# Appendix B—Performance Standards

| Table A—Hydrology Performance Standards | | | | |
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| **Habitat Area** | **Performance Standards** | **Monitoring Activity** | **Monitoring Schedule** | **Adaptive Management Responses** |
| Enhanced Wetlands designed to have inundation and saturation from passive backwatering | • Create a minimum of 12 inches of inundation for a minimum of 5 consecutive months/year in years of normal precipitation levels. | Measure Staff Gauges | Once/month December 1 – June 1; Years 1, 2, 3, 5, 7, 10. | • Increase depths of inundation by raising outlets.<br>• Diminish permeability of leaky berms or other non-fixed outlets. |
| | • Create saturated soils within 12 inches of the surface for a minimum of 5 consecutive months/year in years of normal precipitation levels. | Measure Piezometers | | |
| Enhanced Wetlands designed to have inundation and saturation by grading | • Create impounded water levels of a minimum of 16 inches for a minimum of 5 consecutive months/year in years of normal precipitation levels. | Measure Staff Gauges | | • Deepen the excavation to increase depths of inundation.<br>• Restrict size of outlets to increase volume of retention and prolong inundation. |
| | • Create saturated soils within 12 inches of the surface for a minimum of 5 consecutive months/year in years of normal precipitation levels. | Measure Piezometers | | |
| Created Wetlands designed to have inundation and saturation | • Create impounded water levels of a minimum of 16 inches for a minimum of 5 consecutive months/year in years of normal precipitation levels. | Measure Staff Gauges | | • Deepen the excavation to increase depths of inundation.<br>• Restrict size of outlets to increase volume of retention. |
| | • Create saturated soils within 12 inches of the surface for a minimum of 5 consecutive months/year in years of normal precipitation levels. | Measure Piezometers | | • Add organic soil to facilitate capillary action.<br>• Modify wetland outlet to prolong adjacent inundation. |

| Table B—Water Quality Performance Standards | | | | |
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| **Habitat Area** | **Performance Standards** | **Monitoring Activity** | **Monitoring Schedule** | **Adaptive Management Responses** |
| Enhanced Wetlands designed to have inundation and saturation from passive backwatering | • Provide appropriate pre-treatment for portions of the existing untreated stormwater currently being discharged to Lake Washington<br>• Pre-treat stormwater, and then run it through over 2,000 linear feet of created and enhanced wetland habitats prior to discharging to an existing storm-drain pipe leading to Lake Washington | • Grab samples at appropriate water discharge sites<br>• Grab samples at appropriate sites in the enhanced wetlands | Once/month for November 1 – May 31; Years 1, 2, 3, 5, 7, 10. | According to 2005 Seattle Parks and Recreation BMP's for Turf Management, fertilizer, herbicides and pesticides are not likely to be a component of water discharged from natural grass playing fields.<br>• If used, alter fertilization and herbicide application on natural turf fields.<br>• Extend time period that water is retained within wetlands.<br>• Alter hydrological regimen for recharging wetlands. |
| Enhanced Wetlands designed to have inundation and saturation by grading | | • Grab samples at appropriate water discharge sites<br>• Grab samples at appropriate sites in the enhanced wetlands | | |
| Created Wetlands designed to have inundation and saturation | | • Grab samples at appropriate water discharge sites<br>• Grab samples at appropriate sites in the created wetlands | | |

| Table C—Vegetative Performance Standards | | | | |
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| **Habitat Area** | **Performance Standards** | | **Monitoring Activity** | **Adaptive Management Responses** |
| WETLANDS Created and Enhanced. | EMERGENTS | • No one species will constitute more than 50% presence in the wetland.<br>• By Year 3, a minimum of 4 species per community will be present which can include appropriate native spp.<br>• By Year 3, there will be 45-60% emergent aerial cover, including desirable native spp. | In 1 meter plots measure:<br>• % aerial cover by species Years 1, 2, 3, 5, 7, 10<br>In whole wetland measure:<br>• species composition and note spp. with ≥ 50 % aerial cover Years 1, 2, 3, 5, 7, 10 | • Determine causes of species failure.<br>• Install plug, seed, live stake, bare-root or potted material (as appropriate) of additional plants. May substitute other hydrologically appropriate species.<br>• Increase management of invasives or competitive species.<br>• Provide temporary irrigation during establishment period.<br>• Provide herbivory protection. Possibilities include: netting for emergents; and rodent collars or fencing for trees and shrubs. |
| | SHRUBS: live stakes | • At a minimum % aerial cover will be: 25% by year 3, 50% by year 5, and >70% by year 7.<br>• Plants should be vigorous beginning in Year 1. | In 5 meter plots measure:<br>• % survival Years 1 & 2 (except for live-stakes);<br>• % aerial cover and vigor by species Years 3, 5, 7, 10 | |
| | SHRUBS: live stakes planted @ shading density | • At a minimum % aerial cover will be: >50% by year 3 and >70% by year 5. | | |
| | SHRUBS: potted or bareroot | • A minimum of 80% survival of installed plants for Years 1 and 2.<br>• % aerial cover should be at least: 25% by year 3, 50% by year 5, and >70% by year 7.<br>• By Year 3, planting clusters will have a minimum of 4 shrub spp including desirable native spp.<br>• Plants should be vigorous. | | |
| | SHRUBS: potted or bareroot planted @ shading density | • A minimum of 80% survival of installed plants for Years 1 and 2.<br>• At a minimum % aerial cover will be: >50% by year 3 and >70% by year 5<br>• Richness parameter is absent as function is to provide vigorous competitive growth for canopy closure goal | | |

**Table C—Vegetative Performance Standards**

| Habitat Area | Performance Standards | | Monitoring Activity | Adaptive Management Responses |
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| WETLANDS: Created and Enhanced. | TREES: live stakes<br>TREES: live stakes @ shading density | • At a minimum % aerial cover will be: 25% by year 3, 50% by year 5, and >70% by year 7.<br>• Plants should be vigorous. | In 10 meter plots measure:<br>• % survival Years 1 & 2, except live-stakes;<br>• % aerial cover and vigor by species Years 3, 5, 7, 10 | • Determine causes of species failure.<br>• Install plug, seed, live stake, bare-root or potted material (as appropriate) of additional plants. May substitute other hydrologically appropriate species.<br>• Increase management of invasives or competitive species.<br>• Provide temporary irrigation during establishment period.<br>• Provide herbivory protection. Possibilities include rodent collars or fencing for trees and shrubs.<br>• In upland areas, add or increase mulch depth for trees and shrubs. |
| | TREES: potted or bareroot<br>TREES: pot or bareroot planted @ shading density | • At least 80% survival of installed plants for Years 1&2.<br>• % aerial cover should be: 20-30% by year 3, 50-60% by year 5, and >70% by year 7.<br>• By Year 3, planting clusters will have a minimum of 2 tree spp., not including desirable native spp.<br>• Plants should be vigorous. | | |
| UPLANDS: Buffers (Created and Enhanced Wetlands); Created Forest Areas | SHRUBS: potted or bareroot | • At least 80% survival of installed plants for Years 1&2.<br>• % aerial cover should be at least: 25% by year 3, 50% by year 5, and >70% by year 7.<br>• By Year 3, planting clusters will have a minimum of 2 tree spp. not including desirable native spp.<br>• Plants should be vigorous. | In 5 meter plots measure:<br>• % survival Years 1 & 2;<br>• % aerial cover and vigor by species Years 3, 5, 7, 10 | |
| | TREES: potted or bareroot | • At least 80% survival of installed plants for Years 1&2.<br>• % aerial cover should be: 20-30% by year 3, 50-60% by year 5, and >70% by year 7.<br>• By Year 3, planting clusters will have a minimum of 2 tree spp. not including desirable native spp.<br>• Plants should be vigorous. | In 10 meter plots measure:<br>• % survival Years 1 & 2;<br>• % aerial cover and vigor by species Years 3, 5, 7, 10 | |
| CONIFER Under-planting of Existing Forest Areas | TREES: potted or bareroot installed by the end of Year 4. | • Survival of 80% of installed plants by 3 years post-installation.<br>• Plants should be vigorous. | In 10 meter plots measure:<br>• % survival Years 1, 2 and 3 post-installation;<br>• vigor by species Years 3, 5, 7, 10 | |
| Monitoring Schedule for all Habitat Areas: Once/year by August 1 in Years 1, 2, 3, 5, 7, and 10<br>Document with photographs from permanent photo points during all monitoring events | | | | |

| Table D—Non-native Invasive Species Performance Standards | | | |
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| **Performance Standards** | **Monitoring Activity** | **Monitoring Schedule** | **Adaptive Management Responses** |
| Removal and effective control of non-native invasive species to the following Performance Standards:<br>• Lombardy poplar (*Populus nigra*): 100% removal by end of Year 2 in the Phase 2 project area.<br>• Himalayan and evergreen blackberries (*Rubus armeniacus* and *R. laciniatus*): 100% removal by Year 3 in the Phase 2 project area.<br>• Scotch broom (*Cytisus scoparius*): 100% removal by Year 3 in the Phase 2 project area.<br>• Japanese knotweed and hybrids (*Polygonum cuspidatum, P. bohemicum, P. sachalinense*): 100% removal by Year 3 in the Phase 2 project area.<br>• Reed canary-grass (*Phalaris arundinacea*): installation of native species at high densities (over-planting) in the planting areas of the Phase 2 project area with RCG by Year 2. Reduction in vigor and stem density of RCG in areas of over-planting by Year 5. | The entire Phase 2 project area will be monitored for all managed non-native invasive species:<br>• Patches will be identified and located in as-builts or at Year 1 monitoring.<br>• Monitoring plots will focus on the existing or former invasive patches. Plots will include the entire patch. Patches will be monitored to watch for re-sprouting or recolonization of managed species.<br>• Document with photographs from permanent photo points. | For all managed invasives:<br>• Twice/year Years 1, 2, and 3. Early growing season (prior to June 30) and late growing season (by August 30) to ensure that rapid maintenance actions can be undertaken to remove/control invasives.<br>• Years 5, 7, 10 (spring/summer) monitoring may be reduced to once/year depending upon presence of invasives. | • Increased monitoring frequency to allow faster maintenance action response time.<br>• Re-grubbing of roots, re-application of sheet mulch, and/or re-application of wood chips.<br>• Increased frequency of stem injection of Japanese knotweed<br>• Active mowing between clumps/rows of woody plants to reduce above-ground stock of reed canary grass. |
| Performance Standards Apply to the Entire Phase 2 Project Area. | | | |

| Table E—Existing Groves and Informal Trails Performance Standards | | | | |
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| **Monitoring Parameter** | **Performance Standards** | **Monitoring Activity** | **Monitoring Schedule** | **Adaptive Management Responses** |
| Existing Stands and Groves of Trees | • Maintain the extent and improve the species composition of existing groves of trees and saplings within the Phase 2 Project Area that are designated for monitoring by under-planting with late seral stage conifer saplings. | • Document locations, approximate boundaries, general conditions and composition of existing groves of trees and saplings within the Project Area that are designated for monitoring. | • Groves will be identified and located in as-builts drawings or at Year 1 monitoring. | • Groves will be augmented or replanted if they are damaged during site construction. |
| | | • Document with photographs from permanent photo points.<br>• Document the sizes, species composition, and general conditions of the groves. | • Once/year coincide with annual vegetation monitoring for Years 1, 2, and 3. | |
| Informal Trails | • Block access, eliminate, and post informational signage on all informal trails through the habitat area that are noted for removal, by end of Year 2 of construction. | • Confirm condition of barriers, informational signage, and trail conditions. | • Once/year coincides with annual vegetation monitoring for Years 1, 2, 3, 5, 7, 10. | • Reinstall effective barriers;<br>• Post additional signage<br>• Deconstruct trails through ripping of soils and replanting with un-inviting plant (e.g. wild rose). |
| Performance Standards Apply to the Entire Phase 2 Project Area | | | | |

| Table F—Wildlife Use and Condition of Habitat Structures Performance Standards | | | |
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| **Performance Standards** | **Monitoring Activity** | **Monitoring Schedule** | **Adaptive Management Responses** |
| • At the completion of installation, there will be an average of 4 –6 habitat structures per acre in habitat areas of the Phase 2 project area.<br>• Habitat structures may include brush piles, LWD, and/or rock piles.<br>• Brush piles should be a minimum of approximately 5x5 feet wide and 3-4 feet high at installation.<br>• LWD will be no less than 8" diameter at the smallest end, and no less than 3 feet long.<br>• Rock piles will be no smaller than 3x3 feet wide and average of 2 feet high. Rocks should be an average of 4-6 inches minimum in 'diameter' with the intent to form a pile with substantial spacing between/underneath rocks for refuge. | • Document the location and approximate dimensions of brush piles, LWD, and rock piles in the As-builts. Note presence, dimensions, locations, and provide photo-documentation in the baseline/as-built report.. | • Identify and locate Habitat Structures in As-Built drawings. | • Augment brush piles with additions if they become too compressed or diminished over time.<br>• Add additional pieces of LWD if ones are too decomposed or use indicates need for more;<br>• Replenish rock piles or remove invasives (blackberry) which may establish in them. |
| | • Note evidence of use (trails in/out, scat, droppings, grazing, observed perching activity, etc.) of habitat structures.<br>• Observe and document with photographs, the dimensions and conditions of habitat structures. | • Once/year coincide with annual vegetation monitoring for Years 1, 2, 3, 5, 7, 10. | |
| Performance Standards Apply to the Entire Phase 2 Project Area. | | | |

| Table G—Birds, Amphibians, and Aquatic Macroinvertebrates Performance Standards | | | | |
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| **Animal/Habitat Area** | **Performance Standards** | **Monitoring Activity** | **Monitoring Schedule** | **Adaptive Management Responses** |
| **BIRDS**<br>All habitats associated with Phase 2 of the project | • No specific performance standard in place for birds | • Christmas bird count | • Once/year for bird counts. | • N/A |
| | | • Monthly bird species tallies | • Once/month for species richness Years 1, 2, 3, 5, 7, 10. | |
| **AMPHIBIANS**<br>All Monitored Wetland Areas in Phase 2 project area AND Frog Pond. | • Amphibian populations in Frog Pond, adjacent to Phase 2, will not show declines. | • Frog-Watch qualitative data from volunteers during breeding season | • Once/week from January through July, every year. | • Inoculation of larval amphibians into appropriate habitat.<br>• Establishment of appropriate aquatic plant community to facilitate amphibian survival and reproduction. |
| | | • Egg mass counts during breeding season | • Once/month from January through May, every year. | |
| | | • Adult/larval counts | • Once/month from March through July, every year. | |
| **MACROINVERTEBRATES**<br>All Monitored Wetland Areas in Phase 2 project area. | • Macroinvertebrates: Index of Biological Integrity falls within an appropriate reference range. | • Dip net sweeps | • Once/month from March through September, every year. | • Establishment of appropriate aquatic community to facilitate macroinvertebrate survival and reproduction. |
| | | • Dendy plate larval collections | • Once/year, during a three week period in June. | |

| Table H—Special One-Time Monitoring Events Performance Standards | | | | |
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| **Monitoring Parameter** | **Performance Standards** | **Monitoring Activity** | **Monitoring Schedule** | **Adaptive Management Responses** |
| Site Grading | • Maintain generalized pattern of water movement across the site in pre-existing conditions. | • Examination of as-builts to confirm that site grading reflects approved designs.<br>• Document construction modifications with change-order approvals from design ecologist and agency staff. | Completion of grading of Phase 2 project area. | • Modify grades and elevations as necessary to achieve appropriate water movement and control erosion.<br>• Document construction modifications with change-order approvals from design ecologist and agency staff. |
| Removal of Impervious Surfaces | • Remove 12 acres of existing impervious surfaces from the Phase 2 project area and dispose of the material appropriately off-site. | • Document removal of materials in As-Builts and include photographs in annual monitoring report. | At end of demolition stage of construction. | • If not possible to complete all at once, remove materials in stages and document % removal to agencies. |
| Construction of the New Trail for access that also maintains habitat exclusions | • Trail is completed that allows adequate pedestrian movement.<br>• New trail eliminates informal portions of existing trails and maintains portions of the habitat zones as 'trail-free'. | • Document trail completion in As-Builts.<br>• Document with photographs of site conditions and include in annual monitoring report. | At completion of construction activities. | • If necessary, construct New Trail in phases, and remove old trails in phases. |
| Construction of Educational Access Sites on the New Trail | • Appropriate active education access sites and nodes are located on the Trail such that students can access water and various habitat types in a manner that does not cause damage to habitat functions or water quality. | • Document in As-Builts<br>• Document with photographs of site conditions and include in first monitoring report following completion of construction activities. | At completion of construction activities. | • If necessary, construct active education access sites on the New Trail in phases. |
| Construction of ADA Access on the New Trail | • The portions of trail designed to meet state and federal ADA standards are located to access water and habitats appropriately. | • Document in As-Builts<br>• Document with photographs of site conditions and include in annual monitoring report. | At completion of construction activities. | • If necessary, phase construction of access sites which meet ADA standards on the New Trail. |
| Events are expected to occur once at the completion of construction. | | | | |