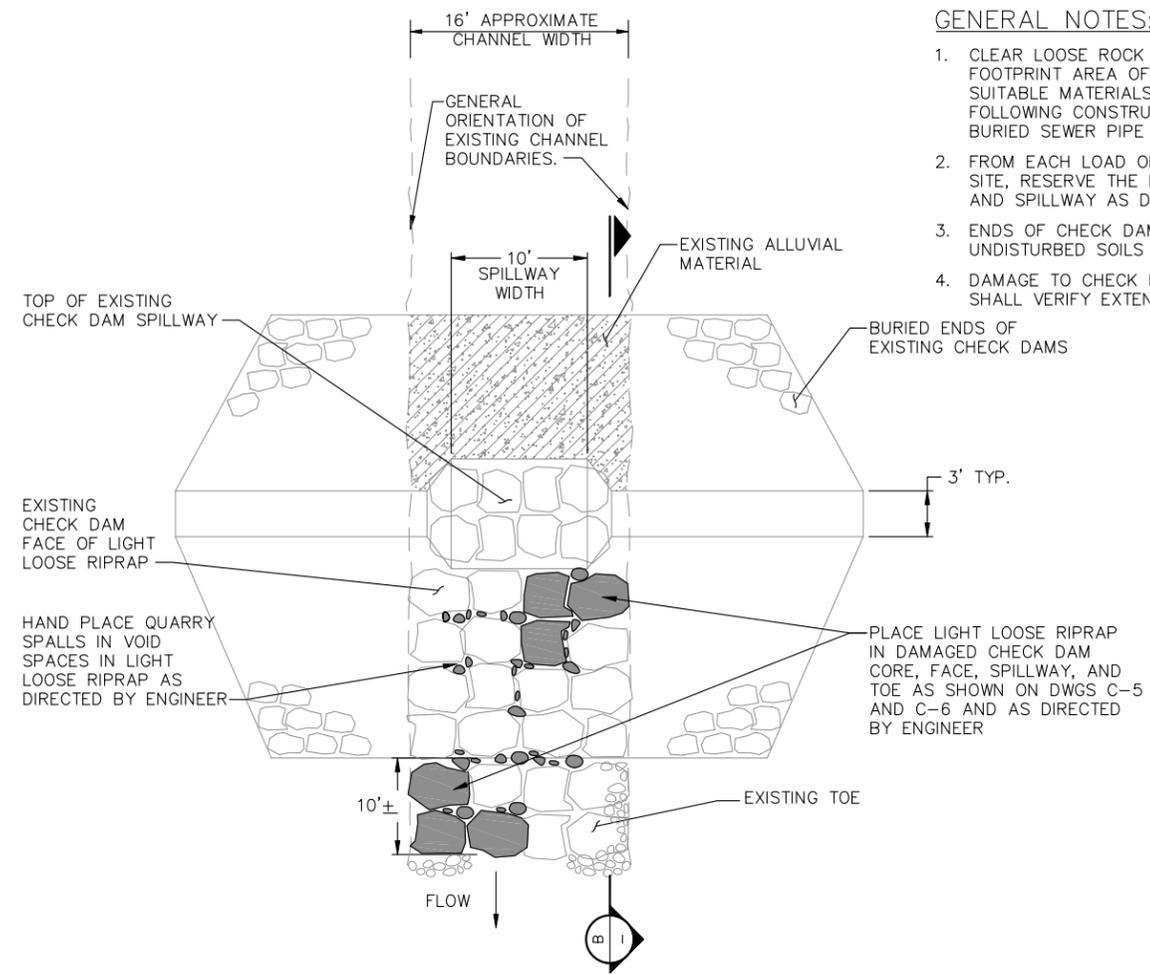
City of Bellevue
UTILITIES

SITE PLAN - SHEET 3 OF 3

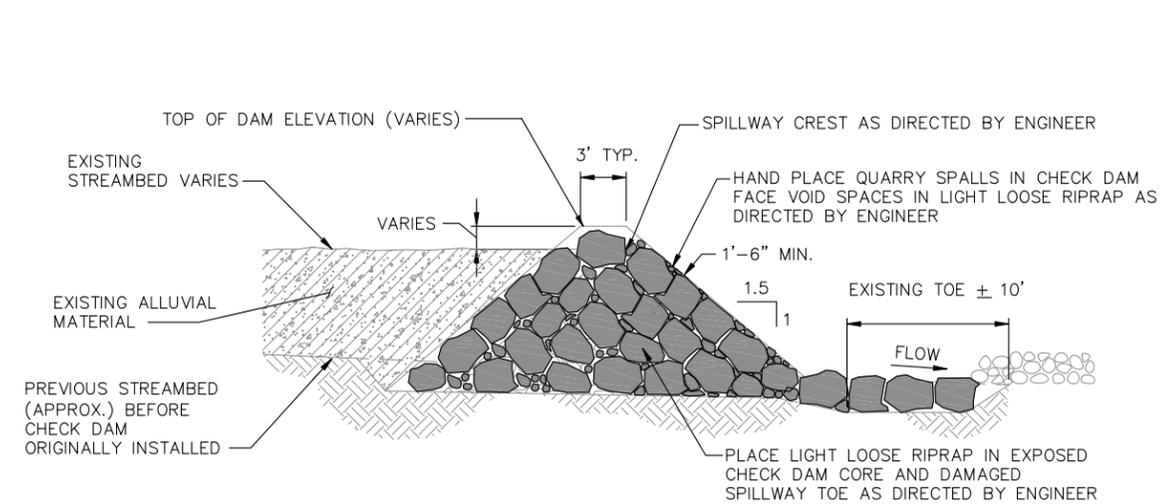
DRAWING C-3 SHT 5 OF 15



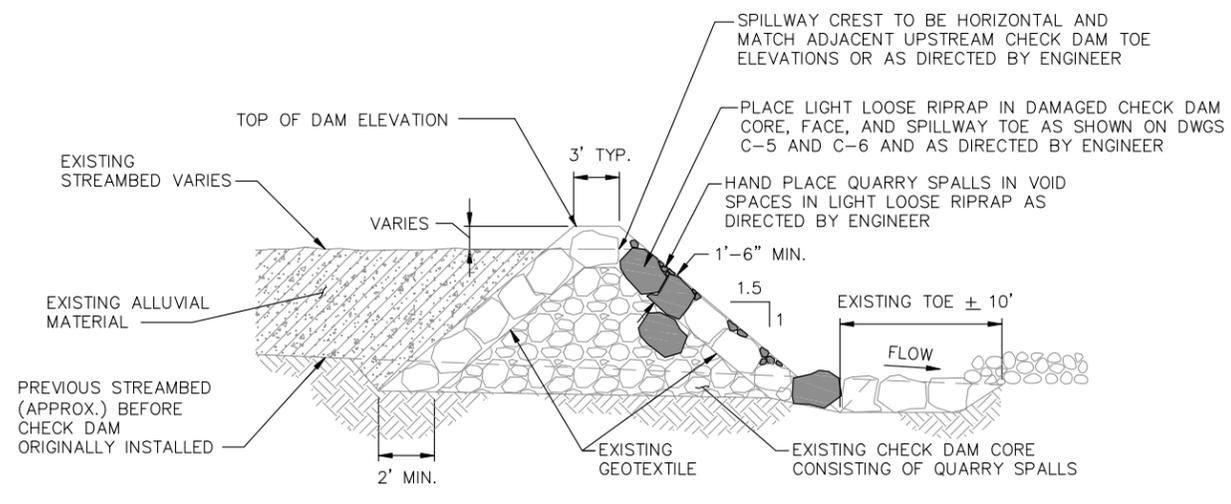
PLAN - CHECK DAM #1
SCALE: NTS



TYPICAL PLAN - CHECK DAMS #2, #3, #4, #6, #9, #11, #12, AND #13
SCALE: NTS



SECTION - CHECK DAM #1
SCALE: NTS



TYPICAL SECTION - CHECK DAMS #2, #3, #4, #6, #9, #11, #12, AND #13
SCALE: NTS



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GENERAL NOTES:

1. CLEAR LOOSE ROCK AND ORGANIC DEBRIS FROM FOOTPRINT AREA OF DAMAGED CHECK DAM. STOCKPILE SUITABLE MATERIALS ON SITE FOR REINCORPORATION FOLLOWING CONSTRUCTION. WORK CAREFULLY NEAR BURIED SEWER PIPE AND STREAMFLOW BYPASS PIPE.
2. FROM EACH LOAD OF RIPRAP DELIVERED TO EACH DAM SITE, RESERVE THE LARGER ROCKS FOR THE DAM CORE AND SPILLWAY AS DIRECTED BY ENGINEER.
3. ENDS OF CHECK DAMS SHALL BE TOED INTO FIRM, UNDISTURBED SOILS ON NATIVE SLOPES.
4. DAMAGE TO CHECK DAM CORE VARIES. CONTRACTOR SHALL VERIFY EXTENTS IN FIELD.

Path: O:\proj\2008\08-03987-000\CADD\Drawings\C-4.dwg
Plot Date: 8/10/2010 7:54 AM
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UPPER VASA CREEK
CHECK DAM REPAIR
PHASE 2

Approved By

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PROJECT MANAGER _____ DATE _____

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DESIGNED BY DATE
L. TURNIDGE 08/2010
DRAWN BY DATE
M. EWBANK 08/2010
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CHECK DAM DETAILS - SHEET 1 OF 3

DRAWING C-4 SHT 6 OF 15

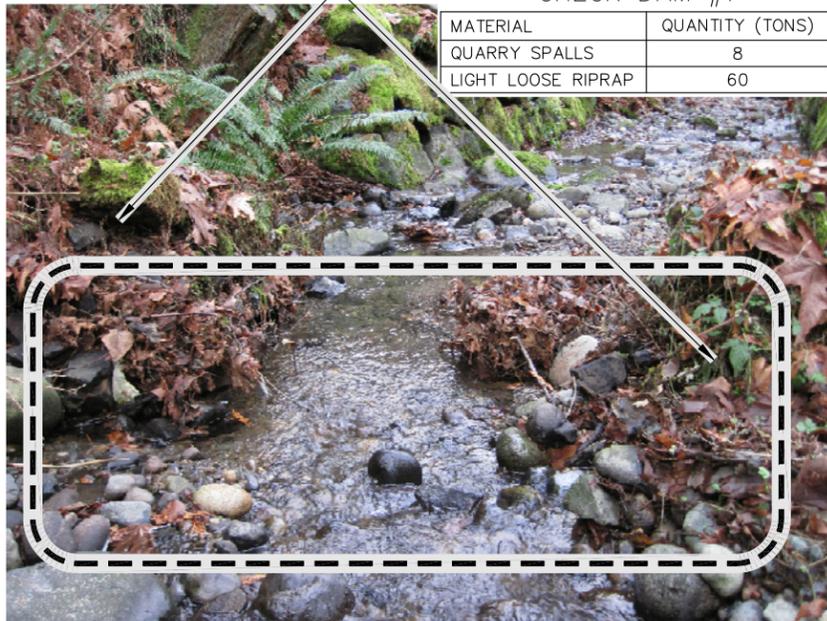


ONE INCH
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INCH SCALE ACCORDINGLY

REMOVE DAMAGED GABIONS PRIOR TO CONSTRUCTING CHECK DAM

CHECK DAM #1

MATERIAL	QUANTITY (TONS)
QUARRY SPALLS	8
LIGHT LOOSE RIPRAP	60



CHECK DAM #1
SCALE: NTS



CHECK DAM #2

MATERIAL	QUANTITY (TONS)
QUARRY SPALLS	1
LIGHT LOOSE RIPRAP	10



CHECK DAM #2
SCALE: NTS



SALVAGE EXISTING WOOD DEBRIS FOR REPLACEMENT FOLLOWING REPAIR

CHECK DAM #3

MATERIAL	QUANTITY (TONS)
QUARRY SPALLS	3
LIGHT LOOSE RIPRAP	26

INSTALL TEMPORARY MATERIALS CHUTE ON EXISTING GRADE, SEE NOTE 1 DWG C-1

REPAIR DOWNSTREAM FACE OF CHECK DAM

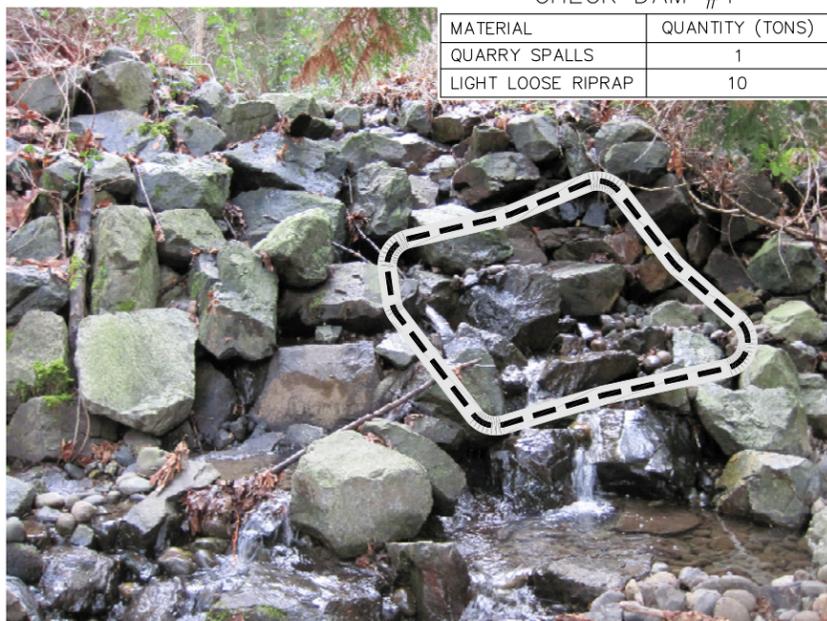


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SCALE: NTS



CHECK DAM #4

MATERIAL	QUANTITY (TONS)
QUARRY SPALLS	1
LIGHT LOOSE RIPRAP	10

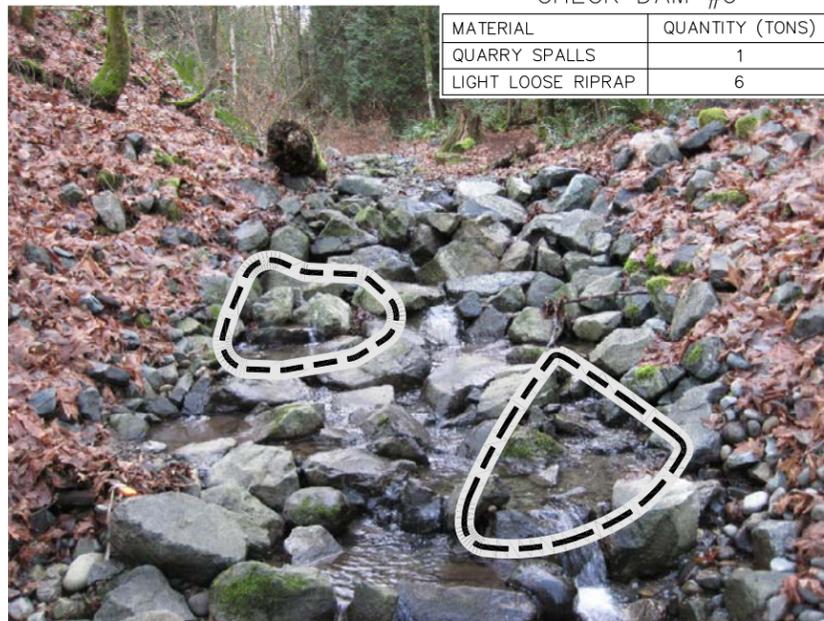


CHECK DAM #4
SCALE: NTS



CHECK DAM #6

MATERIAL	QUANTITY (TONS)
QUARRY SPALLS	1
LIGHT LOOSE RIPRAP	6

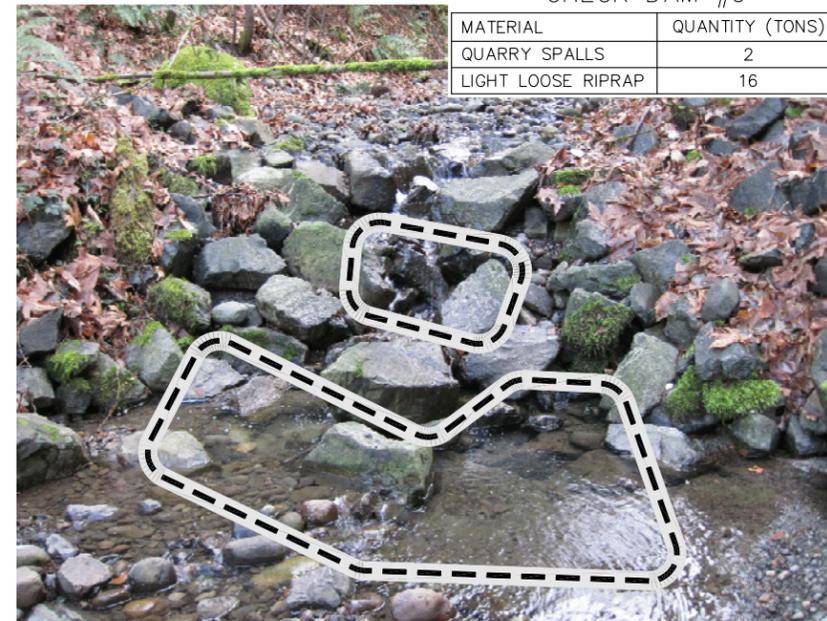


CHECK DAM #6
SCALE: NTS



CHECK DAM #9

MATERIAL	QUANTITY (TONS)
QUARRY SPALLS	2
LIGHT LOOSE RIPRAP	16



CHECK DAM #9
SCALE: NTS



NOTES:

- ALL PHOTOS TAKEN FACING UPSTREAM TOWARDS DAMAGED CHECK DAMS, EXCEPT CHECK DAM #1.
- REPAIR EXTENTS SHOWN ARE APPROXIMATE AND MAY VARY AT TIME OF CONSTRUCTION.



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CHECK DAM DETAILS/PHOTOS -
SHEET 2 OF 3

DRAWING C-5 SHT 7 OF 15

CHECK DAM #11

MATERIAL	QUANTITY (TONS)
QUARRY SPALLS	2
LIGHT LOOSE RIPRAP	12



CHECK DAM #11
SCALE: NTS



CHECK DAM #12

MATERIAL	QUANTITY (TONS)
QUARRY SPALLS	1
LIGHT LOOSE RIPRAP	8



CHECK DAM #12
SCALE: NTS



CHECK DAM #13

MATERIAL	QUANTITY (TONS)
QUARRY SPALLS	1
LIGHT LOOSE RIPRAP	6



CHECK DAM #13
SCALE: NTS



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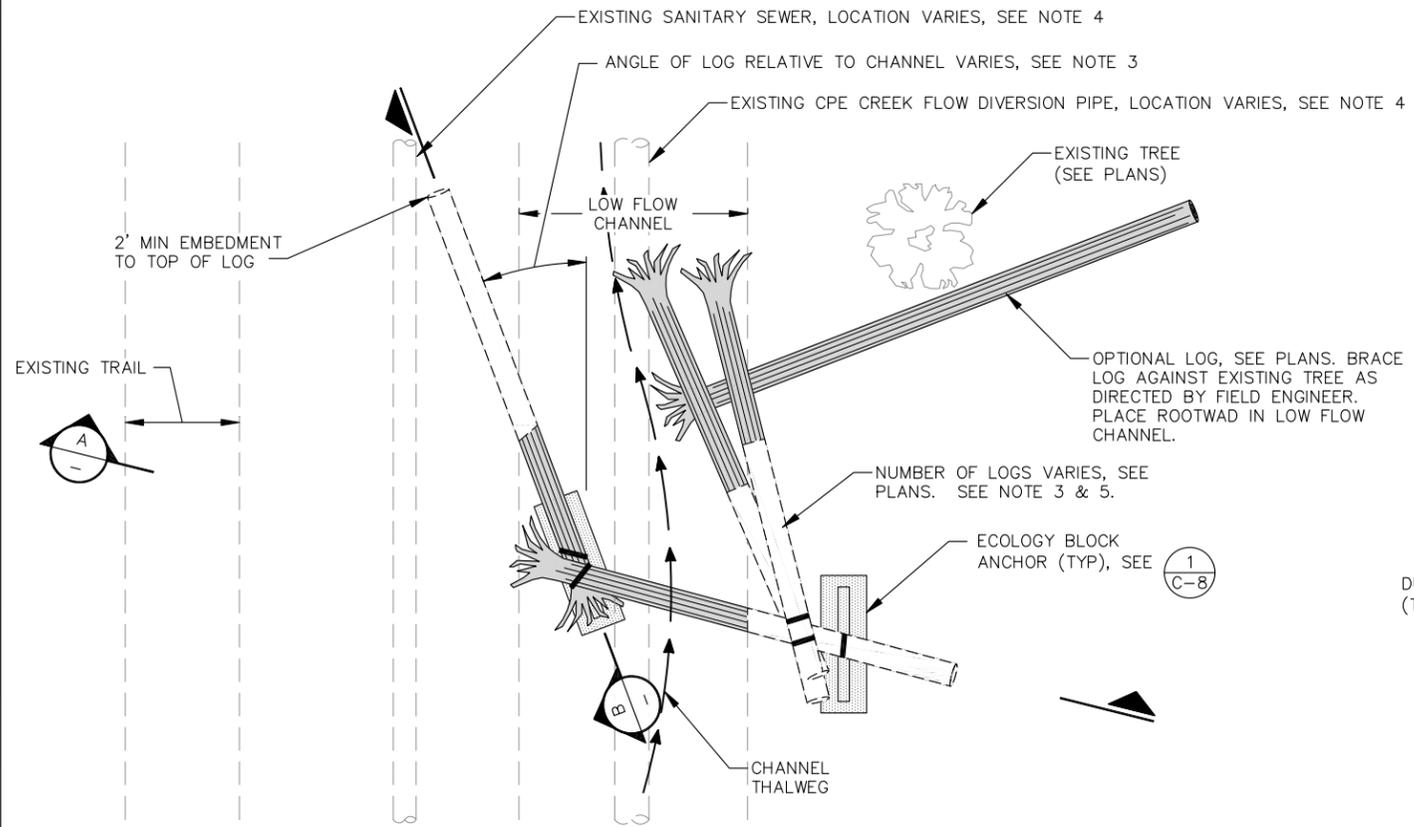
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SHEET 3 OF 3

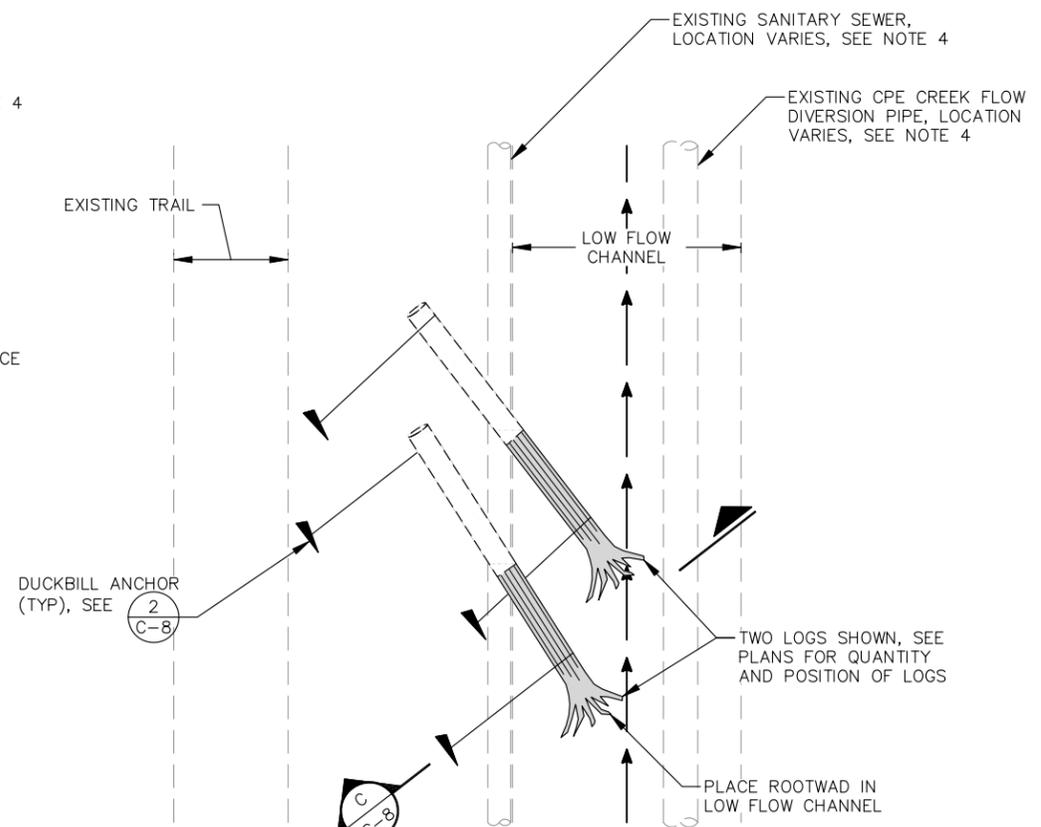
DRAWING C-6 SHT 8 OF 15



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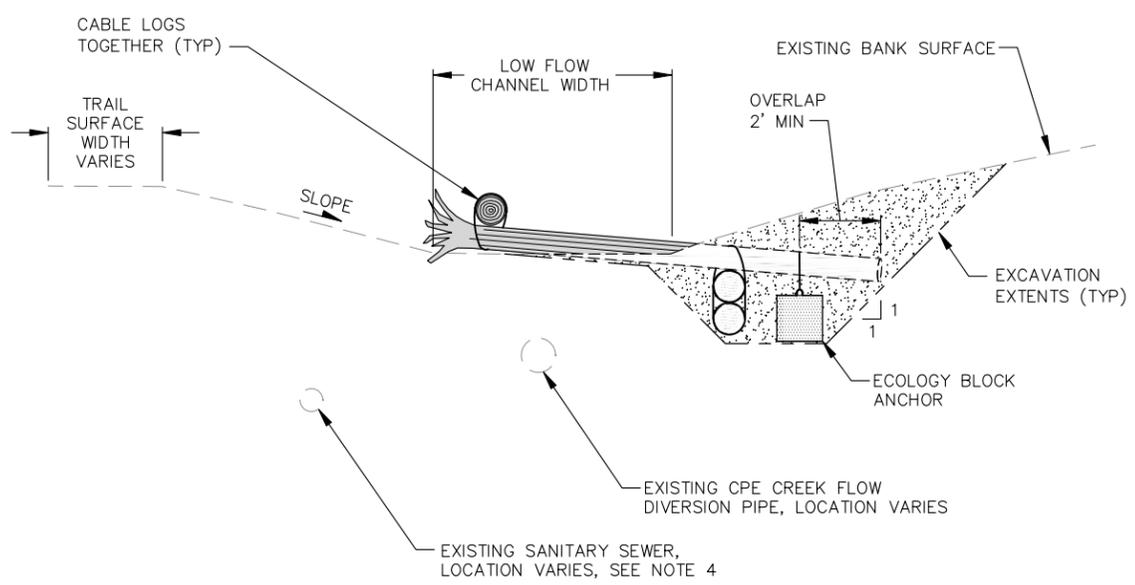
PLAN - LOG STRUCTURE
 SCALE: 1"=4'
 1 VAR



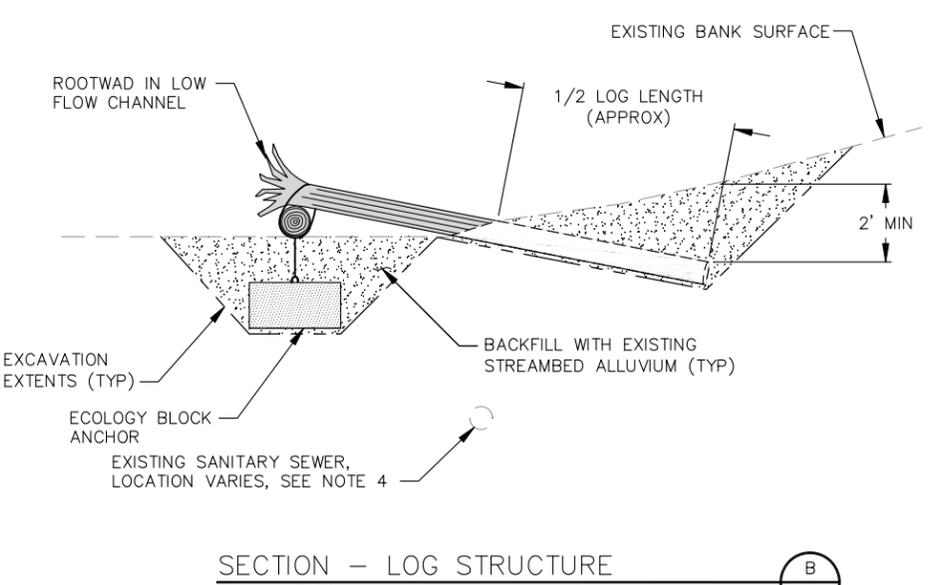
PLAN - HABITAT LOG
 SCALE: 1"=4'
 2 VAR

NOTES:

1. BACKFILL ALL EXCAVATIONS WITH EXISTING STREAMBED GRAVEL AND COBBLES. PLACE EXCESS MATERIAL ADJACENT TO LOG STRUCTURES AS DIRECTED BY ENGINEER.
2. LOG IDENTIFICATION NUMBERS REFLECT POTENTIAL CONSTRUCTION SEQUENCING AND LOG PLACEMENT SEQUENCING. SEE DRAWING C-8 FOR LOG MATERIAL SCHEDULE.
3. ENGINEER SHALL STAKE ALL LOG STRUCTURE LOCATIONS PRIOR TO EXCAVATION.
4. CONTRACTOR TO POTHOLE FOR LOG PLACEMENTS NEAR SEWER PIPE TO VERIFY LOCATIONS. MINIMUM 3' CLEARANCE BETWEEN SEWER PIPE AND LOGS, ANCHOR, OR CABLES. NO MINIMUM CLEARANCE FOR CPE DIVERSION PIPE.
5. VARY LOG PLACEMENT BASED ON PIPE LOCATIONS.

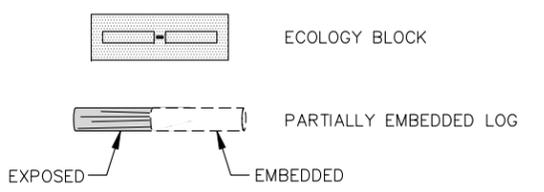


SECTION - LOG STRUCTURE
 SCALE: 1"=4'
 A



SECTION - HABITAT LOG
 SCALE: 1"=4'
 B

LEGEND



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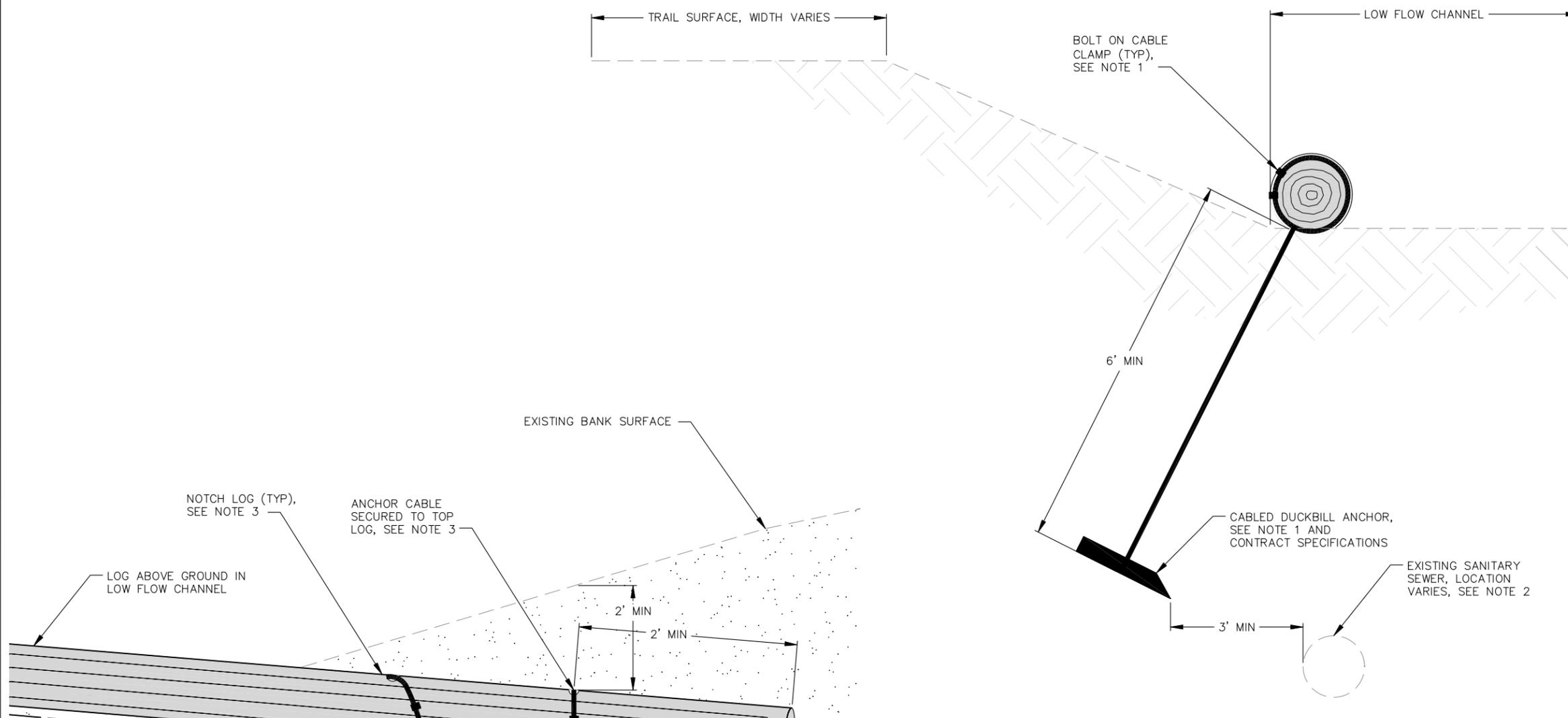
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**LOG STRUCTURE DETAILS -
 SHEET 1 OF 2**

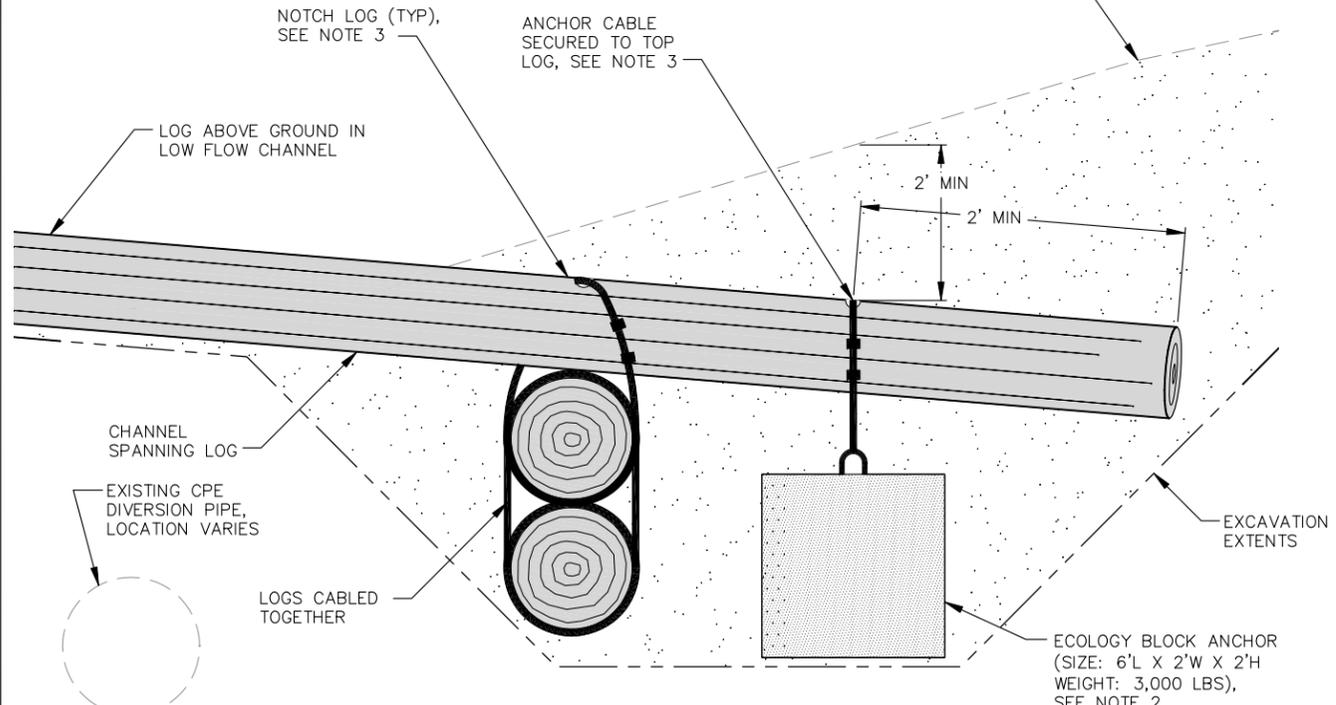
DRAWING C-7 SHT 9 OF 15

TABLE - LOG SCHEDULE:

LOG #	DIA. (IN)	LENGTH (FT)	ROOTWAD	INSTALLATION TYPE
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
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26				
27				
28				
29				
30				
31				
32				
33				
34				
35				



SECTION - HABITAT LOG DUCKBILL ANCHOR
SCALE: 1"=1' C
C-7



DETAIL - ECOLOGY BLOCK ANCHOR
SCALE: 1"=1' 1
C-7

NOTES:

1. SECURE ALL ANCHOR CABLES USING MIN 2 BOLT-ON CABLE CLAMPS.
2. CONTRACTOR TO POTHOLE FOR LOG AND ANCHOR PLACEMENTS NEAR SEWER PIPE TO VERIFY LOCATIONS. MINIMUM 3' CLEARANCE BETWEEN SEWER PIPE AND LOGS, ANCHOR, OR CABLES. NO MINIMUM CLEARANCE FOR DIVERSION PIPE.
3. NOTCH LOG 1" MIN DEPTH. SECURE CABLE IN NOTCH.

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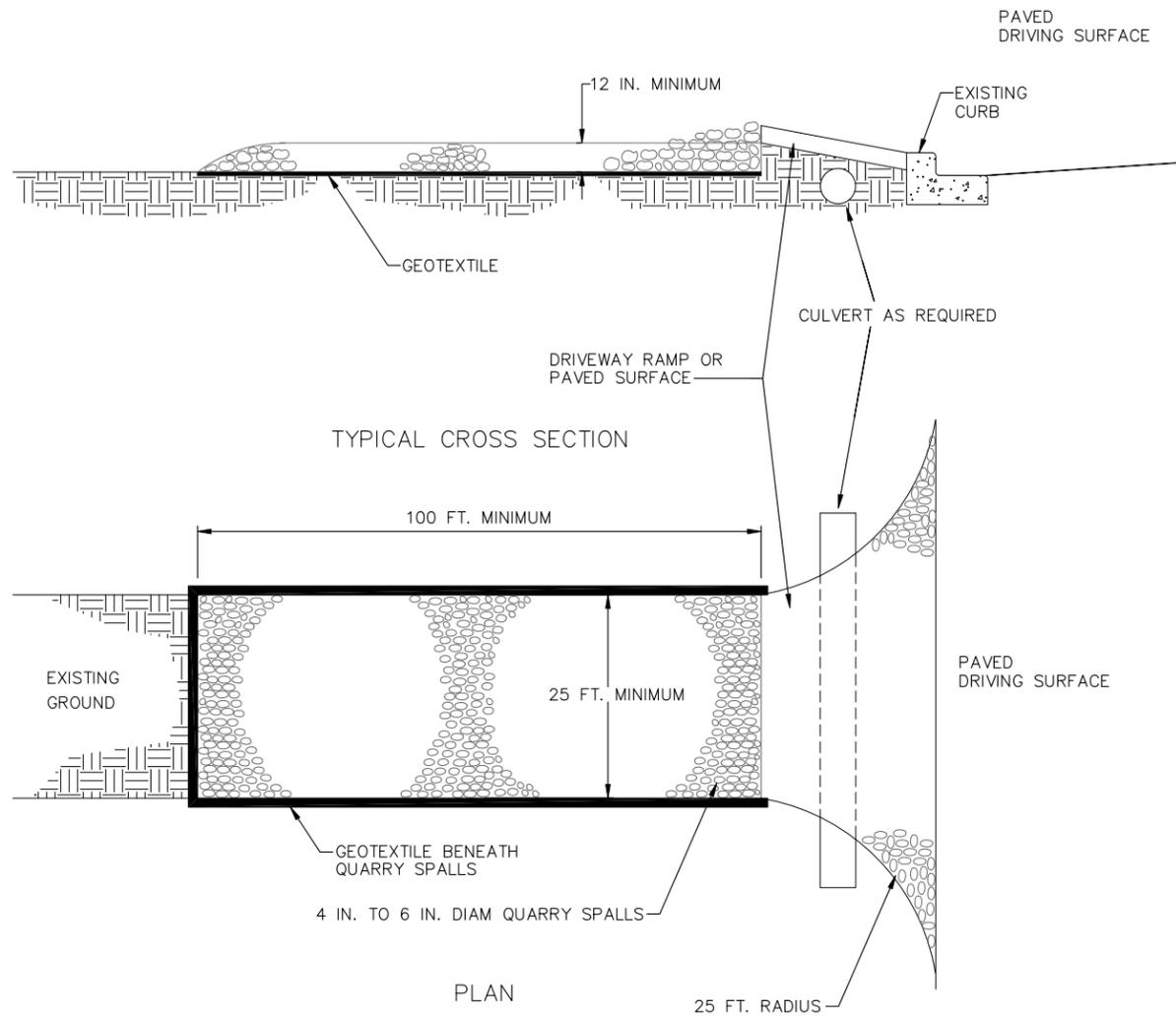
UPPER VASA CREEK
CHECK DAM REPAIR
PHASE 2

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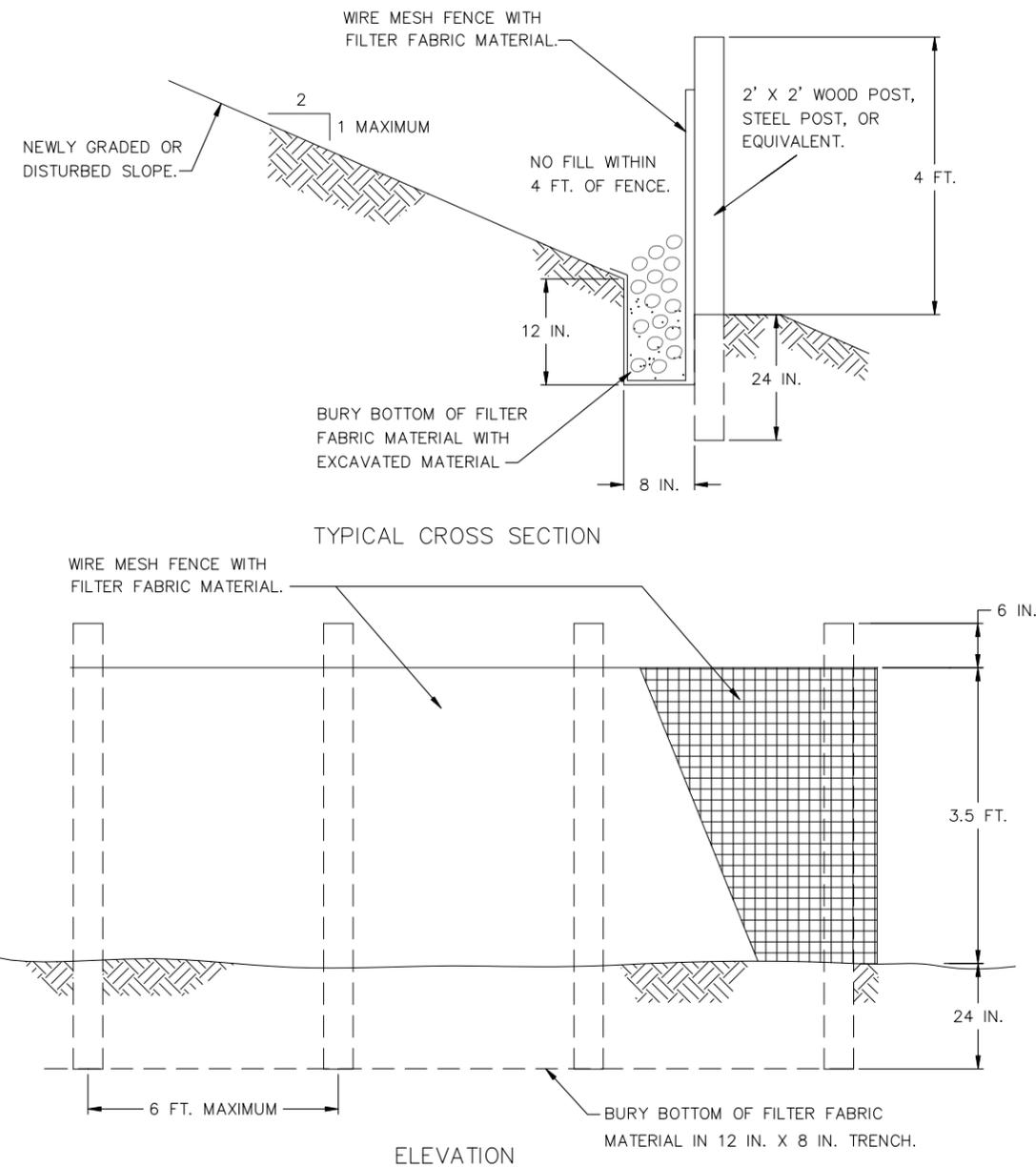


LOG STRUCTURE DETAILS - SHEET 2
OF 2
DRAWING C-8 SHT 10 OF 15



NOTES:

1. PAD SHALL BE REMOVED AND REPLACED WHEN SOIL IS EVIDENT ON THE SURFACE OF THE PAD OR AS DIRECTED BY THE CITY CLEARING AND GRADING INSPECTOR.
2. PAD SHALL BE INSTALLED IN PLANTING STRIP AS APPROPRIATE.
3. PAD THICKNESS SHALL BE INCREASED IF SOIL CONDITIONS DICTATE AND/OR PER THE DIRECTION OF THE CITY CLEARING AND GRADING INSPECTOR.
4. MINIMUM DIMENSIONS MAY BE MODIFIED AS REQUIRED BY SITE CONDITIONS UPON APPROVAL OF THE CITY CLEARING AND GRADING INSPECTOR.
5. PROTECT OR RESTORE EXISTING CURB.
6. TO BE INSTALLED ONLY AT DIRECTION OF CITY OF BELLEVUE ENGINEER.



NOTES:

1. FENCE SHALL NOT BE INSTALLED ON SLOPES STEEPER THAN 2:1.
2. JOINTS IN FILTER FABRIC SHALL BE OVERLAPPED 6 INCHES AT POST.
3. USE STAPLES, WIRE RINGS, OR EQUIVALENT TO ATTACH FABRIC TO WIRE FENCE.
4. REMOVE SEDIMENT WHEN IT REACHES 1/3 FENCE HEIGHT.
5. TO BE INSTALLED ONLY AT DIRECTION OF CITY OF BELLEVUE ENGINEER.

DETAIL - TEMPORARY CONSTRUCTION EXIT (EC-001) 1
SCALE: NTS C-1

DETAIL - REINFORCED SILT FENCE (EC-5) 2
SCALE: NTS C-1

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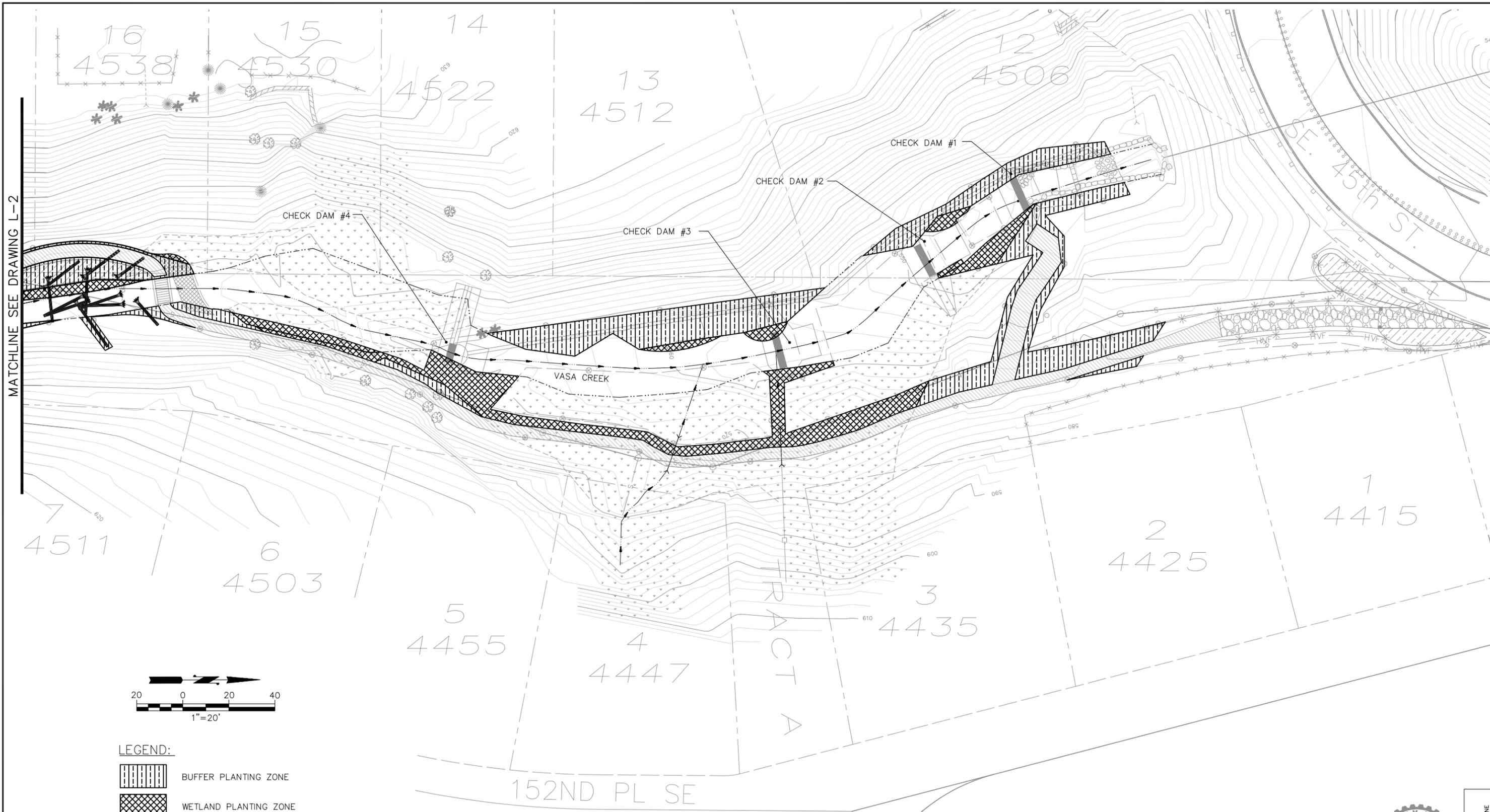
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TESC PLAN

DRAWING ES-1 SHT 11 OF 15



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LEGEND:
 BUFFER PLANTING ZONE
 WETLAND PLANTING ZONE

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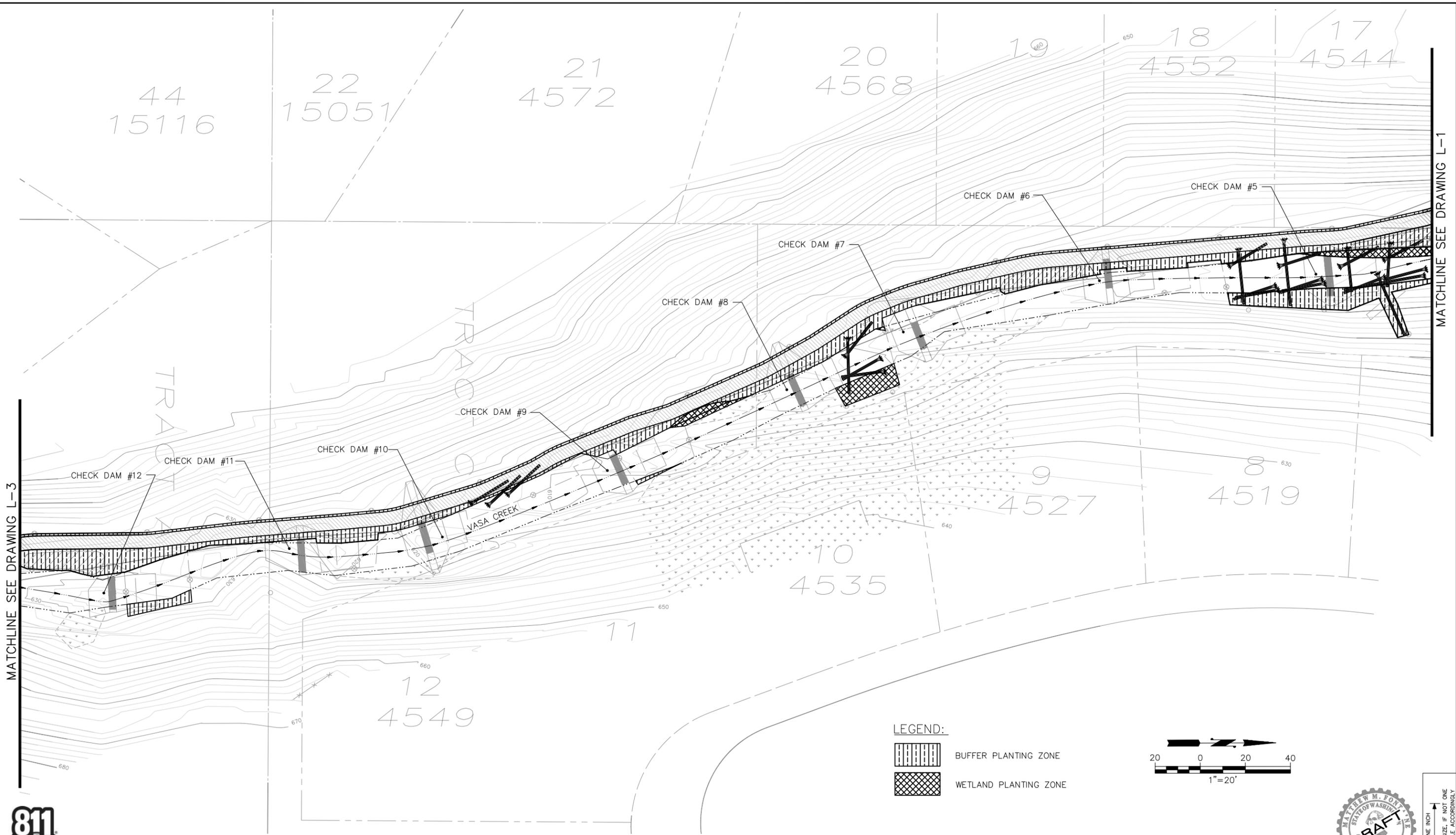
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PLANTING PLAN - SHEET 1 OF 3
 DRAWING L-1 SHT 12 OF 15

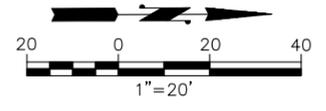


MATCHLINE SEE DRAWING L-3

MATCHLINE SEE DRAWING L-1

LEGEND:

- BUFFER PLANTING ZONE
- WETLAND PLANTING ZONE



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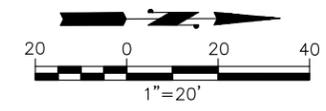
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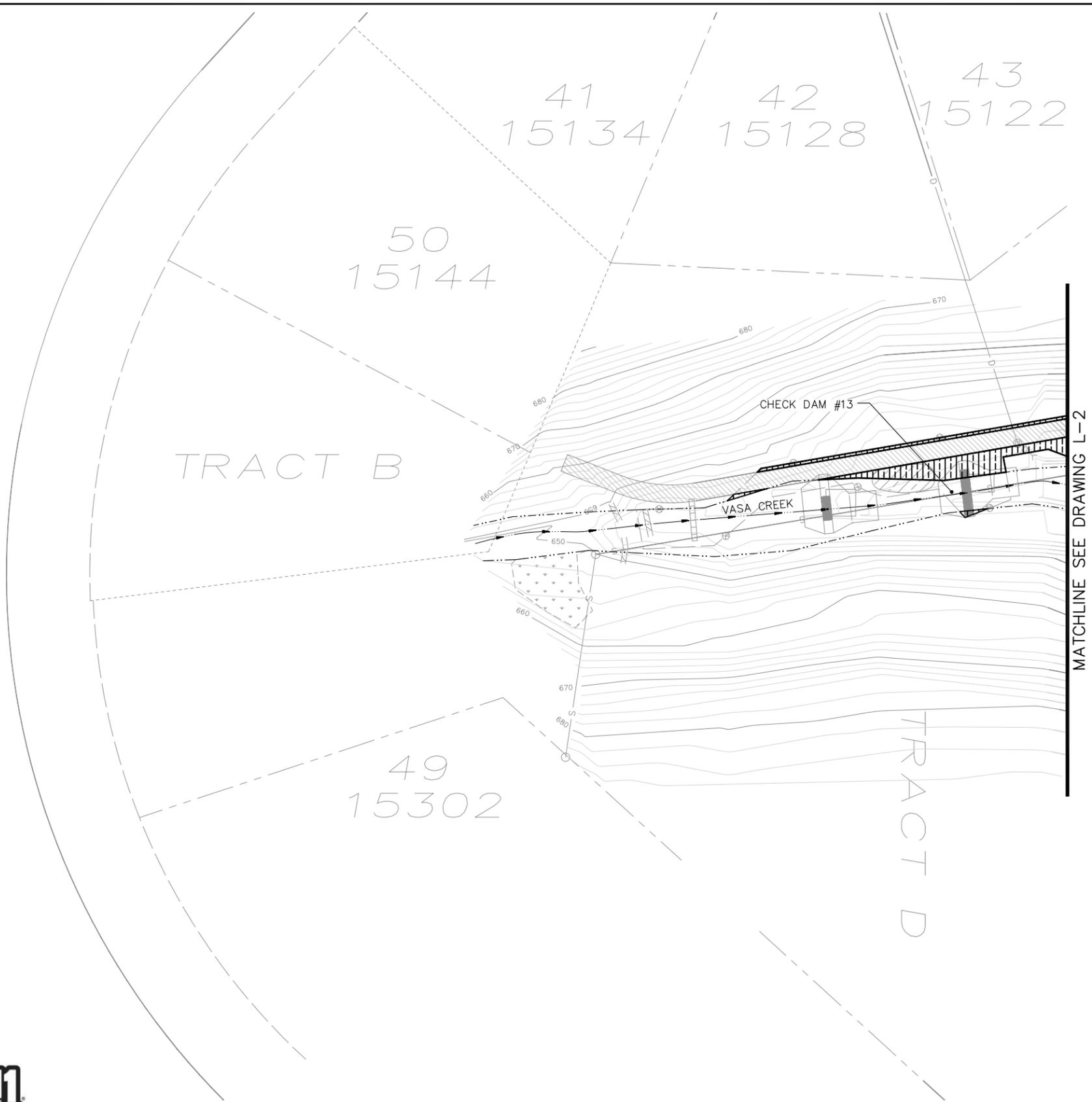
PLANTING PLAN - SHEET 2 OF 3

DRAWING L-2 SHT 13 OF 15

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INCH SCALE ACCORDINGLY



- LEGEND:**
-  BUFFER PLANTING ZONE
 -  WETLAND PLANTING ZONE



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PLANTING PLAN - SHEET 3 OF 3

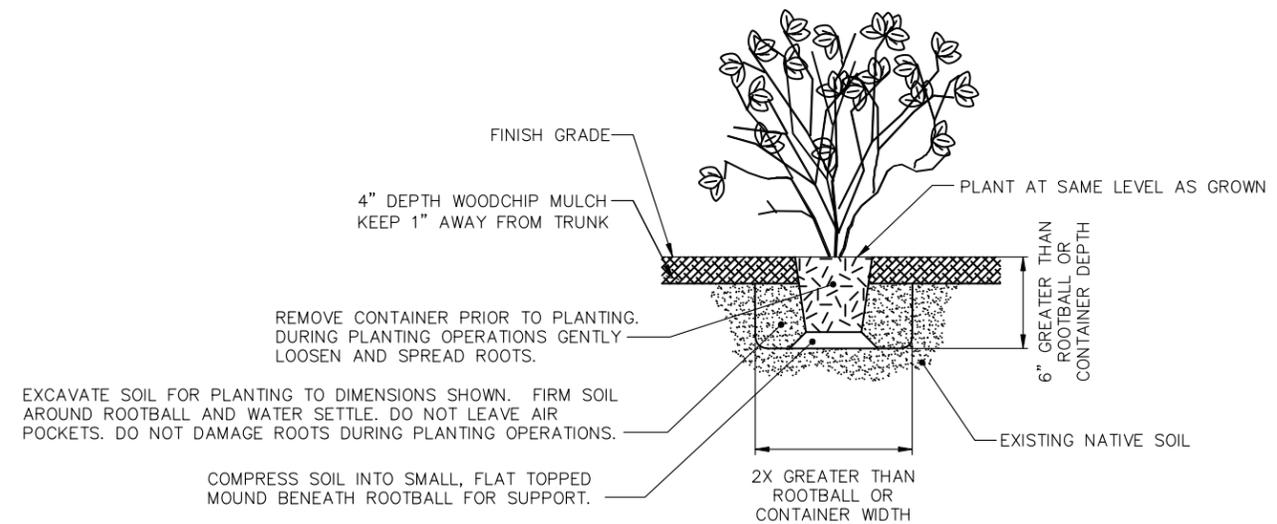
DRAWING L-3 SHT 14 OF 15

PLANTING SCHEDULE:

ZONE	STRATUM	SCIENTIFIC NAME	COMMON NAME	QUANTITY	SPACING (ON CENTER)	CONTAINER SIZE
WETLAND	SHRUB	CORNUS SERICEA	RED-OSIER DOGWOOD	35	5 FEET	1 GALLON
		RIBES LACUSTRE	SWAMP GOOSEBERRY	35	5 FEET	1 GALLON
		RUBUS PARVIFLORUS	THIMBLEBERRY	35	5 FEET	1 GALLON
		RUBUS SPECTABILIS	SALMONBERRY	35	5 FEET	1 GALLON
	EMERGENT	CAREX OBNUPTA	SLOUGH SEDGE	1397	1.5 FEET	PLUG
BUFFER	SHRUB	ACER CIRCINATUM	VINE MAPLE	102	5 FEET	1 GALLON
		OEMLERIA CERASIFORMIS	INDIAN PLUM	102	5 FEET	1 GALLON
		SAMBUCUS RACEMOSA	RED ELDERBERRY	102	5 FEET	1 GALLON
		SYMPHORICARPOS ALBUS	SNOWBERRY	102	5 FEET	1 GALLON
	FERN	ATHYRIUM FILIX-FEMINA	LADY FERN	2064	1.5 FEET	4-INCH POT
		POLYSTICHUM MUNITUM	SWORD FERN	2064	1.5 FEET	4-INCH POT

PLANTING NOTES:

- SPREAD 4" DEPTH OF WOOD CHIP MULCH THROUGHOUT ALL PLANTING AREAS.
- PLANTING OF ALL SHRUBS, SEDGES, AND FERNS SHALL TAKE PLACE DURING THE DORMANT SEASON (OCTOBER-JANUARY).
- ALL PLANTS SHALL CONFORM TO THE STANDARDS OF THE CURRENT EDITION OF AMERICAN STANDARD FOR NURSERY STOCK AS APPROVED BY THE AMERICAN STANDARDS INSTITUTE (ANSI Z60.1-2004).
- ALL PLANT MATERIALS SHALL HAVE NORMAL, WELL-DEVELOPED BRANCHES AND VIGOROUS ROOT SYSTEMS, AND BE FREE FROM PHYSICAL DEFECTS, PLANT DISEASES, AND INSECT PESTS.
- PLANT SUBSTITUTIONS ARE SUBJECT TO APPROVAL BY THE ENGINEER.
- PLANTS SHALL BE TAGGED FOR IDENTIFICATION WHEN DELIVERED.
- LAYOUT OF ALL PLANT MATERIAL SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
- THE ENGINEER WILL FIELD ACCEPT CONTRACTOR'S FIELD STAKING OF LOCATIONS OF PLANTINGS TO FIT SITE CONDITIONS. USE PLAN FOR QUANTITIES -FINAL LOCATIONS ARE SUBJECT TO CHANGE.
- THE ENGINEER SHALL APPROVE GRADING PRIOR TO PLANT INSTALLATION.
- THOROUGHLY WATER ALL PLANTED AREAS IMMEDIATELY AFTER PLANTING AND WATER FOR OPTIMUM HEALTH DURING DRY PERIODS DURING PLANT ESTABLISHMENT PERIOD.
- KEEP PLANTS SHADED UNTIL THE ACTUAL TIME OF PLANTING. DO NOT LET PLANT MATERIAL SIT IN SUN OR DRY OUT DURING PLANTING.
- PLANT SHRUBS IN CLUSTERS OF THREE OR FIVE OF THE SAME SPECIES. PLACE SHRUBS AT 5 FEET ON CENTER. EVENLY DISTRIBUTE CLUSTERS THROUGHOUT PLANTING AREAS.
- INTERPLANT SEDGE AND FERNS AMONGST SHRUBS AT 1.5 FEET ON CENTER WITHIN RESPECTIVE PLANTING ZONES.



PLANT INSTALLATION

SCALE: NTS



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PLANT MATERIAL SCHEDULE

DRAWING L-4 SHT 15 OF 15

APPENDIX B

Wetland Delineation Methods

Critical Area Report—Upper Vasa Creek Check Dam Repairs Phase II Project

Wetland Delineation Methods

This wetland delineation was performed in accordance with the Washington State Wetlands Identification and Delineation Manual (Ecology 1997) and the Interim Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region (Environmental Laboratory 2008), both of which are consistent with the 1987 Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory 1987). These methods use a three-parameter approach for identifying and delineating wetlands. This approach is based on the presence of field indicators for hydrophytic vegetation, hydric soils, and hydrology. This wetland delineation was performed according to procedures specified for the routine wetland determination method (Ecology 1997).

Hydrophytic Vegetation

Hydrophytic vegetation is characterized by the ability to grow, effectively compete, reproduce, and persist in anaerobic soil conditions that have resulted from periodic or long-term saturation. Numerous field indicators of hydrophytic vegetation may be used, although the most common indicator is defined as more than 50 percent of the dominant species in each vegetation stratum having a wetland indicator status of obligate wetland (OBL), facultative wetland (FACW), or facultative (FAC). The plant indicator status categories are explained in Table A-1.

Table A-1. Plant indicator status categories.

Indicator Status	Indicator Symbol	Definition
Obligate wetland plants	OBL	Plants that occur almost always (estimated probability >99%) in wetlands under natural conditions but also occur rarely (estimated probability <1%) in upland areas
Facultative wetland plants	FACW	Plants that usually occur (estimated probability >67%) in wetlands under natural conditions but also occur (estimated probability 1% to 33%) in upland areas
Facultative plants	FAC	Plants with a similar likelihood (estimated probability 33% to 67%) of occurring in both wetlands and upland areas
Facultative upland plants	FACU	Plants that sometimes occur (estimated probability 1% to 33%) in wetlands but occur more often (estimated probability >67% to 99%) in upland areas
Obligate upland plants	UPL	Plants that rarely occur (estimated probability <1%) in wetlands under natural conditions

WET ← $\xrightarrow{\hspace{10em}}$ *DRY*
OBL → *FACW* → *FAC* → *FACU* → *UPL*

Source: Environmental Laboratory (1987).

Dominant species are those that contribute more than other species to the character of a plant community. To determine dominance, first a complete list of plant species that occur in the sampling area is compiled and divided into four strata: tree, sapling/shrub, herb, and woody

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vine. Next, a vegetation sampling plot is determined by the field biologist to accurately characterize the plant community in the area to be evaluated. These sampling plots are typically circular areas that are centered on the location of the test pit (used to sample soils). The radius of the circle is determined in the field on the basis of site conditions. In large wetlands, a typical sampling radius would be 2 to 5 meters for tree and sapling/shrub species and 1 meter for herbaceous species. In a small or narrow wetland (or upland area), the radius might be reduced to accurately sample wetland (upland) areas and avoid overlapping an adjacent community with different vegetation, soils, or hydrologic conditions (Environmental Laboratory 2008). A plant is included in the tree stratum if it is a woody plant with a diameter at breast height (dbh) of at least 3 inches; in the sapling/shrub stratum if it is a woody plant less than 3 inches dbh; in the herb stratum if it is an herbaceous (nonwoody) plant; and in the woody vine stratum if it is a woody vine of any height (Environmental Laboratory 2008). To be included in the sampling, 50 percent or more of the plant base must be within the radius of the sampling plot. For a tree to be included, more than 50 percent of the trunk (diameter) must be within the sampling radius.

For each sampling plot, the plant species within each stratum are listed on the wetland determination data form, in decreasing order of their areal coverage. Starting with the plant species at the top of the stratum list (the highest percentage of coverage) and proceeding down the list (in descending order of coverage); the percentages are cumulatively totaled until the sum reaches 50 percent. The plant species that constitute this first 50 percent of areal coverage are considered the dominant species in the stratum. In addition, a plant species that constitutes 20 percent or more of the areal coverage in the stratum is also considered a dominant species (Environmental Laboratory 1987). The wetland determination data form includes this dominance test and the prevalence test for assessing whether the criteria for hydrophytic vegetation are met at each sampling plot (Environmental Laboratory 2008).

Plant species were identified using *Flora of the Pacific Northwest* (Hitchcock and Cronquist 1987) and *A Field Guide to the Common Wetland Plants of Western Washington and Northwestern Oregon* (Cooke 1997). The indicator status of each plant species is based on a list of plant species that occur in wetlands in the Pacific Northwest (USFWS 1993). Biologists referred to the national Plants Database produced by the U.S. Department of Agriculture (NRCS 2009a) to determine whether the scientific names of plants have changed since the publication of the national list of plant species that occur in wetlands (Reed 1988, 1993); any name changes were noted according to the Plants Database.

Other evidence of hydrophytic vegetation includes observation of plant species growing in areas of prolonged inundation or soil saturation, and visual evidence of physiological, morphological, or reproductive adaptations. The section in the supplement to the Corps of Engineers manual that discusses problematic hydrophytic vegetation further explains how to interpret these situations (Environmental Laboratory 2008).

Hydric Soils

A hydric soil is a soil that is saturated, flooded, or inundated long enough during the growing season to develop anaerobic conditions that favor the growth and regeneration of hydrophytic

Critical Area Report—Upper Vasa Creek Check Dam Repairs Phase II Project

vegetation (SCS 1988). Hydric soils data were obtained by digging test pits at least 20 inches deep and 4 inches wide.

Hydric soil conditions were evaluated using indicators outlined in *Field Indicators of Hydric Soils in the United States* (NRCS 2006) and adopted by the *Interim Regional Supplement to the Corps of Engineers Wetlands Delineation Manual: Western Mountains, Valleys, and Coast Region* (Environmental Laboratory 2008). These indicators are divided into three groups: all soils, sandy soils, and loamy and clayey soils. The “all soils” indicators can apply to any soil, regardless of texture; the “sandy soils” indicators are used in soil layers with textures of loamy fine sand or coarser; the “loamy and clayey soils” indicators are used for soil layers of loamy very fine sand and finer.

Hydric soil indicators applicable to the Western Mountains, Valleys, and Coast region include but are not limited to the presence of organic soils (i.e., histosols or histic epipedons), sulfidic material (i.e., hydrogen sulfide), depleted, gleyed, or reduced soil matrices, the presence of iron or manganese concretions, and color (Environmental Laboratory 2008). Soil color (i.e., hue, value, and chroma) was evaluated using *Munsell Soil Color Charts* (Munsell Color 2000).

Hydric soils were further confirmed by verifying their inclusion on the hydric soils list (NRCS 2009b).

Wetland Hydrology

Wetland hydrology is indicated by soils that are periodically inundated or saturated to the surface for a sufficient duration during the growing season. A sufficient duration is defined as at least 12.5 percent of the total growing season days that are consecutively inundated or saturated to the surface. The growing season is the period of consecutive frost-free days or the longest period during which the soil temperature stays above biological zero (41 degrees Fahrenheit [°F]) at 12 inches below the surface. As a general rule, the growing season for western Washington lowlands consists of 245 days, extending from March 1 to October 31 (Ecology 1997). Therefore, a sufficient duration of inundation would be a minimum of 31 days.

Two indicators of biological activity can be used to determine whether the growing season has begun and is ongoing (Environmental Laboratory 2008). The first indicator is the occurrence of aboveground growth and development of at least two nonevergreen vascular plant species within the wetland. Examples of this growth include the emergence or elongation of leaves on woody plants and the emergence or opening of flowers. The second indicator is soil temperature of at least 41°F at a depth of 12 inches, which can be measured once during a single site visit.

For this wetland delineation, hydrologic indicators were examined within the soil test pits in the field. Hydrologic indicators include the presence of surface water, standing water in the test pit at a depth of 12 inches or less, saturation in the root zone, watermarks, drift lines, sediment deposits, drainage patterns within wetlands, oxidized rhizospheres surrounding living roots, and water-stained leaves.

APPENDIX C

Wetland Delineation Data Forms



WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Vasa Creek City/County: Bellevue Sampling Date: 1/14/2010
 Applicant/Owner: City of Bellevue State: WA Sampling Point: TP-A-UPL
 Investigator(s): Wozniak, Elliot Section, Township, Range: S14 T24N, R5E
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 15
 Subregion (LRR): A Lat: Long: Datum:
 Soil Map Unit Name: Alderwood gravelly sandy loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , Or Hydrology , significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , Or Hydrology , naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Remarks: None of the three parameters are present.		

VEGETATION – Use scientific names of plants

<u>Tree Stratum</u> (Plot Size: 2m)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. <i>Acer macrophyllum</i>	35	Y	FACU	
2.				Total Number of Dominant Species Across All Strata: 4 (B)
3.				Percent of Dominant Species That Are OBL, FACW, or FAC: 0 (A/B)
4.				
	35	= Total Cover		
<u>Sapling/Shrub Stratum</u> (Plot Size: 1m)				Prevalence Index worksheet:
1. <i>Rubus ursinus</i>	25	Y	FACU	<u>Total % Cover of:</u>
2. <i>Oemleria cerasiformis</i>	5	N	FACU	<u>Multiply by:</u>
3.				OBL species 0 x1 =
4.				FACW species 0 x2 =
5.				FAC species 0 x3 =
	30	= Total Cover		FACU species 70 x4 = 280
				UPL species x5 =
				Column Totals: 70 (A) 280 (B)
				Prevalence Index = B/A = 4
<u>Herb Stratum</u> (Plot Size: 1m)				Hydrophytic Vegetation Indicators:
1. <i>Geranium robertianum</i>	15	Y	NOL	Dominance Test is >50%
2. <i>Polystichum munitum</i>	5	Y	FACU	Prevalence Index is ≤3.0 ¹
3.				Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)
4.				Wetland Non-Vascular Plants ¹
5.				Problematic Hydrophytic Vegetation ¹ (Explain)
6.				
7.				
8.				
9.				
10.				
11.				
	20	= Total Cover		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
<u>Woody Vine Stratum</u> (Plot Size: N/A)				
1.				
2.				
	0	= Total Cover		
% Bare Ground in Herb Stratum = 15				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

Remarks: **Dominant vegetation is FACU.**

Project Site: Vasa Creek

SOIL

Sampling Point: TP-A-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (Moist)	%	Type ¹	Loc ²		
0-3	10 YR 2/2	100					Gravelly loam	
3-16+	10 YR 3/2	100					Very gravelly sandy loam	

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)				Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/>	Histosol (A1)	<input type="checkbox"/>	Sandy Redox (S5)	<input type="checkbox"/>	2 cm Muck (A10)
<input type="checkbox"/>	Histic Epipedon (A2)	<input type="checkbox"/>	Stripped Matrix (S6)	<input type="checkbox"/>	Red Parent Material (TF2)
<input type="checkbox"/>	Black Histic (A3)	<input type="checkbox"/>	Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/>	Other (Explain in Remarks)
<input type="checkbox"/>	Hydrogen Sulfide (A4)	<input type="checkbox"/>	Loamy Gleyed Matrix (F2)		
<input type="checkbox"/>	Depleted Below Dark Surface (A11)	<input type="checkbox"/>	Depleted Matrix (F3)		
<input type="checkbox"/>	Thick Dark Surface (A12)	<input type="checkbox"/>	Redox Dark Surface (F6)		
<input type="checkbox"/>	Sandy Mucky Mineral (S1)	<input type="checkbox"/>	Depleted Dark Surface (F7)		
<input type="checkbox"/>	Sandy Gleyed Matrix (S4)	<input type="checkbox"/>	Redox Depressions (F8)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): Type: Depth (inches):	Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
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Remarks: **No hydric soil indicators present**

HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
<input type="checkbox"/>	Surface Water (A1)	<input type="checkbox"/>	Water-Stained Leaves (B9)
<input type="checkbox"/>	High Water Table (A2)		(except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/>	Saturation (A3)	<input type="checkbox"/>	Salt Crust (B11)
<input type="checkbox"/>	Water Marks (B1)	<input type="checkbox"/>	Aquatic Invertebrates (B13)
<input type="checkbox"/>	Sediment Deposits (B2)	<input type="checkbox"/>	Hydrogen Sulfide Odor (C1)
<input type="checkbox"/>	Drift Deposits (B3)	<input type="checkbox"/>	Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/>	Algal Mat or Crust (B4)	<input type="checkbox"/>	Presence of Reduced Iron (C4)
<input type="checkbox"/>	Iron Deposits (B5)	<input type="checkbox"/>	Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/>	Surface Soil Cracks (B6)	<input type="checkbox"/>	Stunted or Stresses Plants (D1) (LRR A)
<input type="checkbox"/>	Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/>	Other (Explain in Remarks)
<input type="checkbox"/>	Sparsely Vegetated Concave Surface (B8)		

Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): Saturation Present? (includes capillary fringe) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches):	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: **No wetland hydrology indicators present.**



WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Vasa Creek City/County: Bellevue Sampling Date: 1/14/2010
 Applicant/Owner: City of Bellevue State: WA Sampling Point: TP-A-WET
 Investigator(s): Wozniak, Elliot Section, Township, Range: S14 T24N, R5E
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Concave Slope (%): 3-4
 Subregion (LRR): A Lat: Long: Datum:
 Soil Map Unit Name: Alderwood gravelly sandy loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , Or Hydrology , significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , Or Hydrology , naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>			
Remarks: All three parameters are met.				

VEGETATION – Use scientific names of plants

<u>Tree Stratum</u> (Plot Size: 2m)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:	
1. N/A				Number of Dominant Species That Are OBL, FACW, or FAC:	3 (A)
2.				Total Number of Dominant Species Across All Strata:	4 (B)
3.				Percent of Dominant Species That Are OBL, FACW, or FAC:	75 (A/B)
4.	0	= Total Cover			
<u>Sapling/Shrub Stratum</u> (Plot Size: 1m)				Prevalence Index worksheet:	
1. <i>Thuja plicata</i> (s)	20	Yes	FAC	<u>Total % Cover of:</u>	<u>Multiply by:</u>
2. <i>Rubus spectabilis</i>	10	Yes	FAC+	OBL species	x1 =
3. <i>Rubus ursinus</i>	15	Yes	FACU	FACW species	x2 =
4.				FAC species	x3 =
5.				FACU species	x4 =
	45	= Total Cover		UPL species	x5 =
<u>Herb Stratum</u> (Plot Size: 1m)				Column Totals:	(A) (B)
1. <i>Ranunculus repens</i>	45	Yes	FACW	Prevalence Index = B/A =	
2.				Hydrophytic Vegetation Indicators:	
3.				X Dominance Test is >50%	
4.				Prevalence Index is ≤3.0 ¹	
5.				Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
6.				Wetland Non-Vascular Plants ¹	
7.				Problematic Hydrophytic Vegetation ¹ (Explain)	
8.				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
9.					
10.					
11.	45	= Total Cover			
<u>Woody Vine Stratum</u> (Plot Size: N/A)				Hydrophytic Vegetation Present?	
1.				Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>
2.					
	0	= Total Cover			
% Bare Ground in Herb Stratum = 20					

Remarks: **More than 50% of the dominant vegetation is FAC or wetter.**

Project Site: Vasa Creek

SOIL

Sampling Point: TP-A-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (Moist)	%	Type ¹	Loc ²		
0-4	10 YR 2/1	95	10 YR 4/3	5	C	M	Very gravelly sandy loam	
4-16	10 YR 3/2	95	10 YR 4/4	5	C	M	Extremely gravelly sandy loam	

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)	Indicators for Problematic Hydric Soils ³ :
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Other (Explain in Remarks)
<input type="checkbox"/> Hydrogen Sulfide (A4)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	
<input type="checkbox"/> Thick Dark Surface (A12)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	
<input type="checkbox"/> Sandy Redox (S5)	
<input type="checkbox"/> Stripped Matrix (S6)	
<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	
<input type="checkbox"/> Loamy Gleyed Matrix (F2)	
<input type="checkbox"/> Depleted Matrix (F3)	
<input checked="" type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): Type: Depth (inches):	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Remarks: Meets hydric soil indicator F6.	

HYDROLOGY

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)
<input checked="" type="checkbox"/> High Water Table (A2)	(except MLRA 1, 2, 4A, and 4B)
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Water-Stained Leaves (B9)
<input type="checkbox"/> Water Marks (B1)	(MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> FAC-Neutral Test (D5)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Salt Crust (B11)	
<input type="checkbox"/> Aquatic Invertebrates (B13)	
<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	
<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	
<input type="checkbox"/> Presence of Reduced Iron (C4)	
<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	
<input type="checkbox"/> Stunted or Stresses Plants (D1) (LRR A)	
<input type="checkbox"/> Other (Explain in Remarks)	

Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): 0.5 Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): surface Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): surface	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: Hydrology indicators A1 , A2, and A3 are present.	



WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Vasa Creek City/County: Bellevue Sampling Date: 1/14/2010
 Applicant/Owner: City of Bellevue State: WA Sampling Point: TP-B/C-UPL
 Investigator(s): Wozniak, Elliot Section, Township, Range: S14 T24N, R5E
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 20
 Subregion (LRR): A Lat: Long: Datum:
 Soil Map Unit Name: Alderwood gravelly sandy loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , Or Hydrology , significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , Or Hydrology , naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Remarks: None of the three parameters are met.		

VEGETATION – Use scientific names of plants

<u>Tree Stratum</u> (Plot Size: 2m)	<u>Absolute % Cover</u>	<u>Dominant Species?</u>	<u>Indicator Status</u>	Dominance Test Worksheet:	
1. <i>Tsuga heterophylla</i>	45	Y	FACU	Number of Dominant Species That Are OBL, FACW, or FAC:	0 (A)
2.				Total Number of Dominant Species Across All Strata:	3 (B)
3.				Percent of Dominant Species That Are OBL, FACW, or FAC:	0 (A/B)
4.	45	= Total Cover			
<u>Sapling/Shrub Stratum</u> (Plot Size: 1m)				Prevalence Index worksheet:	
1. none				<u>Total % Cover of:</u>	<u>Multiply by:</u>
2.				OBL species	x1 =
3.				FACW species	x2 =
4.				FAC species	x3 =
5.	0	= Total Cover		FACU species	85 x4 = 340
<u>Herb Stratum</u> (Plot Size: 1m)				UPL species	x5 =
1. <i>Polystichum munitum</i>	40	Y	FACU	Column Totals:	85 (A) 340 (B)
2. <i>Tellima grandiflora</i>	10	Y	NOL	Prevalence Index = B/A = 4	
3.				Hydrophytic Vegetation Indicators:	
4.				Dominance Test is >50%	
5.				Prevalence Index is ≤3.0 ¹	
6.				Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet)	
7.				Wetland Non-Vascular Plants ¹	
8.				Problematic Hydrophytic Vegetation ¹ (Explain)	
9.				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
10.					
11.	50	= Total Cover			
<u>Woody Vine Stratum</u> (Plot Size: N/A)				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
1.					
2.					
% Bare Ground in Herb Stratum = 5					

Remarks: **67% of the dominant vegetation is FACU.**

Project Site: Vasa Creek

SOIL

Sampling Point: TP-B/C-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (Moist)	%	Type ¹	Loc ²		
0-16+	10 YR 3/3	90	10 YR 5/2	10	D	M	Gravelly sandy loam	
¹ Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix								
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)						Indicators for Problematic Hydric Soils³:		
<input type="checkbox"/>	Histosol (A1)		<input type="checkbox"/>	Sandy Redox (S5)		<input type="checkbox"/>	2 cm Muck (A10)	
<input type="checkbox"/>	Histic Epipedon (A2)		<input type="checkbox"/>	Stripped Matrix (S6)		<input type="checkbox"/>	Red Parent Material (TF2)	
<input type="checkbox"/>	Black Histic (A3)		<input type="checkbox"/>	Loamy Mucky Mineral (F1) (except MLRA 1)		<input type="checkbox"/>	Other (Explain in Remarks)	
<input type="checkbox"/>	Hydrogen Sulfide (A4)		<input type="checkbox"/>	Loamy Gleyed Matrix (F2)		³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.		
<input type="checkbox"/>	Depleted Below Dark Surface (A11)		<input type="checkbox"/>	Depleted Matrix (F3)				
<input type="checkbox"/>	Thick Dark Surface (A12)		<input type="checkbox"/>	Redox Dark Surface (F6)				
<input type="checkbox"/>	Sandy Mucky Mineral (S1)		<input type="checkbox"/>	Depleted Dark Surface (F7)				
<input type="checkbox"/>	Sandy Gleyed Matrix (S4)		<input type="checkbox"/>	Redox Depressions (F8)				
Restrictive Layer (if present):						Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Type: Depth (inches):								
Remarks: Soil does not meet hydric soil criteria								

HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
<input type="checkbox"/>	Surface Water (A1)	<input type="checkbox"/>	Water-Stained Leaves (B9)
<input type="checkbox"/>	High Water Table (A2)	<input type="checkbox"/>	(except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/>	Saturation (A3)	<input type="checkbox"/>	Salt Crust (B11)
<input type="checkbox"/>	Water Marks (B1)	<input type="checkbox"/>	Aquatic Invertebrates (B13)
<input type="checkbox"/>	Sediment Deposits (B2)	<input type="checkbox"/>	Hydrogen Sulfide Odor (C1)
<input type="checkbox"/>	Drift Deposits (B3)	<input type="checkbox"/>	Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/>	Algal Mat or Crust (B4)	<input type="checkbox"/>	Presence of Reduced Iron (C4)
<input type="checkbox"/>	Iron Deposits (B5)	<input type="checkbox"/>	Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/>	Surface Soil Cracks (B6)	<input type="checkbox"/>	Stunted or Stresses Plants (D1) (LRR A)
<input type="checkbox"/>	Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/>	Other (Explain in Remarks)
<input type="checkbox"/>	Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/>	Water-Stained Leaves (B9)
		(MLRA 1, 2, 4A, and 4B)	
		Drainage Patterns (B10)	
		Dry-Season Water Table (C2)	
		Saturation Visible on Aerial Imagery (C9)	
		Geomorphic Position (D2)	
		Shallow Aquitard (D3)	
		FAC-Neutral Test (D5)	
		Raised Ant Mounds (D6) (LRR A)	
		Frost-Heave Hummocks (D7)	
Field Observations:			
Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches):	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches):	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: No wetland hydrology indicators present.			



WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Vasa Creek City/County: Bellevue Sampling Date: 1/14/2010
 Applicant/Owner: City of Bellevue State: WA Sampling Point: TP-B-WET
 Investigator(s): Wozniak, Elliot Section, Township, Range: S14 T24N, R5E
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): concave Slope (%): 3
 Subregion (LRR): A Lat: Long: Datum:
 Soil Map Unit Name: Alderwood gravelly sandy loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , Or Hydrology , significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , Or Hydrology , naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Remarks: All three parameters are present.			

VEGETATION – Use scientific names of plants

Tree Stratum (Plot Size: 2m)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A) Total Number of Dominant Species Across All Strata: 4 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 75 (A/B)
1.				
2.				
3.				Hydrophytic Vegetation Indicators: X Dominance Test is >50% Prevalence Index is ≤3.0 ¹ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain)
4.				
0 = Total Cover				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
Sapling/Shrub Stratum (Plot Size: 1m) 1. <i>Rubus spectabilis</i> 15 Y FAC+ 2. <i>Oemleria cerasiformis</i> 15 Y FACU 3. <i>Rubus ursinus</i> 5 N FACU 4. <i>Acer circinatum</i> 10 Y FAC- 5. 45 = Total Cover				
Herb Stratum (Plot Size: 1m) 1. <i>Polystichum munitum</i> 10 N FACU 2. <i>Ranunculus repens</i> 70 Y FACW 3. <i>Geranium robertianum</i> 10 N NOL 4. <i>Hedera helix</i> 10 N NOL 5. 6. 7. 8. 9. 10. 11. 100 = Total Cover				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Woody Vine Stratum (Plot Size: N/A) 1. 2. 0 = Total Cover				
% Bare Ground in Herb Stratum = 0				

Remarks: **Over 50% of the dominant vegetation is FAC or wetter.**

Project Site: Vasa Creek

SOIL

Sampling Point: TP-B-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (Moist)	%	Type ¹	Loc ²		
0-8	10 YR 2/2	98	10 YR 4/3	2	C	M	Gravelly sandy loam	
8-16+	10 YR 3/2	90	10 YR 4/6	10	C	M	Gravelly sandy loam	

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)				Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/>	Histosol (A1)	<input type="checkbox"/>	Sandy Redox (S5)	<input type="checkbox"/>	2 cm Muck (A10)
<input type="checkbox"/>	Histic Epipedon (A2)	<input type="checkbox"/>	Stripped Matrix (S6)	<input type="checkbox"/>	Red Parent Material (TF2)
<input type="checkbox"/>	Black Histic (A3)	<input type="checkbox"/>	Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/>	Other (Explain in Remarks)
<input type="checkbox"/>	Hydrogen Sulfide (A4)	<input type="checkbox"/>	Loamy Gleyed Matrix (F2)		
<input type="checkbox"/>	Depleted Below Dark Surface (A11)	<input type="checkbox"/>	Depleted Matrix (F3)		
<input type="checkbox"/>	Thick Dark Surface (A12)	<input checked="" type="checkbox"/>	Redox Dark Surface (F6)		
<input type="checkbox"/>	Sandy Mucky Mineral (S1)	<input type="checkbox"/>	Depleted Dark Surface (F7)		
<input type="checkbox"/>	Sandy Gleyed Matrix (S4)	<input type="checkbox"/>	Redox Depressions (F8)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): Type: Depth (inches):	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Remarks: **Hydric soil indicator F6 is present**

HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
<input checked="" type="checkbox"/>	Surface Water (A1)	<input type="checkbox"/>	Water-Stained Leaves (B9)
<input checked="" type="checkbox"/>	High Water Table (A2)		(except MLRA 1, 2, 4A, and 4B)
<input checked="" type="checkbox"/>	Saturation (A3)	<input type="checkbox"/>	Salt Crust (B11)
<input type="checkbox"/>	Water Marks (B1)	<input type="checkbox"/>	Aquatic Invertebrates (B13)
<input type="checkbox"/>	Sediment Deposits (B2)	<input type="checkbox"/>	Hydrogen Sulfide Odor (C1)
<input type="checkbox"/>	Drift Deposits (B3)	<input type="checkbox"/>	Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/>	Algal Mat or Crust (B4)	<input type="checkbox"/>	Presence of Reduced Iron (C4)
<input type="checkbox"/>	Iron Deposits (B5)	<input type="checkbox"/>	Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/>	Surface Soil Cracks (B6)	<input type="checkbox"/>	Stunted or Stresses Plants (D1) (LRR A)
<input type="checkbox"/>	Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/>	Other (Explain in Remarks)
<input type="checkbox"/>	Sparsely Vegetated Concave Surface (B8)		

Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): 0.5 Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): surface Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): surface	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: **Wetland hydrology indicators A1, A2, and A3 are present.**



WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Vasa Creek City/County: Bellevue Sampling Date: 1/14/2010
 Applicant/Owner: City of Bellevue State: WA Sampling Point: TP-C-WET
 Investigator(s): Wozniak, Elliot Section, Township, Range: S14 T24N, R5E
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 50%+
 Subregion (LRR): A Lat: Long: Datum:
 Soil Map Unit Name: Alderwood gravelly sandy loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , Or Hydrology , significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , Or Hydrology , naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Remarks: Wetland is supported by groundwater expression (springs) through very gravelly soil, which appears to be exposed parent material (basal till). The entire wetland is actively slumping into the stream, creating unstable surface soils dominated by annual invasives (geranium). All three indicators are present.		

VEGETATION – Use scientific names of plants

<u>Tree Stratum</u> (Plot Size: 2m)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A) Total Number of Dominant Species Across All Strata: 3 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 33 (A/B)
1. none				
2.				
3.				
4.				
	0	= Total Cover		
<u>Sapling/Shrub Stratum</u> (Plot Size: 1m)				Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species x1 = FACW species x2 = FAC species 15 x3 = 45 FACU species x4 = UPL species x5 = Column Totals: 15 (A) 45 (B) Prevalence Index = B/A = 3
1. none				
2.				
3.				
4.				
5.				
	0	= Total Cover		
<u>Herb Stratum</u> (Plot Size: 1m)				Hydrophytic Vegetation Indicators: Dominance Test is >50% X Prevalence Index is ≤3.0 ¹ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) Wetland Non-Vascular Plants ¹ X Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <i>Adiantum pedatum</i>	15	Y	FAC	
2. <i>Tellima grandiflora</i>	10	Y	NOL	
3. <i>Geranium robertianum</i>	30	Y	NOL	
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
		= Total Cover		
<u>Woody Vine Stratum</u> (Plot Size:)				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
1.				
2.				
		= Total Cover		
% Bare Ground in Herb Stratum =				

Remarks: **Meets prevalence index criteria. NOL (not on USFWS indicator list) plants are dominated by a non-native, invasive annual (Geranium)**

Project Site: Vasa Creek

SOIL

Sampling Point: TP-C-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (Moist)	%	Type ¹	Loc ²		
0-16+	2.5 Y 5/1	100					Very gravelly sandy loam	Exposed parent material
¹ Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix								
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)						Indicators for Problematic Hydric Soils³:		
<input type="checkbox"/>	Histosol (A1)		<input type="checkbox"/>	Sandy Redox (S5)		<input type="checkbox"/>	2 cm Muck (A10)	
<input type="checkbox"/>	Histic Epipedon (A2)		<input type="checkbox"/>	Stripped Matrix (S6)		<input type="checkbox"/>	Red Parent Material (TF2)	
<input type="checkbox"/>	Black Histic (A3)		<input type="checkbox"/>	Loamy Mucky Mineral (F1) (except MLRA 1)		<input checked="" type="checkbox"/>	Other (Explain in Remarks)	
<input type="checkbox"/>	Hydrogen Sulfide (A4)		<input type="checkbox"/>	Loamy Gleyed Matrix (F2)				
<input type="checkbox"/>	Depleted Below Dark Surface (A11)		<input type="checkbox"/>	Depleted Matrix (F3)				
<input type="checkbox"/>	Thick Dark Surface (A12)		<input type="checkbox"/>	Redox Dark Surface (F6)				
<input type="checkbox"/>	Sandy Mucky Mineral (S1)		<input type="checkbox"/>	Depleted Dark Surface (F7)				
<input type="checkbox"/>	Sandy Gleyed Matrix (S4)		<input type="checkbox"/>	Redox Depressions (F8)				
Restrictive Layer (if present): Type: Depth (inches):						Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Remarks: Naturally problematic very gravelly soil, which appears to be exposed parent material (basal till), with aquic moisture regime.								

HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
<input checked="" type="checkbox"/>	Surface Water (A1)	<input type="checkbox"/>	Water-Stained Leaves (B9)
<input checked="" type="checkbox"/>	High Water Table (A2)		(except MLRA 1, 2, 4A, and 4B)
<input checked="" type="checkbox"/>	Saturation (A3)	<input type="checkbox"/>	Salt Crust (B11)
<input type="checkbox"/>	Water Marks (B1)	<input type="checkbox"/>	Aquatic Invertebrates (B13)
<input type="checkbox"/>	Sediment Deposits (B2)	<input type="checkbox"/>	Hydrogen Sulfide Odor (C1)
<input type="checkbox"/>	Drift Deposits (B3)	<input type="checkbox"/>	Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/>	Algal Mat or Crust (B4)	<input type="checkbox"/>	Presence of Reduced Iron (C4)
<input type="checkbox"/>	Iron Deposits (B5)	<input type="checkbox"/>	Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/>	Surface Soil Cracks (B6)	<input type="checkbox"/>	Stunted or Stresses Plants (D1) (LRR A)
<input type="checkbox"/>	Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/>	Other (Explain in Remarks)
<input type="checkbox"/>	Sparsely Vegetated Concave Surface (B8)		
Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): 0.5 Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): surface Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): surface		Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: Wetland hydrology indicators A1, A2, and A3 are present.			



WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Vasa Creek City/County: Bellevue Sampling Date: 1/14/2010
 Applicant/Owner: City of Bellevue State: WA Sampling Point: TP-D-UPL
 Investigator(s): Wozniak, Elliot Section, Township, Range: S14 T24N, R5E
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 20
 Subregion (LRR): A Lat: Long: Datum:
 Soil Map Unit Name: Alderwood gravelly sandy loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , Or Hydrology , significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , Or Hydrology , naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Remarks: None of the three parameters are met.		

VEGETATION – Use scientific names of plants

<u>Tree Stratum</u> (Plot Size: 2m)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A) Total Number of Dominant Species Across All Strata: 5 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 40 (A/B)
1. <i>Alnus rubra</i>	30	Y	FAC	
2. <i>Acer macrophyllum</i>	25	Y	FACU	
3.				
4.				
	55	= Total Cover		
<u>Sapling/Shrub Stratum</u> (Plot Size: 1m)				Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species x1 = FACW species x2 = FAC species 45 x3 = 135 FACU species 55 x4 = 220 UPL species x5 = Column Totals: 100 (A) 355 (B) Prevalence Index = B/A = 3.55
1. <i>Rubus spectabilis</i>	15	Y	FAC+	
2. <i>Mahonia nervosa</i>	10	Y	NOL	
3.				
4.				
5.				
	25	= Total Cover		
<u>Herb Stratum</u> (Plot Size: 1m)				Hydrophytic Vegetation Indicators: Dominance Test is >50% Prevalence Index is ≤3.0 ¹ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <i>Polystichum munitum</i>	30	Y	FACU	
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
	30	= Total Cover		
<u>Woody Vine Stratum</u> (Plot Size: N/A)				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
1.				
2.				
	0	= Total Cover		
% Bare Ground in Herb Stratum = 10				

Remarks: **Less than 50% of the dominant plants are FAC or wetter. Does not meet prevalence index criteria.**

Project Site: Vasa Creek

SOIL

Sampling Point: TP-D-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (Moist)	%	Type ¹	Loc ²		
0-4	10 YR 3/2	100					Gravelly sandy loam	
4-16+	10 YR 3/3	100					Very gravelly loam	

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)				Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/>	Histosol (A1)	<input type="checkbox"/>	Sandy Redox (S5)	<input type="checkbox"/>	2 cm Muck (A10)
<input type="checkbox"/>	Histic Epipedon (A2)	<input type="checkbox"/>	Stripped Matrix (S6)	<input type="checkbox"/>	Red Parent Material (TF2)
<input type="checkbox"/>	Black Histic (A3)	<input type="checkbox"/>	Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/>	Other (Explain in Remarks)
<input type="checkbox"/>	Hydrogen Sulfide (A4)	<input type="checkbox"/>	Loamy Gleyed Matrix (F2)		
<input type="checkbox"/>	Depleted Below Dark Surface (A11)	<input type="checkbox"/>	Depleted Matrix (F3)		
<input type="checkbox"/>	Thick Dark Surface (A12)	<input type="checkbox"/>	Redox Dark Surface (F6)		
<input type="checkbox"/>	Sandy Mucky Mineral (S1)	<input type="checkbox"/>	Depleted Dark Surface (F7)		
<input type="checkbox"/>	Sandy Gleyed Matrix (S4)	<input type="checkbox"/>	Redox Depressions (F8)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):	Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Type:	
Depth (inches):	
Remarks: No hydric soil indicators are present.	

HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
<input type="checkbox"/>	Surface Water (A1)	<input type="checkbox"/>	Water-Stained Leaves (B9)
<input type="checkbox"/>	High Water Table (A2)		(except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/>	Saturation (A3)	<input type="checkbox"/>	Salt Crust (B11)
<input type="checkbox"/>	Water Marks (B1)	<input type="checkbox"/>	Aquatic Invertebrates (B13)
<input type="checkbox"/>	Sediment Deposits (B2)	<input type="checkbox"/>	Hydrogen Sulfide Odor (C1)
<input type="checkbox"/>	Drift Deposits (B3)	<input type="checkbox"/>	Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/>	Algal Mat or Crust (B4)	<input type="checkbox"/>	Presence of Reduced Iron (C4)
<input type="checkbox"/>	Iron Deposits (B5)	<input type="checkbox"/>	Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/>	Surface Soil Cracks (B6)	<input type="checkbox"/>	Stunted or Stresses Plants (D1) (LRR A)
<input type="checkbox"/>	Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/>	Other (Explain in Remarks)
<input type="checkbox"/>	Sparsely Vegetated Concave Surface (B8)		

Field Observations:	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches):	
Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches):	
Saturation Present? (includes capillary fringe) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches):	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:	
Remarks: No wetland hydrology indicators are present.	



WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Vasa Creek City/County: Bellevue Sampling Date: 1/14/2010
 Applicant/Owner: City of Bellevue State: WA Sampling Point: TP-D-WET
 Investigator(s): Wozniak, Elliot Section, Township, Range: S14 T24N, R5E
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 10
 Subregion (LRR): A Lat: Long: Datum:
 Soil Map Unit Name: Alderwood gravelly sandy loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , Or Hydrology , significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , Or Hydrology , naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland? YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	
Remarks: All three parameters are met.		

VEGETATION – Use scientific names of plants

<u>Tree Stratum</u> (Plot Size: 2m)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet:
1. <i>Alnus rubra</i>	45	Y	FAC	
2.				Total Number of Dominant Species Across All Strata: 4 (B)
3.				Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)
4.				
	45	= Total Cover		
<u>Sapling/Shrub Stratum</u> (Plot Size: 1m)				Prevalence Index worksheet:
1. <i>Rubus spectabilis</i>	65	Y	FAC+	<u>Total % Cover of:</u> <u>Multiply by:</u>
2.				OBL species x1 =
3.				FACW species x2 =
4.				FAC species x3 =
5.				FACU species x4 =
	65	= Total Cover		UPL species x5 =
<u>Herb Stratum</u> (Plot Size: 1m)				Column Totals: (A) (B)
1. <i>Adiantum pedatum</i>	15	Y	FAC	Prevalence Index = B/A =
2. <i>Athyrium filix femina</i>	15	Y	FAC	
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
	30	= Total Cover		
<u>Woody Vine Stratum</u> (Plot Size: N/A)				
1.				
2.				
	0	= Total Cover		
% Bare Ground in Herb Stratum = 5				
Remarks: 100% of the dominant plants are FAC or wetter.				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>

Hydrophytic Vegetation Indicators:
 X Dominance Test is >50%
 Prevalence Index is ≤3.0¹
 Morphological Adaptations¹ (Provide supporting data in Remarks or on a separate sheet)
 Wetland Non-Vascular Plants¹
 Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Project Site: Vasa Creek

SOIL

Sampling Point: TP-D-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (Moist)	%	Type ¹	Loc ²		
0-3	10 YR 2/2	100					loam	
3-16+	2.5 Y 3/2	90	2.5 Y 5/3	5	C	M	Gravelly silt loam	
			10 YR 4/4	5	C	M	Gravelly silt loam	

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)				Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)			
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)			
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Other (Explain in Remarks)			
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)				
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)				
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)				
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)				
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)				

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): Type: Depth (inches):	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Remarks: **Hydric soil indicator F6 is present.**

HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water-Stained Leaves (B9)	<input type="checkbox"/> Water-Stained Leaves (B9)	
<input type="checkbox"/> High Water Table (A2)	(except MLRA 1, 2, 4A, and 4B)	(MLRA 1, 2, 4A, and 4B)	
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)	
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)	
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)	
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)	
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)	
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Recent Iron Reduction in Tilled Soils (C6)	<input type="checkbox"/> FAC-Neutral Test (D5)	
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Stunted or Stresses Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)	
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)	
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)			

Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): 4 Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): surface	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: **Wetland hydrology indicators A2 and A3 are present.**



WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Vasa Creek City/County: Bellevue Sampling Date: 1/14/2010
 Applicant/Owner: City of Bellevue State: WA Sampling Point: TP-E-UPL
 Investigator(s): Wozniak, Elliot Section, Township, Range: S14 T24N, R5E
 Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none): Convex Slope (%): 15
 Subregion (LRR): A Lat: Long: Datum:
 Soil Map Unit Name: Alderwood gravelly sandy loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , Or Hydrology , significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , Or Hydrology , naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Remarks: None of the three parameters are present.		

VEGETATION – Use scientific names of plants

<u>Tree Stratum</u> (Plot Size: 2m)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A) Total Number of Dominant Species Across All Strata: 4 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 50 (A/B)
1. <i>Thuja plicata</i>	40	Y	FAC	
2.				
3.				
4.				
	40	= Total Cover		
<u>Sapling/Shrub Stratum</u> (Plot Size: 1m)				Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species x1 = FACW species x2 = FAC species 75 x3 = 225 FACU species 45 x4 = 180 UPL species x5 = Column Totals: 120 (A) 405 (B) Prevalence Index = B/A = 3.375
1. <i>Rubus spectabilis</i>	35	Y	FAC	
2. <i>Gaultheria shallon</i>	20	Y	FACU	
3.				
4.				
5.				
	55	= Total Cover		
<u>Herb Stratum</u> (Plot Size: 1m)				Hydrophytic Vegetation Indicators: Dominance Test is >50% Prevalence Index is ≤3.0 ¹ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain) ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. <i>Polystichum munitum</i>	25	Y	FACU	
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
	25	= Total Cover		
<u>Woody Vine Stratum</u> (Plot Size: N/A)				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
1.				
2.				
	0	= Total Cover		
% Bare Ground in Herb Stratum = 0				

Remarks: **Does not meet criteria for dominance test or prevalence index.**

Project Site: Vasa Creek

SOIL

Sampling Point: TP-E-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (Moist)	%	Type ¹	Loc ²		
0-5	10 YR 3/2	100					Gravelly loam	
5-16+	10 YR 3/3	100					Gravelly sandy loam	

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)				Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/>	Histosol (A1)	<input type="checkbox"/>	Sandy Redox (S5)	<input type="checkbox"/>	2 cm Muck (A10)
<input type="checkbox"/>	Histic Epipedon (A2)	<input type="checkbox"/>	Stripped Matrix (S6)	<input type="checkbox"/>	Red Parent Material (TF2)
<input type="checkbox"/>	Black Histic (A3)	<input type="checkbox"/>	Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/>	Other (Explain in Remarks)
<input type="checkbox"/>	Hydrogen Sulfide (A4)	<input type="checkbox"/>	Loamy Gleyed Matrix (F2)		
<input type="checkbox"/>	Depleted Below Dark Surface (A11)	<input type="checkbox"/>	Depleted Matrix (F3)		
<input type="checkbox"/>	Thick Dark Surface (A12)	<input type="checkbox"/>	Redox Dark Surface (F6)		
<input type="checkbox"/>	Sandy Mucky Mineral (S1)	<input type="checkbox"/>	Depleted Dark Surface (F7)		
<input type="checkbox"/>	Sandy Gleyed Matrix (S4)	<input type="checkbox"/>	Redox Depressions (F8)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): Type: Depth (inches):	Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
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Remarks: **No hydric soil indicators are present.**

HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
<input type="checkbox"/>	Surface Water (A1)	<input type="checkbox"/>	Water-Stained Leaves (B9)
<input type="checkbox"/>	High Water Table (A2)		(except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/>	Saturation (A3)	<input type="checkbox"/>	Salt Crust (B11)
<input type="checkbox"/>	Water Marks (B1)	<input type="checkbox"/>	Aquatic Invertebrates (B13)
<input type="checkbox"/>	Sediment Deposits (B2)	<input type="checkbox"/>	Hydrogen Sulfide Odor (C1)
<input type="checkbox"/>	Drift Deposits (B3)	<input type="checkbox"/>	Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/>	Algal Mat or Crust (B4)	<input type="checkbox"/>	Presence of Reduced Iron (C4)
<input type="checkbox"/>	Iron Deposits (B5)	<input type="checkbox"/>	Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/>	Surface Soil Cracks (B6)	<input type="checkbox"/>	Stunted or Stresses Plants (D1) (LRR A)
<input type="checkbox"/>	Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/>	Other (Explain in Remarks)
<input type="checkbox"/>	Sparsely Vegetated Concave Surface (B8)		

Field Observations: Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): Saturation Present? (includes capillary fringe) Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches):	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: **No wetland hydrology indicators present.**



WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Vasa Creek City/County: Bellevue Sampling Date: 1/14/2010
 Applicant/Owner: City of Bellevue State: WA Sampling Point: TP-E-WET
 Investigator(s): Wozniak, Elliot Section, Township, Range: S14 T24N, R5E
 Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): flat Slope (%): <1
 Subregion (LRR): A Lat: Long: Datum:
 Soil Map Unit Name: Alderwood gravelly sandy loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , Or Hydrology , significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , Or Hydrology , naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>	Is the Sampled Area within a Wetland?	YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>
Hydric Soil Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		
Wetland Hydrology Present?	Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>		

Remarks: **All three parameters are present. The soil (fluvial gravels and sands) are naturally problematic.**

VEGETATION – Use scientific names of plants

<u>Tree Stratum</u> (Plot Size: 2m)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A) Total Number of Dominant Species Across All Strata: 1 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)
1. none 2. 3. 4.	0	= Total Cover		
<u>Sapling/Shrub Stratum</u> (Plot Size: 1m)				Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species x1 = FACW species x2 = FAC species x3 = FACU species x4 = UPL species x5 = Column Totals: (A) (B) Prevalence Index = B/A =
1. none 2. 3. 4. 5.	0	= Total Cover		
<u>Herb Stratum</u> (Plot Size: 1m)				Hydrophytic Vegetation Indicators: X Dominance Test is >50% Prevalence Index is ≤3.0 ¹ Morphological Adaptations ¹ (Provide supporting data in Remarks or on a separate sheet) Wetland Non-Vascular Plants ¹ Problematic Hydrophytic Vegetation ¹ (Explain)
1. <i>Ranunculus repens</i> 2. 3. 4. 5. 6. 7. 8. 9. 10. 11.	85	Y	FACW	
<u>Woody Vine Stratum</u> (Plot Size: N/A)				Hydrophytic Vegetation Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
1. 2.	0	= Total Cover		
% Bare Ground in Herb Stratum = 15				

Remarks: **The dominant plant is FACW**

Project Site: Vasa Creek

SOIL

Sampling Point: TP-E-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (Moist)	%	Type ¹	Loc ²		
0-1	10 YR 2/1	100					Sandy muck	
1-16+	Multiple						Extremely gravelly sand	

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)				Indicators for Problematic Hydric Soils ³ :	
<input type="checkbox"/>	Histosol (A1)	<input type="checkbox"/>	Sandy Redox (S5)	<input type="checkbox"/>	2 cm Muck (A10)
<input type="checkbox"/>	Histic Epipedon (A2)	<input type="checkbox"/>	Stripped Matrix (S6)	<input type="checkbox"/>	Red Parent Material (TF2)
<input type="checkbox"/>	Black Histic (A3)	<input type="checkbox"/>	Loamy Mucky Mineral (F1) (except MLRA 1)	<input checked="" type="checkbox"/>	Other (Explain in Remarks)
<input type="checkbox"/>	Hydrogen Sulfide (A4)	<input type="checkbox"/>	Loamy Gleyed Matrix (F2)		
<input type="checkbox"/>	Depleted Below Dark Surface (A11)	<input type="checkbox"/>	Depleted Matrix (F3)		
<input type="checkbox"/>	Thick Dark Surface (A12)	<input type="checkbox"/>	Redox Dark Surface (F6)		
<input type="checkbox"/>	Sandy Mucky Mineral (S1)	<input type="checkbox"/>	Depleted Dark Surface (F7)		
<input type="checkbox"/>	Sandy Gleyed Matrix (S4)	<input type="checkbox"/>	Redox Depressions (F8)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Type:	
Depth (inches):	

Remarks: **This is a fluvial soil composed of sand and gravel with regular redistribution of these materials during high flows. The coarse texture and mobility of the soil has precluded typical hydric soil indicator development.**

HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
<input checked="" type="checkbox"/>	Surface Water (A1)	<input type="checkbox"/>	Water-Stained Leaves (B9)
<input checked="" type="checkbox"/>	High Water Table (A2)		(except MLRA 1, 2, 4A, and 4B)
<input checked="" type="checkbox"/>	Saturation (A3)	<input type="checkbox"/>	Water-Stained Leaves (B9)
<input type="checkbox"/>	Water Marks (B1)	<input type="checkbox"/>	(MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/>	Sediment Deposits (B2)	<input type="checkbox"/>	Drainage Patterns (B10)
<input type="checkbox"/>	Drift Deposits (B3)	<input type="checkbox"/>	Dry-Season Water Table (C2)
<input type="checkbox"/>	Algal Mat or Crust (B4)	<input type="checkbox"/>	Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/>	Iron Deposits (B5)	<input type="checkbox"/>	Geomorphic Position (D2)
<input type="checkbox"/>	Surface Soil Cracks (B6)	<input type="checkbox"/>	Shallow Aquitard (D3)
<input type="checkbox"/>	Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/>	FAC-Neutral Test (D5)
<input type="checkbox"/>	Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/>	Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/>		<input type="checkbox"/>	Frost-Heave Hummocks (D7)

Field Observations:	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): 0.5	
Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): surface	
Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): surface	

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: **Wetland hydrology indicators A1, A2, and A3 are present.**



WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project Site: Vasa Creek City/County: Bellevue Sampling Date: 1/14/2010
 Applicant/Owner: City of Bellevue State: WA Sampling Point: TP-F-UPL
 Investigator(s): Wozniak, Elliot Section, Township, Range: S14 T24N, R5E
 Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 20
 Subregion (LRR): A Lat: Long: Datum:
 Soil Map Unit Name: Alderwood gravelly sandy loam NWI classification: None
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes No (If no, explain in Remarks.)
 Are Vegetation , Soil , Or Hydrology , significantly disturbed? Are "Normal Circumstances" present? Yes No
 Are Vegetation , Soil , Or Hydrology , naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Is the Sampled Area within a Wetland? YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
Hydric Soil Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Wetland Hydrology Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Remarks: None of the three parameters are present.		

VEGETATION – Use scientific names of plants

<u>Tree Stratum</u> (Plot Size: 2m)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test Worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A) Total Number of Dominant Species Across All Strata: 7 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 14 (A/B)
1. <i>Acer macrophyllum</i>	65	Y	FACU	
2. <i>Alnus rubra</i>	10	N	FAC	
3.				
4.				
	75	= Total Cover		
Sapling/Shrub Stratum (Plot Size: 1m)				
1. <i>Rubus spectabilis</i>	10	Y	FAC+	Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species x1 = FACW species x2 = FAC species 20 x3 = 60 FACU species 115 x4 = 460 UPL species x5 = Column Totals: 135 (A) 520 (B) Prevalence Index = B/A = 3.85
2. <i>Vaccinium parvifolium</i>	5	Y	NOL	
3. <i>Rubus ursinus</i>	10	Y	FACU	
4.				
5.				
	25	= Total Cover		
Herb Stratum (Plot Size: 1m)				
1. <i>Polystichum munitum</i>	20	Y	FACU	
2. <i>Geranium robertianum</i>	40	Y	NOL	
3. <i>Elymus glaucus</i>	20	Y	FACU	
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
	80	= Total Cover		
Woody Vine Stratum (Plot Size: N/A)				
1.				
2.				
	0	= Total Cover		
% Bare Ground in Herb Stratum = 0				Hydrophytic Vegetation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>

Remarks: **86% of the dominant plants are FACU. Dominance test and prevalence index do not indicate hydrophytic vegetation.**

Project Site: Vasa Creek

SOIL

Sampling Point: TP-F-UPL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (Moist)	%	Type ¹	Loc ²		
0-16+	10 YR 3/2	100					Gravelly sandy loam	
¹ Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ² Location: PL=Pore Lining, M=Matrix								
Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)						Indicators for Problematic Hydric Soils³:		
<input type="checkbox"/>	Histosol (A1)		<input type="checkbox"/>	Sandy Redox (S5)		<input type="checkbox"/>	2 cm Muck (A10)	
<input type="checkbox"/>	Histic Epipedon (A2)		<input type="checkbox"/>	Stripped Matrix (S6)		<input type="checkbox"/>	Red Parent Material (TF2)	
<input type="checkbox"/>	Black Histic (A3)		<input type="checkbox"/>	Loamy Mucky Mineral (F1) (except MLRA 1)		<input type="checkbox"/>	Other (Explain in Remarks)	
<input type="checkbox"/>	Hydrogen Sulfide (A4)		<input type="checkbox"/>	Loamy Gleyed Matrix (F2)		³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.		
<input type="checkbox"/>	Depleted Below Dark Surface (A11)		<input type="checkbox"/>	Depleted Matrix (F3)				
<input type="checkbox"/>	Thick Dark Surface (A12)		<input type="checkbox"/>	Redox Dark Surface (F6)				
<input type="checkbox"/>	Sandy Mucky Mineral (S1)		<input type="checkbox"/>	Depleted Dark Surface (F7)				
<input type="checkbox"/>	Sandy Gleyed Matrix (S4)		<input type="checkbox"/>	Redox Depressions (F8)				
Restrictive Layer (if present):						Hydric Soil Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>		
Type:								
Depth (inches):								
Remarks: No hydric soil indicators are present.								

HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
<input type="checkbox"/>	Surface Water (A1)	<input type="checkbox"/>	Water-Stained Leaves (B9)
<input type="checkbox"/>	High Water Table (A2)	<input type="checkbox"/>	(except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/>	Saturation (A3)	<input type="checkbox"/>	Salt Crust (B11)
<input type="checkbox"/>	Water Marks (B1)	<input type="checkbox"/>	Aquatic Invertebrates (B13)
<input type="checkbox"/>	Sediment Deposits (B2)	<input type="checkbox"/>	Hydrogen Sulfide Odor (C1)
<input type="checkbox"/>	Drift Deposits (B3)	<input type="checkbox"/>	Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/>	Algal Mat or Crust (B4)	<input type="checkbox"/>	Presence of Reduced Iron (C4)
<input type="checkbox"/>	Iron Deposits (B5)	<input type="checkbox"/>	Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/>	Surface Soil Cracks (B6)	<input type="checkbox"/>	Stunted or Stresses Plants (D1) (LRR A)
<input type="checkbox"/>	Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/>	Other (Explain in Remarks)
<input type="checkbox"/>	Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/>	Frost-Heave Hummocks (D7)
Field Observations:			
Surface Water Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches):	Wetland Hydrology Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>
Water Table Present?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches):	
Saturation Present? (includes capillary fringe)	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	Depth (inches):	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:			
Remarks: No wetland hydrology indicators are present.			

Project Site: Vasa Creek

SOIL

Sampling Point: TP-F-WET

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)								
Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (Moist)	%	Type ¹	Loc ²		
0-2	10 YR 2/1	98	7.5 YR 3/3	2	C	M	Silt loam	
2-6	10 YR 3/1	95	7.5 YR 3/3	5	C	M	Gravelly sandy loam	
6-16+	Multiple						Gravel, with minor sand	

¹Type: C= Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)			Indicators for Problematic Hydric Soils ³ :			
<input type="checkbox"/>	Histosol (A1)		<input type="checkbox"/>	Sandy Redox (S5)	<input type="checkbox"/>	2 cm Muck (A10)
<input type="checkbox"/>	Histic Epipedon (A2)		<input type="checkbox"/>	Stripped Matrix (S6)	<input type="checkbox"/>	Red Parent Material (TF2)
<input type="checkbox"/>	Black Histic (A3)		<input type="checkbox"/>	Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/>	Other (Explain in Remarks)
<input type="checkbox"/>	Hydrogen Sulfide (A4)		<input type="checkbox"/>	Loamy Gleyed Matrix (F2)		
<input type="checkbox"/>	Depleted Below Dark Surface (A11)		<input type="checkbox"/>	Depleted Matrix (F3)		
<input type="checkbox"/>	Thick Dark Surface (A12)		<input checked="" type="checkbox"/>	Redox Dark Surface (F6)		
<input type="checkbox"/>	Sandy Mucky Mineral (S1)		<input type="checkbox"/>	Depleted Dark Surface (F7)		
<input type="checkbox"/>	Sandy Gleyed Matrix (S4)		<input type="checkbox"/>	Redox Depressions (F8)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present): Type: Depth (inches):	Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
--	---

Remarks: **Hydric soil indicator F6 is present**

HYDROLOGY

Wetland Hydrology Indicators:			
Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)	
<input checked="" type="checkbox"/>	Surface Water (A1)	<input type="checkbox"/>	Water-Stained Leaves (B9)
<input checked="" type="checkbox"/>	High Water Table (A2)		(except MLRA 1, 2, 4A, and 4B)
<input checked="" type="checkbox"/>	Saturation (A3)	<input type="checkbox"/>	Salt Crust (B11)
<input type="checkbox"/>	Water Marks (B1)	<input type="checkbox"/>	Aquatic Invertebrates (B13)
<input type="checkbox"/>	Sediment Deposits (B2)	<input type="checkbox"/>	Hydrogen Sulfide Odor (C1)
<input type="checkbox"/>	Drift Deposits (B3)	<input type="checkbox"/>	Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/>	Algal Mat or Crust (B4)	<input type="checkbox"/>	Presence of Reduced Iron (C4)
<input type="checkbox"/>	Iron Deposits (B5)	<input type="checkbox"/>	Recent Iron Reduction in Tilled Soils (C6)
<input type="checkbox"/>	Surface Soil Cracks (B6)	<input type="checkbox"/>	Stunted or Stresses Plants (D1) (LRR A)
<input type="checkbox"/>	Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/>	Other (Explain in Remarks)
<input type="checkbox"/>	Sparsely Vegetated Concave Surface (B8)		

Field Observations: Surface Water Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): 0.5 Water Table Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): surface Saturation Present? (includes capillary fringe) Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Depth (inches): surface	Wetland Hydrology Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
---	---

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: **Wetland hydrology indicators A1, A2, and A3 are present.**

APPENDIX D

Wetland Rating Forms

Wetland name or number: A

WETLAND RATING FORM - WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): _____ Date of site visit: 1/24/10

Rated by Wozniak Trained by Ecology? Yes No Date: 4/5/10

SEC: 14 TOWNSHIP: 24N RANGE: 5E Is S/T/R in Appendix D? Yes No

Map of wetland unit: Figure 4 Estimated size: _____

SUMMARY OF RATING													
Category based on FUNCTIONS provided by wetland:													
I <input type="checkbox"/>	II <input type="checkbox"/>												
III <input checked="" type="checkbox"/>	IV <input type="checkbox"/>												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Category I = Score >=70</td> </tr> <tr> <td>Category II = Score 51-69</td> </tr> <tr> <td>Category III = Score 30-50</td> </tr> <tr> <td>Category IV = Score <30</td> </tr> </table>	Category I = Score >=70	Category II = Score 51-69	Category III = Score 30-50	Category IV = Score <30	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Score for Water Quality Functions</td> <td style="text-align: right;">8</td> </tr> <tr> <td>Score for Hydrologic Functions</td> <td style="text-align: right;">6</td> </tr> <tr> <td>Score for Habitat Functions</td> <td style="text-align: right;">17</td> </tr> <tr> <td>TOTAL score for functions</td> <td style="text-align: right;">31</td> </tr> </table>	Score for Water Quality Functions	8	Score for Hydrologic Functions	6	Score for Habitat Functions	17	TOTAL score for functions	31
Category I = Score >=70													
Category II = Score 51-69													
Category III = Score 30-50													
Category IV = Score <30													
Score for Water Quality Functions	8												
Score for Hydrologic Functions	6												
Score for Habitat Functions	17												
TOTAL score for functions	31												
Category based on SPECIAL CHARACTERISTICS of wetland													
I <input type="checkbox"/>	II <input type="checkbox"/>												
Does not Apply <input checked="" type="checkbox"/>													
Final Category	(choose the "highest" category from above)												
<div style="border: 1px solid black; display: inline-block; padding: 5px;">III</div>													

Check the appropriate type and class of wetland being rated.

Wetland Type	
Estuarine	<input type="checkbox"/>
Natural Heritage Wetland	<input type="checkbox"/>
Bog	<input type="checkbox"/>
Mature Forest	<input type="checkbox"/>
Old Growth Forest	<input type="checkbox"/>
Coastal Lagoon	<input type="checkbox"/>
Interdunal	<input type="checkbox"/>
None of the above	<input checked="" type="checkbox"/>

Wetland Class	
Depressional	<input type="checkbox"/>
Riverine	<input type="checkbox"/>
Lake-fringe	<input type="checkbox"/>
Slope	<input checked="" type="checkbox"/>
Flats	<input type="checkbox"/>
Freshwater Tidal	<input type="checkbox"/>
Check if multiple HGM classes are present	<input type="checkbox"/>

Comments:

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below, you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Special Protection (in addition to the protection recommended for its category)		YES	NO
SP1.	<i>Has the wetland unit been documented as a habitat for any federally listed Threatened or Endangered (T/E) plant or animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP2.	<i>Has the wetland unit been documented as habitat for any state listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP3.	<i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP4.	<i>Does the wetland unit have a local significance in addition to its functions? For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

To complete the next part of the data sheet, you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, indentify which hydrologic criteria in questions 1-7 apply and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e., except during floods)?

NO - go to 2 YES - the wetland class is **Tidal Fringe**

If YES, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

YES - **Freshwater Tidal Fringe** NO - **Saltwater Tidal Fringe (Estuarine)**

If your wetland can be classified as a Freshwater Tidal Fringe, use the forms for Riverine wetlands. If it is Saltwater Tidal Fringe, it is rated as an Estuarine wetland. Wetlands that were called estuarine in the first and second editions of the rating system are called Saltwater Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is being kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p. xx).

2. The entire wetland unit is flat and precipitation is only source (>90%) of water to it. Groundwater and surface

NO - go to 3 YES - the wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) where at least 20 acres (8 ha) are permanently inundated (ponded or flooded);

At least 30% of the open water area is deeper than 6.6 feet (2 m)?

NO - go to 4 YES - the wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*).

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**.

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 feet in diameter and less than 1 foot deep).

NO - go to 5 YES - the wetland class is **Slope**

5. Does the entire wetland unit meet all of the following criteria?

- The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river.
- The overbank flooding occurs once every two years.
- NO - go to 6 YES - the wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

- NO - go to 7 YES - the wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no stream or river running through it and providing water? The unit seems to be maintained by higher ground water in the area. The wetland may be ditched, but has no obvious natural outlet.

- NO - go to 8 YES - the wetland class is **Depressional**

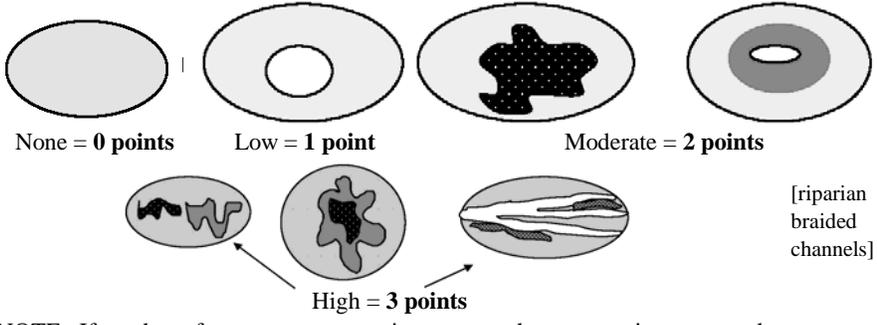
8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide.) Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. **NOTE:** Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the second class is less than 10% of the unit, classify the wetland using the class that represents more than 90% of the total area.

HGM Classes Within a Delineated Wetland Boundary	Class to Use in Rating	
Slope + Riverine	Riverine	<input type="checkbox"/>
Slope + Depressional	Depressional	<input type="checkbox"/>
Slope + Lake-fringe	Lake-fringe	<input type="checkbox"/>
Depressional + Riverine along stream within boundary	Depressional	<input type="checkbox"/>
Depressional + Lake-fringe	Depressional	<input type="checkbox"/>
Saltwater Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics	<input type="checkbox"/>

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

<i>These questions apply to wetlands of all HGM classes</i>										
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat.										
		Points								
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?										
<p>H 1.1 <u>Vegetation structure</u> (<i>see p. 72</i>)</p> <p><i>Check the types of vegetation classes present (as defined by Cowardin). Size threshold for class is 1/4 acre or more than 10% of the areaf unit is smaller than 2.5 acres.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Aquatic bed <input type="checkbox"/> Emergent plants <input checked="" type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input type="checkbox"/> Forested (areas where trees have >30% cover) <p><i>If the unit has a forested class, check if:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon. <p><i>Add the number of vegetation types that qualify. If you have:</i></p> <table style="margin-left: auto; margin-right: 0;"> <tr><td>4 structures or more</td><td style="text-align: right;">Points = 4</td></tr> <tr><td>3 structures</td><td style="text-align: right;">Points = 2</td></tr> <tr><td>2 structures</td><td style="text-align: right;">Points = 1</td></tr> <tr><td>1 structure</td><td style="text-align: right;">Points = 0</td></tr> </table>	4 structures or more	Points = 4	3 structures	Points = 2	2 structures	Points = 1	1 structure	Points = 0	0	
4 structures or more	Points = 4									
3 structures	Points = 2									
2 structures	Points = 1									
1 structure	Points = 0									
	Map of Cowardin vegetation classes	Figure __								
<p>H 1.2 <u>Hydroperiods</u> (<i>see p. 73</i>)</p> <p><i>Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland if less than 2.5 acres in size or 1/4 acre to count (see text for descriptions of hydroperiods).</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Permanently flooded or inundated <input checked="" type="checkbox"/> Seasonally flooded or inundated <input type="checkbox"/> Occasionally flooded or inundated <input type="checkbox"/> Saturated only <input checked="" type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland <input type="checkbox"/> Seasonally flowing stream in, or adjacent to, the wetland <input type="checkbox"/> Lake-fringe wetland = 2 points <input type="checkbox"/> Freshwater tidal wetland = 2 points <table style="margin-left: auto; margin-right: 0;"> <tr><td>4 or more types present</td><td style="text-align: right;">Points = 3</td></tr> <tr><td>3 types present</td><td style="text-align: right;">Points = 2</td></tr> <tr><td>2 types present</td><td style="text-align: right;">Points = 1</td></tr> <tr><td>1 type present</td><td style="text-align: right;">Points = 0</td></tr> </table>	4 or more types present	Points = 3	3 types present	Points = 2	2 types present	Points = 1	1 type present	Points = 0	1	
4 or more types present	Points = 3									
3 types present	Points = 2									
2 types present	Points = 1									
1 type present	Points = 0									
	Map of hydroperiods	Figure __								
<p>H 1.3 <u>Richness of Plant Species</u> (<i>see p. 75</i>)</p> <p><i>Count the number of plant species in the wetland that cover at least 10 sq. ft. (different patches of the same species can be combined to meet the size threshold). You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle.</i></p> <p style="text-align: right; margin-right: 20px;"><i>If you counted:</i></p> <table style="margin-left: auto; margin-right: 0;"> <tr><td>>19 species</td><td style="text-align: right;">Points = 2</td></tr> <tr><td>5-19 species</td><td style="text-align: right;">Points = 1</td></tr> <tr><td><5 species</td><td style="text-align: right;">Points = 0</td></tr> </table> <p><i>List species below if you want to:</i></p>	>19 species	Points = 2	5-19 species	Points = 1	<5 species	Points = 0	1			
>19 species	Points = 2									
5-19 species	Points = 1									
<5 species	Points = 0									

Total for page 2

H 1.4	<p>Interspersion of Habitats (see p. 76) Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1) or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.</p>  <p>None = 0 points Low = 1 point Moderate = 2 points</p> <p>High = 3 points</p> <p>[riparian braided channels]</p> <p>NOTE: If you have four or more vegetation types or three vegetation types and open water, the rating is always "high". Use map of Cowardin vegetation classes.</p>	<p>Points</p> <p>0</p>
H 1.5	<p>Special Habitat Features (see p. 77) Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Large, downed, woody debris within the wetland (>4 inches in diameter and 6 feet long). <input type="checkbox"/> Standing snags (diameter at the bottom >4 inches) in the wetland. <input type="checkbox"/> Undercut banks are present for at least 6.6 feet (2 m) and/or overhanging vegetation extends at least 3.3 feet (1 m) over a stream (or ditch) in or contiguous with the wetland, for at least 33 feet (10 m). <input type="checkbox"/> Stable steep banks of fine material that might be used by beaver/muskrat for denning (>30° slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet turned brown/gray</i>). <input type="checkbox"/> At least 1/4 acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>). <input checked="" type="checkbox"/> Invasive plants cover less than 25% of the wetland area in each stratum of plants. 	<p>2</p>
<p>Note: The 20% stated in early printings of the manual on page 78 is an error.</p>		
<p>H 1. TOTAL Score - potential for providing habitat Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5</p>		<p>4</p>
<p>Comments:</p>		

H 2.3	Near or Adjacent to Other Priority Habitats Listed by WDFW (<i>see p. 82</i>)	Points
	<p>Which of the following priority habitats are within 330 feet (100 m) of the wetland unit? <i>NOTE: the connections do not have to be relatively undisturbed. These are DFW definitions. Check with your local DFW biologist if there are any questions</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Aspen stands: Pure or mixed stands of aspen >0.4 ha (1 acre). <input type="checkbox"/> Biodiversity Areas and Corridors: Areas of habitat that are relatively important to <input type="checkbox"/> Herbaceous Balds: Variable size patches of grass and forbs on shallow soils over <input type="checkbox"/> Old-growth/Mature forests: (Old growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8/acre) >81 cm (32 in) dbh or > 200 years of age. (Mature forests) S <input type="checkbox"/> Oregon white Oak: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is 25% (<i>full descriptions in WDFW PHS report p. 158</i>). <input checked="" type="checkbox"/> Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each <input type="checkbox"/> Westside Prairies: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (<i>full descriptions in WDFW PHS report p. 161</i>). <input checked="" type="checkbox"/> Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream <input type="checkbox"/> Nearshore: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coastal Nearshore, and Puget Sound Nearshore. (<i>full descriptions</i> <input type="checkbox"/> Caves: Naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. <input type="checkbox"/> Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5,000 ft. <input type="checkbox"/> Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. <input checked="" type="checkbox"/> Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. <p>If wetland has: 3+ priority habitats = 4 points 1 priority habitat = 1 point 2 priority habitats = 3 points No habitats = 0 points</p> <p>Note: all vegetated wetlands are by definition a priority habitat but are not included in this list.</p>	4

Nearby wetlands are addressed in question H 2.4		
<p>Choose the one description of the landscape around the wetland that best fits.</p> <p>There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing between wetlands)</p> <p><input checked="" type="checkbox"/> OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development). Points = 5</p> <p><input type="checkbox"/> The wetland is Lake-fringe on a lake with little disturbance and there are 3 other Lake-fringe wetlands within 1/2 mile. Points = 5</p> <p><input type="checkbox"/> There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed. Points = 3</p> <p><input type="checkbox"/> The wetland is Lake-fringe on a lake with disturbance, and there are 3 other Lake-fringe wetlands within 1/2 mile. Points = 3</p> <p><input type="checkbox"/> There is at least 1 wetland within 1/2 mile. Points = 2</p> <p><input type="checkbox"/> There are no wetlands within 1/2 mile. Points = 0</p>		5
H 2. TOTAL Score - opportunity for providing habitat <i>Add the scores from H2.1, H2.2, H2.3, H2.4</i>		13
Total Score for Habitat Functions - add the points for H1 and H2, and record the result on p. 1		17

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and choose the appropriate answers and Category.

Wetland Type <i>Check off any criteria that apply to the wetland. Check the appropriate Category when the appropriate criteria are met.</i>	Category
<p>SC 1.0 Estuarine Wetlands (see p. 86)</p> <p>Does the wetland unit meet the following criteria for Estuarine wetlands?</p> <p> <input type="checkbox"/> The dominant water regime is tidal, <input type="checkbox"/> Vegetated, and <input type="checkbox"/> With a salinity greater than 0.5 ppt. <input type="checkbox"/> YES = <i>Go to SC 1.1</i> <input checked="" type="checkbox"/> NO - not an estuarine wetland </p>	
<p>SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park, or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?</p> <p> <input type="checkbox"/> YES = Category I <input type="checkbox"/> NO = <i>Go to SC 1.2</i> </p>	
<p>SC 1.2 Is the wetland unit at least 1 acre in size and meeting at least two of the following three conditions?</p> <p> <input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has <10% cover of non-native plant species. If the non-native <i>Spartina</i> spp. are the only species that cover >10% of the wetland, then the wetland should be given a dual rating (I/II). The area of <i>Spartina</i> would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of <i>Spartina</i> in determining the size threshold of 1 acre. <input type="checkbox"/> At least 3/4 of the landward edge of the wetland has a 100 foot buffer of shrub, forest, or ungrazed or unmowed grassland. <input type="checkbox"/> The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. <input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not an estuarine wetland </p>	

SC 2.0 Natural Heritage Wetlands (see p. 87)	Category
<p>Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.</p> <p>SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? (This question is used to screen out most sites before you need to contact WNHP/DNR.)</p> <p>S/T/R information from Appendix D <input checked="" type="checkbox"/> or accessed from WNHP/DNR web site <input type="checkbox"/></p> <p><input type="checkbox"/> YES - contact WNHP/DNR (see p. 79) and go to SC 3.2 <input checked="" type="checkbox"/> NO</p> <p>SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as a site with state Threatened or Endangered plant species?</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a Heritage wetland</p>	
<p>SC 3.0 Bogs (see p. 87)</p> <p>Does the wetland unit (or any part of the unit) meet both the criteria for soils and vegetations in bogs? Use the key below to identify if the wetland is a bog. If you answer Yes, you will still need to rate the wetland based on its function.</p> <ol style="list-style-type: none"> Does the unit have organic soil horizons (i.e., layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils.) <p><input type="checkbox"/> YES - go to Q. 3 <input checked="" type="checkbox"/> NO - go to Q. 2</p> <ol style="list-style-type: none"> Does the unit have organic soils, either peats or mucks, that are <16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? <p><input type="checkbox"/> YES - go to Q. 3 <input checked="" type="checkbox"/> NO - not a bog for purpose of rating</p> <ol style="list-style-type: none"> Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (>30% of total shrub and herbaceous cover consists of species in Table 3)? <p><input type="checkbox"/> YES - is a bog for purpose of rating <input type="checkbox"/> NO - go to Q. 4</p> <p>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog.</p> <ol style="list-style-type: none"> Is the unit forested (>30% cover) with sitka spruce, subalpine fir, western redcedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on bog species plant list in Table 3 as a significant component of the ground cover (>30% coverage of total shrub/herbaceous cover)? <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a bog for purpose of rating</p>	

SC 4.0 Forested Wetlands (see p. 90)	Category
<p>Does the wetland unit have at least 1 acre of forest that meets one of these criteria for the Department of Fish and Wildlife's forests as priority habitat? <i>If you answer Yes, you will still need to rate the wetland based on its functions.</i></p> <p><input type="checkbox"/> Old-growth forests: (west of Cascade Crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more.</p> <p style="padding-left: 40px;">NOTE: The criterion for dbh is based on measurements for upland forests. 200-year-old trees in wetlands will often have a smaller dbh because their growth rates are often smaller. The DFW criterion is an "OR" so old-growth forests do not necessarily have to have trees of this diameter.</p> <p><input type="checkbox"/> Mature forests: (west of the Cascade Crest) Stands where the largest trees are 80 - 200 years old OR have average diameters (dbh) exceeding 21 inches (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a forested wetland w/ special characteristics</p>	
<p>SC 5.0 Wetlands in Coastal Lagoons (see p. 91)</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <p>The wetland lies in a depression adjacent to marine waters that is wholly or partially</p> <p><input type="checkbox"/> separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks.</p> <p><input type="checkbox"/> The lagoon in which the wetland is located contains surface water that is saline or brackish (>.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>).</p> <p><input type="checkbox"/> YES = go to SC 5.1 <input checked="" type="checkbox"/> NO - not a wetland in a coastal lagoon</p> <p>SC 5.1 Does the wetland meet all of the following 3 conditions?</p> <p>The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74).</p> <p><input type="checkbox"/> At least 3/4 of the landward edge of the wetland has a 100 foot buffer of shrub, forest, or ungrazed or unmowed grassland.</p> <p><input type="checkbox"/> The wetland is larger than 1/10 acre (4,350 square feet).</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a wetland in a coastal lagoon</p>	

Wetland name or number: B

WETLAND RATING FORM - WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): _____ Date of site visit: 1/24/10

Rated by Wozniak Trained by Ecology? Yes No Date: 4/5/10

SEC: 14 TOWNSHIP: 24N RANGE: 5E Is S/T/R in Appendix D? Yes No

Map of wetland unit: Figure 4 Estimated size: _____

SUMMARY OF RATING													
Category based on FUNCTIONS provided by wetland:													
I <input type="checkbox"/>	II <input type="checkbox"/>												
III <input checked="" type="checkbox"/>	IV <input type="checkbox"/>												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Category I = Score >=70</td> </tr> <tr> <td>Category II = Score 51-69</td> </tr> <tr> <td>Category III = Score 30-50</td> </tr> <tr> <td>Category IV = Score <30</td> </tr> </table>	Category I = Score >=70	Category II = Score 51-69	Category III = Score 30-50	Category IV = Score <30	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Score for Water Quality Functions</td> <td style="text-align: right;">14</td> </tr> <tr> <td>Score for Hydrologic Functions</td> <td style="text-align: right;">4</td> </tr> <tr> <td>Score for Habitat Functions</td> <td style="text-align: right;">16</td> </tr> <tr> <td>TOTAL score for functions</td> <td style="text-align: right;">34</td> </tr> </table>	Score for Water Quality Functions	14	Score for Hydrologic Functions	4	Score for Habitat Functions	16	TOTAL score for functions	34
Category I = Score >=70													
Category II = Score 51-69													
Category III = Score 30-50													
Category IV = Score <30													
Score for Water Quality Functions	14												
Score for Hydrologic Functions	4												
Score for Habitat Functions	16												
TOTAL score for functions	34												
Category based on SPECIAL CHARACTERISTICS of wetland													
I <input type="checkbox"/>	II <input type="checkbox"/>												
Does not Apply <input checked="" type="checkbox"/>													
Final Category	(choose the "highest" category from above)												
<div style="border: 1px solid black; display: inline-block; padding: 5px;">III</div>													

Check the appropriate type and class of wetland being rated.

Wetland Type	
Estuarine	<input type="checkbox"/>
Natural Heritage Wetland	<input type="checkbox"/>
Bog	<input type="checkbox"/>
Mature Forest	<input type="checkbox"/>
Old Growth Forest	<input type="checkbox"/>
Coastal Lagoon	<input type="checkbox"/>
Interdunal	<input type="checkbox"/>
None of the above	<input checked="" type="checkbox"/>

Wetland Class	
Depressional	<input type="checkbox"/>
Riverine	<input type="checkbox"/>
Lake-fringe	<input type="checkbox"/>
Slope	<input checked="" type="checkbox"/>
Flats	<input type="checkbox"/>
Freshwater Tidal	<input type="checkbox"/>
Check if multiple HGM classes are present	<input type="checkbox"/>

Comments:

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below, you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Special Protection (in addition to the protection recommended for its category)		YES	NO
SP1.	<i>Has the wetland unit been documented as a habitat for any federally listed Threatened or Endangered (T/E) plant or animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP2.	<i>Has the wetland unit been documented as habitat for any state listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP3.	<i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP4.	<i>Does the wetland unit have a local significance in addition to its functions? For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

To complete the next part of the data sheet, you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, indentify which hydrologic criteria in questions 1-7 apply and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e., except during floods)?

NO - go to 2 YES - the wetland class is **Tidal Fringe**

If YES, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

YES - **Freshwater Tidal Fringe** NO - **Saltwater Tidal Fringe (Estuarine)**

If your wetland can be classified as a Freshwater Tidal Fringe, use the forms for Riverine wetlands. If it is Saltwater Tidal Fringe, it is rated as an Estuarine wetland. Wetlands that were called estuarine in the first and second editions of the rating system are called Saltwater Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is being kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p. xx).

2. The entire wetland unit is flat and precipitation is only source (>90%) of water to it. Groundwater and surface

NO - go to 3 YES - the wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) where at least 20 acres (8 ha) are permanently inundated (ponded or flooded);

At least 30% of the open water area is deeper than 6.6 feet (2 m)?

NO - go to 4 YES - the wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*).

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**.

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 feet in diameter and less than 1 foot deep).

NO - go to 5 YES - the wetland class is **Slope**

5. Does the entire wetland unit meet all of the following criteria?

- The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river.
- The overbank flooding occurs once every two years.
- NO - go to 6 YES - the wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

- NO - go to 7 YES - the wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no stream or river running through it and providing water? The unit seems to be maintained by higher ground water in the area. The wetland may be ditched, but has no obvious natural outlet.

- NO - go to 8 YES - the wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide.) Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. **NOTE:** Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the second class is less than 10% of the unit, classify the wetland using the class that represents more than 90% of the total area.

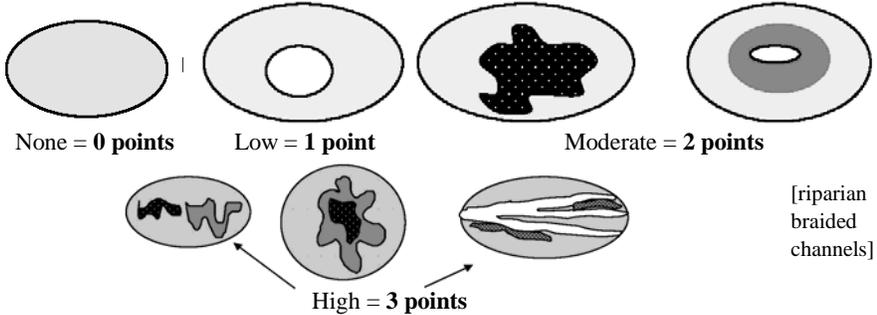
HGM Classes Within a Delineated Wetland Boundary	Class to Use in Rating	
Slope + Riverine	Riverine	<input type="checkbox"/>
Slope + Depressional	Depressional	<input type="checkbox"/>
Slope + Lake-fringe	Lake-fringe	<input type="checkbox"/>
Depressional + Riverine along stream within boundary	Depressional	<input type="checkbox"/>
Depressional + Lake-fringe	Depressional	<input type="checkbox"/>
Saltwater Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics	<input type="checkbox"/>

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S Slope Wetlands		
HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion.		
S 3. Does wetland unit have the <u>potential</u> to reduce flooding/erosion? (see p. 68)		Points
<p>S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. <i>Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.</i></p> <p><input type="checkbox"/> Dense, uncut, rigid vegetation covers >90% of wetland area Points = 6</p> <p><input type="checkbox"/> Dense, uncut, rigid vegetation covers >1/2 of wetland area Points = 3</p> <p><input type="checkbox"/> Dense, uncut, rigid vegetation covers >1/4 of wetland area Points = 1</p> <p><input type="checkbox"/> More than 3/4 of area is grazed, mowed, tilled, or vegetation is not rigid Points = 0</p>		0
<p>S 3.2 Characteristics of the slope wetland that holds back small amounts of flood flows: <i>the slope wetland has small surface depressions that can retain water over at least 10% of its area</i></p> <p>YES = 2 points NO = 0 points</p>		2
<i>Record the points from the boxes above</i>		2
S 4. Does wetland unit have the opportunity to reduce flooding and erosion? (see p. 70)		
<p>Is the wetland in a landscape position where the reduction in water velocity it provides help to protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? <i>Note which of the following conditions apply.</i></p> <p><input checked="" type="checkbox"/> Wetland has surface runoff that drains to a river or stream that has flooding problems</p> <p><input type="checkbox"/> Other: _____</p>		Multiplier
YES - multiplier is 2	NO - multiplier is 1	2
TOTAL - Hydrologic Functions	Multiply the score from S 3. by S 4. <i>Add score to table on p. 1</i>	4

<i>These questions apply to wetlands of all HGM classes</i>														
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat.														
H 1.	Does the wetland unit have the <u>potential</u> to provide habitat for many species?	Points												
H 1.1	<p><u>Vegetation structure</u> (<i>see p. 72</i>)</p> <p><i>Check the types of vegetation classes present (as defined by Cowardin). Size threshold for class is 1/4 acre or more than 10% of the areaf unit is smaller than 2.5 acres.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Aquatic bed <input checked="" type="checkbox"/> Emergent plants <input type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input type="checkbox"/> Forested (areas where trees have >30% cover) <p><i>If the unit has a forested class, check if:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon. <p><i>Add the number of vegetation types that qualify. If you have:</i></p> <table style="margin-left: 40px; border: none;"> <tr><td>4 structures or more</td><td style="text-align: right;">Points = 4</td></tr> <tr><td>3 structures</td><td style="text-align: right;">Points = 2</td></tr> <tr><td>2 structures</td><td style="text-align: right;">Points = 1</td></tr> <tr><td>1 structure</td><td style="text-align: right;">Points = 0</td></tr> </table>	4 structures or more	Points = 4	3 structures	Points = 2	2 structures	Points = 1	1 structure	Points = 0	0				
4 structures or more	Points = 4													
3 structures	Points = 2													
2 structures	Points = 1													
1 structure	Points = 0													
Map of Cowardin vegetation classes		Figure __												
H 1.2	<p><u>Hydroperiods</u> (<i>see p. 73</i>)</p> <p><i>Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland if less than 2.5 acres in size or 1/4 acre to count (see text for descriptions of hydroperiods).</i></p> <table style="width: 100%; border: none;"> <tr> <td><input type="checkbox"/> Permanently flooded or inundated</td> <td>4 or more types present</td> <td style="text-align: right;">Points = 3</td> </tr> <tr> <td><input checked="" type="checkbox"/> Seasonally flooded or inundated</td> <td>3 types present</td> <td style="text-align: right;">Points = 2</td> </tr> <tr> <td><input type="checkbox"/> Occasionally flooded or inundated</td> <td>2 types present</td> <td style="text-align: right;">Points = 1</td> </tr> <tr> <td><input type="checkbox"/> Saturated only</td> <td>1 type present</td> <td style="text-align: right;">Points = 0</td> </tr> </table> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland <input type="checkbox"/> Seasonally flowing stream in, or adjacent to, the wetland <input type="checkbox"/> Lake-fringe wetland = 2 points <input type="checkbox"/> Freshwater tidal wetland = 2 points 	<input type="checkbox"/> Permanently flooded or inundated	4 or more types present	Points = 3	<input checked="" type="checkbox"/> Seasonally flooded or inundated	3 types present	Points = 2	<input type="checkbox"/> Occasionally flooded or inundated	2 types present	Points = 1	<input type="checkbox"/> Saturated only	1 type present	Points = 0	1
<input type="checkbox"/> Permanently flooded or inundated	4 or more types present	Points = 3												
<input checked="" type="checkbox"/> Seasonally flooded or inundated	3 types present	Points = 2												
<input type="checkbox"/> Occasionally flooded or inundated	2 types present	Points = 1												
<input type="checkbox"/> Saturated only	1 type present	Points = 0												
Map of hydroperiods		Figure __												
H 1.3	<p><u>Richness of Plant Species</u> (<i>see p. 75</i>)</p> <p><i>Count the number of plant species in the wetland that cover at least 10 sq. ft. (different patches of the same species can be combined to meet the size threshold). You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle.</i></p> <p style="text-align: right; margin-right: 20px;"><i>If you counted:</i></p> <table style="margin-left: 40px; border: none;"> <tr><td>>19 species</td><td style="text-align: right;">Points = 2</td></tr> <tr><td>5-19 species</td><td style="text-align: right;">Points = 1</td></tr> <tr><td><5 species</td><td style="text-align: right;">Points = 0</td></tr> </table> <p><i>List species below if you want to:</i></p>	>19 species	Points = 2	5-19 species	Points = 1	<5 species	Points = 0	0						
>19 species	Points = 2													
5-19 species	Points = 1													
<5 species	Points = 0													

Total for page 1

H 1.4	<p>Interspersion of Habitats (see p. 76) Decide from the diagrams below whether interspersions between Cowardin vegetation classes (described in H 1.1) or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.</p>  <p>None = 0 points Low = 1 point Moderate = 2 points</p> <p>High = 3 points</p> <p>[riparian braided channels]</p> <p>NOTE: If you have four or more vegetation types or three vegetation types and open water, the rating is always "high". Use map of Cowardin vegetation classes.</p>	Points
H 1.5	<p>Special Habitat Features (see p. 77) Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Large, downed, woody debris within the wetland (>4 inches in diameter and 6 feet long). <input type="checkbox"/> Standing snags (diameter at the bottom >4 inches) in the wetland. <input type="checkbox"/> Undercut banks are present for at least 6.6 feet (2 m) and/or overhanging vegetation extends at least 3.3 feet (1 m) over a stream (or ditch) in or contiguous with the wetland, for at least 33 feet (10 m). <input type="checkbox"/> Stable steep banks of fine material that might be used by beaver/muskrat for denning (>30° slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet turned brown/gray</i>). <input type="checkbox"/> At least 1/4 acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>). <input checked="" type="checkbox"/> Invasive plants cover less than 25% of the wetland area in each stratum of plants. 	2
<p>Note: The 20% stated in early printings of the manual on page 78 is an error.</p>		
<p>H 1. TOTAL Score - potential for providing habitat Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5</p>		3
<p>Comments:</p>		

H 2.3 <u>Near or Adjacent to Other Priority Habitats Listed by WDFW (see p. 82)</u>	Points
<p>Which of the following priority habitats are within 330 feet (100 m) of the wetland unit? <i>NOTE: the connections do not have to be relatively undisturbed. These are DFW definitions. Check with your local DFW biologist if there are any questions</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Aspen stands: Pure or mixed stands of aspen >0.4 ha (1 acre). <input type="checkbox"/> Biodiversity Areas and Corridors: Areas of habitat that are relatively important to <input type="checkbox"/> Herbaceous Balds: Variable size patches of grass and forbs on shallow soils over <input type="checkbox"/> Old-growth/Mature forests: (Old growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8/acre) >81 cm (32 in) dbh or > 200 years of age. (Mature forests) S <input type="checkbox"/> Oregon white Oak: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is 25% (<i>full descriptions in WDFW PHS report p. 158</i>). <input checked="" type="checkbox"/> Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each <input type="checkbox"/> Westside Prairies: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (<i>full descriptions in WDFW PHS report p. 161</i>). <input checked="" type="checkbox"/> Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream <input type="checkbox"/> Nearshore: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coastal Nearshore, and Puget Sound Nearshore. (<i>full descriptions</i> <input type="checkbox"/> Caves: Naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. <input type="checkbox"/> Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5,000 ft. <input type="checkbox"/> Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. <input checked="" type="checkbox"/> Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. <p>If wetland has: 3+ priority habitats = 4 points 1 priority habitat = 1 point 2 priority habitats = 3 points No habitats = 0 points</p> <p>Note: all vegetated wetlands are by definition a priority habitat but are not included in this list.</p>	<p>4</p>

Nearby wetlands are addressed in question H 2.4		
<p>Choose the one description of the landscape around the wetland that best fits.</p> <p>There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing between wetlands)</p> <p><input checked="" type="checkbox"/> OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development). Points = 5</p> <p><input type="checkbox"/> The wetland is Lake-fringe on a lake with little disturbance and there are 3 other Lake-fringe wetlands within 1/2 mile. Points = 5</p> <p><input type="checkbox"/> There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed. Points = 3</p> <p><input type="checkbox"/> The wetland is Lake-fringe on a lake with disturbance, and there are 3 other Lake-fringe wetlands within 1/2 mile. Points = 3</p> <p><input type="checkbox"/> There is at least 1 wetland within 1/2 mile. Points = 2</p> <p><input type="checkbox"/> There are no wetlands within 1/2 mile. Points = 0</p>		5
<p>H 2. TOTAL Score - opportunity for providing habitat <i>Add the scores from H2.1, H2.2, H2.3, H2.4</i></p>		13
<p>Total Score for Habitat Functions - add the points for H1 and H2, and record the result on p. 1</p>		16

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and choose the appropriate answers and Category.

Wetland Type <i>Check off any criteria that apply to the wetland. Check the appropriate Category when the appropriate criteria are met.</i>	Category
<p>SC 1.0 Estuarine Wetlands (see p. 86)</p> <p>Does the wetland unit meet the following criteria for Estuarine wetlands?</p> <p> <input type="checkbox"/> The dominant water regime is tidal, <input type="checkbox"/> Vegetated, and <input type="checkbox"/> With a salinity greater than 0.5 ppt. <input type="checkbox"/> YES = <i>Go to SC 1.1</i> <input checked="" type="checkbox"/> NO - not an estuarine wetland </p>	
<p>SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park, or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?</p> <p> <input type="checkbox"/> YES = Category I <input type="checkbox"/> NO = <i>Go to SC 1.2</i> </p>	
<p>SC 1.2 Is the wetland unit at least 1 acre in size and meeting at least two of the following three conditions?</p> <p> <input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has <10% cover of non-native plant species. If the non-native <i>Spartina</i> spp. are the only species that cover >10% of the wetland, then the wetland should be given a dual rating (I/II). The area of <i>Spartina</i> would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of <i>Spartina</i> in determining the size threshold of 1 acre. <input type="checkbox"/> At least 3/4 of the landward edge of the wetland has a 100 foot buffer of shrub, forest, or ungrazed or unmowed grassland. <input type="checkbox"/> The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. <input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not an estuarine wetland </p>	

SC 2.0 Natural Heritage Wetlands (<i>see p. 87</i>)	Category
<p>Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.</p> <p>SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? (This question is used to screen out most sites before you need to contact WNHP/DNR.)</p> <p>S/T/R information from Appendix D <input checked="" type="checkbox"/> or accessed from WNHP/DNR web site <input type="checkbox"/></p> <p><input type="checkbox"/> YES - contact WNHP/DNR (<i>see p. 79</i>) and <i>go to SC 3.2</i> <input checked="" type="checkbox"/> NO</p> <p>SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as a site with state Threatened or Endangered plant species?</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a Heritage wetland</p>	
<p>SC 3.0 Bogs (<i>see p. 87</i>)</p> <p>Does the wetland unit (or any part of the unit) meet both the criteria for soils and vegetations in bogs? <i>Use the key below to identify if the wetland is a bog. If you answer Yes, you will still need to rate the wetland based on its function.</i></p> <ol style="list-style-type: none"> Does the unit have organic soil horizons (i.e., layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils.) <p><input type="checkbox"/> YES - <i>go to Q. 3</i> <input checked="" type="checkbox"/> NO - <i>go to Q. 2</i></p> <ol style="list-style-type: none"> Does the unit have organic soils, either peats or mucks, that are <16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? <p><input type="checkbox"/> YES - <i>go to Q. 3</i> <input checked="" type="checkbox"/> NO - not a bog for purpose of rating</p> <ol style="list-style-type: none"> Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (>30% of total shrub and herbaceous cover consists of species in Table 3)? <p><input type="checkbox"/> YES - is a bog for purpose of rating <input type="checkbox"/> NO - <i>go to Q. 4</i></p> <p>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog.</p> <ol style="list-style-type: none"> Is the unit forested (>30% cover) with sitka spruce, subalpine fir, western redcedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on bog species plant list in Table 3 as a significant component of the ground cover (>30% coverage of total shrub/herbaceous cover)? <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a bog for purpose of rating</p>	

SC 4.0 Forested Wetlands (see p. 90)	Category
<p>Does the wetland unit have at least 1 acre of forest that meets one of these criteria for the Department of Fish and Wildlife's forests as priority habitat? <i>If you answer Yes, you will still need to rate the wetland based on its functions.</i></p> <p><input type="checkbox"/> Old-growth forests: (west of Cascade Crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more.</p> <p style="padding-left: 40px;">NOTE: The criterion for dbh is based on measurements for upland forests. 200-year-old trees in wetlands will often have a smaller dbh because their growth rates are often smaller. The DFW criterion is an "OR" so old-growth forests do not necessarily have to have trees of this diameter.</p> <p><input type="checkbox"/> Mature forests: (west of the Cascade Crest) Stands where the largest trees are 80 - 200 years old OR have average diameters (dbh) exceeding 21 inches (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a forested wetland w/ special characteristics</p>	
<p>SC 5.0 Wetlands in Coastal Lagoons (see p. 91)</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <p>The wetland lies in a depression adjacent to marine waters that is wholly or partially</p> <p><input type="checkbox"/> separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks.</p> <p><input type="checkbox"/> The lagoon in which the wetland is located contains surface water that is saline or brackish (>.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>).</p> <p><input type="checkbox"/> YES = go to SC 5.1 <input checked="" type="checkbox"/> NO - not a wetland in a coastal lagoon</p> <p>SC 5.1 Does the wetland meet all of the following 3 conditions?</p> <p>The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74).</p> <p><input type="checkbox"/> At least 3/4 of the landward edge of the wetland has a 100 foot buffer of shrub, forest, or ungrazed or unmowed grassland.</p> <p><input type="checkbox"/> The wetland is larger than 1/10 acre (4,350 square feet).</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a wetland in a coastal lagoon</p>	

Wetland name or number: C

WETLAND RATING FORM - WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): _____ Date of site visit: 1/24/10

Rated by Wozniak Trained by Ecology? Yes No Date: 4/5/10

SEC: 14 TOWNSHIP: 24N RANGE: 5E Is S/T/R in Appendix D? Yes No

Map of wetland unit: Figure 4 Estimated size: _____

SUMMARY OF RATING													
Category based on FUNCTIONS provided by wetland:													
I <input type="checkbox"/>	II <input type="checkbox"/>												
III <input type="checkbox"/>	IV <input checked="" type="checkbox"/>												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Category I = Score >=70</td> </tr> <tr> <td>Category II = Score 51-69</td> </tr> <tr> <td>Category III = Score 30-50</td> </tr> <tr> <td>Category IV = Score <30</td> </tr> </table>	Category I = Score >=70	Category II = Score 51-69	Category III = Score 30-50	Category IV = Score <30	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Score for Water Quality Functions</td> <td style="text-align: right;">0</td> </tr> <tr> <td>Score for Hydrologic Functions</td> <td style="text-align: right;">0</td> </tr> <tr> <td>Score for Habitat Functions</td> <td style="text-align: right;">15</td> </tr> <tr> <td>TOTAL score for functions</td> <td style="text-align: right;">15</td> </tr> </table>	Score for Water Quality Functions	0	Score for Hydrologic Functions	0	Score for Habitat Functions	15	TOTAL score for functions	15
Category I = Score >=70													
Category II = Score 51-69													
Category III = Score 30-50													
Category IV = Score <30													
Score for Water Quality Functions	0												
Score for Hydrologic Functions	0												
Score for Habitat Functions	15												
TOTAL score for functions	15												
Category based on SPECIAL CHARACTERISTICS of wetland													
I <input type="checkbox"/>	II <input type="checkbox"/>												
Does not Apply <input checked="" type="checkbox"/>													
Final Category	(choose the "highest" category from above)												
<div style="border: 1px solid black; display: inline-block; padding: 5px;">IV</div>													

Check the appropriate type and class of wetland being rated.

Wetland Type	
Estuarine	<input type="checkbox"/>
Natural Heritage Wetland	<input type="checkbox"/>
Bog	<input type="checkbox"/>
Mature Forest	<input type="checkbox"/>
Old Growth Forest	<input type="checkbox"/>
Coastal Lagoon	<input type="checkbox"/>
Interdunal	<input type="checkbox"/>
None of the above	<input checked="" type="checkbox"/>

Wetland Class	
Depressional	<input type="checkbox"/>
Riverine	<input type="checkbox"/>
Lake-fringe	<input type="checkbox"/>
Slope	<input checked="" type="checkbox"/>
Flats	<input type="checkbox"/>
Freshwater Tidal	<input type="checkbox"/>
Check if multiple HGM classes are present	<input type="checkbox"/>

Comments:

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below, you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Special Protection (in addition to the protection recommended for its category)		YES	NO
SP1.	<i>Has the wetland unit been documented as a habitat for any federally listed Threatened or Endangered (T/E) plant or animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP2.	<i>Has the wetland unit been documented as habitat for any state listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP3.	<i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP4.	<i>Does the wetland unit have a local significance in addition to its functions? For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

To complete the next part of the data sheet, you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, indentify which hydrologic criteria in questions 1-7 apply and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e., except during floods)?

NO - go to 2 YES - the wetland class is **Tidal Fringe**

If YES, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

YES - **Freshwater Tidal Fringe** NO - **Saltwater Tidal Fringe (Estuarine)**

If your wetland can be classified as a Freshwater Tidal Fringe, use the forms for Riverine wetlands. If it is Saltwater Tidal Fringe, it is rated as an Estuarine wetland. Wetlands that were called estuarine in the first and second editions of the rating system are called Saltwater Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is being kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p. xx).

2. The entire wetland unit is flat and precipitation is only source (>90%) of water to it. Groundwater and surface

NO - go to 3 YES - the wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) where at least 20 acres (8 ha) are permanently inundated (ponded or flooded);

At least 30% of the open water area is deeper than 6.6 feet (2 m)?

NO - go to 4 YES - the wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*).

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**.

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 feet in diameter and less than 1 foot deep).

NO - go to 5 YES - the wetland class is **Slope**

5. Does the entire wetland unit meet all of the following criteria?

- The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river.
- The overbank flooding occurs once every two years.
- NO - go to 6 YES - the wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

- NO - go to 7 YES - the wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no stream or river running through it and providing water? The unit seems to be maintained by higher ground water in the area. The wetland may be ditched, but has no obvious natural outlet.

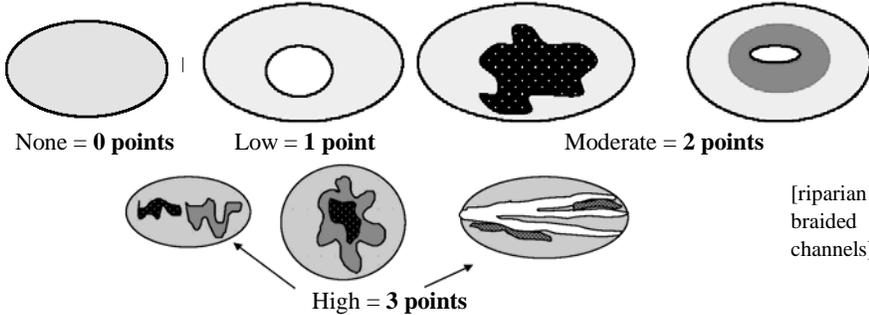
- NO - go to 8 YES - the wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide.) Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. **NOTE:** Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the second class is less than 10% of the unit, classify the wetland using the class that represents more than 90% of the total area.

HGM Classes Within a Delineated Wetland Boundary	Class to Use in Rating	
Slope + Riverine	Riverine	<input type="checkbox"/>
Slope + Depressional	Depressional	<input type="checkbox"/>
Slope + Lake-fringe	Lake-fringe	<input type="checkbox"/>
Depressional + Riverine along stream within boundary	Depressional	<input type="checkbox"/>
Depressional + Lake-fringe	Depressional	<input type="checkbox"/>
Saltwater Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics	<input type="checkbox"/>

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S Slope Wetlands		
HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion.		
S 3. Does wetland unit have the <u>potential</u> to reduce flooding/erosion? (see p. 68)		Points
<p>S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. <i>Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.</i></p> <p><input type="checkbox"/> Dense, uncut, rigid vegetation covers >90% of wetland area Points = 6</p> <p><input type="checkbox"/> Dense, uncut, rigid vegetation covers >1/2 of wetland area Points = 3</p> <p><input type="checkbox"/> Dense, uncut, rigid vegetation covers >1/4 of wetland area Points = 1</p> <p><input type="checkbox"/> More than 3/4 of area is grazed, mowed, tilled, or vegetation is not rigid Points = 0</p>		0
<p>S 3.2 Characteristics of the slope wetland that holds back small amounts of flood flows: <i>the slope wetland has small surface depressions that can retain water over at least 10% of its area</i></p> <p>YES = 2 points NO = 0 points</p>		0
<i>Record the points from the boxes above</i>		0
S 4. Does wetland unit have the opportunity to reduce flooding and erosion? (see p. 70)		
<p>Is the wetland in a landscape position where the reduction in water velocity it provides help to protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? <i>Note which of the following conditions apply.</i></p> <p><input checked="" type="checkbox"/> Wetland has surface runoff that drains to a river or stream that has flooding problems</p> <p><input type="checkbox"/> Other: _____</p>		Multiplier
YES - multiplier is 2	NO - multiplier is 1	2
TOTAL - Hydrologic Functions		0
Multiply the score from S 3. by S 4. <i>Add score to table on p. 1</i>		

H 1.4	<p>Interspersion of Habitats (see p. 76) Decide from the diagrams below whether interspersions between Cowardin vegetation classes (described in H 1.1) or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.</p>  <p>None = 0 points Low = 1 point Moderate = 2 points</p> <p>High = 3 points</p> <p>[riparian braided channels]</p> <p>NOTE: If you have four or more vegetation types or three vegetation types and open water, the rating is always "high". Use map of Cowardin vegetation classes.</p>	Points
H 1.5	<p>Special Habitat Features (see p. 77) Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Large, downed, woody debris within the wetland (>4 inches in diameter and 6 feet long). <input type="checkbox"/> Standing snags (diameter at the bottom >4 inches) in the wetland. <input type="checkbox"/> Undercut banks are present for at least 6.6 feet (2 m) and/or overhanging vegetation extends at least 3.3 feet (1 m) over a stream (or ditch) in or contiguous with the wetland, for at least 33 feet (10 m). <input type="checkbox"/> Stable steep banks of fine material that might be used by beaver/muskrat for denning (>30° slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet turned brown/gray</i>). <input type="checkbox"/> At least 1/4 acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>). <input type="checkbox"/> Invasive plants cover less than 25% of the wetland area in each stratum of plants. 	0
<p>Note: The 20% stated in early printings of the manual on page 78 is an error.</p>		
<p>H 1. TOTAL Score - potential for providing habitat Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5</p>		2
<p>Comments:</p>		

H 2.3	Near or Adjacent to Other Priority Habitats Listed by WDFW (<i>see p. 82</i>)	Points
	<p>Which of the following priority habitats are within 330 feet (100 m) of the wetland unit? <i>NOTE: the connections do not have to be relatively undisturbed. These are DFW definitions. Check with your local DFW biologist if there are any questions</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Aspen stands: Pure or mixed stands of aspen >0.4 ha (1 acre). <input type="checkbox"/> Biodiversity Areas and Corridors: Areas of habitat that are relatively important to <input type="checkbox"/> Herbaceous Balds: Variable size patches of grass and forbs on shallow soils over <input type="checkbox"/> Old-growth/Mature forests: (Old growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8/acre) >81 cm (32 in) dbh or > 200 years of age. (Mature forests) S <input type="checkbox"/> Oregon white Oak: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is 25% (<i>full descriptions in WDFW PHS report p. 158</i>). <input checked="" type="checkbox"/> Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each <input type="checkbox"/> Westside Prairies: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (<i>full descriptions in WDFW PHS report p. 161</i>). <input checked="" type="checkbox"/> Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream <input type="checkbox"/> Nearshore: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coastal Nearshore, and Puget Sound Nearshore. (<i>full descriptions</i> <input type="checkbox"/> Caves: Naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. <input type="checkbox"/> Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5,000 ft. <input type="checkbox"/> Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. <input checked="" type="checkbox"/> Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. <p>If wetland has: 3+ priority habitats = 4 points 1 priority habitat = 1 point 2 priority habitats = 3 points No habitats = 0 points</p> <p>Note: all vegetated wetlands are by definition a priority habitat but are not included in this list.</p>	4

Nearby wetlands are addressed in question H 2.4		
Choose the one description of the landscape around the wetland that best fits. There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing between wetlands) Points = 5		
<input checked="" type="checkbox"/>	OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development). Points = 5	
<input type="checkbox"/>	The wetland is Lake-fringe on a lake with little disturbance and there are 3 other Lake-fringe wetlands within 1/2 mile. Points = 5	5
<input type="checkbox"/>	There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed. Points = 3	
<input type="checkbox"/>	The wetland is Lake-fringe on a lake with disturbance, and there are 3 other Lake-fringe wetlands within 1/2 mile. Points = 3	
<input type="checkbox"/>	There is at least 1 wetland within 1/2 mile. Points = 2	
<input type="checkbox"/>	There are no wetlands within 1/2 mile. Points = 0	
H 2. TOTAL Score - opportunity for providing habitat <i>Add the scores from H2.1, H2.2, H2.3, H2.4</i>		13
Total Score for Habitat Functions - add the points for H1 and H2, and record the result on p. 1		15

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and choose the appropriate answers and Category.

Wetland Type <i>Check off any criteria that apply to the wetland. Check the appropriate Category when the appropriate criteria are met.</i>	Category
<p>SC 1.0 Estuarine Wetlands (see p. 86)</p> <p>Does the wetland unit meet the following criteria for Estuarine wetlands?</p> <p> <input type="checkbox"/> The dominant water regime is tidal, <input type="checkbox"/> Vegetated, and <input type="checkbox"/> With a salinity greater than 0.5 ppt. <input type="checkbox"/> YES = <i>Go to SC 1.1</i> <input checked="" type="checkbox"/> NO - not an estuarine wetland </p>	
<p>SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park, or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?</p> <p> <input type="checkbox"/> YES = Category I <input type="checkbox"/> NO = <i>Go to SC 1.2</i> </p>	
<p>SC 1.2 Is the wetland unit at least 1 acre in size and meeting at least two of the following three conditions?</p> <p> <input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has <10% cover of non-native plant species. If the non-native <i>Spartina</i> spp. are the only species that cover >10% of the wetland, then the wetland should be given a dual rating (I/II). The area of <i>Spartina</i> would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of <i>Spartina</i> in determining the size threshold of 1 acre. <input type="checkbox"/> At least 3/4 of the landward edge of the wetland has a 100 foot buffer of shrub, forest, or ungrazed or unmowed grassland. <input type="checkbox"/> The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. <input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not an estuarine wetland </p>	

SC 2.0 Natural Heritage Wetlands (<i>see p. 87</i>)	Category
<p>Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.</p> <p>SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? (This question is used to screen out most sites before you need to contact WNHP/DNR.)</p> <p>S/T/R information from Appendix D <input checked="" type="checkbox"/> or accessed from WNHP/DNR web site <input type="checkbox"/></p> <p><input type="checkbox"/> YES - contact WNHP/DNR (<i>see p. 79</i>) and <i>go to SC 3.2</i> <input checked="" type="checkbox"/> NO</p> <p>SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as a site with state Threatened or Endangered plant species?</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a Heritage wetland</p>	
<p>SC 3.0 Bogs (<i>see p. 87</i>)</p> <p>Does the wetland unit (or any part of the unit) meet both the criteria for soils and vegetations in bogs? <i>Use the key below to identify if the wetland is a bog. If you answer Yes, you will still need to rate the wetland based on its function.</i></p> <ol style="list-style-type: none"> Does the unit have organic soil horizons (i.e., layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils.) <p><input type="checkbox"/> YES - <i>go to Q. 3</i> <input checked="" type="checkbox"/> NO - <i>go to Q. 2</i></p> <ol style="list-style-type: none"> Does the unit have organic soils, either peats or mucks, that are <16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? <p><input type="checkbox"/> YES - <i>go to Q. 3</i> <input checked="" type="checkbox"/> NO - not a bog for purpose of rating</p> <ol style="list-style-type: none"> Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (>30% of total shrub and herbaceous cover consists of species in Table 3)? <p><input type="checkbox"/> YES - is a bog for purpose of rating <input type="checkbox"/> NO - <i>go to Q. 4</i></p> <p>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog.</p> <ol style="list-style-type: none"> Is the unit forested (>30% cover) with sitka spruce, subalpine fir, western redcedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on bog species plant list in Table 3 as a significant component of the ground cover (>30% coverage of total shrub/herbaceous cover)? <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a bog for purpose of rating</p>	

SC 4.0 Forested Wetlands (see p. 90)	Category
<p>Does the wetland unit have at least 1 acre of forest that meets one of these criteria for the Department of Fish and Wildlife's forests as priority habitat? <i>If you answer Yes, you will still need to rate the wetland based on its functions.</i></p> <p><input type="checkbox"/> Old-growth forests: (west of Cascade Crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more.</p> <p style="padding-left: 40px;">NOTE: The criterion for dbh is based on measurements for upland forests. 200-year-old trees in wetlands will often have a smaller dbh because their growth rates are often smaller. The DFW criterion is an "OR" so old-growth forests do not necessarily have to have trees of this diameter.</p> <p><input type="checkbox"/> Mature forests: (west of the Cascade Crest) Stands where the largest trees are 80 - 200 years old OR have average diameters (dbh) exceeding 21 inches (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a forested wetland w/ special characteristics</p>	
<p>SC 5.0 Wetlands in Coastal Lagoons (see p. 91)</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <p>The wetland lies in a depression adjacent to marine waters that is wholly or partially</p> <p><input type="checkbox"/> separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks.</p> <p><input type="checkbox"/> The lagoon in which the wetland is located contains surface water that is saline or brackish (>.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>).</p> <p><input type="checkbox"/> YES = go to SC 5.1 <input checked="" type="checkbox"/> NO - not a wetland in a coastal lagoon</p> <p>SC 5.1 Does the wetland meet all of the following 3 conditions?</p> <p>The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74).</p> <p><input type="checkbox"/> At least 3/4 of the landward edge of the wetland has a 100 foot buffer of shrub, forest, or ungrazed or unmowed grassland.</p> <p><input type="checkbox"/> The wetland is larger than 1/10 acre (4,350 square feet).</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a wetland in a coastal lagoon</p>	

Wetland name or number: D

WETLAND RATING FORM - WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): _____ Date of site visit: 1/24/10

Rated by Wozniak Trained by Ecology? Yes No Date: 4/5/10

SEC: 14 TOWNSHIP: 24N RANGE: 5E Is S/T/R in Appendix D? Yes No

Map of wetland unit: Figure 4 Estimated size: _____

SUMMARY OF RATING													
Category based on FUNCTIONS provided by wetland:													
I <input type="checkbox"/>	II <input type="checkbox"/>												
III <input checked="" type="checkbox"/>	IV <input type="checkbox"/>												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Category I = Score >=70</td> </tr> <tr> <td>Category II = Score 51-69</td> </tr> <tr> <td>Category III = Score 30-50</td> </tr> <tr> <td>Category IV = Score <30</td> </tr> </table>	Category I = Score >=70	Category II = Score 51-69	Category III = Score 30-50	Category IV = Score <30	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Score for Water Quality Functions</td> <td style="text-align: right;">8</td> </tr> <tr> <td>Score for Hydrologic Functions</td> <td style="text-align: right;">10</td> </tr> <tr> <td>Score for Habitat Functions</td> <td style="text-align: right;">23</td> </tr> <tr> <td>TOTAL score for functions</td> <td style="text-align: right;">41</td> </tr> </table>	Score for Water Quality Functions	8	Score for Hydrologic Functions	10	Score for Habitat Functions	23	TOTAL score for functions	41
Category I = Score >=70													
Category II = Score 51-69													
Category III = Score 30-50													
Category IV = Score <30													
Score for Water Quality Functions	8												
Score for Hydrologic Functions	10												
Score for Habitat Functions	23												
TOTAL score for functions	41												
Category based on SPECIAL CHARACTERISTICS of wetland													
I <input type="checkbox"/>	II <input type="checkbox"/>												
Does not Apply <input checked="" type="checkbox"/>													
Final Category	(choose the "highest" category from above)												
<div style="border: 1px solid black; display: inline-block; padding: 5px;">III</div>													

Check the appropriate type and class of wetland being rated.

Wetland Type	
Estuarine	<input type="checkbox"/>
Natural Heritage Wetland	<input type="checkbox"/>
Bog	<input type="checkbox"/>
Mature Forest	<input type="checkbox"/>
Old Growth Forest	<input type="checkbox"/>
Coastal Lagoon	<input type="checkbox"/>
Interdunal	<input type="checkbox"/>
None of the above	<input checked="" type="checkbox"/>

Wetland Class	
Depressional	<input type="checkbox"/>
Riverine	<input type="checkbox"/>
Lake-fringe	<input type="checkbox"/>
Slope	<input checked="" type="checkbox"/>
Flats	<input type="checkbox"/>
Freshwater Tidal	<input type="checkbox"/>
Check if multiple HGM classes are present	<input type="checkbox"/>

Comments:

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below, you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Special Protection (in addition to the protection recommended for its category)		YES	NO
SP1.	<i>Has the wetland unit been documented as a habitat for any federally listed Threatened or Endangered (T/E) plant or animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP2.	<i>Has the wetland unit been documented as habitat for any state listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP3.	<i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP4.	<i>Does the wetland unit have a local significance in addition to its functions? For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

To complete the next part of the data sheet, you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, indentify which hydrologic criteria in questions 1-7 apply and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e., except during floods)?

NO - go to 2 YES - the wetland class is **Tidal Fringe**

If YES, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

YES - **Freshwater Tidal Fringe** NO - **Saltwater Tidal Fringe (Estuarine)**

If your wetland can be classified as a Freshwater Tidal Fringe, use the forms for Riverine wetlands. If it is Saltwater Tidal Fringe, it is rated as an Estuarine wetland. Wetlands that were called estuarine in the first and second editions of the rating system are called Saltwater Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is being kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p. xx).

2. The entire wetland unit is flat and precipitation is only source (>90%) of water to it. Groundwater and surface

NO - go to 3 YES - the wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) where at least 20 acres (8 ha) are permanently inundated (ponded or flooded);

At least 30% of the open water area is deeper than 6.6 feet (2 m)?

NO - go to 4 YES - the wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*).

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**.

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 feet in diameter and less than 1 foot deep).

NO - go to 5 YES - the wetland class is **Slope**

5. Does the entire wetland unit meet all of the following criteria?
- The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river.
 - The overbank flooding occurs once every two years.
 - NO - go to 6 YES - the wetland class is **Riverine**
6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year? *This means that any outlet, if present, is higher than the interior of the wetland.*
- NO - go to 7 YES - the wetland class is **Depressional**
7. Is the entire wetland unit located in a very flat area with no obvious depression and no stream or river running through it and providing water? The unit seems to be maintained by higher ground water in the area. The wetland may be ditched, but has no obvious natural outlet.
- NO - go to 8 YES - the wetland class is **Depressional**
8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide.) Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. **NOTE:** Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the second class is less than 10% of the unit, classify the wetland using the class that represents more than 90% of the total area.

HGM Classes Within a Delineated Wetland Boundary	Class to Use in Rating	
Slope + Riverine	Riverine	<input type="checkbox"/>
Slope + Depressional	Depressional	<input type="checkbox"/>
Slope + Lake-fringe	Lake-fringe	<input type="checkbox"/>
Depressional + Riverine along stream within boundary	Depressional	<input type="checkbox"/>
Depressional + Lake-fringe	Depressional	<input type="checkbox"/>
Saltwater Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics	<input type="checkbox"/>

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

S Slope Wetlands		
HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding and stream erosion.		
S 3. Does wetland unit have the <u>potential</u> to reduce flooding/erosion? (see p. 68)		Points
<p>S 3.1 Characteristics of vegetation that reduce the velocity of surface flows during storms. <i>Choose the points appropriate for the description that best fits the vegetation in the wetland. Dense vegetation means you have trouble seeing the soil surface (>75% cover), and uncut means not grazed or mowed and plants are higher than 6 inches.</i></p> <p><input type="checkbox"/> Dense, uncut, rigid vegetation covers >90% of wetland area Points = 6</p> <p><input type="checkbox"/> Dense, uncut, rigid vegetation covers >1/2 of wetland area Points = 3</p> <p><input type="checkbox"/> Dense, uncut, rigid vegetation covers >1/4 of wetland area Points = 1</p> <p><input type="checkbox"/> More than 3/4 of area is grazed, mowed, tilled, or vegetation is not rigid Points = 0</p>		3
<p>S 3.2 Characteristics of the slope wetland that holds back small amounts of flood flows: <i>the slope wetland has small surface depressions that can retain water over at least 10% of its area</i></p> <p>YES = 2 points NO = 0 points</p>		2
<i>Record the points from the boxes above</i>		5
S 4. Does wetland unit have the opportunity to reduce flooding and erosion? (see p. 70)		
<p>Is the wetland in a landscape position where the reduction in water velocity it provides help to protect downstream property and aquatic resources from flooding or excessive and/or erosive flows? <i>Note which of the following conditions apply.</i></p> <p><input checked="" type="checkbox"/> Wetland has surface runoff that drains to a river or stream that has flooding problems</p> <p><input type="checkbox"/> Other: _____</p>		Multiplier
YES - multiplier is 2	NO - multiplier is 1	2
TOTAL - Hydrologic Functions		10
Multiply the score from S 3. by S 4. <i>Add score to table on p. 1</i>		

<i>These questions apply to wetlands of all HGM classes</i>										
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat.										
H 1.	Does the wetland unit have the <u>potential</u> to provide habitat for many species?	Points								
H 1.1	<p><u>Vegetation structure</u> (<i>see p. 72</i>)</p> <p>Check the types of vegetation classes present (as defined by Cowardin). Size threshold for class is 1/4 acre or more than 10% of the areaf unit is smaller than 2.5 acres.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Aquatic bed <input type="checkbox"/> Emergent plants <input checked="" type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input checked="" type="checkbox"/> Forested (areas where trees have >30% cover) <p>If the unit has a forested class, check if:</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon. <p>Add the number of vegetation types that qualify. If you have:</p> <table style="margin-left: auto; margin-right: 0;"> <tr> <td>4 structures or more</td> <td>Points = 4</td> </tr> <tr> <td>3 structures</td> <td>Points = 2</td> </tr> <tr> <td>2 structures</td> <td>Points = 1</td> </tr> <tr> <td>1 structure</td> <td>Points = 0</td> </tr> </table>	4 structures or more	Points = 4	3 structures	Points = 2	2 structures	Points = 1	1 structure	Points = 0	2
4 structures or more	Points = 4									
3 structures	Points = 2									
2 structures	Points = 1									
1 structure	Points = 0									
Map of Cowardin vegetation classes		Figure __								
H 1.2	<p><u>Hydroperiods</u> (<i>see p. 73</i>)</p> <p>Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland if less than 2.5 acres in size or 1/4 acre to count (<i>see text for descriptions of hydroperiods</i>).</p> <ul style="list-style-type: none"> <input type="checkbox"/> Permanently flooded or inundated 4 or more types present Points = 3 <input checked="" type="checkbox"/> Seasonally flooded or inundated 3 types present Points = 2 <input type="checkbox"/> Occasionally flooded or inundated 2 types present Points = 1 <input checked="" type="checkbox"/> Saturated only 1 type present Points = 0 <input checked="" type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland <input type="checkbox"/> Seasonally flowing stream in, or adjacent to, the wetland <input type="checkbox"/> Lake-fringe wetland = 2 points <input type="checkbox"/> Freshwater tidal wetland = 2 points 	2								
Map of hydroperiods		Figure __								
H 1.3	<p><u>Richness of Plant Species</u> (<i>see p. 75</i>)</p> <p>Count the number of plant species in the wetland that cover at least 10 sq. ft. (<i>different patches of the same species can be combined to meet the size threshold</i>). You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle.</p> <p style="text-align: right;">If you counted:</p> <table style="margin-left: auto; margin-right: 0;"> <tr> <td>>19 species</td> <td>Points = 2</td> </tr> <tr> <td>5-19 species</td> <td>Points = 1</td> </tr> <tr> <td><5 species</td> <td>Points = 0</td> </tr> </table> <p>List species below if you want to:</p>	>19 species	Points = 2	5-19 species	Points = 1	<5 species	Points = 0	1		
>19 species	Points = 2									
5-19 species	Points = 1									
<5 species	Points = 0									

Total for page 5

H 1.4	<p>Interspersion of Habitats (see p. 76) Decide from the diagrams below whether interspersions between Cowardin vegetation classes (described in H 1.1) or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.</p> <p>None = 0 points Low = 1 point Moderate = 2 points</p> <p>High = 3 points</p> <p>[riparian braided channels]</p> <p>NOTE: If you have four or more vegetation types or three vegetation types and open water, the rating is always "high". Use map of Cowardin vegetation classes.</p>	Points
H 1.5	<p>Special Habitat Features (see p. 77) Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Large, downed, woody debris within the wetland (>4 inches in diameter and 6 feet long). <input checked="" type="checkbox"/> Standing snags (diameter at the bottom >4 inches) in the wetland. <input checked="" type="checkbox"/> Undercut banks are present for at least 6.6 feet (2 m) and/or overhanging vegetation extends at least 3.3 feet (1 m) over a stream (or ditch) in or contiguous with the wetland, for at least 33 feet (10 m). <input checked="" type="checkbox"/> Stable steep banks of fine material that might be used by beaver/muskrat for denning (>30° slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet turned brown/gray</i>). <input type="checkbox"/> At least 1/4 acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>). <input type="checkbox"/> Invasive plants cover less than 25% of the wetland area in each stratum of plants. 	4
<p>Note: The 20% stated in early printings of the manual on page 78 is an error.</p>		
<p>H 1. TOTAL Score - potential for providing habitat Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5</p>		10
<p>Comments:</p>		

H 2.3 <u>Near or Adjacent to Other Priority Habitats Listed by WDFW (see p. 82)</u>	Points
<p>Which of the following priority habitats are within 330 feet (100 m) of the wetland unit? <i>NOTE: the connections do not have to be relatively undisturbed. These are DFW definitions. Check with your local DFW biologist if there are any questions</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Aspen stands: Pure or mixed stands of aspen >0.4 ha (1 acre). <input type="checkbox"/> Biodiversity Areas and Corridors: Areas of habitat that are relatively important to <input type="checkbox"/> Herbaceous Balds: Variable size patches of grass and forbs on shallow soils over <input type="checkbox"/> Old-growth/Mature forests: (Old growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8/acre) >81 cm (32 in) dbh or > 200 years of age. (Mature forests) S <input type="checkbox"/> Oregon white Oak: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is 25% (<i>full descriptions in WDFW PHS report p. 158</i>). <input checked="" type="checkbox"/> Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each <input type="checkbox"/> Westside Prairies: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (<i>full descriptions in WDFW PHS report p. 161</i>). <input checked="" type="checkbox"/> Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream <input type="checkbox"/> Nearshore: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coastal Nearshore, and Puget Sound Nearshore. (<i>full descriptions</i> <input type="checkbox"/> Caves: Naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. <input type="checkbox"/> Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5,000 ft. <input type="checkbox"/> Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. <input checked="" type="checkbox"/> Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. <p>If wetland has: 3+ priority habitats = 4 points 1 priority habitat = 1 point 2 priority habitats = 3 points No habitats = 0 points</p> <p>Note: all vegetated wetlands are by definition a priority habitat but are not included in this list.</p>	<p>4</p>

Nearby wetlands are addressed in question H 2.4		
Choose the one description of the landscape around the wetland that best fits. There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing between wetlands) Points = 5		
<input checked="" type="checkbox"/>	OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development). Points = 5	
<input type="checkbox"/>	The wetland is Lake-fringe on a lake with little disturbance and there are 3 other Lake-fringe wetlands within 1/2 mile. Points = 5	5
<input type="checkbox"/>	There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed. Points = 3	
<input type="checkbox"/>	The wetland is Lake-fringe on a lake with disturbance, and there are 3 other Lake-fringe wetlands within 1/2 mile. Points = 3	
<input type="checkbox"/>	There is at least 1 wetland within 1/2 mile. Points = 2	
<input type="checkbox"/>	There are no wetlands within 1/2 mile. Points = 0	
H 2. TOTAL Score - opportunity for providing habitat <i>Add the scores from H2.1, H2.2, H2.3, H2.4</i>		13
Total Score for Habitat Functions - add the points for H1 and H2, and record the result on p. 1		23

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and choose the appropriate answers and Category.

Wetland Type <i>Check off any criteria that apply to the wetland. Check the appropriate Category when the appropriate criteria are met.</i>	Category
<p>SC 1.0 Estuarine Wetlands (see p. 86)</p> <p>Does the wetland unit meet the following criteria for Estuarine wetlands?</p> <p> <input type="checkbox"/> The dominant water regime is tidal, <input type="checkbox"/> Vegetated, and <input type="checkbox"/> With a salinity greater than 0.5 ppt. <input type="checkbox"/> YES = <i>Go to SC 1.1</i> <input checked="" type="checkbox"/> NO - not an estuarine wetland </p>	
<p>SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park, or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?</p> <p> <input type="checkbox"/> YES = Category I <input type="checkbox"/> NO = <i>Go to SC 1.2</i> </p>	
<p>SC 1.2 Is the wetland unit at least 1 acre in size and meeting at least two of the following three conditions?</p> <p> <input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has <10% cover of non-native plant species. If the non-native <i>Spartina</i> spp. are the only species that cover >10% of the wetland, then the wetland should be given a dual rating (I/II). The area of <i>Spartina</i> would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of <i>Spartina</i> in determining the size threshold of 1 acre. <input type="checkbox"/> At least 3/4 of the landward edge of the wetland has a 100 foot buffer of shrub, forest, or ungrazed or unmowed grassland. <input type="checkbox"/> The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. <input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not an estuarine wetland </p>	

SC 2.0 Natural Heritage Wetlands (<i>see p. 87</i>)	Category
<p>Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.</p> <p>SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? (This question is used to screen out most sites before you need to contact WNHP/DNR.)</p> <p>S/T/R information from Appendix D <input checked="" type="checkbox"/> or accessed from WNHP/DNR web site <input type="checkbox"/></p> <p><input type="checkbox"/> YES - contact WNHP/DNR (<i>see p. 79</i>) and <i>go to SC 3.2</i> <input checked="" type="checkbox"/> NO</p> <p>SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as a site with state Threatened or Endangered plant species?</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a Heritage wetland</p>	
<p>SC 3.0 Bogs (<i>see p. 87</i>)</p> <p>Does the wetland unit (or any part of the unit) meet both the criteria for soils and vegetations in bogs? <i>Use the key below to identify if the wetland is a bog. If you answer Yes, you will still need to rate the wetland based on its function.</i></p> <ol style="list-style-type: none"> Does the unit have organic soil horizons (i.e., layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils.) <p><input type="checkbox"/> YES - <i>go to Q. 3</i> <input checked="" type="checkbox"/> NO - <i>go to Q. 2</i></p> <ol style="list-style-type: none"> Does the unit have organic soils, either peats or mucks, that are <16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? <p><input type="checkbox"/> YES - <i>go to Q. 3</i> <input checked="" type="checkbox"/> NO - not a bog for purpose of rating</p> <ol style="list-style-type: none"> Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (>30% of total shrub and herbaceous cover consists of species in Table 3)? <p><input type="checkbox"/> YES - is a bog for purpose of rating <input type="checkbox"/> NO - <i>go to Q. 4</i></p> <p>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog.</p> <ol style="list-style-type: none"> Is the unit forested (>30% cover) with sitka spruce, subalpine fir, western redcedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on bog species plant list in Table 3 as a significant component of the ground cover (>30% coverage of total shrub/herbaceous cover)? <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a bog for purpose of rating</p>	

SC 4.0 Forested Wetlands (see p. 90)	Category
<p>Does the wetland unit have at least 1 acre of forest that meets one of these criteria for the Department of Fish and Wildlife's forests as priority habitat? <i>If you answer Yes, you will still need to rate the wetland based on its functions.</i></p> <p><input type="checkbox"/> Old-growth forests: (west of Cascade Crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more.</p> <p style="padding-left: 40px;">NOTE: The criterion for dbh is based on measurements for upland forests. 200-year-old trees in wetlands will often have a smaller dbh because their growth rates are often smaller. The DFW criterion is an "OR" so old-growth forests do not necessarily have to have trees of this diameter.</p> <p><input type="checkbox"/> Mature forests: (west of the Cascade Crest) Stands where the largest trees are 80 - 200 years old OR have average diameters (dbh) exceeding 21 inches (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a forested wetland w/ special characteristics</p>	
<p>SC 5.0 Wetlands in Coastal Lagoons (see p. 91)</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <p>The wetland lies in a depression adjacent to marine waters that is wholly or partially</p> <p><input type="checkbox"/> separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks.</p> <p><input type="checkbox"/> The lagoon in which the wetland is located contains surface water that is saline or brackish (>.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>).</p> <p><input type="checkbox"/> YES = go to SC 5.1 <input checked="" type="checkbox"/> NO - not a wetland in a coastal lagoon</p> <p>SC 5.1 Does the wetland meet all of the following 3 conditions?</p> <p>The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74).</p> <p><input type="checkbox"/> At least 3/4 of the landward edge of the wetland has a 100 foot buffer of shrub, forest, or ungrazed or unmowed grassland.</p> <p><input type="checkbox"/> The wetland is larger than 1/10 acre (4,350 square feet).</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a wetland in a coastal lagoon</p>	

Wetland name or number: E

WETLAND RATING FORM - WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): _____ Date of site visit: 1/24/10

Rated by Wozniak Trained by Ecology? Yes No Date: 4/1/05

SEC: 14 TOWNSHIP: 24N RANGE: 5E Is S/T/R in Appendix D? Yes No

Map of wetland unit: Figure 4 Estimated size: _____

SUMMARY OF RATING													
Category based on FUNCTIONS provided by wetland													
I <input type="checkbox"/>	II <input type="checkbox"/>												
III <input checked="" type="checkbox"/>	IV <input type="checkbox"/>												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Category I = Score >=70</td> </tr> <tr> <td>Category II = Score 51-69</td> </tr> <tr> <td>Category III = Score 30-50</td> </tr> <tr> <td>Category IV = Score <30</td> </tr> </table>	Category I = Score >=70	Category II = Score 51-69	Category III = Score 30-50	Category IV = Score <30	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Score for Water Quality Functions</td> <td style="text-align: right;">16</td> </tr> <tr> <td>Score for Hydrologic Functions</td> <td style="text-align: right;">16</td> </tr> <tr> <td>Score for Habitat Functions</td> <td style="text-align: right;">15</td> </tr> <tr> <td>TOTAL score for functions</td> <td style="text-align: right;">47</td> </tr> </table>	Score for Water Quality Functions	16	Score for Hydrologic Functions	16	Score for Habitat Functions	15	TOTAL score for functions	47
Category I = Score >=70													
Category II = Score 51-69													
Category III = Score 30-50													
Category IV = Score <30													
Score for Water Quality Functions	16												
Score for Hydrologic Functions	16												
Score for Habitat Functions	15												
TOTAL score for functions	47												
Category based on SPECIAL CHARACTERISTICS of wetland													
I <input type="checkbox"/>	II <input type="checkbox"/>												
Does not Apply <input checked="" type="checkbox"/>													
Final Category	(choose the "highest" category from above)												
<div style="border: 1px solid black; display: inline-block; padding: 5px;">III</div>													

Check the appropriate type and class of wetland being rated.

Wetland Type	
Estuarine	<input type="checkbox"/>
Natural Heritage Wetland	<input type="checkbox"/>
Bog	<input type="checkbox"/>
Mature Forest	<input type="checkbox"/>
Old Growth Forest	<input type="checkbox"/>
Coastal Lagoon	<input type="checkbox"/>
Interdunal	<input type="checkbox"/>
None of the above	<input checked="" type="checkbox"/>

Wetland Class	
Depressional	<input type="checkbox"/>
Riverine	<input checked="" type="checkbox"/>
Lake-fringe	<input type="checkbox"/>
Slope	<input type="checkbox"/>
Flats	<input type="checkbox"/>
Freshwater Tidal	<input type="checkbox"/>
Check if multiple HGM classes are present	<input type="checkbox"/>

Comments:

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below, you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Special Protection (in addition to the protection recommended for its category)		YES	NO
SP1.	<i>Has the wetland unit been documented as a habitat for any federally listed Threatened or Endangered (T/E) plant or animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP2.	<i>Has the wetland unit been documented as habitat for any state listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP3.	<i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP4.	<i>Does the wetland unit have a local significance in addition to its functions? For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

To complete the next part of the data sheet, you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, indentify which hydrologic criteria in questions 1-7 apply and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e., except during floods)?

NO - go to 2 YES - the wetland class is **Tidal Fringe**

If YES, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

YES - **Freshwater Tidal Fringe** NO - **Saltwater Tidal Fringe (Estuarine)**

If your wetland can be classified as a Freshwater Tidal Fringe, use the forms for Riverine wetlands. If it is Saltwater Tidal Fringe, it is rated as an Estuarine wetland. Wetlands that were called estuarine in the first and second editions of the rating system are called Saltwater Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is being kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p. xx).

2. The entire wetland unit is flat and precipitation is only source (>90%) of water to it. Groundwater and surface

NO - go to 3 YES - the wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) where at least 20 acres (8 ha) are permanently inundated (ponded or flooded);

At least 30% of the open water area is deeper than 6.6 feet (2 m)?

NO - go to 4 YES - the wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*).

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**.

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 feet in diameter and less than 1 foot deep).

NO - go to 5 YES - the wetland class is **Slope**

5. Does the entire wetland unit **meet all** of the following criteria?

- The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river.
- The overbank flooding occurs once every two years.
- NO - go to 6 YES - the wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

- NO - go to 7 YES - the wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no stream or river running through it and providing water? The wetland seems to be maintained by higher ground water in the area. The wetland may be ditched, but has no obvious natural outlet.

- NO - go to 8 YES - the wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide.) Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. **NOTE:** Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the second class is less than 10% of the unit, classify the wetland using the class that represents more than 90% of the total area.

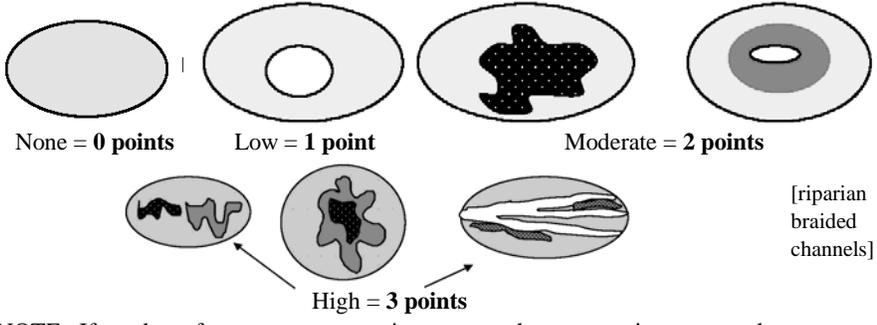
<i>HGM Classes Within a Delineated Wetland Boundary</i>	<i>Class to Use in Rating</i>	
Slope + Riverine	Riverine	<input type="checkbox"/>
Slope + Depressional	Depressional	<input type="checkbox"/>
Slope + Lake-fringe	Lake-fringe	<input type="checkbox"/>
Depressional + Riverine along stream within boundary	Depressional	<input type="checkbox"/>
Depressional + Lake-fringe	Depressional	<input type="checkbox"/>
Saltwater Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics	<input type="checkbox"/>

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

R Riverine and Freshwater Tidal Fringe Wetlands		
HYDROLOGIC FUNCTIONS - Indicators that wetland functions to reduce flooding/stream erosion.		
R 3. Does the wetland unit have the <u>potential</u> to reduce flooding/erosion? (see p. 54)	Points	
R 3.1 Characteristics of the overbank storage the unit provides: <i>Estimate the average width of the wetland unit perpendicular to the direction of the flow and the width of the stream or river channel (distance between banks). Calculate the ratio: (average width of unit)/(average width of stream between banks).</i>		
<input type="checkbox"/> If the ratio is more than 20	Points = 9	1
<input type="checkbox"/> If the ratio is between 10 - 20	Points = 6	
<input type="checkbox"/> If the ratio is 5 - <10	Points = 4	
<input type="checkbox"/> If the ratio is 1 - <5	Points = 2	
<input checked="" type="checkbox"/> If the ratio is <1	Points = 1	
Aerial photo or map showing average widths		Figure __
R 3.2 Characteristics of vegetation that slow down water velocities during floods: <i>Treat large woody debris as "forest or shrub". Choose points appropriate for the best description (polygons need to have >90% cover at person height NOT Cowardin classes).</i>		
<input checked="" type="checkbox"/> Forest or shrub for >1/3 area OR herbaceous plants >2/3 area	Points = 7	7
<input type="checkbox"/> Forest or shrub for >1/10 area OR herbaceous plants >1/3 area	Points = 4	
<input type="checkbox"/> Vegetation does not meet above criteria	Points = 0	
Aerial photo or map shoing polygons of different vegetation types		Figure __
Total for R 3	<i>Add the points in the boxes above</i>	8
R 4. Does the wetland unit have the opportunity to reduce flooding/erosion? (see p.57)		
Answer YES if the unit is in a location in the watershed where the flood storage, or reduction in water velocity, helps protect downstream property and aquatic resources from flooding or excessive and/or erosive flows.		
<u>Note which of the following indicators of opportunity apply:</u>		
<input checked="" type="checkbox"/> There are human structures and activities downstream (roads, buildings, bridges, farms) that can be damaged by flooding		Multiplier
<input checked="" type="checkbox"/> There are natural resources downstream (e.g. salmon redds) that can be damaged by flooding		
<input type="checkbox"/> Other: _____		
Answer NO if the major source of water to the wetland is controlled by a reservoir or the wetland is tidal fringe along the sides of a dike.		2
YES - multiplier is 2	NO - multiplier is 1	
TOTAL - Hydrologic Functions	Multiply the score from R 3. by R 4. <i>Add score to table on p. 1</i>	16

<i>These questions apply to wetlands of all HGM classes</i>									
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat.									
H 1. Does the wetland unit have the <u>potential</u> to provide habitat for many species?	Points								
<p>H 1.1 <u>Vegetation structure</u> (<i>see p. 72</i>)</p> <p><i>Check the types of vegetation classes present (as defined by Cowardin). Size threshold for class is 1/4 acre or more than 10% of the area if unit is smaller than 2.5 acres.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Aquatic bed <input checked="" type="checkbox"/> Emergent plants <input type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input type="checkbox"/> Forested (areas where trees have >30% cover) <p><i>If the unit has a forested class, check if:</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon. <p><i>Add the number of vegetation types that qualify. If you have:</i></p> <table style="margin-left: auto; margin-right: 0;"> <tr><td>4 structures or more</td><td>Points = 4</td></tr> <tr><td>3 structures</td><td>Points = 2</td></tr> <tr><td>2 structures</td><td>Points = 1</td></tr> <tr><td>1 structure</td><td>Points = 0</td></tr> </table>	4 structures or more	Points = 4	3 structures	Points = 2	2 structures	Points = 1	1 structure	Points = 0	0
4 structures or more	Points = 4								
3 structures	Points = 2								
2 structures	Points = 1								
1 structure	Points = 0								
Map of Cowardin vegetation classes									
<p>H 1.2 <u>Hydroperiods</u> (<i>see p. 73</i>)</p> <p><i>Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland if less than 2.5 acres in size or 1/4 acre to count (see text for descriptions of hydroperiods).</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Permanently flooded or inundated <input checked="" type="checkbox"/> Seasonally flooded or inundated <input type="checkbox"/> Occasionally flooded or inundated <input type="checkbox"/> Saturated only <input checked="" type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland <input type="checkbox"/> Seasonally flowing stream in, or adjacent to, the wetland <input type="checkbox"/> Lake-fringe wetland = 2 points <input type="checkbox"/> Freshwater tidal wetland = 2 points <table style="margin-left: auto; margin-right: 0;"> <tr><td>4 or more types present</td><td>Points = 3</td></tr> <tr><td>3 types present</td><td>Points = 2</td></tr> <tr><td>2 types present</td><td>Points = 1</td></tr> <tr><td>1 type present</td><td>Points = 0</td></tr> </table>	4 or more types present	Points = 3	3 types present	Points = 2	2 types present	Points = 1	1 type present	Points = 0	1
4 or more types present	Points = 3								
3 types present	Points = 2								
2 types present	Points = 1								
1 type present	Points = 0								
Map of hydroperiods									
<p>H 1.3 <u>Richness of Plant Species</u> (<i>see p. 75</i>)</p> <p><i>Count the number of plant species in the wetland that cover at least 10 sq. ft. (different patches of the same species can be combined to meet the size threshold). You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle.</i></p> <p style="text-align: right;"><i>If you counted:</i></p> <table style="margin-left: auto; margin-right: 0;"> <tr><td>>19 species</td><td>Points = 2</td></tr> <tr><td>5-19 species</td><td>Points = 1</td></tr> <tr><td><5 species</td><td>Points = 0</td></tr> </table> <p><i>List species below if you want to:</i></p>	>19 species	Points = 2	5-19 species	Points = 1	<5 species	Points = 0	0		
>19 species	Points = 2								
5-19 species	Points = 1								
<5 species	Points = 0								

Total for page 1

H 1.4	<p>Interspersion of Habitats (see p. 76) Decide from the diagrams below whether interspersion between Cowardin vegetation classes (described in H 1.1) or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.</p>  <p>None = 0 points Low = 1 point Moderate = 2 points</p> <p>High = 3 points</p> <p>[riparian braided channels]</p> <p>NOTE: If you have four or more vegetation types or three vegetation types and open water, the rating is always "high". Use map of Cowardin classes</p>	<p>Points</p> <p>1</p>
H 1.5	<p>Special Habitat Features (see p. 77) Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Large, downed, woody debris within the wetland (>4 inches in diameter and 6 feet long). <input type="checkbox"/> Standing snags (diameter at the bottom >4 inches) in the wetland. <input type="checkbox"/> Undercut banks are present for at least 6.6 feet (2 m) and/or overhanging vegetation extends at least 3.3 feet (1 m) over a stream (or ditch) in or contiguous with the wetland, for at least 33 feet (10 m). <input type="checkbox"/> Stable steep banks of fine material that might be used by beaver/muskrat for denning (>30° slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet turned brown/gray</i>). <input type="checkbox"/> At least 1/4 acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>). <input type="checkbox"/> Invasive plants cover less than 25% of the wetland area in each stratum of plants. 	<p>0</p>
<p>Note: The 20% stated in early printings of the manual on page 78 is an error.</p>		
<p>H 1. TOTAL Score - potential for providing habitat Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5</p>		<p>2</p>
<p>Comments:</p>		

H 2.3	Near or Adjacent to Other Priority Habitats Listed by WDFW (<i>see p. 82</i>)	Points
	<p>Which of the following priority habitats are within 330 feet (100 m) of the wetland unit? <i>NOTE: the connections do not have to be relatively undisturbed. These are DFW definitions. Check with your local DFW biologist if there are any questions</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Aspen stands: Pure or mixed stands of aspen >0.4 ha (1 acre). <input type="checkbox"/> Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (<i>full descriptions in WDFW PHS report p. 152</i>). <input type="checkbox"/> Herbaceous Balds: Variable size patches of grass and forbs on shallow soils over bedrock. <input type="checkbox"/> Old-growth/Mature forests: (Old growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. (Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less than 100%; decay, decadence, number of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest. <input type="checkbox"/> Oregon white Oak: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is 25% (<i>full descriptions in WDFW PHS report p. 158</i>). <input checked="" type="checkbox"/> Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. <input type="checkbox"/> Westside Prairies: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (<i>full descriptions in WDFW PHS report p. 161</i>). <input checked="" type="checkbox"/> Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. <input type="checkbox"/> Nearshore: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coastal Nearshore, and Puget Sound Nearshore. (<i>full descriptions of habitats and the definition of relatively undisturbed are in WDFW report pp. 167-169 and glossary in Appendix A</i>). <input type="checkbox"/> Caves: Naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. <input type="checkbox"/> Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5,000 ft. <input type="checkbox"/> Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. <input checked="" type="checkbox"/> Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. <p>If wetland has: 3+ priority habitats = 4 points 1 priority habitat = 1 point 2 priority habitats = 3 points No habitats = 0 points</p> <p>Note: all vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4</p>	4

Choose the one description of the landscape around the wetland that best fits.		
<input checked="" type="checkbox"/>	There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development). Points = 5	5
<input type="checkbox"/>	The wetland is Lake-fringe on a lake with little disturbance and there are 3 other Lake-fringe wetlands within 1/2 mile. Points = 5	
<input type="checkbox"/>	There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed. Points = 3	
<input type="checkbox"/>	The wetland is Lake-fringe on a lake with disturbance, and there are 3 other Lake-fringe wetlands within 1/2 mile. Points = 3	
<input type="checkbox"/>	There is at least 1 wetland within 1/2 mile. Points = 2	
<input type="checkbox"/>	There are no wetlands within 1/2 mile. Points = 0	
H 2. TOTAL Score - opportunity for providing habitat <i>Add the scores from H2.1, H2.2, H2.3, H2.4</i>		13
Total Score for Habitat Functions - add the points for H1 and H2, and record the result on p. 1		15

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and choose the appropriate answers and Category.

Wetland Type <i>Check off any criteria that apply to the wetland. Check the appropriate Category when the appropriate criteria are met.</i>	Category
<p>SC 1.0 Estuarine Wetlands (see p. 86)</p> <p>Does the wetland unit meet the following criteria for Estuarine wetlands?</p> <p> <input type="checkbox"/> The dominant water regime is tidal, <input type="checkbox"/> Vegetated, and <input type="checkbox"/> With a salinity greater than 0.5 ppt. <input type="checkbox"/> YES - Go to SC 1.1 <input checked="" type="checkbox"/> NO - not an estuarine wetland </p>	
<p>SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park, or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?</p> <p> <input type="checkbox"/> YES = Category I <input type="checkbox"/> NO = Go to SC 1.2 </p>	
<p>SC 1.2 Is the wetland unit at least 1 acre in size and meeting at least two of the following three conditions?</p> <p> <input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has <10% cover of non-native plant species. If the non-native <i>Spartina</i> spp. are the only species that cover >10% of the wetland, then the wetland should be given a dual rating (I/II). The area of <i>Spartina</i> would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of <i>Spartina</i> in determining the size threshold of 1 acre. <input type="checkbox"/> At least 3/4 of the landward edge of the wetland has a 100 foot buffer of shrub, forest, or ungrazed or unmowed grassland. <input type="checkbox"/> The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. <input type="checkbox"/> YES = Category I <input type="checkbox"/> NO = Category II </p>	

SC 2.0 Natural Heritage Wetlands (<i>see p. 87</i>)	Category
<p>Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.</p> <p>SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? (This question is used to screen out most sites before you need to contact WNHP/DNR.)</p> <p>S/T/R information from Appendix D <input checked="" type="checkbox"/> or accessed from WNHP/DNR web site <input type="checkbox"/></p> <p><input type="checkbox"/> YES - contact WNHP/DNR (<i>see p. 79</i>) and <i>go to SC 3.2</i> <input checked="" type="checkbox"/> NO</p> <p>SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as a site with state Threatened or Endangered plant species?</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a Heritage wetland</p>	
<p>SC 3.0 Bogs (<i>see p. 87</i>)</p> <p>Does the wetland unit (or any part of the unit) meet both the criteria for soils and vegetations in bogs? <i>Use the key below to identify if the wetland is a bog. If you answer Yes, you will still need to rate the wetland based on its function.</i></p> <ol style="list-style-type: none"> Does the unit have organic soil horizons (i.e., layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils.) <p><input type="checkbox"/> YES - <i>go to Q. 3</i> <input type="checkbox"/> NO - <i>go to Q. 2</i></p> <ol style="list-style-type: none"> Does the unit have organic soils, either peats or mucks, that are <16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? <p><input type="checkbox"/> YES - <i>go to Q. 3</i> <input checked="" type="checkbox"/> NO - not a bog for purpose of rating</p> <ol style="list-style-type: none"> Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (>30% of total shrub and herbaceous cover consists of species in Table 3)? <p><input type="checkbox"/> YES - is a bog for purpose of rating <input type="checkbox"/> NO - <i>go to Q. 4</i></p> <p>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog.</p> <ol style="list-style-type: none"> Is the unit forested (>30% cover) with sitka spruce, subalpine fir, western redcedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on bog species plant list in Table 3 as a significant component of the ground cover (>30% coverage of total shrub/herbaceous cover)? <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a bog for purpose of rating</p>	

SC 4.0 Forested Wetlands (see p. 90)	Category
<p>Does the wetland unit have at least 1 acre of forest that meets one of these criteria for the Department of Fish and Wildlife's forests as priority habitat? <i>If you answer Yes, you will still need to rate the wetland based on its functions.</i></p> <p><input type="checkbox"/> Old-growth forests: (west of Cascade Crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more.</p> <p style="padding-left: 40px;">NOTE: The criterion for dbh is based on measurements for upland forests. 200-year-old trees in wetlands will often have a smaller dbh because their growth rates are often smaller. The DFW criterion is an "OR" so old-growth forests do not necessarily have to have trees of this diameter.</p> <p><input type="checkbox"/> Mature forests: (west of the Cascade Crest) Stands where the largest trees are 80 - 200 years old OR have average diameters (dbh) exceeding 21 inches (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a forested wetland w/ special characteristics</p>	
<p>SC 5.0 Wetlands in Coastal Lagoons (see p. 91)</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <p>The wetland lies in a depression adjacent to marine waters that is wholly or partially</p> <p><input type="checkbox"/> separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks.</p> <p><input type="checkbox"/> The lagoon in which the wetland is located contains surface water that is saline or brackish (>.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>).</p> <p><input type="checkbox"/> YES = go to SC 5.1 <input checked="" type="checkbox"/> NO - not a wetland in a coastal lagoon</p> <p>SC 5.1 Does the wetland meet all of the following 3 conditions?</p> <p>The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74).</p> <p><input type="checkbox"/> At least 3/4 of the landward edge of the wetland has a 100 foot buffer of shrub, forest, or ungrazed or unmowed grassland.</p> <p><input type="checkbox"/> The wetland is larger than 1/10 acre (4,350 square feet).</p> <p><input type="checkbox"/> YES = Category I <input type="checkbox"/> NO = Category II</p>	

Wetland name or number: F

WETLAND RATING FORM - WESTERN WASHINGTON

Version 2 - Updated July 2006 to increase accuracy and reproducibility among users

Updated Oct. 2008 with the new WDFW definitions for priority habitats

Name of wetland (if known): _____ Date of site visit: 1/24/10

Rated by Wozniak Trained by Ecology? Yes No Date: 4/1/05

SEC: 14 TOWNSHIP: 24N RANGE: 5E Is S/T/R in Appendix D? Yes No

Map of wetland unit: Figure 4 Estimated size: _____

SUMMARY OF RATING													
Category based on FUNCTIONS provided by wetland													
I <input type="checkbox"/>	II <input checked="" type="checkbox"/>												
III <input type="checkbox"/>	IV <input type="checkbox"/>												
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Category I = Score >=70</td> </tr> <tr> <td>Category II = Score 51-69</td> </tr> <tr> <td>Category III = Score 30-50</td> </tr> <tr> <td>Category IV = Score <30</td> </tr> </table>	Category I = Score >=70	Category II = Score 51-69	Category III = Score 30-50	Category IV = Score <30	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>Score for Water Quality Functions</td> <td style="text-align: right;">20</td> </tr> <tr> <td>Score for Hydrologic Functions</td> <td style="text-align: right;">18</td> </tr> <tr> <td>Score for Habitat Functions</td> <td style="text-align: right;">19</td> </tr> <tr> <td>TOTAL score for functions</td> <td style="text-align: right;">57</td> </tr> </table>	Score for Water Quality Functions	20	Score for Hydrologic Functions	18	Score for Habitat Functions	19	TOTAL score for functions	57
Category I = Score >=70													
Category II = Score 51-69													
Category III = Score 30-50													
Category IV = Score <30													
Score for Water Quality Functions	20												
Score for Hydrologic Functions	18												
Score for Habitat Functions	19												
TOTAL score for functions	57												
Category based on SPECIAL CHARACTERISTICS of wetland													
I <input type="checkbox"/>	II <input type="checkbox"/>												
Does not Apply <input checked="" type="checkbox"/>													
Final Category	(choose the "highest" category from above)												
<div style="border: 1px solid black; display: inline-block; padding: 5px;">II</div>													

Check the appropriate type and class of wetland being rated.

Wetland Type	
Estuarine	<input type="checkbox"/>
Natural Heritage Wetland	<input type="checkbox"/>
Bog	<input type="checkbox"/>
Mature Forest	<input type="checkbox"/>
Old Growth Forest	<input type="checkbox"/>
Coastal Lagoon	<input type="checkbox"/>
Interdunal	<input type="checkbox"/>
None of the above	<input checked="" type="checkbox"/>

Wetland Class	
Depressional	<input type="checkbox"/>
Riverine	<input checked="" type="checkbox"/>
Lake-fringe	<input type="checkbox"/>
Slope	<input checked="" type="checkbox"/>
Flats	<input type="checkbox"/>
Freshwater Tidal	<input type="checkbox"/>
Check if multiple HGM classes are present	<input checked="" type="checkbox"/>

Comments:

Does the wetland unit being rated meet any of the criteria below?

If you answer YES to any of the questions below, you will need to protect the wetland according to the regulations regarding the special characteristics found in the wetland.

Check List for Wetlands That May Need Special Protection (in addition to the protection recommended for its category)		YES	NO
SP1.	<i>Has the wetland unit been documented as a habitat for any federally listed Threatened or Endangered (T/E) plant or animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state or federal database.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP2.	<i>Has the wetland unit been documented as habitat for any state listed Threatened or Endangered animal species?</i> For the purposes of this rating system, "documented" means the wetland is on the appropriate state database. Note: Wetlands with State listed plant species are categorized as Category I Natural Heritage Wetlands.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP3.	<i>Does the wetland unit contain individuals of Priority species listed by the WDFW for the state?</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
SP4.	<i>Does the wetland unit have a local significance in addition to its functions? For example, the wetland has been identified in the Shoreline Master Program, the Critical Areas Ordinance, or in a local management plan as having special significance.</i>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

To complete the next part of the data sheet, you will need to determine the Hydrogeomorphic Class of the wetland being rated.

The hydrogeomorphic classification groups wetlands into those that function in similar ways. This simplifies the questions needed to answer how well the wetland functions. The Hydrogeomorphic Class of a wetland can be determined using the key below. See p. 24 for more detailed instructions on classifying wetlands.

Classification of Vegetated Wetlands in Western Washington

If the hydrologic criteria listed in each question do not apply to the entire unit being rated, you probably have a unit with multiple HGM classes. In this case, indentify which hydrologic criteria in questions 1-7 apply and go to Question 8.

1. Are the water levels in the entire unit usually controlled by tides (i.e., except during floods)?

NO - go to 2 YES - the wetland class is **Tidal Fringe**

If YES, is the salinity of the water during periods of annual low flow below 0.5 ppt (parts per thousand)?

YES - **Freshwater Tidal Fringe** NO - **Saltwater Tidal Fringe (Estuarine)**

If your wetland can be classified as a Freshwater Tidal Fringe, use the forms for Riverine wetlands. If it is Saltwater Tidal Fringe, it is rated as an Estuarine wetland. Wetlands that were called estuarine in the first and second editions of the rating system are called Saltwater Tidal Fringe in the Hydrogeomorphic Classification. Estuarine wetlands were categorized separately in the earlier editions, and this separation is being kept in this revision. To maintain consistency between editions, the term "Estuarine" wetland is being kept. Please note, however, that the characteristics that define Category I and II estuarine wetlands have changed (see p. xx).

2. The entire wetland unit is flat and precipitation is only source (>90%) of water to it. Groundwater and surface

NO - go to 3 YES - the wetland class is **Flats**

If your wetland can be classified as a "Flats" wetland, use the form for **Depressional** wetlands.

3. Does the entire wetland unit **meet both** of the following criteria?

The vegetated part of the wetland is on the shores of a body of open water (without any vegetation on the surface) where at least 20 acres (8 ha) are permanently inundated (ponded or flooded);

At least 30% of the open water area is deeper than 6.6 feet (2 m)?

NO - go to 4 YES - the wetland class is **Lake-fringe (Lacustrine Fringe)**

4. Does the entire wetland unit **meet all** of the following criteria?

The wetland is on a slope (*slope can be very gradual*).

The water flows through the wetland in one direction (unidirectional) and usually comes from seeps. It may flow subsurface, as sheetflow, or in a swale without distinct banks.

The water leaves the wetland **without being impounded**.

NOTE: Surface water does not pond in these type of wetlands except occasionally in very small and shallow depressions or behind hummocks (depressions are usually <3 feet in diameter and less than 1 foot deep).

NO - go to 5 YES - the wetland class is **Slope**

5. Does the entire wetland unit **meet all** of the following criteria?

- The unit is in a valley, or stream channel, where it gets inundated by overbank flooding from that stream or river.
- The overbank flooding occurs once every two years.
- NO - go to 6 YES - the wetland class is **Riverine**

6. Is the entire wetland unit in a topographic depression in which water ponds, or is saturated to the surface, at some time of the year? *This means that any outlet, if present, is higher than the interior of the wetland.*

- NO - go to 7 YES - the wetland class is **Depressional**

7. Is the entire wetland unit located in a very flat area with no obvious depression and no stream or river running through it and providing water? The wetland seems to be maintained by higher ground water in the area. The wetland may be ditched, but has no obvious natural outlet.

- NO - go to 8 YES - the wetland class is **Depressional**

8. Your wetland unit seems to be difficult to classify and probably contains several different HGM classes. For example, seeps at the base of a slope may grade into a riverine floodplain, or a small stream within a depressional wetland has a zone of flooding along its sides. **GO BACK AND IDENTIFY WHICH OF THE HYDROLOGIC REGIMES DESCRIBED IN QUESTIONS 1-7 APPLY TO DIFFERENT AREAS IN THE UNIT** (make a rough sketch to help you decide.) Use the following table to identify the appropriate class to use for the rating system if you have several HGM classes present within your wetland. **NOTE:** Use this table only if the class that is recommended in the second column represents 10% or more of the total area of the wetland unit being rated. If the area of the second class is less than 10% of the unit, classify the wetland using the class that represents more than 90% of the total area.

<i>HGM Classes Within a Delineated Wetland Boundary</i>	<i>Class to Use in Rating</i>	
Slope + Riverine	Riverine	<input checked="" type="checkbox"/>
Slope + Depressional	Depressional	<input type="checkbox"/>
Slope + Lake-fringe	Lake-fringe	<input type="checkbox"/>
Depressional + Riverine along stream within boundary	Depressional	<input type="checkbox"/>
Depressional + Lake-fringe	Depressional	<input type="checkbox"/>
Saltwater Tidal Fringe and any other class of freshwater wetland	Treat as ESTUARINE under wetlands with special characteristics	<input type="checkbox"/>

If you are unable still to determine which of the above criteria apply to your wetland, or you have more than 2 HGM classes within a wetland boundary, classify the wetland as **Depressional** for the rating.

<i>These questions apply to wetlands of all HGM classes</i>										
HABITAT FUNCTIONS - Indicators that wetland functions to provide important habitat.										
H 1.	Does the wetland unit have the <u>potential</u> to provide habitat for many species?	Points								
H 1.1	<p><u>Vegetation structure</u> (<i>see p. 72</i>)</p> <p><i>Check the types of vegetation classes present (as defined by Cowardin). Size threshold for class is 1/4 acre or more than 10% of the area if unit is smaller than 2.5 acres.</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Aquatic bed <input type="checkbox"/> Emergent plants <input checked="" type="checkbox"/> Scrub/shrub (areas where shrubs have >30% cover) <input checked="" type="checkbox"/> Forested (areas where trees have >30% cover) <p><i>If the unit has a forested class, check if:</i></p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> The forested class has 3 out of 5 strata (canopy, sub-canopy, shrubs, herbaceous, moss/ground-cover) that each cover 20% within the forested polygon. <p><i>Add the number of vegetation types that qualify. If you have:</i></p> <table style="margin-left: auto; margin-right: 0;"> <tr><td>4 structures or more</td><td>Points = 4</td></tr> <tr><td>3 structures</td><td>Points = 2</td></tr> <tr><td>2 structures</td><td>Points = 1</td></tr> <tr><td>1 structure</td><td>Points = 0</td></tr> </table>	4 structures or more	Points = 4	3 structures	Points = 2	2 structures	Points = 1	1 structure	Points = 0	2
4 structures or more	Points = 4									
3 structures	Points = 2									
2 structures	Points = 1									
1 structure	Points = 0									
Map of Cowardin vegetation classes		Figure __								
H 1.2	<p><u>Hydroperiods</u> (<i>see p. 73</i>)</p> <p><i>Check the types of water regimes (hydroperiods) present within the wetland. The water regime has to cover more than 10% of the wetland if less than 2.5 acres in size or 1/4 acre to count (see text for descriptions of hydroperiods).</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Permanently flooded or inundated <input checked="" type="checkbox"/> Seasonally flooded or inundated <input type="checkbox"/> Occasionally flooded or inundated <input checked="" type="checkbox"/> Saturated only <input checked="" type="checkbox"/> Permanently flowing stream or river in, or adjacent to, the wetland <input type="checkbox"/> Seasonally flowing stream in, or adjacent to, the wetland <input type="checkbox"/> Lake-fringe wetland = 2 points <input type="checkbox"/> Freshwater tidal wetland = 2 points <table style="margin-left: auto; margin-right: 0;"> <tr><td>4 or more types present</td><td>Points = 3</td></tr> <tr><td>3 types present</td><td>Points = 2</td></tr> <tr><td>2 types present</td><td>Points = 1</td></tr> <tr><td>1 type present</td><td>Points = 0</td></tr> </table>	4 or more types present	Points = 3	3 types present	Points = 2	2 types present	Points = 1	1 type present	Points = 0	2
4 or more types present	Points = 3									
3 types present	Points = 2									
2 types present	Points = 1									
1 type present	Points = 0									
Map of hydroperiods		Figure __								
H 1.3	<p><u>Richness of Plant Species</u> (<i>see p. 75</i>)</p> <p><i>Count the number of plant species in the wetland that cover at least 10 sq. ft. (different patches of the same species can be combined to meet the size threshold). You do not have to name the species. Do not include Eurasian Milfoil, reed canarygrass, purple loosestrife, Canadian Thistle.</i></p> <p style="text-align: right; margin-right: 20px;"><i>If you counted:</i></p> <table style="margin-left: auto; margin-right: 0;"> <tr><td>>19 species</td><td>Points = 2</td></tr> <tr><td>5-19 species</td><td>Points = 1</td></tr> <tr><td><5 species</td><td>Points = 0</td></tr> </table> <p><i>List species below if you want to:</i></p>	>19 species	Points = 2	5-19 species	Points = 1	<5 species	Points = 0	1		
>19 species	Points = 2									
5-19 species	Points = 1									
<5 species	Points = 0									

Total for page 5

H 1.4	<p>Interspersion of Habitats (see p. 76) Decide from the diagrams below whether interspersions between Cowardin vegetation classes (described in H 1.1) or the classes and unvegetated areas (can include open water or mudflats) is high, medium, low, or none.</p> <p>NOTE: If you have four or more vegetation types or three vegetation types and open water, the rating is always "high". Use map of Cowardin classes</p>	Points
H 1.5	<p>Special Habitat Features (see p. 77) Check the habitat features that are present in the wetland. The number of checks is the number of points you put into the next column.</p> <ul style="list-style-type: none"> <input checked="" type="checkbox"/> Large, downed, woody debris within the wetland (>4 inches in diameter and 6 feet long). <input checked="" type="checkbox"/> Standing snags (diameter at the bottom >4 inches) in the wetland. <input checked="" type="checkbox"/> Undercut banks are present for at least 6.6 feet (2 m) and/or overhanging vegetation extends at least 3.3 feet (1 m) over a stream (or ditch) in or contiguous with the wetland, for at least 33 feet (10 m). <input checked="" type="checkbox"/> Stable steep banks of fine material that might be used by beaver/muskrat for denning (>30° slope) OR signs of recent beaver activity are present (<i>cut shrubs or trees that have not yet turned brown/gray</i>). <input type="checkbox"/> At least 1/4 acre of thin-stemmed persistent vegetation or woody branches are present in areas that are permanently or seasonally inundated (<i>structures for egg-laying by amphibians</i>). <input type="checkbox"/> Invasive plants cover less than 25% of the wetland area in each stratum of plants. <p>Note: The 20% stated in early printings of the manual on page 78 is an error.</p>	4
<p>H 1. TOTAL Score - potential for providing habitat Add the scores from H1.1, H1.2, H1.3, H1.4, H1.5</p>		12
<p>Comments:</p>		

H 2. Does the wetland unit have the opportunity to provide habitat for many species?	Points
<p>H 2.1 <u>Buffers</u> (see p. 80) Choose the description that best represents condition of buffer of wetland unit. The highest scoring criterion that applies to the wetland is to be used in the rating. See text for definition of "undisturbed."</p> <p><input type="checkbox"/> 100 m (330 feet) of relatively undisturbed vegetated areas, rocky areas, or open water >95% of circumference. No structures are within undisturbed part of buffer (<i>relatively undisturbed also means no grazing, no landscaping, no daily human use</i>). Points = 5</p> <p><input type="checkbox"/> 100 m (330 feet) of relatively undisturbed vegetated areas, rocky areas, or open water >50% of circumference. Points = 4</p> <p><input type="checkbox"/> 50 m (170 feet) of relatively undisturbed vegetated areas, rocky areas, or open water >95% circumference. Points = 4</p> <p><input type="checkbox"/> 100 m (330 feet) of relatively undisturbed vegetated areas, rocky areas, or open water for >25% circumference. Points = 3</p> <p><input type="checkbox"/> 50 m (170 feet) of relatively undisturbed vegetated areas, rocky areas, or open water for >50% circumference. Points = 3</p> <p>If buffer does not meet any of the criteria above:</p> <p><input type="checkbox"/> No paved areas (except paved trails) or buildings within 25 m (80 feet) of wetland >95% circumference. Light to moderate grazing, or lawns are OK. Points = 2</p> <p><input type="checkbox"/> No paved areas or buildings within 50 m of wetland for >50% circumference. Light to moderate grazing, or lawns are OK. Points = 2</p> <p><input type="checkbox"/> Heavy grazing in buffer. Points = 1</p> <p><input type="checkbox"/> Vegetated buffers are <2 m wide (6.6 feet) for more than 95% of the circumference (e.g., tilled fields, paving, basalt bedrock extend to edge of wetland). Points = 0</p> <p><input checked="" type="checkbox"/> Buffer does not meet any of the criteria above. Points = 1</p>	1
Aerial photo showing buffers	Figure _____
<p>H 2.2 <u>Corridors and Connections</u> (see p. 81)</p> <p>H 2.2.1 Is the wetland part of a relatively undisturbed/unbroken vegetated corridor (riparian or upland) at least 150 feet wide, has at least 30% cover of shrubs, forest, or native undisturbed prairie, that connects to estuaries, other wetlands, or undisturbed uplands that are at least 250 acres in size? (<i>Dams in riparian corridors, heavily used gravel roads, and paved roads are considered breaks in the corridor.</i>)</p> <p style="text-align: center;">YES = 4 points (go to H 2.3) NO = go to H 2.2.2</p>	2
<p>H 2.2.2 Is the wetland part of a relatively undisturbed/unbroken vegetated corridor (either riparian or upland) at least 50 feet wide, has at least 30% cover of shrubs or forest, and connects to estuaries, other wetlands, or undisturbed uplands that are at least 25 acres in size OR a Lake-fringe wetland, if it does not have an undisturbed corridor as in the question above?</p> <p style="text-align: center;">YES = 2 points (go to H 2.3) NO = go to H 2.2.3</p>	
<p>H 2.2.3 Is the wetland:</p> <p><input type="checkbox"/> within 5 miles (8 km) of a brackish or salt water estuary OR</p> <p><input type="checkbox"/> within 3 miles of a large field or pasture > 40 acres in size OR</p> <p><input type="checkbox"/> within 1 mile of a lake greater than 20 acres in size?</p> <p style="text-align: center;">YES = 1 point NO = 0 points</p>	

Total for page 3

H 2.3	Near or Adjacent to Other Priority Habitats Listed by WDFW (see p. 82)	Points
	<p>Which of the following priority habitats are within 330 feet (100 m) of the wetland unit? <i>NOTE: the connections do not have to be relatively undisturbed. These are DFW definitions. Check with your local DFW biologist if there are any questions</i></p> <ul style="list-style-type: none"> <input type="checkbox"/> Aspen stands: Pure or mixed stands of aspen >0.4 ha (1 acre). <input type="checkbox"/> Biodiversity Areas and Corridors: Areas of habitat that are relatively important to various species of native fish and wildlife (<i>full descriptions in WDFW PHS report p. 152</i>). <input type="checkbox"/> Herbaceous Balds: Variable size patches of grass and forbs on shallow soils over bedrock. <input type="checkbox"/> Old-growth/Mature forests: (Old growth west of Cascade crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 20 trees/ha (8 trees/acre) > 81 cm (32 in) dbh or > 200 years of age. (Mature forests) Stands with average diameters exceeding 53 cm (21 in) dbh; crown cover may be less than 100%; decay, decadence, number of snags, and quantity of large downed material is generally less than that found in old-growth; 80 - 200 years old west of the Cascade crest. <input type="checkbox"/> Oregon white Oak: Woodland stands of pure oak or oak/conifer associations where canopy coverage of the oak component is 25% (<i>full descriptions in WDFW PHS report p. 158</i>). <input checked="" type="checkbox"/> Riparian: The area adjacent to aquatic systems with flowing water that contains elements of both aquatic and terrestrial ecosystems which mutually influence each other. <input type="checkbox"/> Westside Prairies: Herbaceous, non-forested plant communities that can either take the form of a dry prairie or a wet prairie (<i>full descriptions in WDFW PHS report p. 161</i>). <input checked="" type="checkbox"/> Instream: The combination of physical, biological, and chemical processes and conditions that interact to provide functional life history requirements for instream fish and wildlife resources. <input type="checkbox"/> Nearshore: Relatively undisturbed nearshore habitats. These include Coastal Nearshore, Open Coastal Nearshore, and Puget Sound Nearshore. (<i>full descriptions of habitats and the definition of relatively undisturbed are in WDFW report pp. 167-169 and glossary in Appendix A</i>). <input type="checkbox"/> Caves: Naturally occurring cavity, recess, void, or system of interconnected passages under the earth in soils, rock, ice, or other geological formations and is large enough to contain a human. <input type="checkbox"/> Cliffs: Greater than 7.6 m (25 ft) high and occurring below 5,000 ft. <input type="checkbox"/> Talus: Homogenous areas of rock rubble ranging in average size 0.15 - 2.0 m (0.5 - 6.5 ft), composed of basalt, andesite, and/or sedimentary rock, including riprap slides and mine tailings. May be associated with cliffs. <input checked="" type="checkbox"/> Snags and Logs: Trees are considered snags if they are dead or dying and exhibit sufficient decay characteristics to enable cavity excavation/use by wildlife. Priority snags have a diameter at breast height of > 51 cm (20 in) in western Washington and are > 2 m (6.5 ft) in height. Priority logs are > 30 cm (12 in) in diameter at the largest end, and > 6 m (20 ft) long. <p>If wetland has: 3+ priority habitats = 4 points 1 priority habitat = 1 point 2 priority habitats = 3 points No habitats = 0 points</p> <p>Note: all vegetated wetlands are by definition a priority habitat but are not included in this list. Nearby wetlands are addressed in question H 2.4</p>	4

<p>Choose the one description of the landscape around the wetland that best fits.</p> <p><input type="checkbox"/> There are at least 3 other wetlands within 1/2 mile, and the connections between them are relatively undisturbed (light grazing between wetlands OK, as is lake shore with some boating, but connections should NOT be bisected by paved roads, fill, fields, or other development). Points = 5</p> <p><input type="checkbox"/> The wetland is Lake-fringe on a lake with little disturbance and there are 3 other Lake-fringe wetlands within 1/2 mile. Points = 5</p> <p><input type="checkbox"/> There are at least 3 other wetlands within 1/2 mile, BUT the connections between them are disturbed. Points = 3</p> <p><input type="checkbox"/> The wetland is Lake-fringe on a lake with disturbance, and there are 3 other Lake-fringe wetlands within 1/2 mile. Points = 3</p> <p><input type="checkbox"/> There is at least 1 wetland within 1/2 mile. Points = 2</p> <p><input type="checkbox"/> There are no wetlands within 1/2 mile. Points = 0</p>	
<p>H 2. TOTAL Score - opportunity for providing habitat <i>Add the scores from H2.1, H2.2, H2.3, H2.4</i></p>	7
<p>Total Score for Habitat Functions - add the points for H1 and H2, and record the result on p. 1</p>	19

CATEGORIZATION BASED ON SPECIAL CHARACTERISTICS

Please determine if the wetland meets the attributes described below and choose the appropriate answers and Category.

Wetland Type <i>Check off any criteria that apply to the wetland. Check the appropriate Category when the appropriate criteria are met.</i>	Category
<p>SC 1.0 Estuarine Wetlands (see p. 86)</p> <p>Does the wetland unit meet the following criteria for Estuarine wetlands?</p> <p> <input type="checkbox"/> The dominant water regime is tidal, <input type="checkbox"/> Vegetated, and <input type="checkbox"/> With a salinity greater than 0.5 ppt. <input type="checkbox"/> YES - Go to SC 1.1 <input checked="" type="checkbox"/> NO - not an estuarine wetland </p>	
<p>SC 1.1 Is the wetland unit within a National Wildlife Refuge, National Park, National Estuary Reserve, Natural Area Preserve, State Park, or Educational, Environmental, or Scientific Reserve designated under WAC 332-30-151?</p> <p> <input type="checkbox"/> YES = Category I <input type="checkbox"/> NO = Go to SC 1.2 </p>	
<p>SC 1.2 Is the wetland unit at least 1 acre in size and meeting at least two of the following three conditions?</p> <p> <input type="checkbox"/> The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing, and has <10% cover of non-native plant species. If the non-native <i>Spartina</i> spp. are the only species that cover >10% of the wetland, then the wetland should be given a dual rating (I/II). The area of <i>Spartina</i> would be rated a Category II while the relatively undisturbed upper marsh with native species would be a Category I. Do not, however, exclude the area of <i>Spartina</i> in determining the size threshold of 1 acre. <input type="checkbox"/> At least 3/4 of the landward edge of the wetland has a 100 foot buffer of shrub, forest, or ungrazed or unmowed grassland. <input type="checkbox"/> The wetland has at least two of the following features: tidal channels, depressions with open water, or contiguous freshwater wetlands. <input type="checkbox"/> YES = Category I <input type="checkbox"/> NO = Category II </p>	

SC 2.0 Natural Heritage Wetlands (<i>see p. 87</i>)	Category
<p>Natural Heritage wetlands have been identified by the Washington Natural Heritage Program/DNR as either high quality undisturbed wetlands or wetlands that support state Threatened, Endangered, or Sensitive plant species.</p> <p>SC 2.1 Is the wetland unit being rated in a Section/Township/Range that contains a Natural Heritage wetland? (This question is used to screen out most sites before you need to contact WNHP/DNR.)</p> <p>S/T/R information from Appendix D <input checked="" type="checkbox"/> or accessed from WNHP/DNR web site <input type="checkbox"/></p> <p><input type="checkbox"/> YES - contact WNHP/DNR (<i>see p. 79</i>) and <i>go to SC 3.2</i> <input checked="" type="checkbox"/> NO</p> <p>SC 2.2 Has DNR identified the wetland as a high quality undisturbed wetland or as a site with state Threatened or Endangered plant species?</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a Heritage wetland</p>	
<p>SC 3.0 Bogs (<i>see p. 87</i>)</p> <p>Does the wetland unit (or any part of the unit) meet both the criteria for soils and vegetations in bogs? <i>Use the key below to identify if the wetland is a bog. If you answer Yes, you will still need to rate the wetland based on its function.</i></p> <ol style="list-style-type: none"> Does the unit have organic soil horizons (i.e., layers of organic soil), either peats or mucks, that compose 16 inches or more of the first 32 inches of the soil profile? (See Appendix B for a field key to identify organic soils.) <p><input type="checkbox"/> YES - <i>go to Q. 3</i> <input type="checkbox"/> NO - <i>go to Q. 2</i></p> <ol style="list-style-type: none"> Does the unit have organic soils, either peats or mucks, that are <16 inches deep over bedrock, or an impermeable hardpan such as clay or volcanic ash, or that are floating on a lake or pond? <p><input type="checkbox"/> YES - <i>go to Q. 3</i> <input checked="" type="checkbox"/> NO - not a bog for purpose of rating</p> <ol style="list-style-type: none"> Does the unit have more than 70% cover of mosses at ground level, AND other plants, if present, consist of the "bog" species listed in Table 3 as a significant component of the vegetation (>30% of total shrub and herbaceous cover consists of species in Table 3)? <p><input type="checkbox"/> YES - is a bog for purpose of rating <input type="checkbox"/> NO - <i>go to Q. 4</i></p> <p>NOTE: If you are uncertain about the extent of mosses in the understory you may substitute that criterion by measuring the pH of the water that seeps into a hole dug at least 16" deep. If the pH is less than 5.0 and the "bog" plant species in Table 3 are present, the wetland is a bog.</p> <ol style="list-style-type: none"> Is the unit forested (>30% cover) with sitka spruce, subalpine fir, western redcedar, western hemlock, lodgepole pine, quaking aspen, Englemann's spruce, or western white pine, WITH any of the species (or combination of species) on bog species plant list in Table 3 as a significant component of the ground cover (>30% coverage of total shrub/herbaceous cover)? <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a bog for purpose of rating</p>	

SC 4.0 Forested Wetlands (see p. 90)	Category
<p>Does the wetland unit have at least 1 acre of forest that meets one of these criteria for the Department of Fish and Wildlife's forests as priority habitat? <i>If you answer Yes, you will still need to rate the wetland based on its functions.</i></p> <p><input type="checkbox"/> Old-growth forests: (west of Cascade Crest) Stands of at least 2 tree species, forming a multi-layered canopy with occasional small openings; with at least 8 trees/acre (20/hectare) that are at least 200 years of age OR have a diameter at breast height (dbh) of 32 inches (81 cm) or more.</p> <p style="padding-left: 40px;">NOTE: The criterion for dbh is based on measurements for upland forests. 200-year-old trees in wetlands will often have a smaller dbh because their growth rates are often smaller. The DFW criterion is an "OR" so old-growth forests do not necessarily have to have trees of this diameter.</p> <p><input type="checkbox"/> Mature forests: (west of the Cascade Crest) Stands where the largest trees are 80 - 200 years old OR have average diameters (dbh) exceeding 21 inches (53 cm); crown cover may be less than 100%; decay, decadence, numbers of snags, and quantity of large downed material is generally less than that found in old-growth.</p> <p><input type="checkbox"/> YES = Category I <input checked="" type="checkbox"/> NO - not a forested wetland w/ special characteristics</p>	
<p>SC 5.0 Wetlands in Coastal Lagoons (see p. 91)</p> <p>Does the wetland meet all of the following criteria of a wetland in a coastal lagoon?</p> <p>The wetland lies in a depression adjacent to marine waters that is wholly or partially</p> <p><input type="checkbox"/> separated from marine waters by sandbanks, gravel banks, shingle, or, less frequently, rocks.</p> <p><input type="checkbox"/> The lagoon in which the wetland is located contains surface water that is saline or brackish (>.5 ppt) during most of the year in at least a portion of the lagoon (<i>needs to be measured near the bottom</i>).</p> <p><input type="checkbox"/> YES = go to SC 5.1 <input checked="" type="checkbox"/> NO - not a wetland in a coastal lagoon</p> <p>SC 5.1 Does the wetland meet all of the following 3 conditions?</p> <p>The wetland is relatively undisturbed (has no diking, ditching, filling, cultivation, grazing), and has less than 20% cover of invasive plant species (see list of invasive species on p. 74).</p> <p><input type="checkbox"/> At least 3/4 of the landward edge of the wetland has a 100 foot buffer of shrub, forest, or ungrazed or unmowed grassland.</p> <p><input type="checkbox"/> The wetland is larger than 1/10 acre (4,350 square feet).</p> <p><input type="checkbox"/> YES = Category I <input type="checkbox"/> NO = Category II</p>	

