Water Environment Services Buffer Standards

April 2023

CLACKAMAS
WATER
ENVIRONMENT
SERVICES

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1. Definitions

Words, terms, and acronyms specific to these Standards are defined below.

1.1 Words and Terms

The Water Environment Services (WES) Rules and Regulations (Rules) contains definitions that apply to and are consistent across the Rules and all adopted standards. Unless the context specifically indicates otherwise, the following words and terms, as used in these Buffer Standards, shall have the meanings hereinafter designated:

Applicant. See the WES Rules.

Bankfull Stage. The stage or elevation at which water overflows the natural banks of streams or other waters of the state and begins to inundate the upland. The bankfull stage may be approximated using either the 2-year recurrence interval flood elevation or 1-foot measured vertically above the ordinary mean high-water line.

Created Wetlands. Wetlands developed in an area previously identified as a non-wetland to replace, or mitigate, wetland destruction or displacement. A created wetland shall be regulated and managed the same as an existing wetland.

Constructed Wetlands. Wetlands developed as a water quality or quantity facility, subject to change and maintenance as such. These areas must be clearly defined and separated from naturally occurring or created wetlands.

Contractor. See the WES Rules.

Debris. Discarded human made objects that would not exist in an undeveloped stream corridor or wetland. Debris includes, but is not limited to, tires, vehicles, litter, scrap metal, construction waste, lumber, plastic, yard debris, or styrofoam. Debris does not include objects necessary to a use allowed by Section 709, “Water Quality Resource Area District”, of the Clackamas County Zoning and Development Ordinance, or ornamental and recreational structures. Debris does not include existing natural plant materials or natural plant materials that are left after flooding, downed, or standing dead trees, or trees that have fallen into protected water resources.

Development. See the WES Rules.

Disturb. Anthropogenic changes to the existing physical status of the land, which are made in connection with development.

Drip Line. The outermost edge of a tree’s canopy; when delineating the drip line on the ground, it will appear as an irregularly shaped circle defining the canopy’s perimeter.

Engineer. See the WES Rules.

Enhancement. The process of improving upon the natural functions and/or values of an area or resource that has been degraded by human activity. Enhancement activities may or may not return the site to a pre-disturbance condition but create/recreate beneficial processes and resources that occur naturally.

Erosion. See the WES Rules.

Flood Management Areas. Areas defined by Section 703, “Floodplain Management District”, of the Clackamas County Zoning and Development Ordinance.

Invasive Non-Native Vegetation. Plant species that are listed in the Clackamas Weed List maintained by the Clackamas Soil and Water Conservation District on behalf of Clackamas County.

Intermittent Stream. See the WES Rules.

Landscape Architect. See the WES Rules.

Maintenance. Routine, recurring, and usual work for the preservation, protection and keeping of any facility for its intended purpose.

Mitigation. The reduction of adverse effects of a proposed project by considering, in the following order:

A. Avoiding the impact altogether by not taking a certain action or parts of an action;

B. Minimizing impacts by limiting the degree or magnitude of the action and its implementation;

C. Compensating for the impact by replacing or providing comparable substitute Water Quality Resource Areas.

D. Rectifying the impact by repairing, rehabilitating, or restoring the affected environment.

Native Vegetation. Vegetation native to the Portland metropolitan area provided that it is not invasive non-native or noxious vegetation. See the Portland Plant List maintained by the City of Portland Bureau of Planning and Sustainability.

Noxious Vegetation. See Invasive Non-Native Vegetation.

Ordinary Mean High-Water Line. See the WES Rules.

Owner. See the WES Rules.

Perennial Stream. See the WES Rules.

Practicable. Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purpose.

Professional Engineer (PE). See the WES Rules for the definition of Engineer.

Public Right-of-Way (ROW). See the WES Rules.

Restoration. The process of returning a disturbed or altered area or water resource to a previously existing natural condition. Restoration activities reestablish the structure, function, or diversity to that which existed prior to impacts caused by human activity.

Riparian. Those areas associated with streams, lakes, and wetlands where vegetation communities are predominately influenced by their association with water.

Sensitive Area. See the WES Rules.

Stormwater. See the WES Rules.

Stormwater Management Facility. See the WES Rules.

Stream. See the WES Rules.

Stream, Intermittent. See Intermittent Stream.

Stream, Perennial. See Perennial Stream.

Structure. A building or other major improvement that is built, constructed, or installed, not including minor improvements—such as fences, utility poles, flagpoles, or irrigation system components—that are not customarily regulated through zoning codes.

Utility Facilities. Buildings, structures, or any constructed portion of a system that provides for the production, transmission, conveyance, delivery, or furnishing of services including, but not limited to, heat, light, water, power, natural gas, sanitary sewer, stormwater, telephone, and cable television. Utility facilities do not include stormwater management facilities.

Vegetated Corridor. The area between bankfull stage of a protected water resource and the delineated edge of the Water Quality Resource Area.

Water Features. All rivers, streams (regardless of whether they carry year-round flow, i.e., including intermittent streams), springs which feed streams and wetlands and have year-round flow, Flood Management Areas, wetlands, and all other bodies of open water.

Water Quality Resource Area. Water features and adjacent vegetated corridors subject to regulation in order to preserve and enhance water quality, as established in Title 3 of the Metro Urban Growth Management Functional Plan.

Water Year. October 1 through September 30

Wetlands. See the WES Rules.

1.2 Abbreviations

Unless the text specifically indicates otherwise, the following abbreviations are used in these standards to refer to the following:

Abbreviation	Definition
DEQ	Oregon Department of Environmental Quality
DSL	Oregon Division of State Lands
EM	Emergent Marsh
EPSC	Erosion Prevention and Sediment Control
FW	Ash Forested Wetland
IPM	Integrated Pest Management
DSL	Oregon Department of State Lands
ORS	Oregon Revised Statutes
OW	Oak Woodland/Savanna
PE	Professional Engineer
RF	Riparian Forest
ROW	Right-of-Way
SS	Shrub/Scrub Wetland
UF	Upland Forest
USACE	United States Army Corps of Engineers
WES	Water Environment Services
WQRA	Water Quality Resource Area

2. General Information

2.1 Authority and Purpose

The District requires vegetated corridors along protected water resources, including perennial and intermittent streams and wetlands, to buffer the development impacts on water quality resources. These Buffer Standards protect water quality, set standards for vegetated corridors associated with protected water resources, and establish minimums for required mitigation.

2.2 Applicability

All parcels containing a water resource or within 200-feet of a water resource located on an adjacent parcel must submit to the District for a Water Quality Resource Area (WQRA) Boundary Verification prior to any development activity. Any parcel with a WQRA must submit to the District for a WQRA Development Permit prior to any development activities.

Parcels governed by a municipality or county planning agency that implements WQRA protections are excluded from these standards.

2.2.1 Exemptions

The following uses and activities are exempt from the requirements of Buffer Standards:

A. Uses and activities that do not constitute development, except if the use or activity is prohibited by Section 4;

B. Farming practices, as defined in Oregon Revised Statutes (ORS) 30.930, and farm uses, as defined in ORS 215.203, in zoning districts where agricultural uses are a primary use, except that this exemption does not apply to buildings associated with farm practices or farm uses;

C. Forest practices, as defined in ORS 30.930, on forestlands, as defined in ORS 30.930, outside the Portland Metropolitan Urban Growth Boundary;

D. Installation of erosion prevention and sediment control (EPSC) measures pursuant to an EPSC plan approved by the EPSC regulatory authority.

E. Projects with the sole purpose of restoring or enhancing wetlands, streams, or fish and wildlife habitat areas, provided that the project is part of an approved local, regional, state, or federal restoration or enhancement plan;

F. Maintenance of existing structures, roadways, driveways, utility facilities, septic systems, accessory uses, and other development;

G. Removal of invasive non-native or noxious vegetation and the planting or propagation of native vegetation.

H. Removal of dead or diseased trees or trees that pose an imminent hazard to persons or property, provided that a consulting arborist's report, or other credible evidence, is provided by the owner of the subject property and verifies the dead, diseased, or hazardous condition of the trees proposed for removal;

I. Repair, replacement, or improvement of existing utility infrastructure provided that the facility footprint is not increased where the disturbed portion of the WQRA or associated buffer is restored and vegetation is replaced with native vegetation;

J. Additions, alterations, rehabilitation, or replacement of existing structures, roadways, driveways, accessory uses, and other development that do not increase existing structural footprints in the WQRA and associated buffer where the disturbed portion of the WQRA is restored and vegetation is replaced with native vegetation;

K. Measures to remove or abate nuisances, or any other violation of statute, administrative rule, or ordinance, where such measures are required by government order and the disturbed portion of the WQRA and associated buffer is restored and vegetation is replaced with native vegetation; and

L. Work necessary to protect, repair, maintain, or replace existing structures, utility facilities, roadways, driveways, accessory uses, and exterior improvements in response to emergencies, provided that such remedial or preventative action must take place within a timeframe too short to allow for compliance with the requirements of this section and the adverse impacts are mitigated in accordance with **Table 3**.

2.3 Variance

Alternative materials and methods will only be accepted if the applicant can demonstrate that the existing standards are not appropriate for a given site and the proposed alternative provides the same or greater level of protection as defined in these standards. Alternate materials or methods not explicitly approved herein will be considered for approval through the variance process outlined below.

2.3.1 Variance Request

A variance request to the (Standards) shall be submitted in writing to the District. The written request for a variance should be submitted to the District prior to land use approval if a land use action is required. Land use conditions of approval are commonly written so there is little, if any, flexibility after land use approval is issued. If land use approval has already been issued or not required, then the variance request should be submitted in writing along with the first plan review submittal.

Once the District approves the plans, a variance request will only be accepted at the discretion of the District, and if the request is the only feasible solution without regards to delays or cost. Only minor variance requests will be considered during the construction phase of the project to address a specific design or construction problem. It is the responsibility of the applicant to obtain all approvals from any local, county, state or federal authority having any jurisdiction or permitting of the activities before proceeding with an approved variance.

This written request shall include the following:

A. The desired variance(s);

B. The reason(s) for the request(s);

C. A comparison between the specification(s) and standard(s), and the variance(s) for performance, function, maintainability, safety, etc.;

D. References to regionally and/or nationally accepted standards, records of successful use by other agencies, or other supportive information.

2.3.2 Criteria for Variance

The District may grant a variance when the request does not compromise the following: public safety, environmental protection, maintenance/repair/replacement, and when any one of the following conditions are met:

A. Topography or other geographic conditions impose an environmental or safety concern and the request is considered an equivalent alternative, which can accomplish the intent and criteria that is provided in these standards.

B. A minor change to the standard is required to address a specific design or construction problem which, if not enacted, will result in an unreasonable or disproportionate burden or obstacle to development. The financial viability of meeting the requirements of these design standards is not in itself a justification for a design exception.

C. The variance request is in the public interest and requirements for safety, function, appearance, and maintainability are based upon sound engineering and functionality of the proposed system is a feasible alternative.

All requests will be evaluated on a case-by-case basis, and approval of alternative materials and methods for one development proposal will not imply an approval under similar circumstances in another proposal. Approval of a variance, or denial of a site-specific request shall not constitute a precedent for use at other locations with potentially similar circumstances.

2.3.3 Review Process

The variance request shall be reviewed by the District and a decision will be issued, in writing, to the applicant within 30 calendar days indicating one of the following:

A. Approve as proposed, or

B. Approve with changes, or

C. Deny with an explanation.

It is the responsibility of the applicant to obtain all approvals from any local, county, state or federal authority having any jurisdiction or permitting of the activities before proceeding with an approved variance.

2.3.4 Appealing Variance Request Decision

The applicant may make a written request to the District to appeal the variance request decision as outlined in the appeals process contained in Section 3.7 of the District Rules and Regulations.

3. General Requirements

3.1 Classifying Primary or Secondary Resources

Protected water resources are classified as primary or secondary.

A wetland shall be a primary protected water resource if the wetland meets any one of the following criteria and is not a constructed wetland:

A. The wetland is fed by surface flows, sheet flows, or precipitation, has evidence of flooding during the growing season, has 60-percent or greater vegetative cover, and is over one-half-acre in size;

B. The wetland qualifies as having "intact water quality function" under the 1996 Oregon Freshwater Wetland Assessment Methodology;

C. The wetland is in a Flood Management District, has evidence of flooding during the growing season, is five-acres or more in size, and has a restricted outlet or no outlet;

D. The wetland qualifies as having "intact hydrologic control function" under the 1996 Oregon Freshwater Wetland Assessment Methodology; or

E. The wetland or a portion of it is within a horizontal distance of less than one-fourth mile from a water body that meets the Oregon Department of Environmental Quality's (DEQ) definition of a "water quality limited water body."

Rivers, perennial streams, intermittent streams draining more than 100-acres, natural lakes, and springs that feed streams and wetlands and have year-round flow during a year with wet to average precipitation patterns are primary protected water resources.

Intermittent streams draining 100-acres or less are secondary protected water resources.

3.1.1 Methodology for Documenting Intermittent Status of Streams

A. A stream shall be determined to be intermittent through one of the following methods. Water year precipitation patterns are determined by the National Water and Climate Center, United States Department of Agriculture[1].

   a. Method 1: The stream channel is dry (without visible flow or standing water) for a period of 30 consecutive days during a year with wet to average precipitation patterns. This method requires a minimum of two observations per 100-feet of stream length, collected at the beginning and end of the 30-day period, with supporting data (including maps with photos keyed to each sample location), indicating that the stream is dry. During a year with a dry precipitation pattern, all observations must be completed prior to August 15. If standing water is present at the first site visit, Method 2 shall be used, or the applicant must wait until the project reach is completely dry to start the 30-day observation period. For the purposes of this section, the District shall have the discretion to accept data taken up to 37 consecutive days apart.

   b. Method 2: The channel must not have saturated soil in the upper 12-inches, during a year with wet to average precipitation patterns. This method requires

[1] See https://www.nrcs.usda.gov/wps/portal/wcc/home/ and use the interactive map to determine

representative observations (one per 100-feet of stream length) on only one date. Observations shall include supporting data (including soil texture, level of saturation, and maps with photos keyed to each observation location). During a year with a dry precipitation pattern, all sampling must be completed prior to August 15.

If the applicant attempts to make a determination of intermittence during the wet season (November 1 – June 30), the applicant should consider all other available data (historic photos, data, reports, eyewitness accounts, etc.). The District shall review the available data and, if approved, the intermittent determination shall be considered preliminary until status can be definitively confirmed through one of the field methodologies described in Method 2.

If other long-term precipitation data is used, provide location and statistical analysis with submittal.

To determine status of the precipitation levels, review the previous Water Year to date. For determinations conducted during the month of October, use the previous complete Water Year to determine precipitation levels. Daily and monthly data are available online at a variety of government websites.

3.2 Development Review Requirements

3.2.1 Boundary Verification and Permit Required

In order to confirm the presence of a water resource and verify the boundaries of a WQRA, a WQRA Boundary Verification is required for development on a parcel or parcels that contain a WQRA or have a WQRA within 200-feet of the parcel boundary. The verification shall be required prior to issuance of a Service Provider Letter by WES or a Preliminary Statement of Feasibility, as required by the Clackamas County Planning Division. If credible evidence (e.g., aerial photographs, topographic maps, expert studies) indicates that the proposed development is clearly outside a WQRA (as determined by WES/County Planning), the requirement for WQRA Boundary Verification may be waived.

A WQRA Development Permit is required for development in a WQRA. Notice of approval of a WQRA Development Permit shall be mailed to all Owners of record within 300-feet of the subject property, and contiguous properties under the same ownership.

A WQRA Development Permit shall be approved if the applicant provides evidence substantiating compliance with the following criteria:

A. No practicable alternative locations exist for the requested development that will not disturb the WQRA;

B. No reasonably practicable alternative design or method of development exists that would have a lesser impact on the WQRA than the one proposed. If no such reasonably practicable alternative design or method of development exists, the development shall be conditioned to:

   a. Limit its disturbance and impact on the WQRA and the associated vegetated corridor to the minimum extent necessary to achieve the proposed development; and

b. Ensure that impacts to the functions and values of the water quality resource area and the associated vegetated buffer will be mitigated or impacted areas restored to the extent practicable.

c. Additional vegetated corridor planting can be found in **Appendix A – Planting Guide for Buffers.**

Approval of WQRA Boundary Verification or a WQRA Development Permit shall be valid after the conclusion of the appeal period for four years from the date of the final written decision. If the District's final written decision is appealed, the approval period shall commence on the date of the final appellate decision. During this four-year period, if the WQRA Development Permit has not been fully satisfied, the approval will become void.

If the approval of WQRA Boundary Verification or a WQRA Development Permit is not implemented within the initial approval period, a two-year time extension may be approved pursuant to the following standards and criteria:

A. A time extension application shall be submitted to the WES Director (or their designee) prior to the expiration of the initial approval period for the land use permit.

B. The proposed development as originally approved, or as modified by approval from WES, shall be consistent with the relevant provisions of these Standards in effect on the date the application for a time extension is submitted, provided that the application is complete when submitted or is made complete pursuant to these Standards. There shall have been no changes on the subject property or in the surrounding area that would be cause for reconsideration of the original decision.

3.2.2 Minimum Vegetated Corridor Width

The minimum width of the vegetated corridor is calculated based on the type of water resource, the adjacent slope, and the edge of the water resource (see **Table 2**).

At least three slope measurements along the water resource, at no more than 100-foot increments, shall be made for each property for which development is proposed. Slope shall be measured in 25-foot increments away from the water resource until slope is less than 25-percent or a point 150-feet from the starting point of measurement is reached, whichever occurs first. The 25-foot increments shall be measured horizontally. Where the protected water resource is confined by a ravine or gully, the top of ravine is the break in the greater-than-25-percent slope.

The width of the vegetated corridor shall be measured horizontally.

A maximum reduction of 25-feet may be permitted in the width of the vegetated corridor beyond the slope break if a geotechnical report demonstrates that the slope is stable.

Vegetated corridors in excess of 50-feet for primary protected resources, or in excess of 25-feet for secondary protected resources, apply on steep slopes only in the uphill direction from the protected water resource.

If an improved, Public Right-of-Way (ROW) runs parallel to and would be included within a WQRA buffer, the WQRA buffer shall not extend beyond the improved, Public ROW.

The width of the vegetated corridor included within a WQRA is specified in **Table 1**. However, if an improved, Public ROW runs parallel to and, based on **Table 1**, would be included within a WQRA, the WQRA shall not extend beyond the improved, Public ROW.

Table 1. Width of WQRA Vegetated Corridor

Protected Water Resource Type	Slope Adjacent to Protected Water Resource	Starting Point for Measurement from Water Resource	Width of Vegetated Corridor
Primary Protected Water Resource	<25-percent	• Edge of bankfull stage • Delineated edge of protected wetland	50-feet
Primary Protected Water Resource	≥25-percent for 150-feet or more	• Edge of bankfull stage • Delineated edge of protected wetland	200-feet
Primary Protected Water Resource	≥25-percent for less than 150-feet	• Edge of bankfull stage • Delineated edge of protected wetland	Distance from starting point of measurement to break in 25-percent slope plus 50-feet
Secondary Protected Water Resource	<25-percent	• Edge of bankfull stage	25-feet
Secondary Protected Water Resource	≥25-percent	• Edge of bankfull stage	50-feet

3.2.3 Partitions and Subdivisions

A partition or subdivision of property that contains a WQRA shall require that the WQRA and associated buffer shall be platted as a tract rather than as part of any lot. The tract shall be protected from development by restrictive covenant, public dedication or other District approved equivalent. However, the tract may be subject to an easement conveying storm and surface water management rights to the surface water management authority. The tract shall be designated as one of the following prior to final plat approval:

A. A private natural area owned by a homeowners association or a private non-profit with the mission of land conservation; or

B. A public natural area where the tract has been dedicated to a public entity

A WQRA Boundary Verification that was valid on the date when the final plat for a subdivision or partition was recorded with the County Clerk shall remain valid for subsequent development on the lots or parcels created by the subdivision or partition.

3.3 Mitigation Required

Development impacts to the WQRA and associated vegetated corridor shall be mitigated. The type and amount of mitigation will depend on the amount and type of encroachment in to the WQRA and vegetated corridor and the existing condition of the vegetated corridor. Mitigated Vegetated Corridor areas must be protected through a tract, restrictive covenant, public dedication, or other District approved equivalent

Mitigation shall be performed in the following order:

A. Area Mitigation – Adding of additional area onsite to offset the amount of vegetated corridor impacted.

   a. The additional Vegetated Corridor area required for approved encroachments shall be at the ratio of 1.5 square feet of added area to 1.0 square feet of impacted area.

   b. The additional Vegetated Corridor area shall be in addition to the existing Vegetated Corridor.

   c. The additional Vegetated Corridor area must be contiguous with an existing Vegetated Corridor.

   d. Additional Vegetated Corridor areas that are in “marginal” or “degraded” condition shall be improved to “good” condition as described in **Table 2**.

B. Enhancement Mitigation – Where there is insufficient room for area mitigation onsite, mitigation shall consist of a combination of area mitigation and enhancement mitigation. Enhancement mitigation is removal of non-natives species and planting of natives according to an approved plan to bring the corridor into a Good Condition.

   a. The enhanced Vegetated Corridor area required for approved encroachments shall be at the ratio of 2.0 square feet of enhanced area to 1.0 square feet of impacted area.

   b. The enhanced Vegetated Corridor areas shall be improved to “good” condition as described in **Table 2**. Applicant shall be responsible for annual monitoring, maintenance, and reporting on success of enhancement for three years after initial enhancement is completed.

C. Offsite Mitigation – Where full or partial onsite mitigation through area mitigation, enhanced mitigation, or a combination of the two is not possible (e.g., no additional onsite area is available and remaining vegetated corridor is insufficient to meet 2:1 ratio), the balance shall be mitigated through offsite mitigation upon approval of the District.

   a. The offsite Vegetated Corridor area required for approved encroachments shall be at the ratio of 2.0 square feet of offsite mitigation area to 1.0 square feet of impacted area.

   b. The offsite Vegetated Corridor area shall be in addition to the existing Vegetated Corridor.

   c. The offsite Vegetated Corridor must be contiguous with an existing Vegetated Corridor.

   d. Offsite Vegetated Corridor areas that are in “marginal” or “degraded” condition shall be improved to “good” condition as described in **Table 2**. Applicant shall be responsible for annual monitoring, maintenance, and reporting on success of enhancement for three years after initial enhancement is completed.

Table 2. Water Quality Resource Area Mitigation

Existing Condition of Water Quality Resource Area	Mitigation Requirements
Good Condition: Combination of native trees, shrubs and groundcover are 80-percent present, and there is more than 50-percent tree canopy coverage in the vegetated corridor.	**If area is disturbed during construction:** 1. Restore and mitigate according to approved plan using native vegetation to re-establish "good" condition. 2. Remove debris. 3. Prior to construction a qualified professional shall prepare and submit a plan for mitigating water quality impacts related to the development, including: sediments, temperature nutrients, sediment control, temperature control, or any other condition that may have caused the protected water resources to be listed on DEQ's 303(d) list. 4. Re-vegetation must occur during the next planting season following site disturbance. Seeding may be required prior to establishing plants for site stabilization. Annual replacement of plants that do not survive is required until vegetation representation of natural conditions is established on the site. **If area is undisturbed during construction:** 1. Remove debris
Marginal Condition: Combination of native trees, shrubs and groundcover are 50-80-percent present, and there is 26-50-percent tree canopy coverage in the vegetated corridor.	**If area is disturbed during construction:** 1. Restore and mitigate according to approved mitigation plan using native vegetation to achieve "good" condition. 2. Remove debris. 3. Re-vegetate during the next planting season following site disturbance. Seeding may be required prior to establishing plants for site stabilization. Annual replacement of plants that do not survive is required until vegetation representative of "good" conditions is established on the site. **If area is undisturbed during construction:** 1. Remove debris.
Degraded Condition: Combination of native trees, shrubs, and groundcover cover less than 50-percent of the community and less than 25-percent tree canopy exists (areal measure).	**If area is disturbed during construction:** 1. Restore and mitigate according to approved mitigation plan using native vegetation to achieve "good" condition. 2. Remove debris. 3. Re-vegetate during the next planting season following site disturbance. Seeding may be required prior to establishing plants for site stabilization. Annual replacement of plants that do not survive is required until vegetation representative of natural conditions is established on the site. **If area is undisturbed during construction:** 1. Vegetate bare areas with native vegetation. 2. Remove non-native vegetation and re-vegetate with native vegetation 3. Remove debris.

3.4 Design Requirements

A. To the greatest extent practicable, existing native vegetation within the WQRA and the associated vegetated corridor shall be retained and protected.

B. Walkways and bike paths shall be subject to the following standards:

   a. Where it is not practicable to maintain a setback of greater than 30-feet from the edge a protected water resource, a maximum of 10-percent of the total area of a gravel, earthen, tree bark product or equivalent walkway or bike path may be within 30-feet of the edge of a protected water resource.

   b. For any paved walkway or bike path, the width of the water quality resource area and associated vegetated buffer on the subject property shall be increased by a distance equal to the width of the paved path. Where it is not practicable to maintain a setback of greater than 30-feet from the edge of a protected water resource, a maximum of 10-percent of the total area of the walkway or bike path may be within 30-feet of the edge of a protected water resource.

   c. A walkway or bike path shall not exceed 10-feet in width, shall not be constructed closer than 10-feet from the edge of the protected water resource, and shall be constructed so as to minimize disturbance to existing vegetation.

C. Stormwater pretreatment facilities shall be subject to the following standards:

   a. A stormwater pretreatment facility may encroach a maximum of 25-feet into the outside boundary of the vegetated buffer of a primary protected water resource.

   b. A stormwater pretreatment facility may encroach a maximum of 5-feet into the outside boundary of the vegetated buffer of a secondary protected water resource.

   c. The area of encroachment shall be replaced by adding an equal area to the WQRA and associated buffer on the subject property.

   d. All post-construction stormwater runoff shall be mitigated in accordance with District Standards, prior to being discharged into the WQRA.

4. Prohibited Uses

The following uses and activities are prohibited within a WQRA and associated vegetated buffer:

A. The planting of invasive non-native or noxious vegetation; and

B. Uncontained areas of hazardous materials as defined by DEQ.

Appendix A: Submittal Requirements

Applications filed pursuant to Buffer Standards shall comply with the following submittal requirements.

1. Application for WQRA Boundary Verification

An application for WQRA Boundary Verification shall include a site plan that complies with the following requirements:

A. The site plan shall be drawn at a scale of no less than 1-inch equaling 20-feet.

B. The site plan shall show the location of the proposed development and the lot lines of the property on which development is proposed.

C. The site plan shall show the location of the protected water resource. If the protected water resource is a wetland, the delineation shall be made by a qualified wetlands specialist pursuant to the Division of State Lands' (DSL) recommended wetlands delineation process. For all other protected water resources, the location shall be established by a registered Professional Engineer (PE), Landscape Architect, or surveyor licensed by the State of Oregon.

D. The site plan shall show the location of the WQRA and associated vegetated corridor, including slope and drainage information sufficient to classify the protected water resource under **Table 1**.

2. Application for WQRA Development Permit

An application for a WQRA Development Permit shall include the following information in a report stamped by a registered PE, licensed Landscape Architect, or surveyor licensed by the State of Oregon:

A. A topographic map of the site at contour intervals of 2-foot intervals. Where slopes exceed 15-percent, contours may be shown at 5-foot intervals showing a delineation of the WQRA and associated vegetated corridor;

B. The location of all existing natural features including, but not limited to, all trees of a caliper greater than 6-inches diameter at a height of 4-feet, natural or historic drainages on the site, springs, seeps, outcroppings of rocks, and boulders within the WQRA;

C. Location of wetlands that qualify as primary protected water resources. Where such wetlands are identified, a delineation shall be made by a qualified wetlands specialist pursuant to the DSL recommended wetlands delineation process;

D. An inventory and location of existing debris, nuisance vegetation, and any noxious or hazardous materials;

E. An assessment of the existing condition of the WQRA and associated vegetated buffer in accordance with **Table 2**;

F. An inventory of vegetation, including percentage ground and canopy coverage;

G. An Impact Evaluation and Alternatives Analysis that addresses the requirements of these Buffer Standards;

H. A mitigation plan containing the following information:

a. A description of adverse impacts that will be caused as a result of development;

b. An explanation of how adverse impacts to resource areas and vegetated corridors will be avoided, minimized, and/or mitigated in accordance with, but not necessarily limited to, **Table 2**;

c. A list of all responsible parties including, but not necessarily limited to, the Owner, Applicant, Contractor, or other persons responsible for work on the subject property;

d. A map showing where the specific mitigation activities will occur; and

e. An implementation schedule, including a timeline for construction, mitigation, mitigation maintenance, monitoring, and reporting and a contingency plan. All in-stream work in fish-bearing streams shall be done in accordance with approval by the Oregon Department of Fish and Wildlife and their in-stream timing schedule.

Data from sources other than a field verified delineation of the protected water resource may be used to satisfy the submittal requirements only if the protected water resource is not located on the subject property and access to the water resource is denied for the purpose of supplying the required delineation. In order to use alternate data, an applicant shall submit the following:

A. A copy of a letter addressed to the owner of the property on which the protected water resource exists requesting access to the property for the purpose of completing a delineation of the protected water resource; and

B. A copy of a return receipt from the US Postal Service verifying that the letter was mailed certified and was received or refused.

Appendix B: Planting Guide for Buffers

1. General

This appendix covers information on plant selection and design guidance for vegetated buffers. Buffers require a specific range of plants based on the location of the area that is being rehabilitated. The following sections outline a range of practices related to selection of the right plant in the right place.

A. Native Plants

Only native plants are approved for Vegetated Buffers. Native plants are plants that are indigenous to the Pacific Northwest. They typically require minimal care once they are planted because they have evolved and adapted to the growing conditions and climate of the region. Because of their place in the local ecology, native plants also have habitat value for birds and other local species. For these reasons, only native plants are allowed in designated stream buffers and sensitive areas, or for revegetation purposes**.** Alternative plant materials for stormwater facilities must be approved by the District through a variance.

B. Climate and Microclimate

All native vegetation is well-adapted to the northwest regional climate. Although regional climate dictates average seasonal temperatures, amount of rainfall and available daylight, site-specific microclimates can vary considerably and should be factored into the planting design. For example, sword fern is a plant native to woodlands of the Pacific Northwest that likely would not survive if placed in a south facing area with direct sun exposure most of the day. However, sword fern placed in shady area on the north would thrive.

C. Habitat Diversity and Layering of Plants

Natural environments in the Pacific Northwest are characterized by diverse, layered plant habitats. A forest typically has habitats vertically arranged one on top of the other; low-growing groundcovers, topped by shrubs, topped by arborescent shrubs (shrubs that look like small trees) and trees. These layers vary in composition and form from one habitat type to another, such as the different northwest habitats of forest, wetland, and riparian. Different organisms occupy different niches within these habitats, creating greater biodiversity. The structural variety of a diversified planting design can also be very pleasing to the eye. Plantings should reflect this natural ordering, as well as mimicking a mixture of deciduous and evergreen materials.

D. Maintenance

Temporary irrigation is recommended for vegetated buffers if plants are installed during warmer summer months. If a temporary system is installed, it must be removed by the end of the maintenance period. Recommended maintenance procedures are as follows:

- Check regularly for weeds. Remove weeds or invasive plants, such as blackberries and ivy, and implement a weed control program as needed.
- Check regularly to maintain uniform coverage to prevent erosion and moisture loss during dry periods.

- Replant bare patches as necessary to comply with the facility's coverage requirements and maintenance plan.

2. Planting Plan Methods

Vegetated buffer mitigation or enhancement requires use of plants. Four major components shall be addressed: hydrology, soils, plant materials, and maintenance. When developing planting plans, the following steps should be used:

A. Assess Plant Community Type

Identify location of vegetated buffer and its adjacent plant community type(s). Assign appropriate plant community type to design:

- Riparian Forest (RF)
- Upland Forest (UF)
- Oak Woodland/Savanna (OW)
- Ash Forested Wetland (AF)
- Scrub/Shrub Wetland (SS)
- Emergent Marsh (EM)

B. Assess Soil Conditions and Assign Appropriate Preparation Specifications to Plans

a. Preservation: Every effort shall be made to protect a site's existing soils. Native soil along Sensitive Areas and Vegetated Buffers shall be retained to the maximum extent practicable. Determine the organic content and non-native, invasive seed bank likely in the soil. The conditions in Sensitive Areas and Vegetated Buffers vary greatly.

b. For upland sites with at least one foot of native topsoil, but containing a non-native, invasive seed bank or plants, add notes to the plan to remove the undesirable plants, roots, and seeds (see District Integrated Pest Management (IPM) Plan) prior to planting.

c. For upland sites with either disturbed and compacted soils or less than one foot of topsoil and invasive, non-native seed bank or plants that have become established, the following notes shall be added to the plan:

a. Remove the undesirable plants, roots, and seeds (see District IPM Plan*)* prior to adding topsoil.

b. Till the sub-grade in these areas to a depth of at least 4-inches and add at least 12-inches of clean compost-amended topsoil. The compost-amended topsoil shall have the following characteristics to ensure a good growing medium:

i. Texture – material passes through 1-inch screen

ii. Fertility – 35-percent organic matter

c. For wet areas in Sensitive Areas, the soil conditions shall be hydric or graded to hold sufficient water to promote hydric soil formation. The addition of organic muck soil will improve plant establishment for some bulbs and tubers.

d. Other amendments, conditioners, and bio-amendments may be added as needed to support the specified plants or adjust the soil pH. Traditional fertilization techniques (applying nitrogen, phosphorous, and potassium) are not necessary for native plants.

C. Identify Plants to be Preserved; Select Revegetation Plant Materials, Quantities, and Placement; Assign Planting Zones and Specifications to Plans

a. Preservation: Every effort shall be made to protect a site's existing native vegetation. Native vegetation along Sensitive Areas and Vegetated Buffers shall be retained to the maximum extent practicable.

d. Selection: Plant selection shall be from a native species palette and shall consider site soil types, hydrologic conditions, and shade requirements. Containerized or bare root plants may be used. A list of common native plant community types appropriate for planting Sensitive Areas and Vegetated Buffers is provided below in **Tables B-1** through **B-5**. Unless approved by District staff, planting restrictions are the following:

i. Deep rooting trees and shrubs (e.g., willow) shall not be planted on top of concrete pipes, or within 10-feet of retaining walls, inlet/outlet structures or other culverts; and

ii. Large trees or shrubs shall not be planted on berms over 4-feet tall that impound water. Small trees or shrubs with fibrous root systems may be installed on berms that impound water and are less than 4-feet tall.

e. Quantities: Trees and shrubs shall be planted using the following equations to achieve the specified densities on a per acre basis.

i. Total number of trees per acre = area in square feet x 0.01

ii. Total number of shrubs per acre = area in square feet x 0.05

iii. Groundcover = plant and seed to achieve 100-percent area coverage

f. Size: See **Tables B-1** through **B-5** for minimum rooted plant size.

g. Placement: Plant placement shall be consistent with naturally occurring plant communities. Trees and shrubs shall be placed in singles or clusters of the same species to provide a natural planting scheme. This arrangement may follow curved rows to facilitate maintenance. Distribution and relative abundance shall be dependent on the plant species and on the size of the revegetation area. The Vegetated Corridor revegetation area shall be overseeded with native seed mixes appropriate to the plant community and hydrologic zone of the site (see **Tables B-1** through **B-5**). Plant placement and seeding shall promote maximum vegetative cover to minimize weed establishment. Where feasible and applicable, planting plans shall consider effective shading considerations (i.e., southern and western exposures).

D. Determine Plant Installation Requirements and Assign Specifications to Plans

a. Timing: Containerized stock shall be installed only from February 1 through May 1 and October 1 through November 15. Bare root stock shall be installed only from December 15 through April 15. Seeding shall occur only from March 15 through October 15. Planting or seeding outside these times may require additional measures to ensure survival which shall be specified on the plans and require District approval.

b. Erosion Control: Grading, soil preparation, and seeding shall be performed during optimal weather conditions and at low flow levels to minimize sediment impacts. Site disturbance shall be minimized and desirable vegetation retained where possible. Slopes shall be graded to support the establishment of vegetation. Where seeding is used for erosion control, an appropriate native

grass, Regreen (or its equivalent), or sterile wheat shall be used to stabilize slopes until permanent vegetation is established. Biodegradable fabrics (coir, coconut, or approved jute matting (minimum ¼-inch square holes) may be used to stabilize slopes and channels. Fabrics such as burlap may be used to secure plant plugs in place and to discourage floating upon inundation. No plastic mesh that can entangle wildlife is permitted. Erosion control must meet the standards of the District's Erosion Prevention and Sediment Control Planning and Design Manual.

c. Mulching: Areas shall be mulched a minimum of 3-inches in depth and 24-inches in diameter, to retain moisture and discourage weed growth around newly installed plant material. Appropriate mulches are made from composted bark or leaves that have not been chemically treated.

d. Plant protection from Wildlife: Depending on site conditions, appropriate measures shall be taken to limit wildlife-related damage (see District IPM Plan).

e. Irrigation: Appropriate plant selection, along with adequate site preparation and maintenance, reduces the need for irrigation. However, unless site hydrology is currently adequate, a District approved irrigation system or equivalent shall be used during the two-year plant establishment period (unless otherwise approved by the District). Watering shall be at a rate to maintain all plantings in a healthy thriving condition during establishment. Other irrigation techniques, such as deep watering, may be allowed with prior approval by District staff.

f. Access: Maintenance access for plant maintenance shall be provided for Sensitive Areas and Vegetated Corridors.

E. Determine Plant Monitoring and Maintenance Requirements

a. *Monitoring*: Site visits are necessary throughout the growing season to assess the status of the plantings, irrigation, mulching, etc. and ensure successful plant establishment.

b. *Weed Control*: The removal of non-native, invasive weeds shall be necessary throughout the maintenance period, or until a healthy stand of desirable vegetation is established (see District IPM Plan).

c. *Plant Placement and Preservation*: At the end of the maintenance period, all plants not in a healthy growing condition will be noted and as soon as seasonal conditions permit, shall be removed from the site and replaced with plants of the same species and size as originally specified. Prior to replacement, the cause of loss (wildlife damage, poor plant stock, etc.) shall be documented with a description of the corrective actions taken.

F. Prepare Construction Documents and Specifications

The construction documents and specifications shall include:

a. Sensitive Area and Vegetated Buffer boundaries as shown on the Service Provider Letter, including limits of approved, temporary construction encroachment. Orange construction fencing shall be noted at Vegetated Buffer boundaries as well as at encroachment limits during construction. Note: permanent type fencing and signage between the development and the Vegetated Corridor for project completion is required.

b. Site preparation plan and specifications, including limits of clearing, existing plants and trees to be preserved, and methods for removal and control of

invasive, non-native species, and location and depth of topsoil and or compost to be added to revegetation area.

c. Planting plan and specifications, including all of the following

i. Planting table that documents the common name, scientific name, distribution (zone and spacing), condition, and size of plantings

ii. Installation methods for plant materials.

iii. Mulching

iv. Plant tagging for identification

v. Plant protection (non-plastic)

vi. Seeding mix, methods, rates, and areas

G. Irrigation plan and specifications, including identification of water source, and maintenance of the system.

H. Maintenance schedule, including responsible party and contact information, dates of inspection (minimum three per growing season and one prior to onset of growing season), and estimated maintenance schedule (as necessary) over the 2-year monitoring period.

I. Easement descriptions for all Vegetated Buffers and Sensitive Areas that are required as part of the development.

J. Notes describing vegetated corridor conditions and steps to achieve a “good” condition following mitigation, i.e., invasive species removal resulting in cleared areas exceeding 25 square feet shall be replanted with native vegetation.

K. Access points for installation and maintenance including vehicle access if available.

L. Standard drawing details (north arrow, scale bar, property boundaries, project name, drawing date, name of Professional Engineer and/or Landscape Architect and Owner).

3. Plant Selection

The plant lists provided for buffer remediation are generally grouped according to the ecosystem that is being restored. These include broad plant communities such as riparian forest, upland forest, oak woodland/savannah, ash forested wetland, shrub/scrub wetland, and emergent marsh.

Each plant list contains characteristics (such as water and light requirements) as well as minimum standards for meeting mitigation and submittal requirements, such as planting size and recommended spacing. Each plant community also contains a minimum species composition (plants that must be included as a minimum variety) to ensure adequate biodiversity.

TABLE B-1: Buffer Restoration Plant: Riparian Forest (RF)

Species name ***Botanical*, common**	**Minimum Species Composition**	**Plant Category**	**Water Requirements**	**Light Requirements**	**Minimum Rooting Size**	**Minimum Plant Height**	**Spacing Format**
Adiatum aleuticum, Maidenhair fern		Herb	Moist	Shade	4" pot	n/a	Cluster
Agrostis exarata, Spike bentgrass	•	Grass	Moist	Part	Seed	n/a	Mass
Agrostis scabra, Hair bentgrass		Grass	Moist	Part	Seed	n/a	Mass
Alnus rubra, Red alder	•	Tree	Moist	Sun	1 gal.	3'	Single
Athyrium filix-femina, Lady fern		Herb	Moist	Shade	1 gal.	n/a	Cluster
Carex deweyana, Dewey's sedge		Herb	Dry	Shade	Plugs/4" pot	4"	Mass
Claytonia sibirica, Candy flower		Herb	Moist	Shade	4" pot	n/a	Cluster
Cornus stoniferia, Red-osier dogwood	•	Shrub	Wet	Part	1 gal.	2'	Cluster
Glyceria elata, Tall manna-grass	•	Grass	Moist	Part	Seed	n/a	Mass
Lonicera involcrata, Black twinberry		Shrub	Moist	Part	1 gal.	1.5'	Single
Lysichiton americanum, Skunk cabbage		Herb	Wet	Shade	Bulbs	n/a	Cluster
Maianthemum dilatatum, False lily-of-the-valley		Herb	Moist	Shade	Bulbs/4" pot	n/a	Cluster
Montia perfoliata, Miners lettuce		Herb	Moist	Shade	4" pot	n/a	Cluster
Oemleris cerasiformis, Indian plum	•	Shrub	Moist	Shade	2 gal.	2'	Cluster
Pysocarpus capitatus, Pacific ninebark		Shrub	Moist	Shade	1 gal.	2'	Single
Rosa pisocarpa, Swamp rose		Shrub	Moist	Shade	1 gal.	1.5'	Cluster
Rubus spectabilis, Salmonberry	•	Shrub	Moist	Shade	1 gal.	1.5'	Cluster
Sambucus racemosa, Red elderberry	•	Shrub	Moist	Part	1 gal.	1.5'	Single
Symphoricarpos albus, Snowberry	•	Shrub	Dry	Part	1 gal.	1.5'	Cluster
Tolmiea menziesii, Youth-on-age		Herb	Moist	Shade	4" pot	n/a	Cluster
Thuja plicata, Western red cedar	•	Tree	Moist	Part	1 gal.	1.5'	Single
Vancouveria hexandra, Insideout flower		Herb	Moist	Shade	4" pot	n/a	Cluster
Viola glabella, Stream violet		Herb	Moist	Shade	4" pot	n/a	Cluster

TABLE B-2: Buffer Restoration Plant: Upland Forest (UF)

Species name *Botanical*, common	Minimum Species Composition	Plant Category	Water Requirements	Light Requirements	Minimum Rooting Size	Minimum Plant Height	Spacing Format
Alnus rubra, Red alder	•	Tree	Moist	Sun	1 gal.	3'	Single
Acer macrophyllum, Big leaf maple	•	Tree	Dry	Sun	2 gal.	3'	Single
Pseudotsuga menziesii, Douglas fir	•	Tree	Dry	Sun	2 gal.	3'	Single
Abies grandis, Grand fir	•	Tree	Dry	Sun	2 gal.	2'	Single
Taxus brevifolia, Pacific yew		Tree	Moist	Shade	2 gal.	2'	Single
Rhamnus purshiana, Cascara		Tree	Dry	Part	2 gal.	2'	Single
Cornus nuttallii, Pacific dogwood		Tree	Moist	Shade	1 gal.	2'	Single
Prunus emarginata, Bitter cherry		Tree	Moist	Part	2 gal.	2'	Single
Acer circinatum, Vine maple	•	Tree	Moist	Part	2 gal.	2'	Single
Holodiscus discolor, Oceanspray	•	Shrub	Dry	Sun	1 gal.	1.5'	Single
Sambucus racemose, Red elderberry	•	Shrub	Moist	Part	1 gal.	1.5'	Single
Ribes sanguineum, Red flowering currant	•	Shrub	Dry	Sun	1 gal.	1.5'	Cluster
Mahonia nervosa, Cascade Oregon grape		Shrub	Moist	Part	1 gal.	4"	Cluster
Mahonia aquifolium, Tall Oregon grape		Shrub	Dry	Sun	1 gal.	6"	Single
Vaccinium parvifolium, Red huckleberry		Shrub	Moist	Shade	1 gal.	1.5'	Cluster
Rubus pariflorus, Thimbleberry		Shrub	Moist	Shade	1 gal.	1.5'	Cluster
Symphoricarpos albus, Snowberry	•	Shrub	Dry	Part	1 gal.	1.5'	Cluster
Rosa gymnocarpa, Baldhip rose	•	Shrub	Dry	Part	1 gal.	1.5'	Cluster
Almelanchier alnifolia, Serviceberry		Shrub	Dry	Part	2 gal.	2'	Single
Polystichum munitum, Sword fern		Shrub	Moist	Shade	2 gal.	n/a	Cluster
Blechnum spicant, Deer fern		Herb	Moist	Shade	1 gal.	n/a	Cluster
Lonicera ciliosa, Orange honeysuckle		Herb	Moist	Shade	2 gal.	n/a	Single
Gaultheria shallon, Salal		Herb	Moist	Part	1 gal.	4"	Cluster
Fragaria vesca, Wood strawberry		Herb	Moist	Shade	4" pot	n/a	Cluster
Trillium ovatum, Western trillium		Herb	Moist	Shade	4" pot	n/a	Cluster
Mitella pentandra, Five-stemmed miterwort		Herb	Moist	Shade	1 gal.	n/a	Cluster
Aquilegia Formosa, Red columbine		Herb	Dry	Part	4" pot	n/a	Cluster
Smilacina racemose, False Solomon's seal		Herb	Moist	Shade	4" pot	n/a	Cluster
Bromus carinatus, Native California brome	•	Grass	Dry	Sun	Seed	n/a	Mass
Elymus glaucus, Blue wildrye	•	Grass	Dry	Part	Seed	n/a	Mass

TABLE B-3: Buffer Restoration Plant: Oak Woodland/Savanna (OW)

Species name *Botanical*, common	Minimum Species Composition	Plant Category	Water Requirements	Light Requirements	Minimum Rooting Size	Minimum Plant Height	Spacing Format
Almelanchier alnifolia, Serviceberry	•	Shrub	Dry	Part	1 gal.	2'	Single
Bromus carinatu, Native California brome	•	Grass	Dry	Sun	Seed	n/a	Mass
Elymus glacus, Blue wild-rye	•	Grass	Dry	Part	Seed	n/a	Mass
Holodiscus discolor, Oceanspray	•	Shrub	Dry	Sun	1 gal.	1.5'	Cluster
Mahonia nervosa, Cascade Oregon grape		Herb	Moist	Part	1 gal.	4"	Cluster
Quercus garryana, Oregon white oak	•	Tree	Dry	Sun	2 gal.	2'	Single
Rubus ursinus, Training blackberry		Shrub	Dry	Sun	1 gal.	1.5'	Cluster
Symphoricarpos albus, Snowberry	•	Shrub	Dry	Part	1 gal.	1.5'	Cluster

TABLE B-4: Buffer Restoration Plant: Ash Forested Wetland (FW)

Species name *Botanical*, common	Minimum Species Composition	Plant Category	Water Requirements	Light Requirements	Minimum Rooting Size	Minimum Plant Height	Spacing Format
Carex deweyana, Dewey's sedge		Herb	Dry	Shade	Plugs	4"	Mass
Carex obnupta, Slough sedge	•	Herb	Moist	Part	Plugs	6"	Mass
Claytonia sibirica, Candy flower		Herb	Moist	Shade	4"	n/a	Cluster
Cornus sericea, Red-osier dogwood	•	Shrub	Wet	Part	1 gal.	2'	Cluster
Fraxinus latifolia, Oregon ash	•	Tree	Moist	Part	2 gal.	3'	Single
Glyceria elata, Tall mannagrass	•	Grass	Moist	Shade	Seed	n/a	Mass
Montia parvifolia, Streambank springbeauty		Herb	Moist	Shade	4"	n/a	Cluster
Physocarpus capitatus, Pacific ninebark	•	Shrub	Moist	Shade	2 gal.	2'	Single
Symphoricarpus albus, Snowberry	•	Shrub	Dry	Part	1 gal.	1.5'	Cluster
Scirpus microcarpus, Small fruited bulrush		Herb	Wet	Sun	Plugs	4"	Mass

TABLE B-5: Buffer Restoration Plant: Shrub/Scrub Wetland (SS)

Species name ***Botanical*, common**	**Minimum Species Composition**	**Plant Category**	**Water Requirements**	**Light Requirements**	**Minimum Rooting Size**	**Minimum Plant Height**	**Spacing Format**
Cornus sericea, Red-osier dogwood	•	Shrub	Wet	Part	1 gal.	2'	Cluster
Crataegus douglasii, Douglas hawthorne		Tree	Moist	Part	2 gal.	2'	Cluster
Bidens cernua, Nodding beggarstick		Herb	Wet	Sun	1 gal.	1.5'	Cluster
Glyceria occidentalis, Western manna-grass	•	Grass	Wet	Sun	Seed	n/a	Mass
Juncus patens, Spreading rush		Herb	Moist	Part	Plugs	6"	Mass
Malus fusca, Pacific crabapple	•	Tree	Moist	Part	2 gal.	2'	Cluster
Rosa pisocarpa, Clustered rose		Shrub	Wet	Part	1 gal.	1.5'	Cluster
Salix lasiandra, Pacific willow	•	Tree	Wet	Sun	1 gal.	3'	Single
Salix sitchensis, Sitka willow		Tree	Moist	Sun	1 gal.	3'	Cluster
Salix scouleriana, Scouler's willow	•	Shrub	Moist	Sun	1 gal.	3'	Cluster
Spiraea douglasii, Douglas's spiraea	•	Shrub	Wet	Sun	1 gal.	1.5'	Cluster