



CREW WORK SPECIFICATIONS

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Specifications Purpose: This document is a compilation of best management practices to be used while carrying out Green Seattle Partnership restoration activities on properties managed by Seattle Parks and Recreation or on public lands in the City of Seattle where work is directed by Seattle Parks and Recreation. The body of work outlined in the GSP Crew Work Specifications is intended to be carried out by professional crews, not by volunteers. The City of Seattle has determined that as long as City staff, their contractors, and GSP volunteers comply with the BMPs, then GSP is in compliance with the restrictions included, but not exclusive, in the City's Critical Areas Ordinances (CAO), Citywide Pesticide Use Reduction Strategy and Policy, and Seattle Parks Natural Area Best Management Practices.

1. Project Implementation

1.1. Project Management

- **Scope of Work:** The Plant Ecologist/Project Manager will develop a Scope of Work document prior to the Work Schedule that will define any project-specific requirements different than or in addition to the best management practices outlined below. This includes but is not limited to: an explanation of the type and area of work, details on project-specific stormwater management requirements, plant lists, timing considerations, as well as invoicing and reporting requirements. The Crew Work Specifications accompanies all GSP Scopes of Work.

1.2. Project Boundaries

- **GSP Reference Map:** The [GSP Reference Map](#) is included in the Scope of work to delineate Project areas. A mobile version of ArcGIS can be [downloaded for use in the field](#).
- **Define and Field Identify Clearing Limits:** Before beginning restoration activities, invasive plant clearing limits marked with flagging or similar best management practices (BMPs) where necessary. Clearing limits may identify, but is not limited to, property boundaries, wetlands, streams, and other Environmental Critical Areas.

1.3. Project Phasing

- **Restoration Phasing:** Phase projects when feasible in order to minimize impacts to high-value bird nesting areas, prevent soil erosion and, to the maximum extent practicable, the transport of sediment from the site during restoration.
- **Bird Habitat Considerations:** From April 15 through July 31, during primary bird nesting season, limit clearing activities in and around high-value nesting areas. These dates may be extended for certain early and late nesting species. Notify Plant Ecologist of nesting bird concerns. Reference the GSP document [Forest Parkland Restoration Planning Related to Breeding Birds](#).
- **Wet Areas:** Work in wetlands or wet areas avoided when inundated (flooded) or when soils are saturated up to the surface. Saturated soils will glisten. Refer to Scope of Work for appropriate restoration phasing. Contact Plant Ecologist if crews encounter wet areas not identified in the Scope of Work.
- **Seasonal Work Limitations:** From October 31 through April 1, clearing, grading, and other soil disturbing activities will be subject to additional limitations unless otherwise specified in the Project Scope of Work.

STEWARDSHIP CALENDAR	1	2	3	4	5	6	7	8	9	10	11	12	NOTES
	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	Dec	
planting considerations:													
primary planting season	go	go	go	stop	stop	stop	stop	stop	stop	stop	go	go	
wetland planting season	stop	stop	stop	go	go	stop	stop	stop	go	go	stop	stop	*soils dry out during part of year
wetland planting season	stop	stop	stop	stop	go	go	go	go	go	stop	stop	stop	*saturated soils year-round
wildlife considerations:													
primary bird nesting season	go	go	go	stop	stop	stop	stop	go	go	go	go	go	* majority of songbird species, some birds nest later into end of August
early bird nesting season	go	stop	stop	go	go	go	go	go	go	go	go	go	* larger speices such as herons, geese, raptors, and hummingbirds
duck nesting season	go	go	stop	stop	stop	stop	go	go	go	go	go	go	
amphibian reproduction	stop	stop	stop	stop	stop	stop	go	go	go	go	go	stop	*at sites with 10 cm standing open water, avoid 25 ft from waters edge
professional crew considerations:													
steep slope work	stop	stop	stop	stop	go	go	go	go	go	go	stop	stop	
knotweed herbicide treatment	stop	stop	stop	stop	stop	stop	stop	go	go	stop	stop	stop	
ivy herbicide treatment	stop	stop	stop	stop	stop	stop	stop	go	go	stop	stop	stop	
blackberry herbicide treatment	stop	stop	stop	stop	stop	stop	stop	go	go	stop	stop	stop	
Legend:	go												
	stop												

1.4. Project Access

- **Means of Access:** To minimize compaction and erosion effects on soil due to accessing work sections, a single means of ingress and egress, located in an area that is less susceptible to erosion or compaction, shall be established accessing one work section or multiple work sections adjacent to each other. Trips through the access routes shall be kept to a minimum by identifying the necessary work and equipment needed to complete the activities planned within the project boundary. A single access route is preferred for work areas that are in close proximity to each other.
- **Access in Wet Areas:** If it is necessary to work on saturated soils, temporary planks (duck boards), three layers of jute fabric, or wood chips to a minimum 6" depth, shall be installed to create a protective surface on saturated soils where stewardship access trails are to be developed. Prior to removing coir or scattered wood chips, assess the impacts to vegetation and soils of their removal. Material left in place to biodegrade if it is determined that removal would create an erodible or unstable surface, or would damage colonizing native plant species.
- **Minimize Soil Disturbance:** Limit access routes across steep slopes. Access routes installed parallel to contour and perpendicular to water flows. Stabilize prior to restoration work by installing wood chip mulch to a minimum depth of 6 inches, and/or installing woody debris or coir logs perpendicular to runoff and along the outer edge of the access path. If the means of ingress and egress will be used over subsequent days to access unfinished work sections, the pathway shall be stabilized with BMPs outlined in *Section 3.1 Stabilize Soils*.
- **Crew Size:** In wet areas, limit crew size to six people.
- **Project Staging:** In wet areas, establish work center (i.e. tool and material storage, plant delivery and primary staging location, and lunch location) outside of the wet area where soils are more stable, and avoid staging near storm drains.
- **Access Route Restoration:** After work is closed out of the work section(s), the access route(s) shall be restored.

1.5. Weather Conditions

Contractors shall monitor weather conditions in order to assure restoration effectiveness, crew safety, and compliance. Project operations will be halted when the Plant Ecologist determines weather conditions are injurious to the plants or the Project. Weather conditions during which Seattle Parks may not allow Work include, but are not limited to:

- Potential for rain conditions that would affect herbicide effectiveness, soil erosion
- Air temperature of less than 32 degrees F (32°F) or greater than 75 degrees F (75°F);
- Sustained wind velocity greater than twenty-five (25) miles per hour;
- Sustained wind velocity greater than five (5) miles per hour during pesticide applications;
- Soil frozen more than one-half (1/2) inch deep;
- Snow cover greater than two (2) inches; and
- Less than 50 percent Relative Humidity (RH)

2. Target Weed Removal

2.1. Target Weed Species

GSP Target weed species includes the complete [King County Noxious Weeds List](#), as well as the Target Woody Invasive List, included below.

Botanical name	Common Name
<i>Acer campestre</i>	Hedge Maple
<i>Acer platanoides</i>	Norway Maple
<i>Acer psuedoplatanus</i>	Sycamore Maple
<i>Aesculus hippocastanum</i>	Horse Chestnut
<i>Buddleia davidii</i>	Butterfly bush
<i>Clematis vitalba</i>	Traveler's Joy
<i>Cotoneaster spp.</i>	Cotoneaster
<i>Crataegus monogyna</i>	English Hawthorne
<i>Cytisus scoparius</i>	Scotch Broom
<i>Ilex aquifolium</i>	English Holly
<i>Laburnum anagyroides</i>	Golden Chain Tree
<i>Ligustrum sinense</i>	Chinese Privet
<i>Populus alba</i>	Silver Poplar
<i>Populus nigra</i>	Black Poplar, Lombardy Poplar
<i>Prunus domestica</i>	Domestic Cherry
<i>Prunus spinosa</i>	Sloe
<i>Prunus avium</i>	Wild Cherry
<i>Prunus cerasifera</i>	Thundercloud Plum
<i>Prunus laurocerasus</i>	Cherry Laurel, English Laurel
<i>Prunus lusitanica</i>	Portuguese Laurel
<i>Pyracantha spp.</i>	Firethorn
<i>Robinia pseudoacacia</i>	Black Locust
<i>Sorbus acuparia</i>	Mountain Ash
<i>Tamarix ramosissima</i>	Saltcedar

2.2. Manual Target Weed Removal

Selectively remove the shoots and roots of all target weed species (explained below), including any hybrids, varieties, or cultivars. Avoid damage to all native vegetation. Follow composting guidelines (see *Section 4: Weed Compost Pile Construction* below) unless otherwise specified in the Scope of Work.

Additional considerations:

- For mechanical "knockdown" of blackberry canes, cut canes to 2ft and scatter canes evenly to ground contact.
- For woody invasive species smaller than 1" that are not root suckering, use a weed wrench where possible.
- Manual removal exceptions include any invasive tree or shrub greater than 1" diameter at 6" above the soil level, as well as species that respond negatively to mechanical removal, i.e. knotweed (*Polygonum cuspidatum* and *Polygonum cuspidatum x sachalinense*) and yellow archangel (*Lamium galeobdolan*).

- Completely sever target weed climbing vines from native trees with a horizontal cut at shoulder height. Strip vines from the trunk of the tree, from the shoulder-height cut and down to where the ground meets the base of the tree. Remove roots (“grub”) in a radius three feet away from the trunk of the tree. Do not attempt to pull vines above shoulder-height from of the tree.
- When removing invasive thickets or invasive tree species adjacent to a wetland, establish a wetland buffer area surrounding the wetland and ensure that only 25% of the entire buffer area is removed. Delay further invasive removal until the installed native vegetation has grown to provide 50% of the functional structure (measured by density of vegetation) of the vegetation that was removed. The buffer shall extend 75’ from the wetland edge outward, unless the thicket ends prior to 75’.
- When manually removing target weed species from areas adjacent to or near to waterways, prevent sediment and vegetative debris (stems, roots, flower parts, fruits, and seeds) from entering the waterway. Use a barrier if necessary. Barriers may include a sheet, tarp, cardboard, or other BMPs outlined in *Section 3.1 Prevent Erosion and Sediment Transport from the Site*.
- Designate “haul-and-drag” routes for removing invasive plant material for least disturbance.
- Install temporary erosion and sediment controls as necessary or directed by Plant Ecologist (see *Section 3: Temporary Erosion and Sediment Control*).

2.3. Chemical Target Weed Treatment

2.3.1 Citywide Pesticide Reduction and Integrated Pest Management Program

Seattle Parks’ Integrated Pest Management program includes all potential pest suppression and control strategies but focuses on non-pesticide strategies whenever possible. Certain levels of weed populations are accepted within established thresholds and all reasonable non-pesticide pest control options are considered first before resorting to the use of pesticides. This strategy aligns with the [Citywide Pesticide Use Reduction Strategy and Policy](#). Pesticide applicators shall strictly follow this pesticide reduction policy and rules. All pesticide applications must be made under direct supervision of a licensed pesticide applicator and conform to all applicable state and federal regulations and City of Seattle policies.

2.3.2 Application Methods

Use the following herbicide application methods for treatment of target weed species where indicated in the Scope of Work. Consult with Parks Plant Ecologist before treating any trees 6” DBH or greater. See the table below for species-specific specifications.

- **Foliar:** Applied to leaves and green stems. Avoid drift at all times.
- **Cut & Dab:** Cut stems of target weed species between 6” and 12” and immediately apply an herbicide to the fresh cut.
- **Frill & Treat:** For all invasive trees greater than 3” diameter at 6” above ground, do not cut the tree down, but instead clear branches necessary to access the main trunk(s). Make a series of downward angled cuts through the bark and cambium, leaving the frill connected to the tree. Make these cuts completely around the entire circumference of the trunk, at a spot 12” from ground. Immediately apply herbicide to the cambium of the freshly frilled trunk at the recommended rate.
- **Lance:** Used for woody invasive species greater than 2.5” diameter at 6” above ground. Do not cut the tree down, but instead clear branches necessary to access the main trunk(s) and use EZ-Ject lance per the manufacturer’s instructions to inject herbicide into the tree at the rate outlined below. For trees greater than 6” diameter at 6” above the ground, consult with Plant Ecologist before treating.
- **Cut Stump:** Applied to woody invasive species smaller than 2.5” diameter at 6” above ground. Cut the tree or shrub down to a stump 6 inches high. Apply herbicide immediately to entire surface of the stump/stem at the rates outlined below. Cut all branches to lengths 18” or less and scatter, avoiding direct ground contact.

- **Stem Injection:** Using a stem injection gun for knotweed species, inject herbicide into stems greater than ½" between the first and second nodes from the ground (or between the second and third node if the stem is too woody lower). Use marker spray (orange) to indicate treated canes. Follow manufacturer's directions carefully, especially on calibration and cleaning of equipment.

2.3.3 Contractor Pesticide Application Responsibilities

All pesticide applications must be made under direct supervision of a licensed pesticide applicator and conform to all applicable state and federal regulations and City of Seattle policies.

Contractor shall provide and be responsible for the following:

- Tier 1 pesticides on the [City's approved Tier tables](#) shall not be used in Seattle Parks' facilities;
- Notification of [Pesticide-Sensitive Individuals](#) listed with Washington State Department of Agriculture, and included on [this map](#) (updated once annually) prior to any pesticide application;
- Pesticides will not be used inside of or within 50 feet of a play area, picnic shelters, picnic table groupings or wading pools/water play features;
- Pesticides will not be used to control plants that are in flower or fruit;
- Avoid spraying when pollinators are active on target weeds or adjacent off-target vegetation;
- Equipment must be maintained to satisfactorily accomplish treatment;
- All safety equipment must be utilized to meet legal requirements for the Work, including appropriate personal protective equipment and spill kit;
- Use of blue marker dye with application unless directed otherwise;
- Upon request, provide a sample of the herbicide solution being applied;
- Proper disposal of all herbicide solutions, residues and empty containers in accordance with applicable laws;
- Wind monitoring equipment;
- Avoidance of incidental overspray into water resources, including waterways and wetlands that are wet during herbicide application or will become wet while the active ingredient is biologically available and;
- Compliance with all requirements of [Department of Ecology's Aquatic Noxious Weed Management General Permit](#) when using herbicides near water resources (streams) and in wetlands that are wet during herbicide application or will become wet while the active ingredient is biologically available.
- Applicator shall have an aquatic endorsement when applying herbicides in a wetland.

2.3.4 Signage

The contractor is solely responsible for placing and removing necessary signage at treated sites, in accordance with the [Citywide Standard Pesticide Application Signage](#). For aquatic applications accomplished under the Washington State Aquatic Noxious Weed General Permit, use required signage included with Permit.

Use the following guidelines for signage:

- Signs shall be used where re-entry restrictions are listed on the herbicide label. For example: labels that limit entry until after a product is dry, shall be posted during application and until the product is dry.
- Post at key facility entrances (if applicable) and other usual points of entry, as well as post in front of area treated
- For high-use recreational areas such as near picnic areas and playgrounds, post signs at a minimum interval of every 50'

- For linear applications in Parks or other recreational areas such as along sidewalks, paths etc., post at ends of treated area and at trail intersections or other key crossings at a minimum of every 200'
- For roadways or fence lines with low pedestrian traffic, signs shall be posted at block or median ends and at pedestrian crossings at a minimum of one sign per 500'
- Signs shall not be left on site past the required re-entry period.

2.3.5 WSDA Pesticide Application Records

Contractors must use the WSDA-approved Seattle Parks and Recreation Pesticide Application Record, available as a [PDF here](#) or as a [Microsoft Word document here](#). An example form is available [here](#). Submit the project Plant Ecologist. Reference your project Scope of Work for details on submittal requirements. Record all information completely and be sure to provide total quantity of each product applied in ounces per gallon for tank mixtures, in fluid ounces for straight product, or in number of shells for lance injections.

2.4. Weed Hygiene

Avoid moving weeds on tools, materials, boots and clothing within a restoration site or from site to site. King County Noxious Weed research suggests that crews are responsible for moving noxious weed species between restoration areas. To reduce the potential for moving weeds employing basic weed-free precautions prior to entering the field by ensuring equipment, vehicles and clothing are free of seeds and soil, including:

- Clean all soil from tools while still on site using a stiff brush;
- Remove and wash/brush boots that are potentially carrying soil and seeds;
- Wash clothing that is potentially carrying soil and seeds, and;
- Consider your parking location, making an effort not to park in areas that have soil or seed sources in close proximity. Keep vehicles clean from day to day and between work sites.

Performance Measure:

- *100% removal of shoots and roots AND complete survival rings on 100% of trees with climbing vines found within the project area.*
- *Marker dye is used to verify foliar chemical application on 100% of target weed species AND visible presence of EZ-Ject shell casings AND less than 5% off-target damage to native plants AND dieback of target weeds beginning within 2 months following treatment.*
- *Pesticide Application Record submitted on time and correctly.*

Select Chemical Treatment Methods

* Follow pesticide label, including re-entry period information and total solution per acre information.

Species	Method	Timing	Additional Notes
woody invasive species (see target list)	Lance: inject one Imazapyr (Copperhead) shell every 4" of circumference at 6" above ground; for trees <2.5" use 1 shell/stem	Injection can occur during any season, except when trees are frozen	For aquatic sites, this product may be injected into stems of trees and brush standing in water or wetlands. Do not apply directly to water or inject stems below the water level.
	Cut Stump: 100% solution of Glyphosate produce on cut stems		
blackberry	Foliar: 3-5% solution of Glyphosate	Folar application is best during August - October	Consider knocking down bb for easier application of re-growth
	Cut & Dab: 00% solution immediately	Most effective in late summer	
knotweeds	Foliar: 1% solution Imazapyr	Apply when knotweed is actively growing and most canes have reached the bud to early flowering stage, until the first hard frost	To avoid spraying pollinators, change to early/late season application, or spray early in the morning before pollinators are active
	Stem Injection: 3 ml per cane on canes greater than 1/2", injecting between the first and second nodes from the ground	Timing best from early July to end of September	At this rate, you can only do 2375 canes per acre
yellow archangel	Foliar: 1.5% Glyphosate (2 oz/g), 1% Imazapyr (1.27 oz/g), 0.5% MVO (Competitor) (0.64 oz/g)		
garlic mustard	Foliar: 2% solution Glyphosate or 2% solution Triclopyr at the rosette stage	Best before natives emerge, late fall to early spring	
lesser celandine	Foliar: 1.5 % Glyphosate (2oz/g)	Spring, during short flowering window	
canada thistle	Foliar: 2% Glyphosate (2.67 oz/g)		
herb robert	Foliar: 2% solution Glyphosate	Anytime actively growing	
morning glory nightshade	Foliar: 5% solution of Glyphosate		
reed canary grass	Foliar: 2% Glyphosate or 1% Imazapyr	Foliar application before summer dormancy (July) and again when it regrows.	Mow before seeding and spray regrowth at 1 ft tall and then again in 2 weeks or as needed.
bamboos	Foliar: 5% glyphosate (6.5 fl oz/g)		
garden loosestrife	Foliar: 5% triclopyr, 1% MVO (Competitor)		
english ivy clematis	Foliar: use tank mix of 5% solution Glyphosate (6.5 oz/g), 2% solution Triclopyr (2.67 oz/g), and 2% solution MVO (Competitor) (2.67 oz/g)	With single applications per year, late summer treatments show the greatest reduction in cover the following year. Treatment on new growth in spring may provide better control in sunny exposures.	

3. Stormwater and Erosion Controls

Temporary erosion and sediment controls (TESC) shall be constructed in conjunction with all target weed removal and treatment activities where appropriate in Environmentally Critical Areas.. TESC installation will comply with all applicable Washington State laws and City of Seattle standards and requirements, including those defined in the following documents:

- [2016 City of Seattle Stormwater Manual](#) (CSSM)
- [2012 Stormwater Management Manual for Western Washington](#) (SMMWW)
- [Slope Stabilization Erosion Control Using Vegetation: A Manual of Practice for Coastal Bluff](#) (SSECUV)
- City of Seattle Standard Specifications for Road, Bridge and Municipal Construction, especially [Section 8-01: Construction Requirements Stormwater Pollution Prevention](#)

The following sections outline elements of Construction Stormwater Pollution Prevention Plans (CSECP) for GSP projects. Refer to the Project Scope of Work for site-specific BMPs to be used throughout the Work Schedule. Retain a copy of this at the restoration project or within reasonable access to the project.

3.1 Protect Waterways

- Wood chip mulch not installed below the ordinary high water mark (OHWM). OHWM will be determined by Parks staff.
- If soils are unstable and an erosion control practice is determined to be necessary below the OHWM, coir mat shall be installed along the banks. Install only the coir as shown along the upper (outermost) banks within the detail (Figure 1). Install coir so that any upstream mat is laid over any downstream mat where they meet. Overlap should be 12" with staples installed through overlap (refer to CSSM BMP E1.15).
- When manually or mechanically removing target weed species from areas adjacent to or near to waterways, sediment and vegetative debris (stems, roots, flower parts, fruits, and seeds) prevented from entering the waterway. Use a barrier if necessary. Barriers may include a sheet, tarp, or cardboard and may require affixing barrier to existing vegetation or assistance to temporarily position in place (refer to CSSM BMP E3.30 and BMP E3.35)

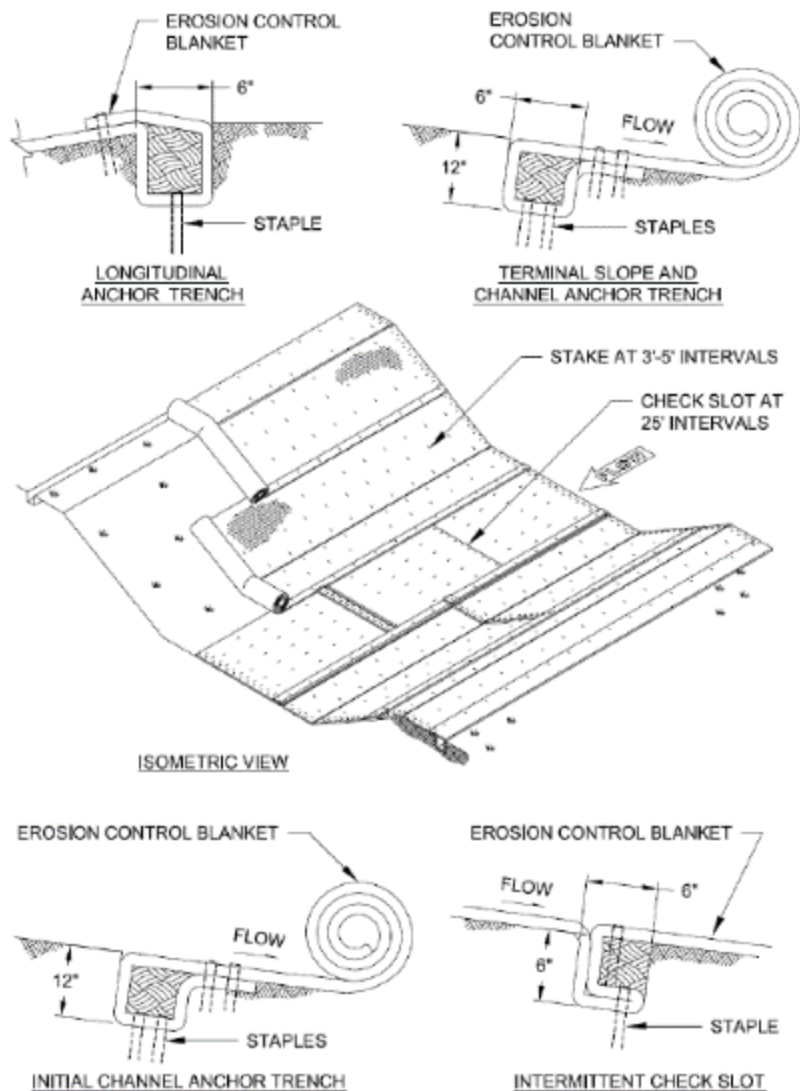


Figure 1: channel coir mat installation

3.2 Prevent Erosion and Sediment Transport from the Site

All perimeter sediment controls (e.g. silt fence, wattles, compost socks, berms, etc.) installed, and maintained in accordance with the CSECP.

- **Preserving Vegetation:** Phase restoration activities to minimize exposed soils and consequent erosion by removing only target weeds where restoration will occur (refer to CSSM BMP E1.35).
- **Buffer Zones:** An undisturbed area or strip of natural vegetation or an established suitable planting that will provide a living filter to reduce soil erosion and runoff velocities (refer to CSSM BMP E1.35).
- **Filter Fence:** A temporary sediment barrier consisting of a filter fabric stretched across and attached to supporting posts and entrenched. The filter fence is constructed of stakes and synthetic filter fabric with a rigid wire fence backing where necessary for support (refer to CSSM BMP E3.10).
- **Brush Barrier:** Barriers of dead organic material used to reduce the transport of coarse sediment from a restoration site by providing a temporary physical barrier to sediment and reducing the runoff velocities of overland flow. In some cases, the compost "windrows" may serve as brush barriers (refer to SMMWW BMP C231).

- **Vegetated Strip:** A vegetated area located downslope of a disturbed area that is capable of filtering coarse sediment from runoff and slowing runoff velocities (refer to CSSM BMP E3.30).
- **Straw Wattles, Compost Socks, and Compost Berms, Coir Logs:** Temporary erosion and sediment control barriers consisting of encased straw, encased compost, or a compost berm. The wattles and logs are placed in shallow trenches and staked along the contour of disturbed or newly constructed slopes (refer to CSSM BMP E3.35).
 - Straw wattles can be installed across slopes to control erosion. Wattles should be installed within shallow trenches parallel with the contour and perpendicular to runoff.
 - On clay soils, trenches shall be 2-3" deep, on steep slopes or on more granular soils, trenches shall be 3-5" deep or ½ the diameter of the wattle, whichever is deeper.
 - A sequence of wattles shall be installed starting at the base of the slope and continuing uphill at a frequency that allows no more than 6 vertical feet between wattle rows. Wattles shall be installed snugly into trench and staked at both ends and no less than every 4' along length. Adjacent wattles shall be butted up to each other with minimal overlap.

3.3 Prevent Erosion and Sediment Transport from the Site by Vehicles

- **Cleaning Inlets and Catch Basins:** Removal of debris from existing inlets, catch basins, and connecting pipelines to protect and maintain private facilities and the public drainage system (refer to CSSM BMP E3.65).
- **Street Sweeping and Vacuuming:** Use of human-powered and/or mechanical equipment to collect sediment on paved surfaces to minimize sediment accumulation in private systems and the public drainage system (refer to CSSM BMP E3.70).

3.4 Stabilize Soils

Exposed un-worked soils (and piles) stabilized with effective BMP to prevent erosion and sediment deposition. Soils stabilized at the end of the shift, before a holiday or weekend as needed based on the weather forecast. Any area stripped of vegetation and left as bare soil in which **no further work is anticipated for five days** stabilized by an approved erosion and sediment control method. Soils susceptible to erosion covered. Approved erosion control BMPs include jute or coir mat, wood chip mulch, wood straw, coir logs, and plastic sheeting; as well as materials that may be found on site, such as leaves, downed wood, blackberry canes (cut to 2 feet lengths), and forest duff.

- **Temporary Seeding:** The establishment of temporary vegetative cover on disturbed areas by seeding with appropriate rapidly growing annual plants (refer to CSSM BMP E1.10).
- **Mulching, Matting, and Compost Blankets:** Application of plant residues or other suitable materials (e.g. WoodStraw, downed wood, blackberry canes or combination thereof) to the soil surface in order to provide immediate protection to exposed soils during the period of short restoration delays or over winter months through the application of plant residues, or other suitable materials, to exposed soil areas (refer to CSSM BMP E1.15).
- **Clear Plastic Covering:** The covering with clear plastic sheeting of bare areas that need immediate protection from erosion (refer to CSSM BMP E1.20).
- **Permanent Seeding and Planting:** The establishment of perennial vegetative cover on disturbed areas (refer to CSSM BMP E1.40 and CWS6).
- **Dust Control:** Reducing surface and air movement of dust during land-disturbing, demolition, and restoration activities (refer to CSSM BMP E2.45).
- **Surface Roughening:** Surface roughening aids in the establishment of vegetative cover, reduces runoff velocity, increases infiltration, and provides for sediment trapping through the provision of a rough soil surface. Horizontal depressions are created by suitable equipment on the contour or by

leaving slopes in a roughened condition by not fine grading them. Use this BMP in conjunction with other BMPs such as seeding, mulching, or sodding (refer to SMMWW BMP C130).

3.5 Protect Slopes

- **Level Spreader:** A level spreader is constructed at zero percent grade and can be used to distribute concentrated runoff to sheet flow. Level spreaders can be used as either a temporary or a permanent BMP in order to convert concentrated runoff to a thin layer of sheet flow to promote release onto a stable receiving area. For example, an existing vegetated area or a vegetated strip (refer to CSSM Appendix E).
- **Check Dams:** Small dams constructed across a swale or drainage ditch in order to reduce the effective slope of the channel and, therefore, the velocity of concentrated flows; reduce erosion of the swale or ditch; and slow water velocity to allow retention of sediments (refer to CSSM BMP E2.35).
- **Earth Dike and Drainage Swale:** A ridge of compacted soil or a swale with vegetative lining located at the top or base of a sloping disturbed area in order to intercept stormwater runoff from drainage areas above unprotected slopes and direct it to a stabilized outlet (refer to Section CSSM BMP E2.80).
- **Grass-lined Channels:** Provide a channel with a vegetative lining for conveyance of runoff (refer to SMMWW BMP C201).
- **Surface Roughening:** Surface roughening aids in the establishment of vegetative cover, reduces runoff velocity, increases infiltration, and provides for sediment trapping through the provision of a rough soil surface. Horizontal depressions are created by operating a tiller or other suitable equipment on the contour or by leaving slopes in a roughened condition by not fine grading them. Use this BMP in conjunction with other BMPs such as seeding and mulching (refer to SMMWW BMP C130).
- **Modified Straw Wattles and Fascines:** Can be used to help stabilize soils on gradual slopes. See Section 7: Plant Installation for additional details on fascine installation. Modified straw wattles and fascines can also be installed and staked within rills (down-cutting erosional features) formed on wet slopes. Wattle, or fascine cuttings can be shortened to fit within rill. Structure should be fit snugly into rill ensuring good ground contact. A sequence of structures shall be installed within the rill starting at the base of the slope and continuing uphill at a frequency such that the vertical distance between structures is two times the diameter of the structure.

3.6 Protect Storm Drains

Storm drain inlets operable during restoration are protected. Existing storm drains within the influence of the project protected. This measure includes all points of access.

- **Storm Drain Inlet Protection:** A sediment filter or an excavated impounding area around a storm drain or catch basin (refer to CSSM BMP E3.25).
- **Cleaning Inlets and Catch Basins:** Removal of debris from existing inlets, catch basins, and connecting pipelines to protect and maintain private facilities and the public drainage system (refer to CSSM BMP E3.65).
- **Street Sweeping and Vacuuming:** Use of human-powered and/or mechanical equipment to collect sediment on paved surfaces to minimize sediment accumulation in private systems and the public drainage system (refer to CSSM BMP E3.70).

3.7 Control Pollutants

Waste materials and debris handled and disposed of to prevent contamination of stormwater. Cover provided for all chemicals, liquid products, petroleum products, and other material. Contaminated surfaces cleaned immediately after a spill incident. Spills reported immediately to Plant Ecologist.

- **Material Delivery, Storage, and Containment:** Best practices for all deliveries, storage, and containment of materials, liquid and solid on a project site that may potentially pollute stormwater (refer to CSSM BMP C1.15 and CWS Section 1.3).
- **Solid Waste Handling and Disposal:** Methods used to protect stormwater from pollution associated with the management, handling and disposal of all solid waste generated on a project site (refer to CSSM BMP C1.45 and CWS Section 5).

3.8 Maintain Erosion and Sediment Control BMPs

- Maintain and repair all temporary and permanent erosion and sediment control BMPs as needed to assure continued performance of their intended function.
- Protect all stormwater BMPs from sedimentation through installation and maintenance of erosion and sediment control BMPs.
- Restore the BMPs to their fully functioning condition if they accumulate sediment during restoration.
- Remove all temporary erosion and sediment control BMPs within 5 business days after final site stabilization is achieved, or after they are no longer needed—whichever is later.

Performance Measure:

No slopes greater than 40%, with less than 50% native vegetation cover, exposed to risk of erosion AND no potential for sediment transport into bodies of water, drainage systems, flow off site, or flow within wetland. BMPs installed per the Design Criteria, and maintained during the duration of the Project period.

4. Sheet Mulching

If outlined in the Scope of Work for the site, cover cleared areas completely with 3/8" of burlap or cardboard, working around existing native plants. Cover burlap or cardboard with minimum 6" to 8" arborist wood chip mulch. Sheet mulching should be used only in areas where there is little native seed bank, such as when there is minimal canopy or existing native plants. Do not sheet mulch in wet areas that will become inundated (flooded). Burlap and cardboard is appropriate for use in wet areas or wetlands.

Performance Measure:

No invasive re-growth through mulch during the duration of the Project period.

5. Weed Compost Pile Construction

Pile all weeds on burlap, cardboard sheets, or downed logs using the following steps:

1. Find an area free of native plants and remove all invasive plants and roots. It is very important that the area is cleared well before building your compost piles.
2. Lay out a frame of branches that will define your compost area. The area of the pile shall not be more than 40 sq. ft. If you are using cardboard, lay the cardboard down first and put the frame of branches on top of the cardboard edges and skip Step 3.
3. Fill in your frame with dead branches and sticks found on site. Place them in both directions to form a grid. This helps prevent the composting weeds from having direct contact with the soil.
4. Put pulled weeds on top of the pile. Stack ivy in smaller bundles and contain all debris inside the frame. Take care to separate herbaceous material from woody material to allow more rapid decomposition of the pile. Do not make the pile higher than 3 feet tall.



Figure 2: Weed compost pile construction diagram

Additional Considerations:

- If working in a wetland where soils are saturated or will be saturated for long durations (over 2 weeks at a time), locate compost piles outside of the estimated wetland area, where soils freely drain. This will help minimize the likelihood that plant fragments re-root from the compost pile. If near a waterway, place compost pile well outside of the flood zone. Use topography, existing plant species, and soil characteristics, or consult with the Plant Ecologist to determine the extent of wetland soils.
- If slope is greater than 40%, the pile should be no more than 3 ft. wide and 2 ft. high, placed parallel to the contours of the slope in a "windrow" fashion.
- Piles should be constructed such that air and small wildlife can circulate throughout the pile.
- Piles should be located in full sun where possible.
- Target weed species that re-sprout or could spread seeds (including any plant material in flower or fruiting stage) should not be placed in piles, including garlic mustard (*Alliaria petiolata*), yellow archangel (*Lamium galeobdolan*), purple loosestrife (*Lythrum salicaria*), bittersweet nightshade berries (*Solanum dulcamara*), jewelweed (*Impatiens noli-tangere*) and policeman's helmet in flower (*Impatiens glandulifera*). Instead, they should be placed in plastic bags and disposed of in garbage.
- Where Mountain Beaver are present, construct piles on a log rack over the den entrances.

Performance Measure:

No piles constructed over 4 ft. wide x 3 ft. tall (3 ft. wide x 2 ft. tall if windrow), and no target weed re-generation from compost pile. No piles located within wetlands.

6. Litter Removal

Collect and bag all litter found during field work. Litter required for removal does not include biohazardous material, personal belongings, or large material (i.e. refrigerators). Bags are to be placed in a location jointly determined by Contractor and Plant Ecologist for pick up by Seattle Parks and Recreation staff. Plastic, steel, aluminum, and glass containers should be placed in separate bags for recycling. Planting pots shall be removed from the Project Area to be recycled, reused, or returned to Jefferson Horticulture.

Notify the project Plant Ecologist immediately if excessive dumping, property encroachment, or illegal camping is encountered. There are specific policies and procedures that need to be initiated and may impact the crew's work timeline or work area. For example, if active camps are present, do not move forward with herbicide application activities.

Sharps have been encountered by Professional Crews and so the following is provided for your reference. If the crew is not capable of following this procedure, please submit a request for clean up to the Project Plant Ecologist. Sharps are items that are potentially contaminated with blood or body fluids that are capable of puncturing the skin and transmitting blood borne infections. Sharps can include needles, razor

blades, broken glass, or lancets. A specific pick-up procedure has been developed by Seattle Parks and Recreation:

1. Put on gloves
2. Open the sharps container carefully and place on a sturdy, flat surface
3. Using the litter stick, pick up the syringe from the plastic end and use caution to point the tip away from your body
4. Place in container one at a time, needle point down. Do not force anything inside. (If you are not using a biohazard container, please label appropriately).
5. Carefully close and secure container, take off gloves and sanitize hands (or ideally wash hands with hot soapy water)
6. Discard gloves and any other trash in the garbage
7. When container is full, take to disposal site

If you are stuck by a needle, allow the area to bleed as much as possible. Then, wash the area immediately with soap and water. Contact your supervisor immediately for information about immediate medical attention.

Performance Measure:

100% removal of all litter by end of project.

7. Plant Installation

7.1 Wet Area Considerations

Plant installation timing shall vary with the moisture regime of the wetland.

- In sites that dry out during part of the year, plant in the fall, as soon as the soils becomes wet again. Or in the spring after soils have dried enough that you can access the area but several months before the start of the dry period.
- In sites where soils within the plant's root zone remain saturated all year, plant between late spring and early fall, when the soil is saturated only (not flooded). To ensure plant establishment, do not plant within the 2 months prior to site flooding (mid- to late-fall) as plants can float out of their holes if submerged. Avoid planting a site if it is under water.
- If recent precipitation has flooded or saturated a site temporarily, delay work activities until the site has drained and returned to a drier more stable state.
- Avoid planting during the primary bird nesting season, April 1st to July 31st, if at all possible. In sites with open water, ducks may start nesting in March, a month earlier than primary nesting season. Avoid areas with active nests.
- In areas that have standing open water at a depth of at least 10 cm between Dec 1 and June 1, avoid work in close proximity (within 25') to the water's edge during this period as it may impact breeding and developing amphibian species. Establish and mark a perimeter 25' (landward) from the water's edge and keep all work activities outside of the protection zone.

7.2 Plant Staging

Staging is the distribution of plants across a site in preparation for planting. Consult Vegetation Management Plans (VMPs) and the Plant Ecologist for guidance in staging plants.

Plant palettes are selected to meet general site conditions, however within each site there is variability in soils, sunlight, moisture and nutrient availability. The following considerations should be made for microsites:

- The Clump-Gap mosaic planting pattern should be used to address microsites. The basic pattern is 3-5 plants grouped together. Between these clumps are gaps where individuals of the different species are randomly placed with wider spacing. This layout ensures that each species will be distributed across the site and in association with several different other suites of species as well as alone. It provides several unique opportunities to enhance wildlife habitat and increase plant survival.
- For shade tolerant conifers (STC), plant in an appropriate microsite adjacent to (within 2 ft.) coarse woody debris, slash, dead brush, or compost pile. STC are not subject to the desired spacing, and can be planted within four feet of another STC and within six feet of any other plant species. STC shall be planted in microsites where available, otherwise they shall be planted evenly across the planting area.
- Consider the trail corridor when placing plants. Seattle Parks natural area trails standard is 3 to 4 feet wide and a brushing width of 6 feet wide. Do not plant material that will grow significantly over 18 inches within 2 feet of the trail corridor. Plant trees at least 10 feet away from the trail corridor.

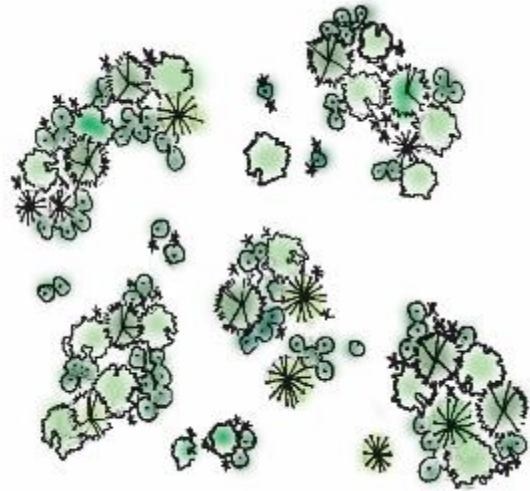


Figure 3: Clump-gap mosaic diagram

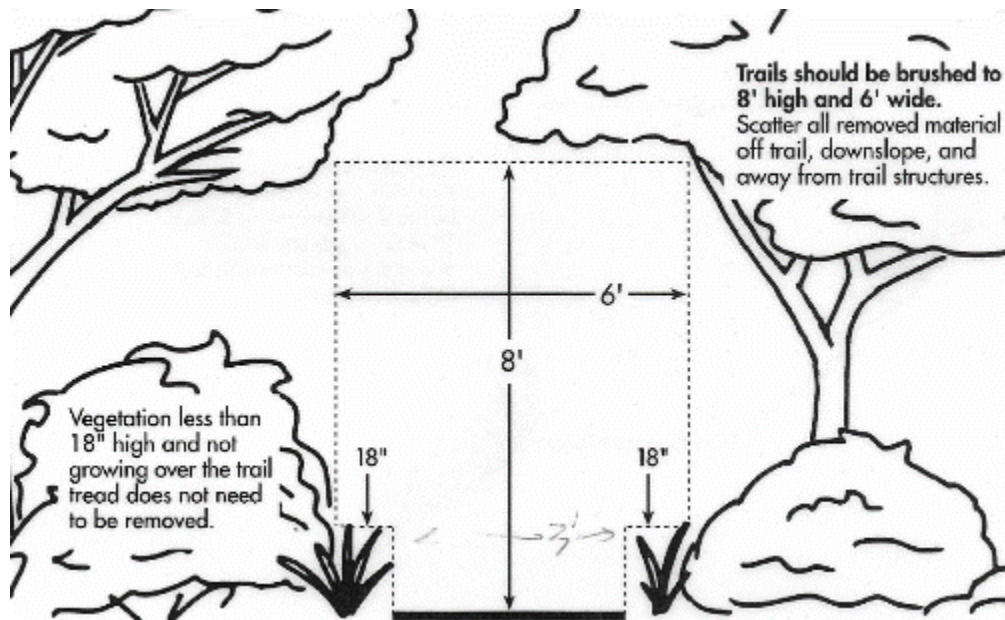


Figure 4: Trail corridor diagram

- Consider above and belowground utilities. Seattle City Light requires the following safe clearances from underneath and to the sides of overhead power lines: 10 foot clearances from distribution lines and 16.5 foot clearances from transmission lines. Trees are discouraged under or near transmission lines and towers. For belowground utilities, review the GSP Reference Map "Sewage and Drainage Lines" layer, available under "Content" on the left sidebar. In some cases, it may be necessary to call

for utility location services before plant installation. Call 811 - <http://call811.com/map-page/washington>.

7.3 Plant Spacing

The following plant spacing specifications shall be implemented for any planting activities unless otherwise specified by the Plant Ecologist.

Plant and Stock Type	Desired Plant Density	Spacing Average (on center)	Divide Square Footage by:
Trees	Dense	6 ft.	36 ft ²
	Medium	8,9, or 10 ft.	64, 81, or 100 ft ²
	Sparse	15 ft.	225 ft ²
Shrubs	Dense	3 ft.	9 ft ²
	Medium	4 ft.	16 ft ²
	Sparse	5 ft.	25 ft ²
Live Stakes	Dense	1 ft.	1 ft ²
	Medium	2 ft.	4 ft ²
	Sparse	3 ft.	9 ft ²
Emergent Plugs	Dense	6 in	0.25 ft ²
	Medium	12 in	1 ft ²
	Sparse	18 in	2.25 ft ²
Herbaceous/Ground Cover (4" pots in groups of 3)	Dense	2 ft.	4 ft ²
	Medium	3 ft.	9 ft ²
Herbaceous/Ground cover (1 gallon pot)	Dense	2 ft.	4 ft ²
	Medium	3 ft.	9 ft ²

7.4 Plant Installation Details

• Potted Plants

- Dig the planting hole twice the width of the container and deep enough so the plant, when set in the hole, will have the top of the root crown flush with the soil surface (use a shovel as a level, but doesn't cover the stem above the roots).
- Soil shall be at the same level it was in the pot; make sure the plant is placed at its original depth.
- Return native soil to the planting hole, and push down firmly to remove any air pockets.



Figure 5: Potted plant installation diagram

• Bareroot Plants

- Dig the hole wide enough to completely spread out the plant roots, without crowding or bending the roots.

- Keep the roots moist until planting by storing them in moist sawdust or soil. In addition, you may soak them for 1–2 hours (never longer than 6 hours).
- Before planting, prune back any badly bruised, broken, kinked, or jagged roots to sound wood.
- Set in the plant in the hole such that the top of the root crown is flush with the soil surface.
- Return native soil to the planting hole, and push down firmly to remove any air pockets.

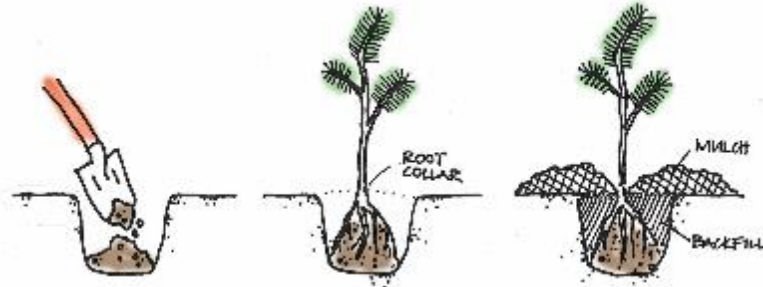


Figure 6: Bareroot plant installation diagram

- **Live Stakes**

- Insert into the soil such that one-half to two-thirds of the entire stake length is in the soil. Live stakes shall be a minimum of 18" in length unless otherwise specified by the Plant Ecologist.
- If soil permits, insertion may be accomplished without pilot holes as long as stakes are not damaged in the process. If necessary, pilot holes of the appropriate depth should be made prior to insertion using a length of rebar.
- No watering or mulching required.
- Flag live stakes with appropriately colored forestry tape.

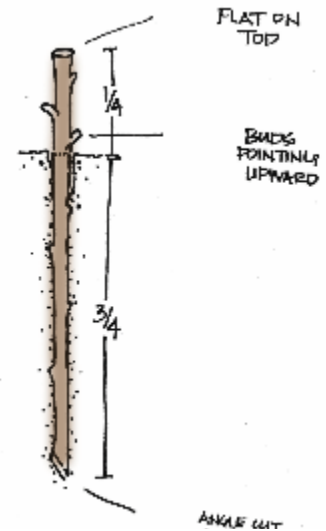


Figure 7: Livestake installation diagram

- **Emergent Bareroot Plugs**

- Keep plugs in their packaging until time of installation. Using a narrow-bladed shovel or trowel to make a slit in the soil, levering back and forth so that the plug will fit into the slit. Alternatively, make a pilot hole with a rock-bar, a piece of rebar, or a dibble
- Insert the plug. Once properly inserted, tamp soil around the plug to eliminate large air gaps. Do not over compact.
- Do not flag the plants as the leaves are fragile. Flag the perimeter of the planting if determined to be necessary by Plant Ecologist.
- Only apply wood chips if directed to by Plant Ecologist. (See *Wood Chip Mulch Application, Section 8.4* below)
- Water the plant immediately using enough water to saturate the soil to a depth of 12" when directed in Scope or Work.

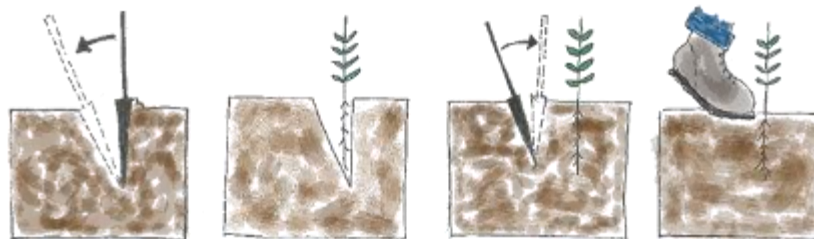


Figure 8: Emergent bareroot plug installation diagram

- **Fascines**

- Fascines can be constructed of live material if soil moisture is adequate enough to allow for growth. Fascines are bundled cuttings of live or dried branches/stakes. Build fascine by bundling alternately oriented cuttings so that diameter of the bundle is even throughout its length. Bundle should be 6" to 8" in diameter, a minimum 6' long and made of cuttings ½" to 2" in width. Live cuttings should be quick rooting materials (i.e. willow, cottonwood, dogwood).
- Dig a shallow trench that follows the contour of the slope and perpendicular to the runoff. The trench should be deep enough to bury ¾ of the fascine below the soil surface. When digging the trench, place soil on the upslope. Any soil that is not replaced into the trench during installation will end up there through the course of gravity and surface runoff.
- If more than a single fascine is needed to run the length of the trench, overlap the fascines enough to eliminate gaps.
- Use stakes to anchor the fascines at intervals of 3-4 feet. Use standard, untreated wooden stakes or live stakes, 2-3 feet in length, and pound the stakes into the soil immediately down slope and angled slightly away from the fascine. For extra stability, pound tapered wood stakes through the middle of the fascine at a 45° angle to the slope, staggered between the down slope stakes.
- Shovel the soil back over the top of the fascine and into the trench, and stomp it down well to work the soil through the fascine. Following backfilling, only the very top (10-15%) of the fascine should be visible.

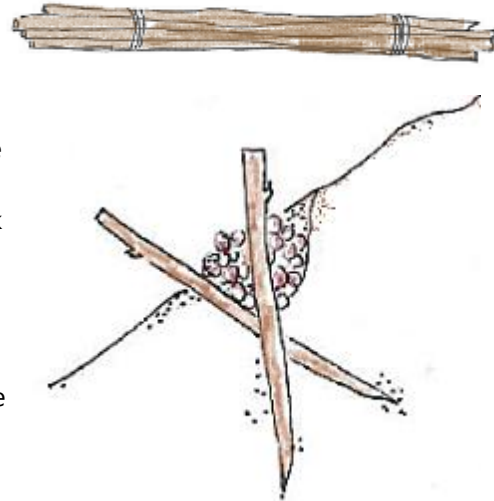


Figure 9: Fascine bundle and installation

7.5 Plant Flagging

Flag the plant with 6" of 1" wide flagging tape attached to a lateral branch. Do not tie tape on the main stem. Use flagging color as indicated by the Plant Ecologist for the given planting season. Mark herbaceous plants with an appropriately colored small flag (e.g. irrigation flag) or flagging tape tied to a stick inserted in to the ground adjacent to the plant. For emergent bare root stock, do not flag the plants as the leaves are fragile. Flag the perimeter of the planting if determined to be necessary by Plant Ecologist.

Performance Measure:

Plants staged and installed as specified AND all plants flagged unless otherwise specified AND plants planted with root crown flush with soil level and according to details above.

8. Wood Chip Mulch Application

- Apply wood chip mulch to the top of the soil in a circle at least as wide as the roots, but not touching the stem. Spread 10 gallons of wood chips evenly to a depth of 4" to 6" around the base of the plant. Make sure that wood chips are not in contact with the stem or trunk of the plant.
- When working near a waterway, do not apply wood chip mulch below the ordinary high water mark (OHWM). OHWM will be determined by Plant Ecologist. See for explanation of coir mat installation (refer to CSSM BMP E1.15).

- All wood chip mulch used in wetlands should be free of weed seeds. Use chipped wood only.
- Apply wood chip mulch only in wetland areas that are under intensive weed pressure (weed seeds, roots, or rhizomes present in soil) or that dry out for longer than two months of the year. In areas with low or no weed pressure, or where soils retain moisture within the root zone for longer than ten months of the year, wood chip mulch shall be avoided.

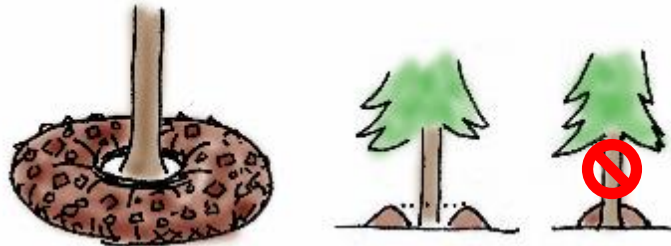


Figure 10: Mulch ring diagram

9. Irrigation

9.1 Hand Watering

Apply a minimum of 2 gallons of water per plant per visit to recently planted native plants to achieve soil saturation to 12" depth, except madrone (*Arbutus menziesii*) and Garry Oak (*Quercus garryana*). Repair or replace any damaged or missing plant flagging. Measure, tally and record water use. Report water use per zone on GSP work logs.

9.2 Cistern Fill

Haul water to and fill cistern water tanks. Inspect cisterns systems for functionality and vandalism prior to filling. Repair and maintain tanks and irrigation tubing as needed. Keep lids and valves locked so that water may not be removed without Parks issued 2396 key. Parks will provide padlocks and tanks; all other parts and materials will need to be provided by contractor.

Performance Measure:

Apply water to achieve soil saturation to 12" depth AND water use reported on work logs. Tank filled based on specified schedule AND tanks and valves maintained in working order AND lids and valves locked after filling AND maintained graffiti-free.

10. Reporting

Reporting requirements and timelines will be outlined in detail in the project Scope of Work. Contractors must submit work logs at the same time as invoices, using the [GSP CEDAR website](#). Key information shall include, but is not limited to the following information: Lead Agency - "Seattle Parks"; Blanket vendor contract number with the City, and work accomplished per Zone. There is no need to attach pesticide records to the CEDAR work log.

Performance Measure:

As directed in the Scope of Work.