

**Wildlife Assessment
and Mitigation Report**
Parcel 0920069038



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1 Introduction

This report addresses critical areas and wildlife habitat on the property located in unincorporated King County near Enumclaw, on parcel 0920069038. Critical areas have been flagged the property, described in a report (Ed Sewall, 2/7/18), and approved by King County (CADS19-0035, issued 3/4/19). This report includes an assessment of existing wildlife conditions and describes compensatory mitigation for anticipated impacts resulting from construction of a new drainfield within a wildlife corridor. The drainfield is a necessary component of developing the site with a single-family residence.

2 Methods

2.1 Existing Documentation Review

Publicly available sensitive areas and habitat documentation for the study property were reviewed for this report. Sources include aerial photographs of the site and surrounding area, the King County public GIS database (iMAP), the Washington Department of Fish and Wildlife (WDFW) SalmonScape online mapping system, WDFW Priority Habitat and Species (PHS), the public database eBird.org, and general information on habitat types from Johnson and O'Neil (2001), and existing approved wetland and stream approved by King County (CADS-19-035) was reviewed.

2.2 Fieldwork

A biologist assessed vegetative structure and composition, special features, presence of wildlife species and sign, and evidence of human disturbance. Because the onsite stream had previously been delineated, no additional wetland or stream mapping was conducted.

3 Existing Conditions

3.1 Project Vicinity

The project site is on the east side of Newaukum Creek, which represents the western property boundary. Properties in this area are zoned Agriculture, and fall within the Enumclaw Agricultural Production District. Adjacent parcels to the north and south are developed with single-family homes; parcels to the west also consist of rural residential development.

3.2 Project Site

The subject property is 1.04 acres and is presently undeveloped. The property slopes down to Newaukum Creek, from a high elevation of 590 in the northeast portion of the site to a low of 565 at Newaukum Creek. The entire parcel is within the 100-year flood plain of Newaukum Creek.

Specifics of the natural features of the site are detailed in Section 4.

4 Habitat Assessment

4.1 Site Level

The subject property falls within a Wildlife Habitat Network (WHN) that follows Newaukum Creek. A WDFW PHS data retrieval for this project yielded the map included as Appendix A. PHS species in the Creek with federal status are Coho (*Oncorhynchus kisutch*) (candidate), Chinook (*O. tshawytscha*) (threatened), and steelhead (*O. mykiss*) (threatened). No terrestrial PHS species by WDFW are

documented within the project area. Species of interest to King County (KCC 21A.24.382) are addressed in Section 4.3 of this report.

Habitat on the subject property consists of cleared area in primarily herbaceous vegetation and riparian forest (Figure 1). The cleared area makes up the majority of the site and is dominated by reed canarygrass, a non-native species that tends to form monotypic stands. A patch of Himalayan blackberry (*Rubus armeniacus*), and occasional common dandelion (*Taraxacum officinale*) are also present. A photo of this area is provided in Figure 2. This assemblage of species provides little habitat for native wildlife; it lacks vegetative compositional and structural diversity, and consequently lacks nesting and perching opportunities for most species. Cover is limited to a low stratum and forage is sparse, consisting mostly of Himalayan blackberry, which is also an invasive species that tends to proliferate to the detriment of native plants. Reed canarygrass is unpalatable to wildlife due to its alkaloid content and coarse stem.

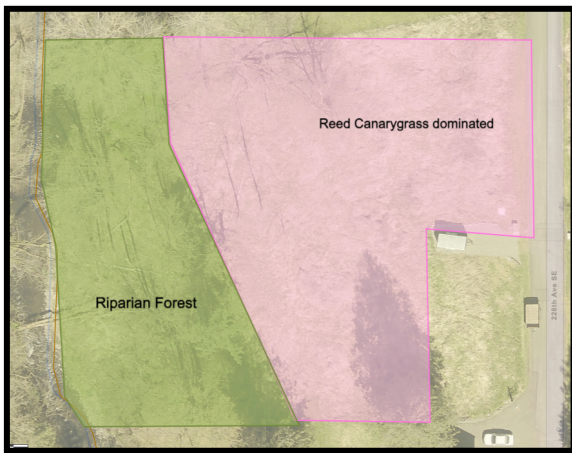


Figure 1. Habitat types on subject parcel.

A remnant upland forest, dominated by bigleaf maple (*Acer macrophyllum*), is present in a band adjacent to Newaukum Creek (see Figure 1). Photos of the area are provided in Figures 2 and 3. Vegetation present in the riparian area is listed in Table 1. As shown in the photographs, the understory is sparse, and includes patches of reed canarygrass. Bird species noted are listed in Table 2.

Trees in the forested area are in early to mid-successional age classes. The structural complexity of forest vegetation varies from somewhat sparse due a preponderance of low-growing species along the easternmost edge of the area to a more complex riparian zone with dense native shrubs (see Figures 3 and 4). This provides not only a multi-stratum, diverse nesting and foraging environment for birds, but shade for the creek and stability for the creek banks. There are, however, short reaches of incised bank (Figure 4), as is often the case in streams within a developed landscape; this is a form of erosion.



Figure 2. Upper portion of riparian forest



Figure 3. Riparian forest adjacent to Newaukum Creek.



Figure 4. Incised bank/ bank failure on opposite bank.

Table 1. Vegetation observed in riparian forest.

Common name	Scientific name
Bigleaf maple	<i>Acer macrophyllum</i>
Black cottonwood	<i>Populus balsamifera</i>
Douglas-fir	<i>Pseudotsuga menziesii</i>
Red alder	<i>Alnus rubra</i>
Himalayan blackberry	<i>Rubus armeniacus</i>
Salmonberry	<i>Rubus spectabilis</i>
Snowberry	<i>Symphoricarpos albus</i>
Indian plum	<i>Oemleria cerasiformis</i>
Common bedstraw	<i>Galium aparine</i>
Cow parsnip	<i>Heraculum lunatum</i>
Trailing blackberry	<i>Rubus ursinus</i>
Western swordfern	<i>Polystichum munitum</i>
<i>Pacific bleeding heart</i>	<i>Dicentra formosa</i>
<i>Reed canarygrass</i>	<i>Phalaris arundinacea</i>

The forest canopy is low but contiguous along the creek. Dead and downed trees are present, and many have woodpecker sign. Nesting cavities for passerines are present, and several cavity nesting bird species were observed during the site visit (Table 2).

Newaukum Creek provides a year-round water source for wildlife; overhanging vegetation, downed woody debris, and the largely native riparian vegetation represent potential habitat for reptiles and amphibians. The continuity of forest along the creek provides travel cover through the property and

access to other parts of the WHN. The presence of two habitat types on the site creates a transition zone that may have attributes different from the habitat types alone. Such transitional habitat, or edge, can have both positive and negative impacts on wildlife. Although edge habitat generally supports greater wildlife species richness than one block of homogeneous habitat, it can also promote invasion by pest species, particularly where they occur near urban areas. Nest depredation and brood parasitism are also generally high in edge habitat. The on-site edge between the two habitat types is abrupt and opens the riparian zone to potential invasion from adjacent developed areas. It does not provide the more beneficial attributes, such as greater vegetative species diversity, associated with some edge habitat. The reed canarygrass expanse represents a break in the functionality of the vegetated corridor, as it pinches the forest to a narrow riparian zone and presents a gap that must be crossed by any wildlife leaving the riparian area.

The area is presently free of litter and other evidence of human intrusion. Given the private ownership of the property and zoning of the area, the property offers no direct benefits for education or recreation.

Generally, expected wildlife use of this site includes birds, small mammals, and possibly reptiles and amphibians. Potential use by larger mammals, specifically deer and coyote, is possible. Species whose breeding requirements could be met on the site include ground, shrub, tree, and cavity nesters, and species depended on a consistent aquatic component. Factors that may affect the potential for certain taxa to use the site are discussed further in Section 4.2.

4.2 Landscape Level

All habitats occurring in and adjacent to the project site should be considered together in qualifying habitat value, as their juxtaposition and interspersion have both beneficial and detrimental effects. The study vicinity can be characterized low density rural or exurban within a largely agricultural landscape. Blocks and corridors of deciduous and mixed forest, including the Newaukum Creek WHN, are interspersed with farms and development, often as a result of regulatory protections afforded to streams and other critical areas. Significant tracts of forested land are situated to the north of the site, beginning approximately 0.80 miles from the site and branching into a number of parks, including Flaming Geysers State Park, O'Grady Park, and Green River Park. All are connected by riparian buffer zones, although connections are broken by roads. The vegetated corridor is narrowest at the southern extent and broken by a few developed residential lots and SE 400th Street approximately 0.80 mi from the subject property. This pattern is typical of rural and exurban areas and contribute to landscape fragmentation, which impacts wildlife communities and populations. As a general rule, fragmentation is considered more harmful than beneficial to wildlife. Although initially species densities increase as fragmentation increases, density increases are the result of species that thrive in developed areas and diversity tends to decrease.

The areas north of the site could be a source of wildlife for the onsite extent of the WHN. The road breaks amount to a considerable barrier for small mammals, reptiles, and amphibians, but can be readily crossed by birds. The creek may offer mobility for some of these species, however, provided culverts do not present an impassable barrier.

4.3 Species of Importance

The site has the potential to support use by several species listed in KCC 21A.24.382. Each species and its potential to occur on the site discussed below.

The online database eBird.org and other publicly accessible resources were used to determine recent occurrences of each species.

Bald Eagle

No bald eagle nests were observed on the site. The species is common in the Enumclaw area, and eagles are likely to be seen flying above the site regularly, but the creek does not provide the open surface water most often used for foraging. The site's scattered large trees make it possible that bald eagles would be found perching on the property, albeit for resting rather than foraging; foraging perches probably would be located within sight of open water. Although some large trees might be suitable in size and structure for nest, the lack of adjacent open water makes it unlikely that nesting would occur. Staging and roosting usually occur in dense conifer stands, not present on the site.

Great Blue Heron

Great blue heron rookeries are mainly built in tall trees in or near foraging sites, which include wetlands, shorelines, and agricultural fields. There are no rookeries in the study area vicinity, but herons use the area and are commonly seen in the nearby parks. Newaukum Creek provides suitable foraging habitat for the species on the subject property and beyond.

Marbled Murrelet

There are no records of marbled murrelets in the vicinity. They are most common in Washington in the Puget Sound area; the nearest potential nesting sites in King County are in the Cascade Mountains north of Interstate 90.

Osprey

Osprey are common along rivers in King County. They are easily seen on their nest and perches in exposed treetops and platforms. No nests are known in the immediate area, and any site use would likely be limited to perching for short periods of time. Foraging normally takes place in open bodies of water larger than Newaukum Creek in the site area.

Peregrine Falcon

Peregrine falcons are increasingly found in developed areas in King County, although they remain fairly uncommon overall. There are sightings in the Enumclaw area. Nesting habitat can include ledges, cliffs, manmade structures, and broken tree tops. While they may infrequently be seen in the study area vicinity, suitable falcon habitat does not exist on the site.

Spotted Owl

Spotted owls are rare throughout the state. While they have historically been confirmed and "probable" accounts of breeding birds in the Cascades east of Enumclaw, no sightings in the vicinity of the study area have been documented.

Vaux's Swift

Vaux's swift most often forage in open skies over forest and water bodies; the creek does not provide significant open habitat. The species is associated with large snags for nesting, although they increasingly use artificial structures, particularly chimneys. Snags of sufficient size are not available on the site, but the species is commonly seen in the area and may frequent the site or vicinity.

Townsend's Big-eared Bat

These bats are not common but occur in most areas of the state. Some large snags in the vicinity's parks could provide roosting and nesting habitat, but suitable roosts and hibernacula do not occur in the study area.

Table 2. Birds heard or observed.

Common name	Scientific name
American dipper	<i>Cinclus mexicanus</i>
Red crossbill	<i>Loxia curvirostra</i>
Golden crowned kinglet	<i>Regulus satrapa</i>
Song sparrow	<i>Melospiza melodia</i>
Chestnut backed chickadee	<i>Poecile rufescens</i>
Common raven	<i>Corvus corax</i>
Violet-green swallow	<i>Tachycineta thalassina</i>
Anna's hummingbird	<i>Calypte anna</i>
Northern flicker	<i>Colaptes auratus</i>
Yellow-rumped warbler	<i>Setophaga coronata</i>

9 Potential Impacts

Temporary impacts are expected to result from installation of the new drainfield within the wildlife corridor and stream buffer. The total permanent impact area within the buffer is 2,264 s.f, and an additional 315 s.f. will be temporarily impacted. Within the permanent impact area, the ground will be excavated, drainfield lines will be installed and buried, and the surface will be returned to herbaceous vegetation (domestic grasses). Approximately 929 s.f. of this drainfield area within the buffer will be affected in the near future, during home construction when the primary drainfield is installed, and the remainder will be installed if the primary drainfield fails. With appropriate care, a drainfield is expected to last 30 to 50 years.

Temporary impact is proposed at the north end of the home site. Grading in this area is necessary for home construction. This area is currently vegetated with domestic grasses, and will be returned to its current condition upon completion of grading. In summary, the immediate impact includes 929 s.f. of disturbance to a reed canarygrass field for drainfield placement, and 315 s.f. of grading for home site construction.

12 Regulatory Implications

King County Code 21A.24.045 D 63 allows drainfields within the buffer of an aquatic area, provided the criteria in Table 3 are met. Drainfields are not allowed in Wildlife corridors, and thus, a Critical Areas Alteration Exception is required. Table 2 addresses the alteration exception criteria.

Table 3. Criteria for drainfield in aquatic buffer.

Criteria	Comment
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Not allowed in the severe channel migration zone	N/A
there is no alternative location with less adverse impact on the critical area and buffer	Due to soil conditions and proposed structures, this is the only feasible location.
and clearing is minimized to the maximum extent practical.	No trees will be cleared for drainfield installation.

Table 4. Criteria for Critical Areas Alteration Exception

Criteria	Relationship to this Proposal
a. there is no feasible alternative to the development proposal with less adverse impact on the critical area;	Due to the size of the site, soil conditions, and extensive buffer and wildlife corridor, it is not possible to locate the drainfield outside of the buffer.
b. the alteration is the minimum necessary to accommodate the development proposal;	The drainfield has been sized per Health Department requirements. The temporary disturbance within the buffer (2,264 s.f., with approximately 929 s.f. occurring in the near term), is the minimum necessary to support a single-family residence.
c. the approval does not require the modification of a critical area development standard established by this chapter;	Criterion met.
d. the development proposal does not pose an unreasonable threat to the public health, safety or welfare on or off the development proposal site and is consistent with the general purposes of this chapter and the public interest;	Criterion met.
e. for dwelling units, no more than five thousand square feet or ten percent of the site, whichever is greater, may be disturbed by structures, building setbacks or other land alteration, including grading, utility installations and landscaping, but not including the area used for a driveway or for an on-site sewage disposal system. When the site disturbance is within a critical area buffer, the building setback line shall be measured from the building footprint to the edge of the approved site disturbance;	House plus reduced BSBL is 4,882 s.f. The entire structure and driveway are entirely outside of the buffer and BSBL. A reduced BSBL is proposed per the accompanying plan. Due to the extensive onsite buffer, the required street setbacks, the BSBL is proposed to be reduced to meet the criteria. However, no development activity is proposed outside of this reduced BSBL.
f. to the maximum extent practical, access is located to have the least adverse impact on the critical area and critical area buffer;	Access is entirely outside of the aquatic buffer and wildlife corridor.
g. the critical area is not used as a salmonid spawning area; and	The proposed drainfield is not used as a salmonid spawning area.

Criteria	Relationship to this Proposal
h. the director may approve an alteration in a category II, III and IV wetland for development of a public school facility.	N/A

Functions of Impact and Enhancement Areas

Impact Area

The area within the wildlife corridor proposed to be disturbed for the drainfield is currently vegetated with invasive reed canarygrass. No trees will be removed for construction of the house and driveway. In its current condition, the disturbance area offers little in the way of functions and values. The lack of vegetative structural and compositional diversity, combined with the proximity to other developed residential properties limits nesting and travel habitat for wildlife. Habitat features such as snags and downed wood are absent within the disturbance area.

The density of herbaceous vegetation in the current condition of the buffer provides moderate water quality and hydrology function, as dense herbaceous stems slow the flow and allow for infiltration before surface runoff reaches Newaukum Creek. The low foliage height diversity limits transpiration rates.

Enhancement Area

The area between the house and the stream is proposed for enhancement. The area is dominated by reed canarygrass with a few sprouts of Himalayan blackberry. In its current condition, the area exhibits very low function for habitat, water quality, and hydrology, as it lacks vegetative diversity, complex structure, and habitat features. Few breeding or foraging opportunities presently exist for terrestrial birds and mammals. The lack of cover above the ground stratum presents a travel deterrent for some species. Enhancement of this area, by planting a dense community of native trees and shrubs, will increase function in a variety of ways.

Table 6 summarizes current and anticipated function of impact and enhancement areas.

Table 5. Anticipated functional lift

Buffer Function	Existing Condition	Proposed Condition	Net Functional Change
Habitat	Very low vegetative species diversity; structural diversity limited to a single low stratum. Invasive blackberry dominates. Foraging and nesting opportunities limited.	Increased vegetative diversity, in both composition and structure. Addition of native trees and shrubs.	Anticipated lift in wildlife cover, foraging, and nesting opportunities. Increasing habitat value as site matures. Enhanced travel corridor

			connectivity to other areas,
Water quality	Low density upright of rigid stems in the buffer, combined with slope, limits vegetation's ability to filtrate water before surface runoff reaches Newaukum Creek,	Increased woody stem density, increased plant foliage and foliage height diversity. Additionally, drainage BMPs per KC SWDM will be employed to minimize erosion and other water quality impacts.	Filtration potential will improve with higher stem density and drainage BMPs.
Hydrology	Low foliage surface limits transpiration rate. Low stem density limits flow attenuation of surface runoff to lake.	Increased stem density, increased plant foliage and foliage height diversity.	Transpiration will increase with increase in foliage. Increased stem density with aid flow attenuation and infiltration.

Proposed Mitigation

To compensate for the proposed drainfield within the wildlife corridor, the owner proposes to restore 5,420 square feet of area within the aquatic buffer and wildlife corridor by planting native trees and shrubs, and installing a split-rail fence along the edge of the buffer. The proposed planting area is approximately 2.3 times larger than impact area (including primary drainfield, to be installed immediately, and the reserve drainfield, to be installed in +/- 30 years. The planting area is 5.8 times larger than the immediate impact from installing the primary drainfield. This exceeds the code requirement of 1.5:1. Additionally, much of this planting area would be considered "advance compensation", as the majority of the impact pertains to the reserve drainfield, which will likely not be constructed for 30 to 50 years.

Mitigation will involve the following sequence of actions:

1. Place temporary erosion control, such as a properly installed silt fence, at the outer edge of the work area.
2. Remove Himalayan and cutleaf blackberry per with the King County Noxious weed program guidelines, attached to this report as Appendix B.
3. Obtain plants from a reputable nursery. If possible, bare root stock shall be used, as bare root specimens tend to adjust to planting more quickly than container plants. If bare root material is not available or appropriate (due to time of year), sizes specified on the accompanying plan shall be used.
4. Install specified plants throughout the prepared planting area as indicated on accompanying plan.
5. Amend each planting hole with one shovelful of compost.

6. Upon completion of planting, sheet mulch areas of reed canarygrass within the enhancement area. Apply several layers of cardboard and 4 – 6 inches of wood mulch.
7. Water each plant thoroughly by hand/hose to remove air pockets.
8. Install a 3-inch-thick layer of coarse wood chip mulch around the base of each installed plant in an 18-inch-diameter circle. Mulch should not touch plant stems.
9. Upon completion of all required site work, install wildlife-friendly fence and Critical Area signs, per plan.
10. Provide documentation of plant installation to King County.
11. Monitor the site for three years to ensure success of planted species.
12. Provide annual reports to King County.

Irrigation Plan

King County has required an irrigation plan. Water will be delivered to the new plantings at the rate of no less than 1 inch of water per week from June 1 through October 15. Irrigation will supplement natural rainfall during the growing season to achieve the required volume of water. Water will be provided from hoses at the proposed house, which is within 200 feet of all proposed plantings. The owner will be living on site and will be available onsite for watering at least once per week. Automatic timers will be used in the event that the owner is unable to irrigate during a particular week.

Mitigation Goals

The goal of the mitigation plan is to improve the functions of the buffer and wildlife corridor by increasing vegetative and structural diversity.

Mitigation Objectives

Specific objectives of the planting plan include:

- Planting six site-appropriate native shrub species.
- Planting three site-appropriate native tree species.
- Augmenting soil as needed with compost to improve organic content and increase survivorship of planted specimens.

Maintenance and Monitoring Plan

Maintenance and monitoring will be conducted for three years post-installation; monitoring may be extended if standards are not met by Year 3.

Performance Standards

The mitigation will be measured against the following performance standards.

1. Survival:
 - a. 100% of installed plants will be alive at the end of Year 1. Plants will be replaced as needed to achieve this standard.

- b. At least 85% survival of installed plants will be achieved in Years 2 and 3.
2. Native woody vegetation cover:
 - a. 60% cover of native trees and shrubs will be achieved by Year 3 within the mitigation area and maintained. Volunteer and existing plants may count towards this cover standard.
3. Invasive cover: No more than 10% cover by invasive plants will be present in any stratum in any monitoring year with the exception of reed canarygrass. No more than 20% cover of reed canarygrass will be present within the enhancement area at any time after completion of planting.
4. Native plants will exhibit good health, vigor, and growth in each monitoring year.

Maintenance

1. Maintenance will take place twice yearly (or more often if necessary), in spring and fall, for the length of the monitoring period by the landowner or a consultant.
2. Irrigate as needed. Water will be delivered to supplement natural precipitation in the period from June 15 through September 15 (or as needed) at a minimum rate of 1 inch per week.
3. Dead mitigation plants will be replaced during fall/winter planting time (October 15 – April 1).
4. All invasive plants in the planting areas will be removed by hand or with light equipment during maintenance, including roots. No herbicides will be used.
5. Non-native herbaceous weeds will be removed to the dripline of installed plants.
6. Mulch rings will be replenished around installed plants to maintain a thickness of 3 inches to the dripline.
7. Any litter, dumping, and non-native vegetation within the mitigation area will be removed and disposed of properly off-site.

Commented [ST1]: This seems to cover the comment about showing methods of plant removal.

Methods and Reporting

1. Plant survival and native plant diversity will be documented by performing a full count of installed and volunteer plants in each monitoring year.
2. Native vegetation cover and invasive plant cover will be measured by line-intercept along transects spanning the mitigation area. Transect length will be dictated by the width of the mitigation area. Five transects will be established in Year 1 and used in each monitoring year.
3. Four photograph points will be established in Year 1 and photographs submitted with each monitoring report.
4. Visual inspection will be used to determine plant health and vigor and to assess for structure damage and litter.

5. Monitoring reports will be submitted to Snohomish County by October 31 of each monitoring year. Report will include methods, results, analysis, and recommendations for maintenance and remedial actions.

Contingency Plan

If there is a significant problem with the mitigation achieving its performance standards, the bond-holder shall work with consultant, landscape professional, or Snohomish County to develop an appropriate contingency plan. Contingency actions may include, but are not limited to: regrading, additional plant installation, erosion control, addressing invasive species, modifications to hydrology, fencing from deer or plant substitutions of type, size, quantity, and location. Such contingency plan shall be submitted to King County by December 31 of any year when deficiencies are discovered.

At the request of King County, a specific plan for addressing blackberries species is provided in Appendix B.

Appendix A: Priority Habitat Data

Occurrence Name	Federal Status	State Status	Sensitive Location
Winter Steelhead	N/A	N/A	No
Coho	Candidate	N/A	No
Sockeye	N/A	N/A	No
Fall Chum	N/A	N/A	No
Chinook	Threatened	N/A	No
Steelhead	Threatened	N/A	No
Resident Coastal Cutthroat	N/A	N/A	No
Coho	N/A	N/A	No
Fall Chinook	N/A	N/A	No
Pink Salmon Odd Year	N/A	N/A	No
Chum	Not Warranted	N/A	No

PHS Species/Habitats Details:

Winter Steelhead	
Scientific Name	<i>Oncorhynchus mykiss</i>
Priority Area	Breeding Area
Site Name	Newaukum Creek
Accuracy	NA
Notes	LLID: 1220671472853, Fish Name: Steelhead Trout, Run Time: Winter, Life History: Anadromous
Source Record	28652
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversity/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	<i>Oncorhynchus kisutch</i>
Priority Area	Occurrence
Site Name	Newaukum Creek
Accuracy	NA
Notes	LLID: 1220671472853, Stock Name: Green River/Soos Creek Coho, Run: Unspecified, Status: Healthy
Source Record	3140
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Candidate
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Sockeye	
Scientific Name	<i>Oncorhynchus nerka</i>
Priority Area	Occurrence/Migration
Site Name	Newaukum Creek
Accuracy	NA
Notes	LLID: 1220671472853, Fish Name: Sockeye Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	28650
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Fall Chum	
Scientific Name	<i>Oncorhynchus keta</i>
Priority Area	Breeding Area
Site Name	Newaukum Creek
Accuracy	NA
Notes	LLID: 1220671472853, Fish Name: Chum Salmon, Run Time: Fall, Life History: Anadromous
Source Record	28642
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chinook	
Scientific Name	<i>Oncorhynchus tshawytscha</i>
Priority Area	Occurrence
Site Name	Newaukum Creek
Accuracy	NA
Notes	LLID: 1220671472853, Stock Name: Green River (Duwamish) Chinook, Run: Sum/Fall, Status: Healthy
Source Record	1160
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Threatened
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Steelhead	
Scientific Name	<i>Oncorhynchus mykiss</i>
Priority Area	Occurrence
Site Name	Newaukum Creek
Accuracy	NA
Notes	LLID: 1220671472853, Stock Name: Green River (Duwamish) Winter Steelhead, Run: Winter, Status: Healthy
Source Record	6175
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Threatened
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Resident Coastal Cutthroat	
Scientific Name	<i>Oncorhynchus clarki</i>
Priority Area	Occurrence/Migration
Site Name	Newaukum Creek
Accuracy	NA
Notes	LLID: 1220671472853, Fish Name: Cutthroat Trout, Run Time: Unknown or not Applicable, Life History: Unknown
Source Record	28638
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Coho	
Scientific Name	<i>Oncorhynchus kisutch</i>
Priority Area	Breeding Area
Site Name	Newaukum Creek
Accuracy	NA
Notes	LLID: 1220671472853, Fish Name: Coho Salmon, Run Time: Unknown or not Applicable, Life History: Anadromous
Source Record	28646
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Fall Chinook	
Scientific Name	<i>Oncorhynchus tshawytscha</i>
Priority Area	Breeding Area
Site Name	Newaukum Creek
Accuracy	NA
Notes	LLID: 1220671472853, Fish Name: Chinook Salmon, Run Time: Fall, Life History: Anadromous
Source Record	28639
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Pink Salmon Odd Year	
Scientific Name	<i>Oncorhynchus gorbuscha</i>
Priority Area	Occurrence/Migration
Site Name	Newaukum Creek
Accuracy	NA
Notes	LLID: 1220671472853, Fish Name: Pink Salmon, Run Time: Odd Year, Life History: Anadromous
Source Record	28648
Source Dataset	SWIFD
Federal Status	N/A
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

Chum	
Scientific Name	<i>Oncorhynchus keta</i>
Priority Area	Occurrence
Site Name	Newaukum Creek
Accuracy	NA
Notes	LLID: 1220671472853, Stock Name: Duwamish/Green Fall Chum, Run: Fall, Status: Unknown
Source Record	2143
Source Dataset	SASI
Source Name	Not Given
Source Entity	WDFW Fish Program
Federal Status	Not Warranted
State Status	N/A
PHS Listing Status	PHS Listed Occurrence
Sensitive	N
SGCN	N
Display Resolution	AS MAPPED
More Info	http://wdfw.wa.gov/wlm/diversty/soc/soc.htm
Geometry Type	Lines

DISCLAIMER. This report includes information that the Washington Department of Fish and Wildlife (WDFW) maintains in a central computer database. It is not an attempt to provide you with an official agency response as to the impacts of your project on fish and wildlife. This information only documents the location of fish and wildlife resources to the best of our knowledge. It is not a complete inventory and it is important to note that fish and wildlife resources may occur in areas not currently known to WDFW biologists, or in areas for which comprehensive surveys have not been conducted. Site specific surveys are frequently necessary to rule out the presence of priority resources. Locations of fish and wildlife resources are subject to variation caused by disturbance, changes in season and weather, and other factors. WDFW does not recommend using reports more than six months old.

Appendix B: Blackberry Control

Himalayan Blackberry

Rubus bifrons, syn. Rubus armeniacus, syn. Rubus discolor

Evergreen Blackberry

Rubus laciniatus
Rosaceae

Class C Noxious Weeds
Control Recommended

Legal Status in King County: Himalayan blackberry and evergreen blackberry are Class C noxious weeds (non-native species that can be designated for control based on local priorities) according to Washington State Noxious Weed Law, RCW 17.10. The State Weed Board has not designated these species for control in King County. The King County Weed Control Board recommends control of these species where feasible, but does not require it.

BACKGROUND INFORMATION

Impacts and History

- Highly invasive and can be found throughout King County.
- Can be very difficult to control.
- Out competes native understory vegetation and prevents the establishment of desirable native shade intolerant trees such as Pacific Madrone, Douglas Fir and Western White Pine.
- Can limit movement of large animals when forming large impenetrable thickets.

Description

- **Himalayan blackberry** is a robust, sprawling perennial with stems having large stiff thorns.
- Main canes up to 10 feet long with trailing canes reaching up to 40 feet.
- Trailing canes typically take root at the tips.
- Leaves are large, round to oblong and toothed typically come in sets of three (trailing canes) or five (main stems).
- Individual canes can reach a density of 520 canes per square meter.
- Flowers are white to pink, about one inch in diameter and borne in clusters of about 5 to 20 blooms.
- Develops edible black fruit that clings to the center core when picked.



Himalayan blackberry

- **Evergreen blackberry** is a robust trailing evergreen shrub that grows into impenetrable thickets.
- Ribbed reddish stems up to 10 feet in length with large curved thorns.
- Young canes arch as they grow longer, eventually reaching the ground and rooting at the nodes.
- Palmately compound leaves with 3 to 5 deeply lacerated leaflets.
- Flowers are white to pink about one inch in diameter borne in clusters.
- Develops edible black fruit that clings to the center core when picked.



© 2007 Virginia Tech
Evergreen blackberry

Habitat

- Blackberry can be found in a myriad of habitats such as vacant lands, pastures, forest plantations, roadsides, creek gullies, river flats, riparian areas, fence lines, and right-of-way corridors.
- Does not grow well in wetland areas, will grow if cane tip roots.

Reproduction and Spread

- Reproduces vegetatively by root and stem fragments and by seed.
- Plants begin flowering in spring with fruit ripening in midsummer to early August.
- Daughter plants can form where canes touch the ground.
- Seeds can remain viable in the soil for several years.

Local Distribution

Found throughout King County.

CONTROL INFORMATION

Integrated Pest Management

- The preferred approach for weed control is Integrated Pest Management (IPM). IPM involves selecting from a range of possible control methods to match the management requirements of each specific site. The goal is to maximize effective control and to minimize negative environmental, economic and social impacts.
- Use a multifaceted and adaptive approach. Select control methods which reflect the available time, funding and labor of the participants, the land use goals, and the values of the community and landowners. Management will require dedication over a number of years, and should allow for flexibility in method as appropriate.

Planning Considerations

- Plan your control effort including: 1) surveying of the area thoroughly for blackberry, 2) setting priorities for control, 3) selecting the best control method(s) for the site conditions and regulatory compliance issues (**refer to the King County Noxious Weed Regulatory Guidelines**) and 4) monitoring the success of control and implementing follow up control as necessary.
- Control practices in critical areas should be selected to minimize soil disturbance. Any disturbed areas need to be stabilized to control erosion and sediment deposition. Refer to the King County Surface Design Manual (www.kingcounty.gov/environment/waterandland/stormwater/documents/surface-water-design-manual) for further information about sediment and erosion control practices. Minimizing disturbance also avoids creating more opportunities for germination of blackberry and other weeds.
- Generally work first in least infested areas, moving towards more heavily infested areas.
- Ensure habitat protection by targeting only blackberry and preserving all native and beneficial vegetation.
- For sites that provide important bird habitat, it is recommended to remove only one quarter of the blackberry infestation each year especially if there is little alternative habitat nearby. You may also want to consider refraining from large blackberry removal projects during nesting season (mid-March to the end of June).

Early Detection and Prevention

- Blackberry is easily identifiable throughout the year.
- Manually control new infestations as early as possible.
- Monitor the control site and remove any plants returning from root fragments.

Manual

- Hand-pull the stem closest to the ground and uproot the root ball. This method is most effective with first year plants.
- Manual control works best after rain or in loose soils where the canes are suppressed because the blackberries are growing in a forest understory.
- Digging up root crowns and major side roots is slow but will control blackberry and is effective on small infestations.
- Using a claw mattock or pulaski/mattock is also effective.
- Recheck work area because large root fragments left can re-sprout.
- If removing dense patches, area should be replanted with native plants and mulched, or reseeded with a suitable grass.
- Hand pulling and the use of hand mechanical tools are allowable in all critical areas in unincorporated King County.

Mechanical

- Mowing, including the use of riding mowers and tractor mounted mowers, can be very effective in controlling blackberries but also may harm desirable plants present.
- Mowing should not be used where soils are highly susceptible to compaction or erosion, or where soils are very wet.
- Several cuttings a year over several years are necessary to exhaust the roots of their reserve food supply.
- If only one cutting is done per year, cut when the plants begin to flower. If no follow-up is done, the blackberry may re-sprout from the root crown at a greater density, and could overgrow any vegetation planted.
- Cultivation in agricultural areas utilizing cultivation machinery can be effective in controlling blackberry either alone or in conjunction with mowing but is not selective and may require specific sediment and erosion control measures (see Control of Large Infestations/Monocultures).

Biological

Biological control is the deliberate introduction of insects, mammals or other organisms which adversely affect the target weed species. Biological control is generally most effective when used in conjunction with other control techniques. Biological control methods that may assist in blackberry control include the use of goats and chickens as follows:

- Goats and pigs may be effective on clearing or controlling blackberry re-growth from a year to four years old. On mature stands, goats tend to only strip leaves off of the canes. Animals may prefer alternative forage available, so reduce opportunities for selective browsing. Grazing must be continuous or else re-growth will occur. Care needs to be taken to fence off or protect any native or other valuable vegetation. The King Conservation District can provide further information of the use and management of goats for weed control.
- Chickens can potentially decrease the seed bank in blackberry cleared areas by grazing on the seeds.

Chemical

- **Precautions:**
 - Herbicides should only be applied at the rates and for the site conditions and/or land usage specified on the label of the product being used. **Follow all label directions.**
 - For herbicide use in critical areas and their buffers, certain restrictions apply depending on the site and jurisdiction. In unincorporated King County, refer to the **King County Noxious Weed Regulatory Guidelines** for a summary of current restrictions and regulatory compliance issues. Elsewhere, check with the local jurisdiction.

- For your personal safety, at a minimum wear gloves, long sleeves, long pants, closed toe shoes, and appropriate eye protection. Follow label directions for any additional personal protection equipment needed.
- For control of large infestations, herbicide use may be effective, either alone or in combination with mowing. Infested areas should not be mowed until after the herbicide has had a chance to work and weeds are brown and dead.
- For several years following treatment, monitor areas for new plants germinating from the seed bank, or any missed plants.

Specific Herbicide Information

Herbicides are generally described here by the active ingredient. Many commercial formulations are available containing a specific active ingredient. References to product names are as an example only, and other equally, or more effective commercial products may be available.

Glyphosate: can effectively control blackberry. Treatment with glyphosate needs to be combined with effective re-vegetation of the site to prevent re-invasion by undesirable vegetation and to control erosion. Glyphosate is most effective on blackberry in September to October when canes are actively growing and after berries have formed. Fall treatments should be conducted before the first frost.

Selective Broadleaf Herbicides (such as triclopyr, 2,4-D and metsulfuron): most effective when blackberry is growing in a grassy area. Read the label of the product you are using to determine the optimal time to spray. Re-treatment the following year may be necessary to control any returning plants. Continue to monitor for new plants for several years after the initial treatment and following any disturbance to the soil such as tilling or construction.

NOTE: Certain additional restrictions apply for products containing 2,4-D and Triclopyr BEE (e. g. Garlon 4, Crossbow). Refer to the King County Noxious Weed Regulatory Guidelines for more details.

Selective herbicides that are effective on blackberry include metsulfuron (e.g. Escort, Cimarron, Ally), triclopyr ester (e.g. Garlon 4) or triclopyr amine (e.g. Garlon 3A) and a combination treatment of triclopyr and 2,4-D (e.g. Crossbow).

Metsulfuron should be applied to fully leafed-out blackberry before fall leaf coloration. Good coverage is essential to achieve control.

Triclopyr (amine and ester) and triclopyr + 2,4-D should be applied when actively growing. Foliage must be thoroughly wetted with herbicide.

2,4-D can harm certain grasses, alfalfa, clover and other legumes. The addition of a suitable surfactant may improve the control results.

The mention of a specific product brand name in this document is not, and should not be construed as an endorsement or as a recommendation for the use of that product. Chemical control options may differ for private, commercial and government agency users. **For questions about herbicide use, contact the King County Noxious Weed Control Program at 206-477-9333.**

SUMMARY OF BEST MANAGEMENT PRACTICES

Small Infestations in Native and/or Desirable Vegetation

- Properly identify targeted blackberries.
- Mark all desirable vegetation around control area, ensuring that no native plants are removed.
- Small infestations of less than 200 square feet can be effectively and relatively easily hand-pulled or dug up. Isolated plants should be removed in order to prevent them from infesting a larger area.
- Cut above ground portion of blackberry with loppers or pruners. Dig up or pull the remaining root ball.
- Pull or dig up the plants when the soil is wet.
- Replace any divots created when removing the plants to lessen the amount of disturbed soil.
- Apply appropriate herbicide with wick wiper or by spot spray to the cut stumps to minimize off target injury.
- Monitor site throughout growing season and remove any new plants.
- If using an herbicide in a grassy area, use a selective herbicide to avoid injury to the grass.

Large Infestations/Monocultures

- Properly identify invasive blackberries.
- Mark all native vegetation in and around the control area, ensuring that no native plants are removed.
- Mow down the blackberry with weed-eaters, brush mowers or machetes.
- Following mowing, either dig up the root-ball if labor is available or treat re-sprouting blackberry re-growth with an appropriate herbicide (See the Chemical section of this BMP).
- Mechanical cultivation is also an option for controlling invasive blackberries in agricultural areas. After initially mowing down the above ground vegetation, deep cultivation of the land can control root balls if done multiple times. Yearly spot control of returning seedlings or re-growth will likely be necessary.
- For large areas, it may be more cost-effective to apply herbicide to the mature blackberry plants and then mow the dead canes.
- When large dense areas of blackberry are removed, the bare areas created need to be stabilized and re-vegetated with native or non-invasive vegetation to prevent erosion

and re-invasion of blackberries and other weeds (refer to the King County Surface Water Design Manual or equivalent for incorporated areas). Ensure that a high standard of blackberry control has been achieved prior to re-planting the site.

- If a non-selective herbicide is used in grassy areas, the area needs to be re-seeded to prevent reinvasion by weeds.
- Infested areas will require follow-up management lasting for several years to control plants re-growing from the seed bank and rhizomes.

Riparian and Aquatic Area Control Issues

- Additional permits may be required for control of infestations in riparian areas. See the Noxious Weed Regulatory Guidelines for more information or contact your local jurisdiction.
- In some cases, the cleared area will need to be replanted with native or non-invasive vegetation and stabilized against erosion. See the King County Surface Water Design Manual for further information.
- Focus on manual removal for small infestations if possible. Follow procedures listed above.
- For larger areas where herbicide use is warranted, spray using low pressure and large droplet size to reduce drift. If herbicide could potentially drift into the water or a wetland area, use only approved aquatic herbicides and surfactants.
- Blackberry shrubs can be found growing along wetland margins but are typically daughter plants off of a main cane. Control can be achieved by cutting the canes down to the ground. The roots can not withstand the anaerobic soil conditions without the supporting canes.

Road Rights-of-Way Control Issues

- Manually remove infestations if possible.
- If plants are in grassy areas, use a selective broadleaf herbicide; if controlled with a non-selective herbicide, re-seed after control is completed.
- An effective mowing program can control blackberries along a Right-of-Way. Any blackberries remaining outside the mowed area will quickly re-invade the cleared areas.
- Spot spray blackberries with glyphosate in areas with no desirable vegetation.

Disposal Methods

- Plant crowns and rootballs should be collected and discarded with the trash or yard waste or taken to a transfer station for disposal. Back yard composting of rootballs is not recommended.
- Stems can be composted, but they will root on moist soil so they need to be completely dried out or chipped up before composting.
- Dried out stems may be composted on site, disposed of in a city-provided yard waste container or in the green recycling at a transfer station.

- Stems with berries should be collected and put in the trash, yard waste container, or taken to a transfer station. If removal is not feasible, these stems can be left on site. However, there is a risk of spread from the seeds, so the area should be monitored for
- several years for seedlings. Stems should be left well away from waterways, shorelines, roads and un-infested areas.
- Never dump yard waste in parks or natural areas, as weeds may spread from yard waste piles.

References

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Appendix C: Bond Quantity Worksheet



Department of Permitting
 Environmental Review
 35030 SE Douglas Str, Suite 210
 Snoqualmie, WA 98065-9266
 206-296-6600 TTY Relay: 711

**Critical Areas Mitigation
 Bond Quantity Worksheet**

C24 09/09/2015
 Is-wks-sensareaaBQ.xls
 Is-wks-sensareaaBQ.pdf

Project Name: Argo **Date:** 19-May-23 **Prepared by:** MacWhinney

Project Number: **Project Description:** SFR

Location: PIN 092006-9038 **Applicant:** Argo **Phone:**

PLANT MATERIALS (includes labor cost for plant installation)

Type	Unit Price	Unit	Quantity	Description	Cost
PLANTS: Potted, 4" diameter, medium	\$5.00	Each			\$ -
PLANTS: Container, 1 gallon, medium soil	\$11.50	Each	154.00		\$ 1,771.00
PLANTS: Container, 2 gallon, medium soil	\$20.00	Each	66.00		\$ 1,320.00
PLANTS: Container, 5 gallon, medium soil	\$36.00	Each			\$ -
PLANTS: Seeding, by hand	\$0.50	SY			\$ -
PLANTS: Slips (willow, red-osier)	\$2.00	Each			\$ -
PLANTS: Stakes (willow)	\$2.00	Each			\$ -
PLANTS: Stakes (willow)	\$2.00	Each			\$ -
PLANTS: Flats/plugs	\$2.00	Each			\$ -
TOTAL					\$ 3,091.00

INSTALLATION COSTS (LABOR, EQUIPMENT, & OVERHEAD)

Type	Unit Price	Unit	Quantity	Description	Cost
Compost, vegetable, delivered and spread	\$37.88	CY			\$ -
Decompacting till/hardpan, medium, to 6" depth	\$1.57	CY			\$ -
Decompacting till/hardpan, medium, to 12" depth	\$1.57	CY			\$ -
Hydroseeding	\$0.51	SY			\$ -
Labor, general (landscaping other than plant installation)	\$40.00	HR			\$ -
Labor, general (construction)	\$40.00	HR			\$ -
Labor: Consultant, supervising	\$55.00	HR			\$ -
Labor: Consultant, on-site re-design	\$95.00	HR			\$ -
Rental of decompacting machinery & operator	\$70.00	HR			\$ -
Sand, coarse builder's, delivered and spread	\$42.00	CY			\$ -
Staking material (set per tree)	\$7.00	Each			\$ -
Surveying, line & grade	\$250.00	HR			\$ -
Surveying, topographical	\$250.00	HR			\$ -
Watering, 1" of water, 50' soaker hose	\$3.62	MSF			\$ -
Irrigation - temporary	\$3,000.00	Acre			\$ -
Irrigation - buried	\$4,500.00	Acre			\$ -
Tilling topsoil, disk harrow, 20hp tractor, 4"-6" deep	\$1.02	SY			\$ -
TOTAL					\$ -

HABITAT STRUCTURES*

ITEMS	Unit Cost	Unit	Quantity	Description	Cost
Fascines (willow)	\$ 2.00	Each			\$ -
Logs (cedar), w/ root wads, 16"-24" diam., 30' long	\$1,000.00	Each			\$ -
Logs (cedar) w/o root wads, 16"-24" diam., 30'	\$400.00	Each			\$ -
Logs, w/o root wads, 16"-24" diam., 30' long	\$245.00	Each			\$ -
Logs w/ root wads, 16"-24" diam., 30' long	\$460.00	Each			\$ -
Rocks, one-man	\$60.00	Each			\$ -
Rocks, two-man	\$120.00	Each			\$ -
Root wads	\$163.00	Each			\$ -
Spawning gravel, type A	\$22.00	CY			\$ -
Weir - log	\$1,500.00	Each			\$ -
Weir - adjustable	\$2,000.00	Each			\$ -
Woody debris, large	\$163.00	Each			\$ -
Snags - anchored	\$400.00	Each			\$ -
Snags - on site	\$50.00	Each			\$ -
Snags - imported	\$800.00	Each			\$ -
TOTAL					\$ -

* All costs include delivery and installation

EROSION CONTROL

ITEMS	Unit Cost	Unit	Quantity	Description	Cost
Backfill and Compaction-embankment	\$ 4.89	CY			\$ -
Crushed surfacing, 1 1/4" minus	\$30.00	CY			\$ -
Ditching	\$7.03	CY			\$ -
Excavation, bulk	\$4.00	CY			\$ -
Fence, silt	\$1.60	LF			\$ -
Jute Mesh	\$1.26	SY			\$ -
Mulch, by hand, straw, 2" deep	\$1.27	CY			\$ -
Mulch, by hand, wood chips, 2" deep	\$3.25	SY	600.00		\$ 1,950.00
Mulch, by machine, straw, 1" deep	\$0.32	SY			\$ -
Piping, temporary, CPP, 6"	\$9.30	LF			\$ -
Piping, temporary, CPP, 8"	\$14.00	LF			\$ -
Piping, temporary, CPP, 12"	\$18.00	LF			\$ -
Plastic covering, 6mm thick, sandbagged	\$2.00	SY			\$ -
Rip Rap, machine placed, slopes	\$33.98	CY			\$ -
Rock Constr. Entrance 100'x15'x1'	\$3,000.00	Each			\$ -
Rock Constr. Entrance 50'x15'x1'	\$1,500.00	Each			\$ -
Sediment pond riser assembly	\$1,695.11	Each			\$ -
Sediment trap, 5' high berm	\$15.57	LF			\$ -
Sediment trap, 5' high berm w/spillway incl. riprap	\$59.60	LF			\$ -
Sodding, 1" deep, level ground	\$5.24	SY			\$ -
Sodding, 1" deep, sloped ground	\$6.48	SY			\$ -
Straw bales, place and remove	\$600.00	TON			\$ -
Hauling and disposal	\$20.00	CY			\$ -
Topsoil, delivered and spread	\$35.73	CY			\$ -
TOTAL					\$ 1,950.00

GENERAL ITEMS					
ITEMS	Unit Cost	Unit			Cost
Fencing, chain link, 6' high	\$18.89	LF			\$ -
Fencing, chain link, corner posts	\$111.17	Each			\$ -
Fencing, chain link, gate	\$277.63	Each			\$ -
Fencing, split rail, 3' high (2-rail)	\$10.54	LF	230.00		\$ 2,424.20
Fencing, temporary (NGPE)	\$1.20	LF			\$ -
Signs, sensitive area boundary (inc. backing, post, install)	\$28.50	Each	3.00		\$ 85.50
TOTAL					\$ 2,509.70
OTHER				(Construction Cost Subtotal)	\$ 7,550.70
ITEMS	Percentage of Construction	Unit			Cost
Mobilization	10%	1			\$ 755.07
Contingency	30%	1			\$ 2,265.21
TOTAL					\$ 3,020.28
MAINTENANCE AND MONITORING <p style="font-size: small; margin: 0;">NOTE: Projects with multiple permit requirements may be required to have longer monitoring and maintenance terms. This will be evaluated on a case-by-case basis for development applications. Monitoring and maintenance ranges may be assessed anywhere from 5 to 10 years.</p>					
Maintenance, annual (by owner or consultant)					
Less than 1,000 sq. ft. and buffer mitigation only	\$ 1.08	SF		(3 X SF total for 3 annual events; Includes monitoring)	\$ -
Less than 1,000 sq. ft. with wetland or aquatic area mitigation	\$ 1.35	SF		(3 X SF total for 3 annual events; Includes monitoring)	\$ -
Larger than 1,000 sq. ft. but less than 5,000 sq. ft. of buffer mitigation	\$ 180.00	EACH	3.00	(4hr @ \$45/hr)	\$ 540.00
Larger than 1,000 sq. ft. but less than 5,000 sq. ft. of wetland or aquatic area mitigation	\$ 270.00	EACH		(6hr @ \$45/hr)	\$ -
Larger than 5,000 sq. ft. but < 1 acre -buffer mitigation only	\$ 360.00	EACH		(8 hrs @ 45/hr)	\$ -
Larger than 5,000 sq. ft. but < 1 acre with wetland or aquatic area mitigation	\$ 450.00	EACH		(10 hrs @ \$45/hr)	\$ -
Larger than 1 acre but < 5 acres - buffer and / or wetland or aquatic area mitigation	\$ 1,600.00	DAY		(WEC crew)	\$ -
Larger than 5 acres - buffer and / or wetland or aquatic area mitigation	\$ 2,000.00	DAY		(1.25 X WEC crew)	\$ -
Monitoring, annual (by owner or consultant)					
Larger than 1,000 sq. ft. but less than 5,000 wetland or buffer mitigation	\$ 720.00	EACH	3.00	(8 hrs @ 90/hr)	\$ 2,160.00
Larger than 5,000 sq. ft. but < 1 acre with wetland or aquatic area impacts	\$ 900.00	EACH		(10 hrs @ \$90/hr)	\$ -
Larger than 1 acre but < 5 acres - buffer and / or wetland or aquatic area impacts	\$ 1,440.00	DAY		(16 hrs @ \$90/hr)	\$ -
Larger than 5 acres - buffer and / or wetland or aquatic area impacts	\$ 2,160.00	DAY		(24 hrs @ \$90/hr)	\$ -
TOTAL					\$ 2,700.00
Total					\$13,270.98

Appendix D: Site & Planting Plans



King County
 Department of Permitting
 and Environmental Review

Residential Site Plan Template

Ref: KCC 21a.12.030

Max. Impervious Surface Allowed _____

Max. Bldg. Height Allowed _____

Ref: KCC 21a.12.170

Min. Blg. Setback From Street _____

Min. Garage Setback From Street _____

Min. Blg. Setback From Interior _____

Permit Center validation:

- Zoning
- Site Review Not Applicable

Validated Signature _____

Login Initials _____ Date: _____

Engineering / Drainage Approval

Signature: _____

Date: _____

Critical Areas Approval

Signature: _____

Date: _____

Clearing / Grading Approval

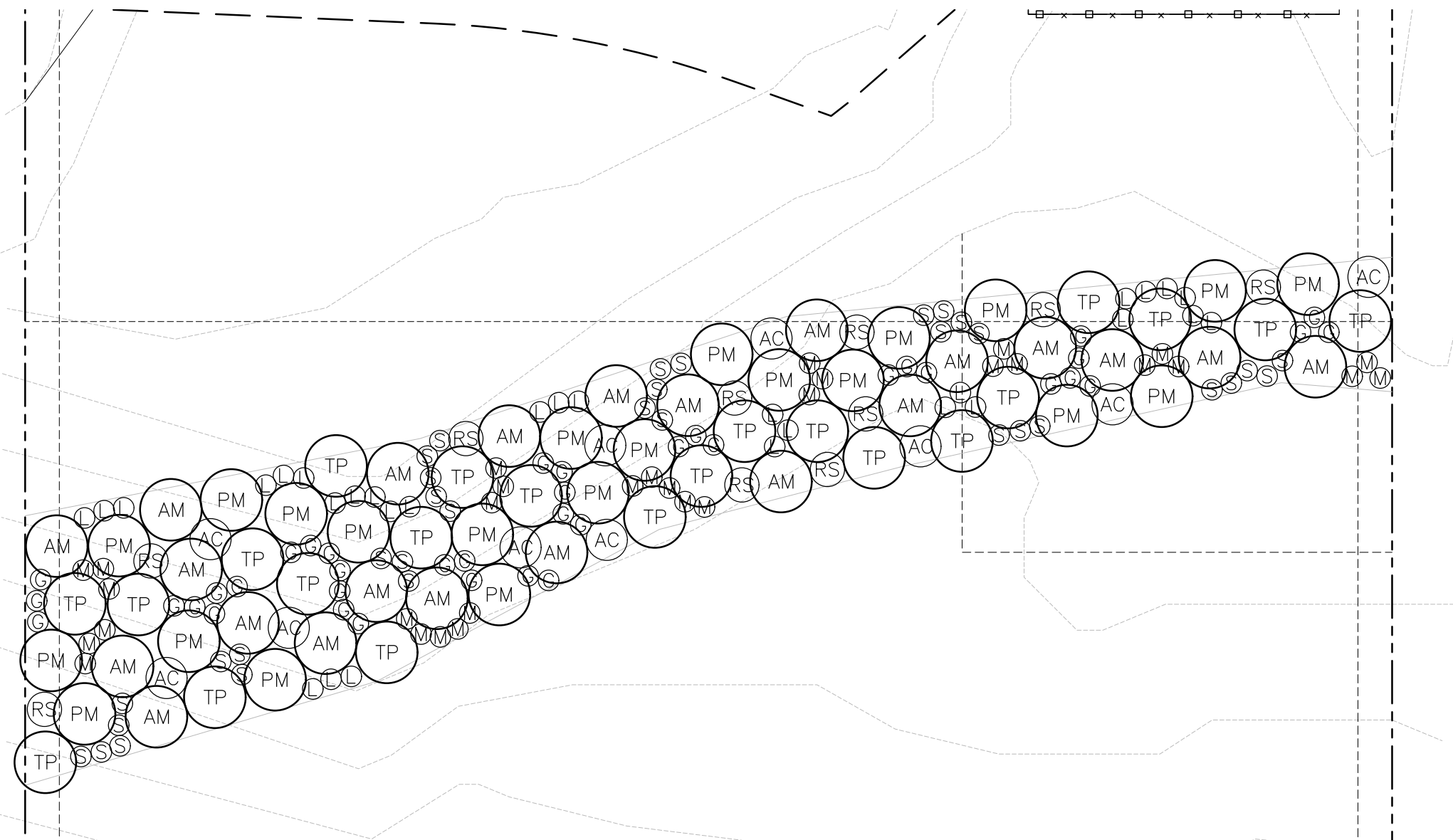
Signature: _____

Date: _____

Fire Approval

Signature: _____

Date: _____



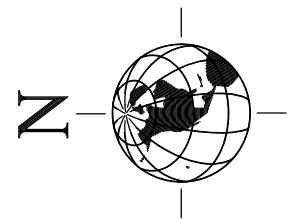
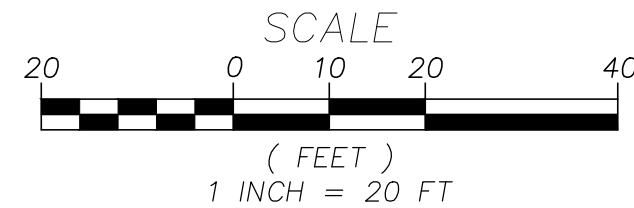
PLANT SCHEDULE

TREES

KEY	SCIENTIFIC NAME	COMMON NAME	SIZE (MIN.)	SPACING	QUANTITY
AM	ACER MACROPHYLLUM	BIGLEAF MAPLE	2 GAL.	9' O.C.	22
PM	PSEUDOTSUGA MENZIESII	DOUGLAS FIR	2 GAL.	9' O.C.	22
TP	THUJA PLICATA	WESTERN RED CEDAR	2 GAL.	9' O.C.	22

SHRUBS

KEY	SCIENTIFIC NAME	COMMON NAME	SIZE (MIN.)	SPACING	QUANTITY
AC	ACER CIRCINATUM	VINE MAPLE	1 GAL.	6' O.C.	10
G	GAULTHERIA SHALLON	SALAL	1 GAL.	3' O.C.	39
L	LONICERA INVOLUCRATA	BLACK TWIN-BERRY	1 GAL.	3' O.C.	30
M	MAHONIA AQUIFOLIUM	TALL OREGON GRAPE	1 GAL.	3' O.C.	31
RS	RIBES SANGUINEUM	RED CURRANT	1 GAL.	5' O.C.	10
S	SYMPHORICARPOS ALBUS	SNOWBERRY	1 GAL.	3' O.C.	34



PLANTING PLAN



King County
Department of Permitting
and Environmental Review

Residential Site Plan Template

Ref: KCC 21a.12.030

Max. Impervious Surface Allowed _____

Max. Bldg. Height Allowed _____

Ref: KCC 21a.12.170

Min. Blg. Setback From Street _____

Min. Garage Setback From Street _____

Min. Blg. Setback From Interior _____

Permit Center validation:

- Zoning
- Site Review Not Applicable

Validated Signature _____

Login Initials _____ Date: _____

Engineering / Drainage Approval

Signature: _____

Date: _____

Critical Areas Approval

Signature: _____

Date: _____

Clearing / Grading Approval

Signature: _____

Date: _____

Fire Approval

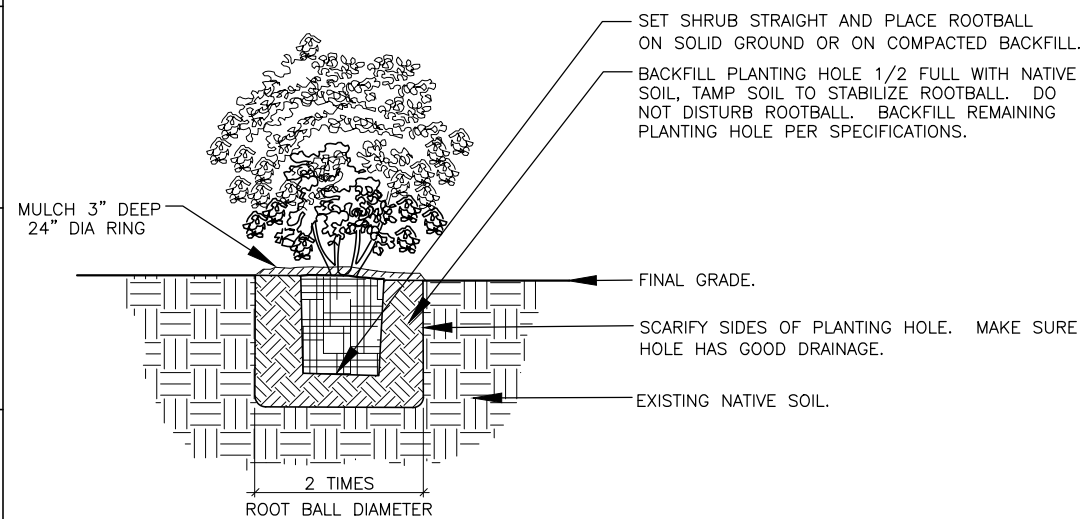
Signature: _____

Date: _____

SPECIFICATIONS

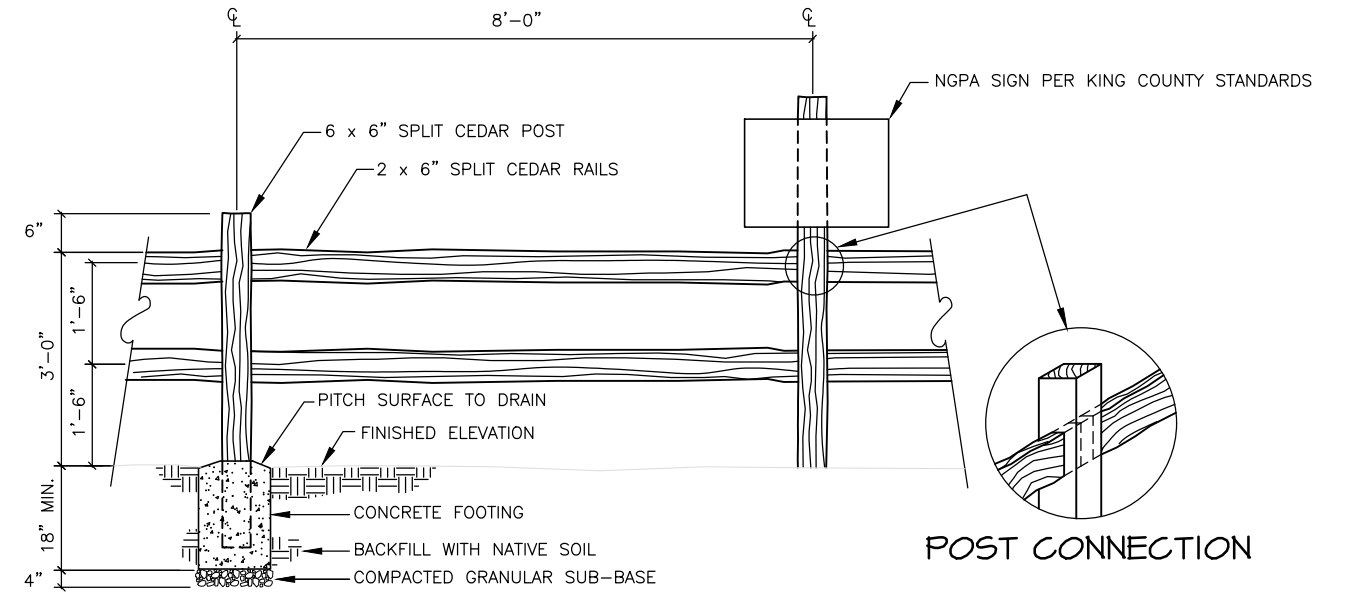
CONSTRUCTION/SPECIFICATIONS

- Prior to construction, the limits of work will be clearly staked at 20-foot intervals and all temporary erosion and sedimentation controls in place.
- Activity on steep slopes must be minimized and shall not occur during wet, rainy periods. Prior to weed removal or planting activities, erosion control must be installed near the stream edges, using compost socks or straw wattles.
- Prior to planting, remove Himalayan blackberry, and other noxious weeds (per King County Noxious Weed List) in areas to be planted. Do not remove roots of invasive plant roots on the wetland slopes.
- Areas of compacted soil (near the parking area) shall be restored. Gravel shall be removed and the subsoil replaced with a quality topsoil or amended to allow for 15 inches of a plantable medium.
- Areas vegetated lawn grasses and ivy that are not on slopes shall be covered in cardboard and mulched with 4 inches of coarse wood chips.
- Plants in other areas of site shall be mulched with a 24" mulch ring.
- Species substitution shall not be made without approval of wetland biologist.
- Plants shall be locally grown (western Washington or Oregon), of normal health, vigorous, and free of weeds, diseases, insects, insect eggs and larvae.
- Container grown plants shall not be loose in container and shall not be pot-bound.
- B&B plant material shall not have cracked or mushroomed root balls. Root balls shall be firm, natural balls of earth of sufficient size to encompass the fibrous and feeding rooting system necessary for establishment and health of plant.
- Do not prune plants prior to delivery or planting.
- Take all precautions and customary good trade practices in preparing plants for transport. Cover plants transported on open vehicles with a protective covering to prevent wind burn.
- Protect plants from drying out. Bare root and B&B plant material shall have their roots kept moist at all times. Protect from freezing, wind, and sun. If planting is delayed by more than 24 hours, cover roots/root balls with sawdust, compost, or soil. Water plants as necessary.
- Water plants within 24 hours of planting.
- All receipts for labor and materials shall be retained for submittal to the City if requested.
- The bond holder shall replace any plants that die within the first year following approval of installation.



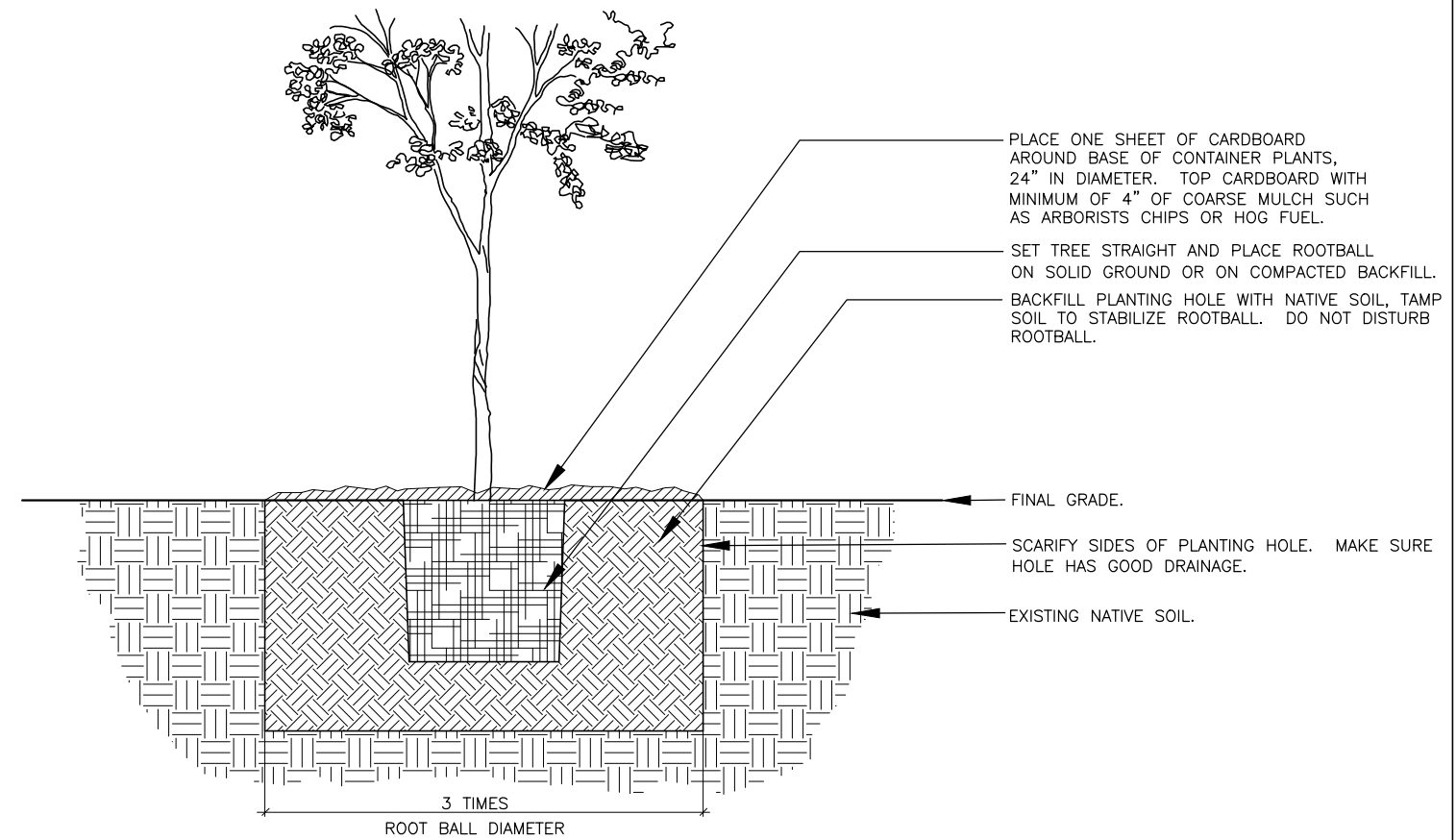
3 SHRUB PLANTING

Scale: NTS



1 SPLIT-RAIL FENCE WITH SIGNS

Scale: NTS



2 TREE PLANTING

Scale: NTS

SPECIFICATIONS & DETAILS

Permit Number: _____ Parcel Number: 092006-9038

Applicant Name: ARGO

Site Address: 40255 228TH AVE. SE, ENUMCLAW, WA

Engineering
Scale: 1" = NTS

Sheet 3 of 3