DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 3755
SEATTLE, WASHINGTON 98124-3755

REPLY TO
ATTENTION OF

CENWS-PM-ER

BIG SPRINGS CREEK STREAM RELOCATION AND WETLAND RESTORATION PROJECT

A SEPARABLE ELEMENT OF THE GREEN-DUWAMISH RIVER BASIN ECOSYSTEM RESTORATION PROJECT

KING COUNTY, WASHINGTON

FINDING OF NO SIGNIFICANT IMPACT (FONSI)

1. Background.
Big Spring Creek currently flows through roadside ditches overgrown with weeds that parallels the east side of 244th Avenue SE and the south side of SE 424th Street before turning southwards through a ditch to the confluence with Newaukum Creek, northwest of Enumclaw, Washington. Coho salmon (*Onchorhynchus kisutch*) utilize this stream for spawning, rearing, foraging, and as refuge habitat. However, during high flow events the straight, wood devoid channel provides little refugia, allowing for the potential of juvenile fish to be flushed further downstream. This lack of channel complexity reduces the stream's ability to provide suitable habitat for fish and wildlife.

The Corps proposed to relocate Big Spring Creek away from its straightened roadside and pasture ditches and into a more natural stream channel. The relocated stream would flow into a constructed streambed that would meander through a forested and reforested wetland. This project would increase available spawning habitat for adult fish, and would enhance rearing, foraging, and refuge habitat for juvenile salmonids and resident fish in Newaukum and Big Spring creeks by creating off-channel habitat areas, removing the stream from a source of potential water quality contamination, though provision of a riparian buffer, and by allowing access to the spring's headwaters.

2. Proposed Action.
Four alternatives were considered in the planning phase of the project, these include three different routes for the streambed and the no-action alternative. The no action alternative and two alignment variations were rejected because the alternatives did not meet the purpose and need of the proposed action and for the additional reasons described in the environmental documentation accompanying this Finding of No Significant Impact.

The proposed alternative would move Big Spring Creek from the ditched system of 244th Avenue SE and SE 424th Street, and reroute the stream into an approximate 4,600-foot constructed meandering channel from 424th Avenue SE to Newaukum Creek. Two new culverts would be installed to connect the new stream channel with the headwaters east of 244th Avenue SE and under SE 424th Street and connect the northern parcel with the southern parcel. The newly constructed channel would separate the stream from pollution sources, roads, and the adjacent dairy. Six off-channel hydrologically connected pools would be constructed to provide juvenile fish rearing areas. On the southern parcel, earthen material (spoils) removed from excavating the stream channel would be placed within the project boundary to create small hillocks. On the northern parcel, spoils would be removed to an offsite disposal area. Large woody debris would be placed to promote stream process formation and improve in-stream habitat complexity. The large woody debris should form areas of hydraulic complexity that would create additional pools, side channels, and juvenile salmon refuge. A 200-foot wide riparian corridor buffer would be planted with native conifers and deciduous trees for additional habitat. A fence would be constructed along project boundaries to exclude livestock and encourage a riparian buffer. On the west boundary of the northern parcel, a low earthen berm would be constructed to lessen the effects of flooding on the adjacent property.

The Big Spring Creek Restoration Project would be constructed in two phases. Phase I restoration would be the southern parcel that is currently pasturelands dominated by reed canary-grass (*Phalaris arundinacea*). Phase II in the northern second-growth forested parcel is currently planned for construction the following year. Each construction phase is expected to take approximately 8 weeks. In construction year 1, the new lower stream channel would be built. Construction year 2 would reroute water into the new Phase I stream bed, complete the construction of the new upper channel, install two culverts to connect the headwaters east of 244th Avenue SE, with the Phase I channel and divert water into the upper stream bed.

3. Conservation Measures.

The Corps would take all practicable steps during construction of the project to minimize impacts to aquatic resources during in-water construction. Contingencies would be in place if any of the water quality protection measures fail to achieve their intended function. Potential impacts to aquatic animals and fish would be avoided by constructing the new channel in the dry, without connection to the inlet to Big Spring Creek and the outlet to Newaukum Creek. The following impact minimization measures would be implemented:

- Any in-water work would be conducted during designated fish windows of June 16 through September 15.
- Use of all practicable best management practices (BMPs), such as stormwater runoff prevention, to ensure that no unnecessary damage to the environment occurs.
- During inlet/outlet construction and watering of the new channel, use of appropriate turbidity control measures (temporary coffer dam, silt curtains, or similar) to isolate construction from the existing Big Spring Creek channel and Newaukum Creek and to minimize turbidity impacts.
- Utilization of "marsh mats" to minimize impacts to wetland soils during channel excavation in Area II.

- Use of appropriate devices (i.e. pumps, sand bags, sumps) for required de-watering activities during construction.
- All water removed from the site would be discharged in a vegetated upland location, a de-siltation basin, or location that would not incur damage due to water discharge .
- Prohibition of operating equipment drive trains in the water.
- Cleaning all equipment prior to in-water construction work.
- No refueling near Newaukum Creek or the existing Big Spring Creek channel.
- Regular checks of construction equipment for drips or leaks.
- Use of dust suppression methods to minimize airborne particulate matter that would be created during any ground disturbing activities that could create dust. Additionally, all equipment and vehicles would be required to be kept in good operating condition to minimize exhaust emissions. Standard practices would be used to control fugitive dust during the construction phase and during daily operations and maintenance of the proposed project.

If during construction activities the contractor observes items that might have historical or archaeological value, the contractor would stop operations and notify the Corps archaeologist. The contractor shall prevent employees from trespassing on, removing, or otherwise damaging such resources. The Corps archaeologist will make notification to the State Historic Preservation Officer and affected Tribes if there is discovery of historical or cultural resources.

If human remains are found, the King County Sheriff will be called to determine if the human remains are of recent and potentially criminal origin. Concurrently, the Corps archaeologist will notify the appropriate Indian Tribe(s) for consultation about the nature and disposition of the remains should the Sheriff's Department determine that the remains are not the result of a crime and if the remains are of Native American origin. The contractor shall redirect work to other areas or tasks until the disposition of the remains is arranged to the satisfaction of the appropriate Indian Tribe.

4. Summary of Impacts.

An Environmental Assessment (EA) has been prepared pursuant to the National Environmental Policy Act for the proposed work. This document describes the environmental consequences of the proposed relocation of Big Springs Creek and the restoration of adjacent riparian and forested wetlands, which are briefly summarized below. This office has assessed the impacts of the proposed action on important resources including water quality, vegetation, fish and wildlife, threatened and endangered species, cultural resources and Native American concerns, land use, utilities and public services, air quality, noise, transportation, socioeconomics, recreation, and aesthetics. No significant adverse impacts were identified for any the resources evaluated. No impacts were identified that would require compensatory mitigation.

The Big Springs Creek watershed, as an upper part of the greater Green River watershed, supports several threatened and endangered species and their designated critical habitat as well as species that are candidates for listing. The Corps has determined that the project **may**

affect, not likely to adversely affect bull trout, Chinook salmon, steelhead, and coho salmon. The project **may affect, not likely to adversely affect** the critical habitat of Chinook salmon. The project would have **no effect** on Canada lynx, gray wolf, grizzly bear, marbled murrelet, northern spotted owl, golden paintbrush, fisher, wolverine, Oregon spotted frog, yellow-billed cuckoo, and white-bark pine. The proposed project would have **no effect** on the critical habitat of bull trout, marbled murrelet, northern spotted owl, and Canada lynx. In correspondence dated May 10, 2012, and June 7, 2012, the National Marine Fisheries Service and the US Fish and Wildlife Service respectively concurred with these findings.

The project is expected to cause temporary disruptions to nearby fish and wildlife as a result of construction activities. To lessen the potential impacts to threatened, endangered, and sensitive species, in-water work would take place during the work window of June 16 through September 15. Implementation of best management practices (BMPs), will also minimized impacts to fish and wildlife habitats.

During construction, there may be water quality impacts such as temporary and localized increase in turbidity. Implementation of BMPs would ensure such impacts are minimal and dissipate quickly. No long term effects to water quality are expected to occur.

Although the project will result in the loss of approximately 2.9 acres of pasture (1.8 acres) and forested (1.1 acres) wetlands to restore Big Springs Creek to a more natural streambed, the gain in habitat value and ecosystem function from moving the stream away from the road, meandering it through a forested wetland, and planting approximately 22.6 acres of native vegetation will exceed this loss.

No impacts to cultural resources or National Register of Historic Places eligible properties are anticipated as a result of project construction activities, and the Washington State Office of Archaeology and Historic Preservation (SHPO) concurred with this effects determination in a letter dated July 18, 2012. Concurrence for the Phase I portion of the project was received from the SHPO in a letter dated March 3, 2009 when that portion of the project was a permit action through Regulatory Branch.

The project will involve a discharge of fill material into waters of the United States. The Corps does not issue permits for its own civil works activities. Nevertheless, the Corps has complied substantively with Section 404, and has received water quality certification under Section 401. The Corps' Big Springs Creek Restoration project meets the criteria for Nationwide Permit (NWP) 27, Aquatic Habitat Restoration, and the requirements for the State water quality certification and coastal zone consistency concurrence under a NWP 27. Therefore, the Corps has concluded that the Big Springs Creek Restoration is functionally analogous to the effects of the conditions of a NWP 27 and that State's water quality certification for NWP 27 applies to this project. In a letter dated June 25, 2012, the Washington Department of Ecology concurred that the project meets the requirements for a Washington State 401 Water Quality Certification and Coastal Zone Management Act under NWP 27.

Unavoidable adverse effects of the proposed project include: (1) noise disturbance to wildlife and home owners in the vicinity due to operating heavy machinery during excavation and construction of the restoration site; (2) disruption of local traffic in the project vicinity during construction; (3) excavation of approximately 0.9 acres of existing forested wetland and 1.8 acres of pasture wetlands to create the streambed; (4) filling of 0.2 acres of scrub-shrub wetland for the berm to lessen the effects of flooding on the adjacent property; and (5) impacts to turbidity during the connection of the newly aligned stream to the upstream culverts and the downstream existing channel. Given the temporary, localized, and minor nature of these effects, the Corps has determined that the proposed restoration project would not result in significant adverse environmental impacts.

5. Public Involvement. The proposed action has been coordinated with appropriate Federal, state, and local agencies. The draft EA was made available for public review on May 22 through June 23, 2012 via mailings to local libraries and posting on the public Corps website, and no comments were received.

6. Finding. Based on the analysis described above and provided in more detail in the EA, I have determined that the proposed action will not result in significant adverse environmental impacts. This project is not a major Federal action significantly affecting the quality of the human environment, and therefore does not require preparation of an environmental impact statement.

6 AUG 2012
Date

BRUCE A. ESTOK
Colonel, Corps of Engineers
Commanding

FINAL ENVIRONMENTAL ASSESSMENT

BIG SPRING CREEK STREAM RELOCATION AND WETLAND RESTORATION PROJECT,

A SEPARABLE ELEMENT OF THE GREEN-DUWAMISH RIVER BASIN ECOSYSTEM RESTORATION PROJECT

KING COUNTY, WASHINGTON

US ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

July 2012

US Army Corps of Engineers
Seattle District

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EXECUTIVE SUMMARY

Responsible Agencies: The agencies responsible for this proposed project are the U.S. Army Corps of Engineers (USACE), Seattle District (Corps), and King County. USACE is the lead Federal agency responsible for compliance with this National Environmental Policy Act Environmental Assessment (EA).

Summary: Big Spring Creek currently flows through roadside ditches overgrown with weeds that parallels the east side of 244th Avenue SE and the south side of SE 424th Street before turning southwards through a ditch to the confluence with Newaukum Creek. Coho salmon (*Onchorhynchus kisutch*) utilize this stream for spawning, rearing, foraging, and as refuge habitat. However, during high flow events the straight wood-devoid channel provides little refugia, allowing for the potential of juvenile fish to be flushed further downstream. This lack of channel complexity reduces the stream's ability to provide suitable habitat for fish and wildlife.

The Corps and King County proposed to relocate Big Spring Creek away from its straightened roadside and pasture ditches and into a more natural stream channel. The relocated stream would flow into a constructed streambed that would meander through a forested and reforested wetland. This project would increase available spawning habitat for adult fish, and would enhance rearing, foraging, and refuge habitat for juvenile salmonids and resident fish in Newaukum and Big Spring Creeks by creating off-channel habitat areas, removing the stream from a source of potential water quality contamination, though provision of a riparian buffer, and by allowing access to the spring's headwaters. In accordance with the National Environmental Policy Act (NEPA), this document evaluates the potential environmental impacts of the proposed restoration alternatives.

Based on the analysis in this EA, the project would not constitute a major Federal action that would significantly affect the quality of the human or natural environment; therefore; the preparation of an Environmental Impact Statement is not required. The Corps would use best management practices to minimize potential adverse effects to aquatic and terrestrial resources. Impacts to air quality, noise, and water quality would be mitigated to a level of insignificance because the proposed project would provide enhanced aquatic functions and values in the project area as a result of the creek relocation.

Summary Table to Compare Potential Impacts

Environmental Resource Area	No Action Alternative	Proposed Action
Land Use	Possible but unknown changes in land use could occur in the future without the project.	With conservation easements in place, would allow increased public access to area, would prevent livestock grazing.
Geology and Soils	No change from present.	Localized disturbance to soils with construction activities. However, there would be no long term negative impacts on geology or soils.

Environmental Resource Area	No Action Alternative	Proposed Action
Water Resources and Water Quality	Would remain degraded and may worsen due to street runoff.	Potential temporary increase in turbidity due to construction activities. Potential adverse impacts during construction would be minimized through BMPs. Long term water quality should improve with the restoration actions. There would be potential for reduced roadside and pasture runoff. The increased filter effects of wetlands and riparian corridor would further improve water resources and water quality. Installation of two “fish friendly” culverts to carry the new stream flow.
Vegetation and Wetlands	No change from present are predicted at this time.	2.9 acres of land converted to stream. 13.3 acres of pasture dominated by reed canary-grass removed and replaced with native wetland and riparian species. 9.3 acres scrub/shrub enhanced with planting native species.
Fisheries and Wildlife	Degraded habitat conditions are expected to continue.	Improved spawning and rearing habitat for fisheries Improved habitat for wildlife.
Threatened and Endangered Species	No change from present.	Improved habitat conditions for salmonids. Temporary localized effects from sediment when water begins flowing in the new stream bed. No effect to other listed species.
Air Quality and Noise	No change from present.	Temporary localized increase in noise during construction. Construction activities would not exceed *de minimus* standards for air quality. No long term increase in noise or pollutants.
Cultural Resources	No change from present.	Possible adverse effect to historic resources due to exposure and erosion of existing archaeological site from stream meander.
Transportation	No change from present.	Temporary and localized increase in traffic from construction vehicles. Temporary road closures with installation of under-road culverts. No long term negative impacts on transportation are expected.

Environmental Resource Area	No Action Alternative	Proposed Action
Aesthetics and Visual Resources	No change from present.	Visual and aesthetic appeal of the site should increase by the restoration of the creek to a more natural streambed and the planting of native vegetation. During excavation and construction of the site, the aesthetic quality of the general area could be reduced due to construction activities, which may disturb local residents.
Recreation	No change from present.	Potential increase in recreation with opportunities for fishing and wildlife viewing.
Hazardous, Toxic, and Radioactive (HTRW) Materials	No change from present.	Project would not introduce or mobilize HTRW materials.
Coastal Zone Management	No change from present.	Project is consistent to the maximum extent practicable with Coastal Zone Management Act.
Floodplain Management	No change from present.	No increase in flood risk. Wetlands buffer would absorb impacts from flooding.

1 INTRODUCTION

This Draft Environmental Assessment (EA) is prepared in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 USC §§ 4321-4370e), Sec. 102(C) as reflected in the USACE Engineering Regulation ER 200-2-2. This EA evaluates the environmental, cultural and social effects of the restoration of Big Spring Creek in southeastern King County, Washington, to more natural stream bed from the current roadside and pasture ditches. Restoration actions to improve fish rearing habitat and storm refuge at this site include channel relocation and reconstruction, wetland enhancement, riparian re-vegetation, and woody debris additions. Two culverts would also be installed to increase stream connectivity.

1.1 BACKGROUND

The Big Spring Creek reach in the project area is straight, shallow, and does not offer quality riparian vegetation and in-channel structure. Much of the area has been filled or drained for agricultural purposes degrading the value of the available habitat. The proposed Big Spring Creek areas are not able to function effectively as rearing habitat and storm refuge for trout and salmonids and lack connectivity for fish migration.

1.2 AUTHORITY

Section 306 of the Water Resources Development Act (WRDA) of 1990 authorized the Secretary of the Army to include environmental restoration as one of the primary missions of the U.S. Army Corps of Engineers (Corps). Congress initially authorized the Green/Duwamish River Ecosystem Restoration Project in the 1996 Energy and Water Development Appropriations Act as part of a General Investigation study under Section 209 of Public Law (PL) 87-874, Puget Sound and Adjacent Waters. Authorization for construction of the Green/Duwamish River Ecosystem Restoration Project was authorized by section 101(b)(26) of WRDA 2000. The Record of Decision for the Green/Duwamish River Basin Programmatic Environmental Impact Statement (PEIS) (USACE and KCDNR, 2002) was signed in April 2002. The proposed Big Spring Creek Ecosystem Restoration Project is a separable element tiering off of the 2002 PEIS for the Green/Duwamish River Ecosystem Restoration Project which is incorporated herein by reference.

1.3 PROJECT LOCATION

Big Spring Creek (WRIA 09.0119) is located within the Newaukum Creek Basin (Middle Green River Sub-watershed) on the Enumclaw plateau northwest of the City of Enumclaw (Figure 1). The project area is bounded by Southeast (SE) 416th Street to the north, SE 436th Street to the south, 244th Way SE to the east, and 236th Avenue SE to the west. The 1.2 mile-long stream is a tributary of Newaukum Creek entering at river mile (RM) 6.3. Newaukum Creek is a left-bank tributary of the Green River (RM 40). Big Spring Creek originates from a series of wetlands that are part of its 1,000 acre drainage area. The primary wetland within the Big Spring Creek watershed is the 144-acre Newaukum Creek Wetland (King County, 2011).

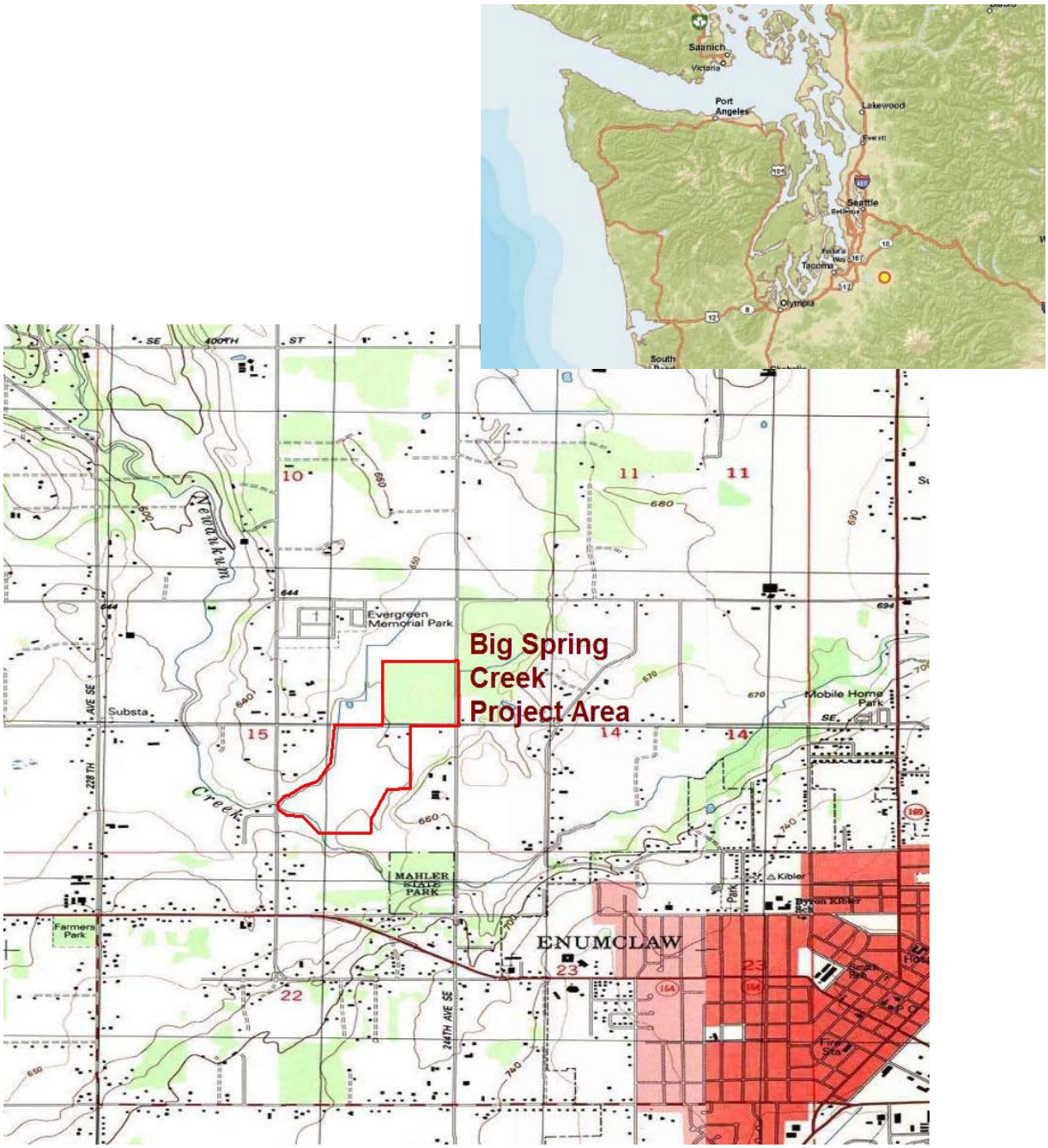


Figure 1. Big Spring Creek stream restoration project area, northwest of Enumclaw, King County, Washington.

2 PURPOSE AND NEED

Degraded habitat conditions in Big Spring Creek have severely impacted the habitat and ecological functions and resulted in the underlying need to improve these habitat conditions

through proposed restoration activities. The purpose or goal of the project is to restore salmonid habitat complexity and process-based ecological functions by relocating Big Spring Creek from the roadside ditch to its original wetland location. The project is intended to enhance support of coho salmon, steelhead, and cutthroat trout by creating a greater complexity of habitats for juvenile fish and thereby restoring off-channel rearing and refuge pools that are connected to Big Spring Creek.

The clearing of the wetland riparian buffer, grading, and livestock access to Big Spring Creek and the source wetlands has resulted in bank erosion, siltation, and degraded water quality, which has ultimately affected Newaukum Creek (King County, 2000). The road fill has disrupted hydrologic connectivity and function within the wetlands and between stream and wetland. These impacts have also affected both the stream and anadromous salmonids. Vegetative structure and diversity is very poor, especially downstream (south) of SE 424th Street where reed canary-grass (*Phalaris arundinacea*) dominates the landscape.

3 PROPOSED ACTION AND ALTERNATIVES

Four alternatives were considered in the planning phase of the project, these include three different routes for the streambed and the no-action alternative.

3.1 ALTERNATIVE 1: NO ACTION ALTERNATIVE

Under the no-action alternative, Big Spring Creek would remain in its current location, flowing through roadside and pasture ditches. Under NEPA, a federal agency must always consider this alternative. Although the no-action alternative does not meet authorized project objectives, it will be carried forward for comparison purposes to discern the relative advantages and disadvantages of the various alternatives considered.

3.2 ALTERNATIVE 2: PROPOSED ACTION ALTERNATIVE

This alternative would move Big Spring Creek from the ditched system of 244th Avenue SE and SE 424th Street, and reroute the stream into an approximate 4,600-foot constructed meandering channel from 424th Avenue SE to Newaukum Creek (Figure 2). Two new culverts would be installed to connect the new stream channel with the headwaters east of 244th Avenue SE and under SE 424th Street to connect the northern parcel with the southern parcel. The newly constructed channel would separate the stream from pollution sources, roads, and the adjacent dairy. Six off-channel hydrologically connected pools would be constructed to provide juvenile fish rearing areas. On the southern parcel, earthen material (spoils) removed from excavating the stream channel would be placed within the project boundary to create small hillocks. On the northern parcel, spoils would be removed to an offsite disposal area. Large woody debris would be placed to promote stream process formation and improve in-stream habitat complexity. The large woody debris should form areas of hydraulic complexity that would create additional pools, side channels, and juvenile salmon refuge. A 200-foot wide riparian corridor buffer would be planted with native conifers and deciduous trees for additional habitat. A fence would be constructed along project boundaries to exclude livestock and encourage a riparian buffer. On the

west boundary of the northern parcel, a low earthen berm would be constructed to lessen the effects of flooding on the adjacent property.

3.3 Alternatives Considered and Eliminated from Further Consideration

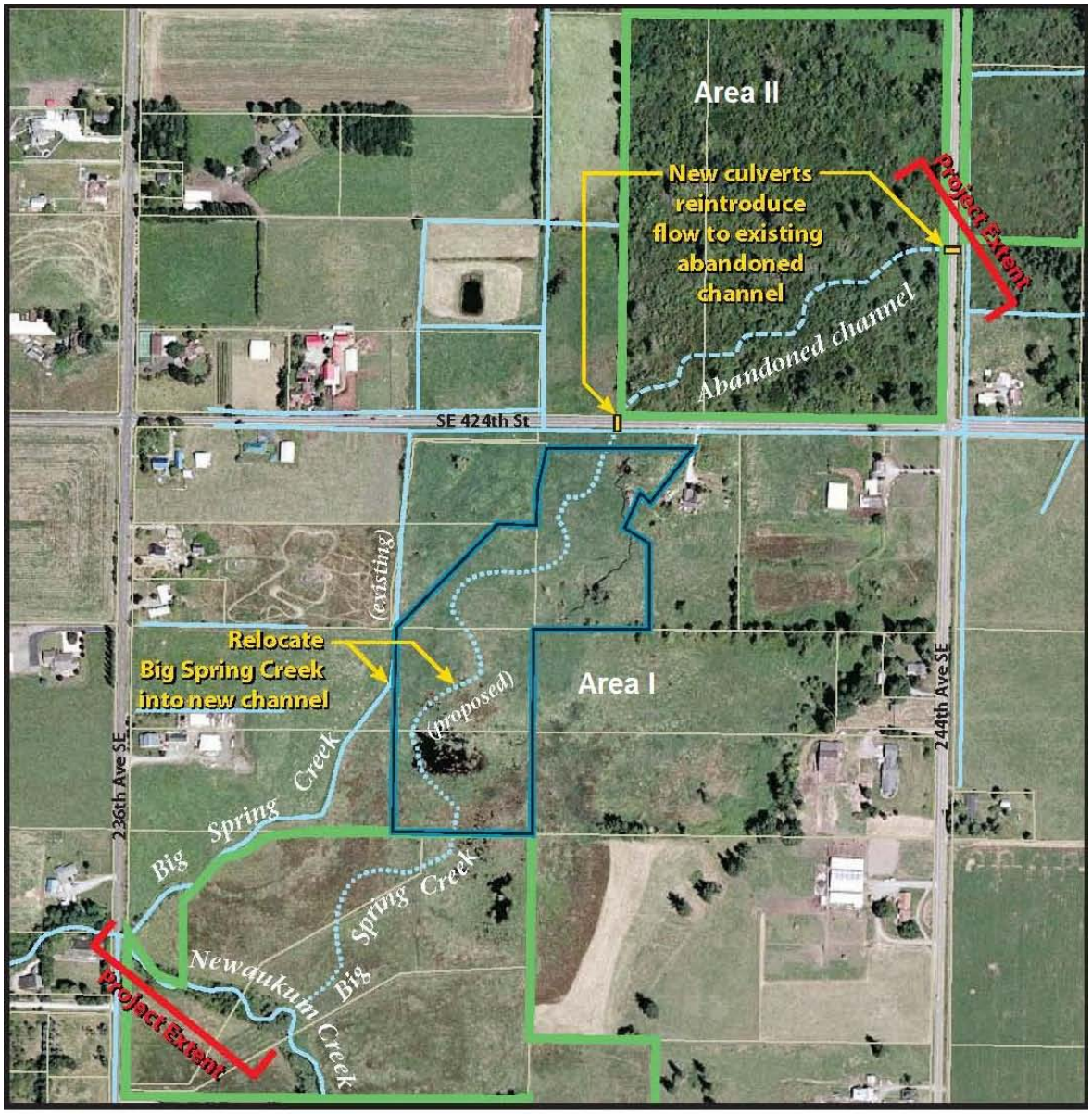
3.3.1 Relocate the streambed to east of 244th Avenue SE

This alternative would create a stream channel east of 244th Avenue SE flowing southwards, cross under SE 424th Street east of the residence that is on the corner, cross westwards under 244th Avenue SE, approximately 500 feet south of the 424th Street/244th Avenue intersection and continue diagonally southwestwards to connect with Newaukum Creek. This route would require very difficult construction in year-round standing water which can be as deep as 4 to 5 feet in the dry season, with greater depths during winter. The route would transverse through *Spiraea*[1] filled wetland and would require the purchase of three rural residential homes and land. The new channel and buffer area would still be in close proximity of existing roads, providing limited benefit. The farther east the channel could be moved, the more uphill the route would become. The longer the channel, the less the resulting downhill gradient could be achieved to meet the ecological goal of providing a design with both spawning and rearing habitat. With these multiple issues, this alternative was abandoned as it is not considered a reasonable and feasible alternative for further analysis under NEPA.

3.3.2 Connect the streambed to the existing channel near the confluence of Newaukum Creek

This alternative is a variation of the current proposed alternative, and would reconnect with the more natural stream channel that exists above the confluence with Newaukum Creek. The lower reach (existing channel) has fewer buffers between the stream and agricultural field runoff and the confluence is near a paved road (236th Avenue SE), both non-point sources of water pollution. The existing channel is still fairly straight, heavily modified, and contains very poor fish habitat. In addition, despite communication and outreach efforts for the proposed alignment, not all the adjacent land owners were willing to give the necessary conservation easements For these reasons, the use of the existing lower stream channel was considered to be less than optimal and is not considered a reasonable and feasible alternative for further analysis under NEPA.

[1] *Spiraea* is an ornamental shrub that is considered invasive in the wild. It forms dense thickets that shade out existing plants and prevents establishment of new plants. Its seeds often spread along waterways and with movement of fill dirt (Kaufman & Kaufman, 2007).



Big Spring Creek *Proposed New Channel*

- Existing stream channels
- Proposed new channel of Big Spring Creek
- Existing abandoned channel of Big Spring Creek (approx.)
- Conservation easement
- Public land
- Parcel

N

0 250 500 Feet

June 2007

The information included on this map has been compiled from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. King County shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.

Data sources: King County datasets

King County

Department of Natural Resources and Parks

Water and Land Resources Division

Figure 2. Proposed new channel for Big Spring Creek, Area I and II.

3.4 PROJECT DESCRIPTION

The Big Spring Creek Restoration Project will be constructed in two phases constructed over two years. The project two phases or areas are separated by SE 424th Street and are distinctly different habitat environments. The southern segment, Area I, restoration is currently pasturelands dominated by reed canary-grass (*Phalaris arundinacea*). The northern segment, Area II, is comprised of second-growth forest and shrubby habitat. Construction of the each phase is expected to take approximately 8 weeks.

3.4.1 Area 1

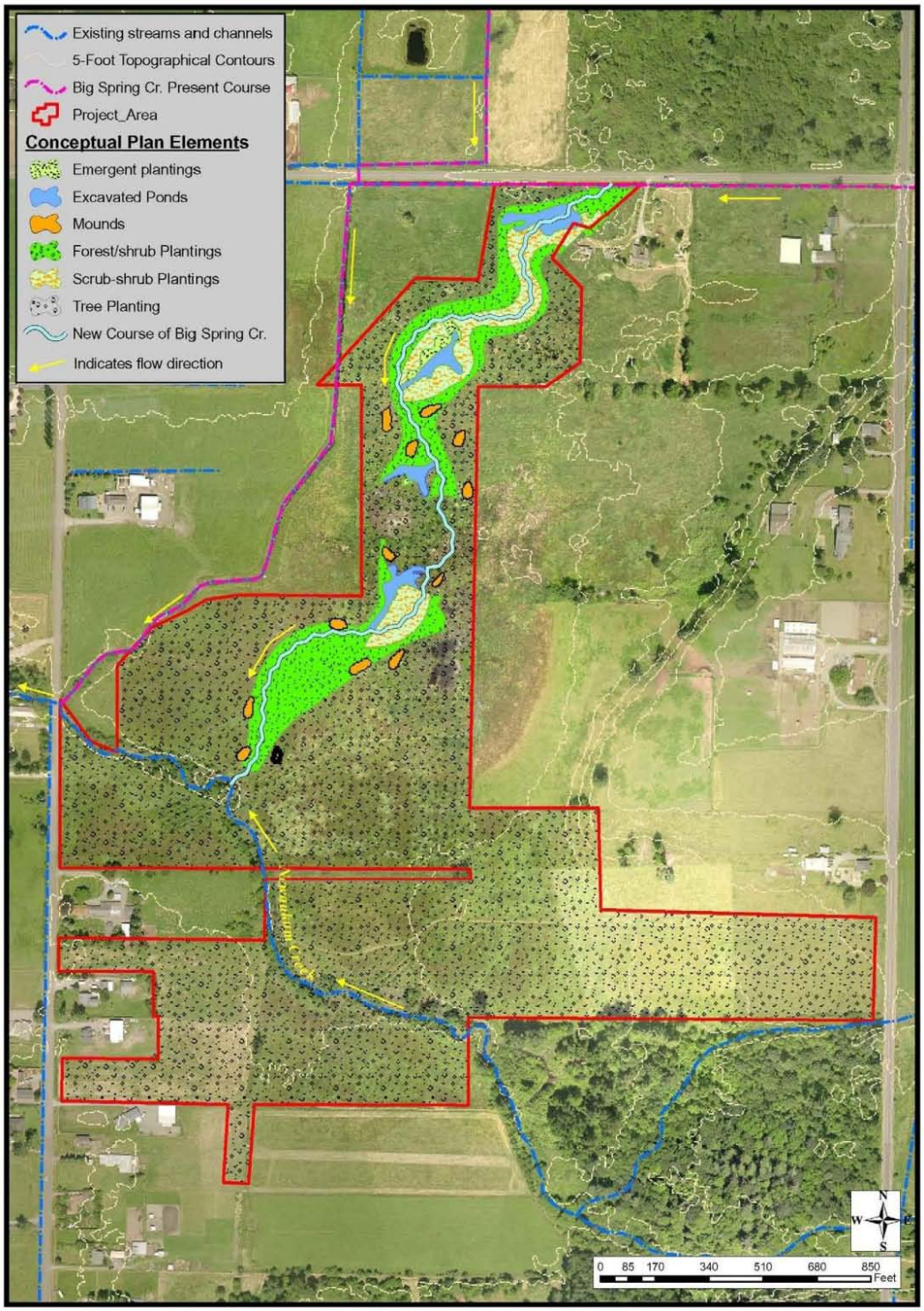
Area I construction footprint would be 200 feet wide to include the new stream and replanted riparian corridor. This width would allow all construction access. This phase of construction would create a new stream channel, approximately 2,800 lineal feet long, from SE 424th Street to Newaukum Creek. The new stream bed (Figure 3) would have an average bottom width of approximately 6 feet, with varying side slopes and a top width of 5 to 15 feet. Maximum depth would be approximately 4 feet. Four off-channel excavated embayments would be constructed and connected to the main channel (Figure 4). A typical embayment area would be approximately 100 feet long and up to 4 feet deep. In addition three flow-through side pools, approximately 120 feet long, would be constructed at the inside of the bends in the main channel. Two on-line pools, 100 feet diameter, would be constructed in the main channel. The stream would meander and hydrologically connect to existing wetland pools in the area. During construction, the new channel will be isolated from the flowing stream by plugs at the upstream and downstream ends of the new channel. These plugs would be substantial enough to prevent flood flows from entering the new channel during construction. Approximately 280 pieces of large woody debris would be placed in and along the newly-created stream channel and side pools. The large woody debris structures would consist of fir, cedar, or other approved[2] coniferous species. Earthen material removed from the stream channel excavation would be deposited within the project boundaries to create small hillocks no more than 5 feet high. Any additional earthen material would be disposed in designated upland areas and revegetated, or used to fill part of the abandoned ditch.

Wetlands buffers would be planted with native emergent plants such as sedges (*Carex spp*), rushes (*Juncus spp*), and bulrush (*Scirpus microcarpus*). The riparian corridor would be planted with fast growing species such as willows (*Salix spp*) and cottonwoods (*Populus trichocarpa*) as well as native conifers such as Sitka spruce (*Picea sitchensis*) and red cedar (*Thuja plicata*). To help control weeds, all bare ground would be covered with approximately 6 inches of mulch. Plantings would be maintained as necessary for three years to ensure 80 percent or greater survival of each species or contingency species. Fences would be repaired and/or constructed along the easement boundary to exclude livestock.

Temporary construction access and staging would take place on an approximate 12 acre parcel of pasture that is owned by King County on the southern boundary of the project area off 244th

[2] Washington Department of Wildlife and Fisheries recommended species.

Avenue SE (Figure 5). Use of this parcel would require a temporary road for access. Although the southern parcel does extend into wetland soils, the staging area will be restricted to the upper portion out of the wetlands with the exception of that portion required to gain access to the project area. To lessen the effects to wetlands, marsh mats will be utilized to limit soil compaction. All materials utilized in the staging area will be removed and the site restored as part of the project closeout.



Big Spring Creek
Stream Relocation and Wetland Restoration Project
King County

Figure 3. Area I features, Big Spring Creek

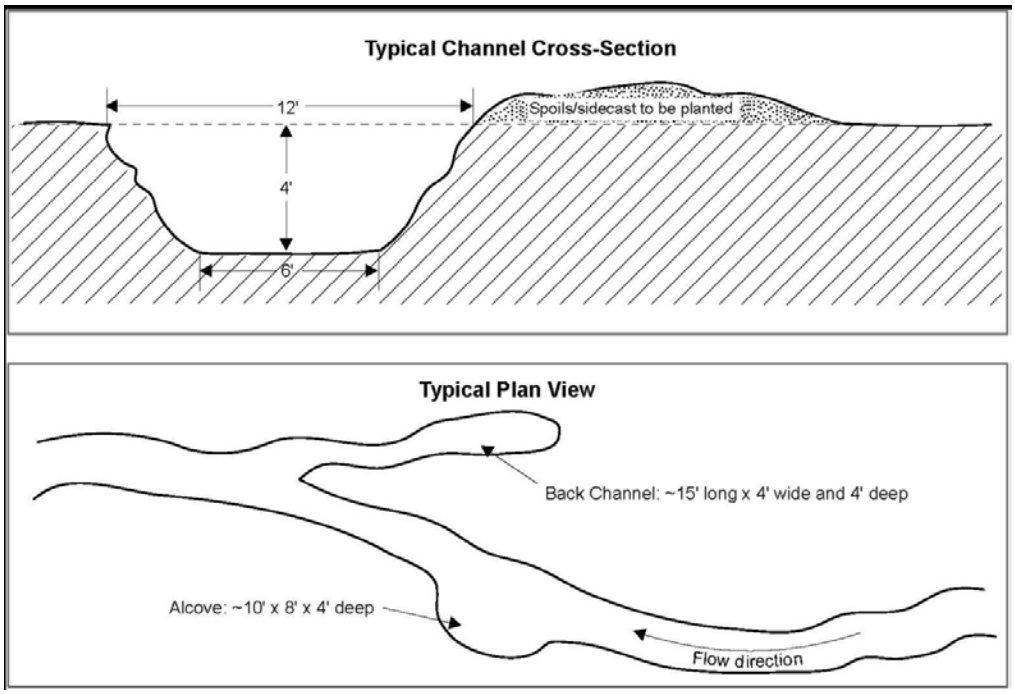


Figure 4. Stream cross-section, side pool, and back channel example.

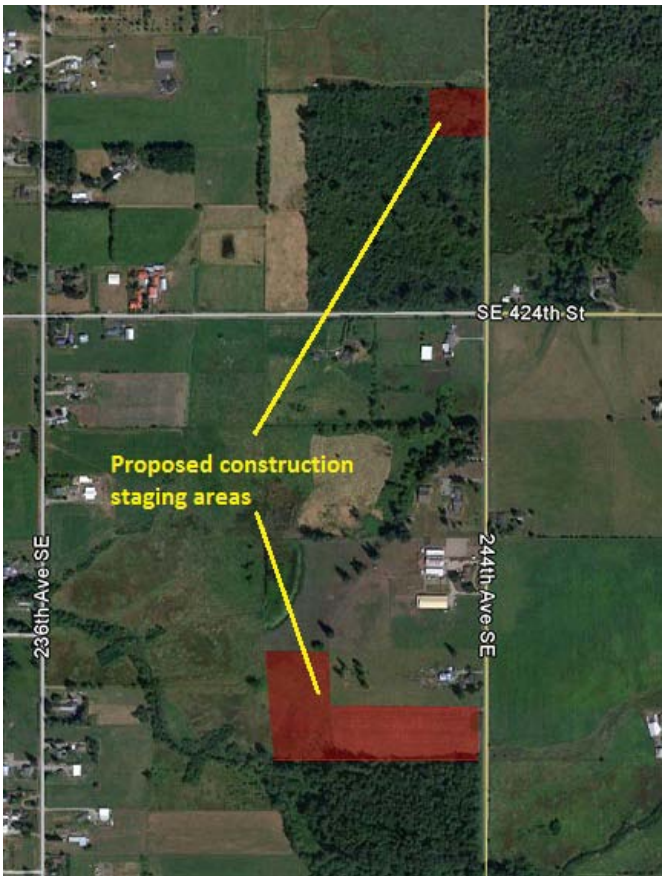


Figure 5. Temporary construction staging areas

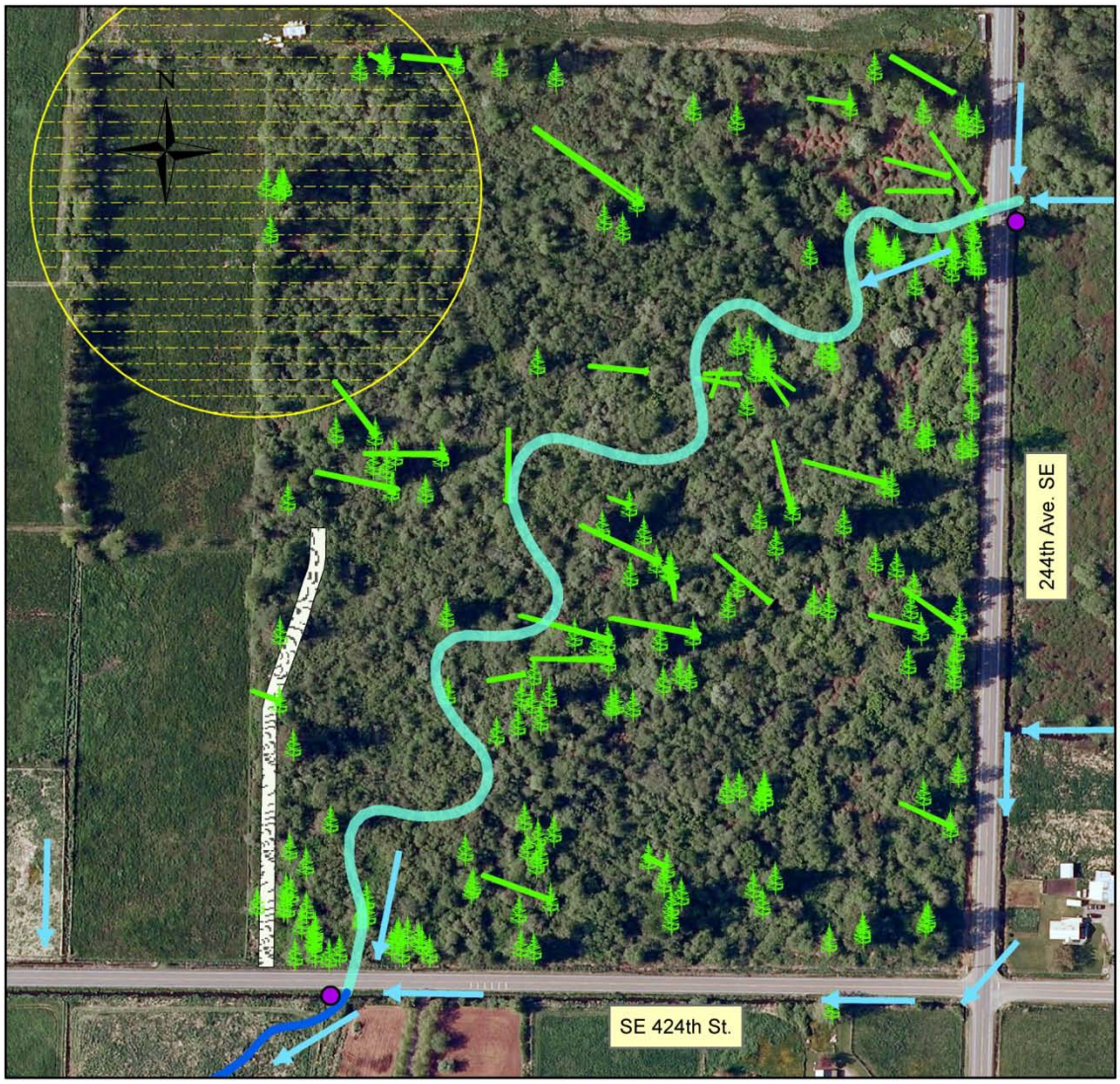
3.4.2 Area II

Area II construction would be similar in design as the Area I design described previously, but would be in a 1,500 linear foot corridor, and would extend from SE 424th Street to the inlet of Big Spring Creek at 244th Avenue SE. The new stream channel (**Error! Reference source not found.** 6) would be placed to avoid impacts to existing coniferous trees and would be approximately 2,160 feet in length. In an effort to reduce construction effects to the second growth forest in Area II, existing large wood within the construction area would be salvaged and utilized for stream structure, but no additional large wood would be brought in. The upstream end of the old channel (south and west of SE 424th Street) would be closed and securely armored to prevent re-entry of any flow. Armor material would consist of clean, angular rock, and would be installed to withstand the 100-year peak flow.

Two new fish passable culverts, approximately 10 to15 feet in wide and 5 to 7 feet high would be installed at 244th Avenue SE and SE 424th Street to direct the stream from roadside ditches to the new stream channels. Roadside ditches would be hydrologically connected to the new stream bed at 244th Avenue SE, but would be blocked at SE 424th Street.

Approximately 600 cubic yards of the excavated earthen materials will be utilized to construct a low berm along part of the southwest side of Area II. The berm would be approximately 660 feet in length connecting to the road embankment at the south end and to higher ground at the north end. The berm would have a 5-ft wide top crown, 2:1 side slopes, and an average bottom width of 10 to 15 ft. A plug would be constructed in the ditch at the intersection of the new berm and SE 424th Street. The purpose of the berm is to control surface water flows up to a 100-yr storm event. Hydrologic modeling has indicated that the southwest portion of Area II would be inundated at flows greater than a 10-yr event with addition of the new stream alignment.

Temporary construction access and staging would be in the northeast corner of the Area II parcel adjacent to 244th Avenue SE (Figure 5). This corner is slightly higher in elevation and would not involve wetland impacts. Existing scrub/shrub vegetation would be cleared using chainsaws or other equipment to make the area safe.



Big Spring Creek -- Area 2
35% Proposed plan

Channel characteristics:
slope = 0.002 - 0.0015
bankfull width = 12 - 16 ft.
side slopes = 1:1 to 3:1
bottom width = 3 ft.
bankfull depth = 2 - 3 ft.
length = 2160 ft.
sinuosity = 1.4
Berm length = 650 ft
Berm height = 1-3 ft

Legend
- Area 2 channel
- Area 1 channel
- flow direction
- Tree
- downtree
- Plug existing ditch
- Red Tailed Hawk 325 ft. buffer (year round)
- Berm

Figure 6. Area II features, Big Spring Creek

4 EXISTING ENVIRONMENT

This section contains a description of relevant resources that could be impacted by the project. The important resources described in this section are those recognized by laws, executive orders, regulations, and other standards of National, state, or regional agencies and organizations; technical or scientific agencies, groups, or individuals; and the general public. The following resources have been considered and found to not be affected by any alternative under consideration: prime and unique farmlands, environmental justice, and socioeconomics.

4.1 LAND USE

The Big Spring Creek project area has two distinct land use areas. South of SE 424th Street, the land is mowed pasture, north of SE 424th Street; it is reverting to forest and is dominated by scrub/shrub habitat with some fir trees. The creek itself is channeled into roadside and pasture drainage ditches. The southern portion of the creek re-enters a more natural channel with a replanted willow overstory. The forested portion north of SE 424th Street (construction Area II site) is part of the King County Big Spring Creek/Newaukum Creek Natural Area. King County has secured conservation easements for the mowed pasture area south of SE 424th Street (construction Area I).

4.2 GEOLOGY AND SOILS

The Natural Resources Conservation Service soils surveys show the project area to be Shalcar muck, Seattle muck, and Buckley silt loam in almost equal proportions (36 percent, 28 percent, and 30 percent respectively) (NRCS, 2009). The forested area (Area II site) is predominately Seattle muck with some Buckley series in the northwest corner, and the pasture area (Area I site) is largely Shalcar muck and Buckley silt loam in the southern portion. Both Shalcar and Seattle series soils are described as very poorly drained organic soils, with the Shalcar being stratified with mineral soils. The Seattle series soils are in depressions and valleys on the glacial till plain and also in river and stream valleys. The Shalcar series were formed in deposits of sedge peat and alluvium in stream valleys and on rolling, glaciated uplands. The Buckley series consists of poorly drained soils which formed in the Osceola mudflow on the nearly level plain between the Green and White Rivers (NRCS, 1973).

4.3 WATER RESOURCES AND WATER QUALITY

Big Spring Creek's spring source flows from an aquifer located under the Osceola mudflow deposits that blanket the Enumclaw Plateau. Spring discharge at low flow is between 4 and 7 cubic feet per second (cfs). A long series of roadside, rural residential, highway, and agricultural properties ditches flow from the north and west of the spring source and these join at 244th Avenue SE. The next major input of flow comes from the North Fork of Big Spring Creek, which contains mostly a long series of agricultural ditches, combined with a reported set of springs north of SE 424th Street. Water quality of the North Fork is impacted by dairy cows allowed to pasture in the wetlands and creek, and possibly by dairy runoff. Young cows are also allowed to pasture south of 424th Street, adjacent to the mainstem of Big Spring Creek on one large agricultural parcel. This parcel is partially or wholly inundated with Big Spring flow, even

in the summer, depending on beaver activity, and how recent the stream has been cleaned out of accumulated vegetation and organic matter build up. Aerial photos from 1936 (King County, 2011), the earliest available, indicate the roads in the area already in place and Big Spring Creek flowing in its current alignment. There is no visible evidence in the 1936 aerial photo (Figure 7) of the original stream bed.

Big Spring Creek has been observed by property owners and King County employees to have widespread flooding during storm events, as well as significant inundation throughout the wet season of a widespread area. SE 424th Street has been known to be overtopped, though it is not known the frequency of such overtopping. An extensive dredging effort from 2005 seemed to improve flooding and inundation temporarily, but has not had a lasting effect. Reed canary-grass and other invasive continue to choke the channel and lateral ditches. Newaukum Creek also has a significant backwater effect during large storm events, as is indicated by the 1995 Flood Insurance Rate Map (FIRM) 100 year flood maps. This backwater significantly reduces the effective water surface gradient at high flow. The 100 year flow for Big Spring Creek is roughly 70 cfs, while the 100 year flow for Newaukum Creek is approximately 1800 cfs. Big Spring Creek has extremely low gradient, with only 2.09 feet of elevation drop over about 2300 linear feet, or less than 0.1 percent average water surface gradient.

Figure 7. Project vicinity, 1936 aerial photo (map courtesy of King County imap).

4.3.1 Temperature

Water temperature is extremely cold, typically about 50 degrees F (10 degrees C), fluctuating in a narrow range. The water warms only slightly on its course into Newaukum Creek.

4.3.2 Sediment

Much of the basin of Big Spring Creek is in agricultural use, which typically increases the risks of fine sediment input into streams.

4.3.3 Chemical contamination/nutrients

Much of the basin of Big Spring Creek is in agricultural use, raising the risk of nutrient and chemical contamination. Big Spring Creek is a tributary to Newaukum Creek, which has similar agricultural land use. Water chemistry measurements in Newaukum Creek continue to demonstrate that the stream does not meet state water quality standards on at least one occasion for the following parameters: fecal coliform, dissolved oxygen, and total phosphates (WDOE, 2008). Runoff of vehicle deposits on roads is one of the sources of toxics that kill returning salmon (Fiest *et al*., 2011) Similar water chemistry is anticipated in Big Spring Creek, so this reach is functioning at risk.

4.4 VEGETATION AND WETLANDS

4.4.1 General Site Conditions

South of SE 424th Street the land was cleared, ditched, and drained in the past to convert it to agricultural pasturelands. As a result, the site is largely open, dominated by pasture grasses with little woody vegetation except along the perimeter of Newaukum Creek where native trees and shrubs have been installed as part of previous restoration efforts. North of SE 424th Street, the parcel is heavily vegetated with a combination of trees and shrubs. Access to the interior is difficult due to the growth of Himalayan blackberries on the perimeter.

4.4.2 Area I

The wetland directly south of SE 424th Street is largely reed canary-grass (*Phalaris arundinacea*) with some areas of cattails (*Typha latifolia*) in localized depressions. Soft rush (*Juncus effucus*), spirea (*Spirea douglasii*), buttercub (*Ranunculus repens*), red fescue (*Festuca rubra*), velvet grass (*Holcus lanatus*), and other pasture grasses are also found on site. Previous native plantings installed by King County near Newaukum Creek include Pacific willow (*Salix lasiandra*), Sitka willow (*Salix sitchensis*), and red alder (*Alnus rubra*).

From visual observations, reed canary-grass constitutes approximately 70 percent of the wetland in the project area. This wetland within the project area was rated according to the Washington Department of Ecology (WDOE) wetland rating system. The rating exercise resulted in a Class II wetland rating (Appendix A). This depressional wetland scored highest for the Water Quality function, secondly the Hydrologic function, and lastly the Habitat function. Since the site is bordered by some grazed pastures and drainage from farm fields and a road, the wetland has the potential to improve water quality. It also has the potential to improve water quality because of

the persistent ungrazed vegetation and organic soil found on the site. The potential to reduce flooding and erosion is high because water is able to pond in some areas. Habitat is degraded by the heavy grazing in its buffers, low vegetative diversity, and the lack of undisturbed, unbroken vegetated corridors to other wetland areas outside of the project area.

4.4.3 Area II

The wetland complex located on the 30-acre parcel is unique in that it has diverse native plant communities; including several large Sitka spruce (*Picea sitchensis*) trees. The surrounding properties were historically modified for agricultural use and are dominated by reed canary-grass. Access to the interior of the site is difficult due to dense vegetative growth, predominately Himalayan blackberries (*Rubus armeniacus* Focke).

Field investigations conducted in 2008 and 2011 as well as study of aerial photos (Appendix B) found less than 30 mature Sitka spruce on the parcel, some of these were down due to storm events. About 15 cottonwood (*Populus balsamifera*), red alder, birch (*Betula spp*.), and a big-leaf maple (*Acer macrophylum*) over 50 feet in height are found scattered across the site. Collectively, the trees cover approximately 10 percent of the surface of the site. Other native plants 30 to 35 feet in height include Pacific and Sitka willows, red alder, birch, and Pacific crabapple (*Pyrus fusca*). They occupy approximately 20 percent of the project site. Dominant native and non-native shrubs include spirea, Nootka rose (*Rosa nutkana*), vine maple (*Acer circinatum*), red-twig dogwood (*Cornus sericea*), twinberry (*Lonicera involucrata*), and Himalayan and evergreen blackberry (*R. lacinatus*). The shrubs, all less than 20 feet in height, are found growing over 70 percent of the site. False lily of the valley (*Mianthemum dilitatum*) covers much of the ground. Mosses are found on much of the woody vegetation as well as the ground.

From visual observations and examination of aerial photos, vegetation over 20 feet in height is found to constitute, at most, 30 percent of the forested wetland. Some of this tall woody vegetation is scattered throughout the site and some is found in distinct areas. While the areas covered in trees are scattered, they are cumulatively large enough to be considered an individual class. Although there are individual trees and small clusters that exceed 50 feet in height, none of the communities meet the definition of a mature forested wetland[3]. In the areas identified as forested, the cover of evergreen or deciduous trees, and the cover of trees greater than 50 feet in height are both less than 50 percent.

This wetland area was rated according to the WDOE wetland rating system. This rating exercise resulted in a Class III wetland rating (Appendix B). This depressional wetland scored highest for the Water Quality function, secondly the Habitat function, and lastly the Hydrologic function. Since the site is bordered by agricultural fields on two sides, it has the opportunity to improve water quality, and because of the persistent ungrazed vegetation and organic soil found on the site, the wetland also has the potential to improve water quality. The potential to reduce flooding and erosion is low because there is no obvious natural outlet with the only outlet being a

[3] 50 percent of the cover of the upper forest canopy must consist of evergreen trees older than 80 years or deciduous trees older than 50 years, or 50 percent of the forest canopy must consist of trees taller than 50 feet.

manmade ditch. The terrain is very flat and water is not ponded to any great extent. Habitat is degraded by the lack of vegetated buffers, and undisturbed, unbroken vegetated corridors to other wetlands; but does possess special features such as large downed woody debris, standing snags, and growth of non-native plants below the threshold.

4.5 FISH AND WILDLIFE

4.5.1 Fisheries and Aquatic Biota

Due to the size of the stream, and its degraded condition, a limited variety of fish have been caught in either the trap operated by the Mid-Puget Sound Fisheries Group (Table 1) or the King County Roads Maintenance staff during "ditch maintenance" efforts. Large numbers of coho that utilize this tributary are of a mixed hatchery and native origin (WDFW, 2002). Resident species of fish in the Big Spring Creek system include cutthroat trout, steelhead trout, three-spine stickleback, pumpkinseed sunfish, lamprey, and sculpin.

Fish habitat within the channel is in a degraded state due to the straightened nature of the channel, lack of overhanging vegetation, poor pool-riffle structure, and surface water runoff it receives from the two adjacent roads; all of which limit the amount of in-stream micro-habitat and refuge. Although there are some areas where suitable spawning gravel for coho exists within the current channel, it is likely that incubation success and juvenile survival is limited due to the factors discussed previously.

Table 1. Aquatic species caught in Big Spring Creek fish trap, upstream from confluence with Newaukum Creek

Species	Number Caught					
	2003	2004	2005	2006	2010	2011*
Coho Salmon	2006	2103	569	1760	1714	12
Cutthroat Trout	55	67	14	34	22	3
Steelhead Trout	32	33	23	21	27	-
Three-spine Stickleback	50	91	23	29	1	-
Sculpin	16	24	227	83	95	33
Lamprey	10	10	13	4	-	-
Northwestern Salamander	13	15	5	2	-	-
Crayfish	3	7	29	42	59	8
Frog	2	18	26	2	13	1
Tadpol	-	-	6	-	-	-
Peamouth	-	-	16	-	2	4
Pumpkinseed / Red-eared Sunfish	-	-	3	-	-	1

Source: Mid-Puget Sound Fisheries Enhancement Group, 2011
* 2011 season suffered trap failure problems

4.5.2 Wildlife

As the project area has a variety of habitat types (riparian, pasture, scrub/shrub) all within a semi-rural area, a multitude of bird species could potentially be found in the project area. These would include song birds (thrushes, warblers, sparrows, finches, etc.), hawks and owls, woodpeckers, flycatchers, and humming birds. An active red-tailed hawk is known to nest on the northwestern edge of forested Area II site. Due to the small stream size, water dependant birds such as ducks, geese, herons, and kingfishers may be found in lesser numbers. Common urban wildlife such as coyotes, black-tailed deer, beaver, raccoons, rats, mice, and voles are likely to be found in the project area. Currently beavers have constructed dams on the lower reaches of Big Spring Creek upstream from the confluence with Newaukum Creek. Reptiles expected in the project area would be tree frogs and small snakes.

4.6 Threatened and Endangered Species

The Big Spring Creek project is part of the greater Green/Duwamish Ecosystem Restoration Project and coordination with the US Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) for project impacts to the watershed were concluded in 2001. As it's been over 10 years since the PEIS coordination was completed, the USFWS and NMFS Northwest Region web sites[4] were consulted in January 2012 to determine which protected species under their respective jurisdictions could occur in the project area. Fifteen species protected under the ESA, as amended, potentially occur in the project vicinity, nine of which are listed as either threatened or endangered, the other six are candidate species or species of concern (Table 2). Since 2001, Steelhead has been added as a threatened species; critical habitat has been added for three species; and four species were added as candidate. In 2009, King County updated endangered species coordination for those species under the jurisdiction of NMFS (letter dated January 13, 2009) as part of their permitting efforts for the proposed project.

Table 2. Protected species potentially occurring in the project area

Species	Listing Status	Critical Habitat
Bull Trout (*Salvelinus confluentus*)	Threatened	Designated – not in project area
Chinook Salmon, Puget Sound/Strait of Georgia DPS (*Onchorhynchus tshawytscha*)	Threatened	Designated
Steelhead, Puget Sound DPS (*O. mykiss*)	Threatened	-
Canada lynx (*Lynx canadensis*)	Threatened	Designated – not in project area
Gray wolf (*Canis lupus*)	Endangered	-
Grizzly bear (*Ursus arctos horribilis*)	Threatened	-
Marbled murrelet (*Brachyramphus marmoratus)*	Threatened	Designated – not in project area

[4] *http://www.fws.gov/wafwo/speciesmap.html* and *http://www.nwr.noaa.gov/species-lists.cfm* respectively

SPECIES	LISTING STATUS	CRITICAL HABITAT
Northern spotted owl (*Strix occidentalis caurina)*	Threatened	Designated – not in project area
Golden paintbrush (*Castilleja levisecta*)	Threatened	-
Fisher, west coast DPS (*Martes pennant*)	Candidate	-
North American wolverine, contiguous U.S. DPS. *Gulo gulo lutesu*)	Candidate	-
Oregon spotted frog (*Rana pretiosa*)	Candidate	-
Yellow-billed cuckoo (*Coccyzus americanus*)	Candidate	-
Whitebark pine (*Pinus albicaulis*)	Candidate	-
Coho salmon, Puget Sound/Strait of Georgia DPS (*O. kisutch*)	Candidate	-

4.7 AIR QUALITY AND NOISE

In general, air quality in the Puget Sound region is considered to be good. Areas where pollutants originate from are mostly urban where there is a high density of cars, residences, and industry. Sources of these pollutants include car and truck exhaust and smoke from woodstoves and outdoor burning (WDOE, 2011). In 2009, the Puget Sound Clean Air Agency (PSCAA) reported that the number of days air quality was considered to be "good" 75 percent in King County, the number of days that air quality was "moderate 24 percent, and the days where the air quality was considered "unhealthy for sensitive groups" occurred 1 percent of the time, likely during times of stable weather when there is an absence of winds (PSCAA, 2011). In winter months, temperature inversions can occur as a result of low solar heating, trapping in concentrations of pollutants associated with wood burning (stoves and fireplaces) and from vehicular exhaust. This condition is intensified by the topography, with valleys having poorer air quality than hilltops due to inversions. In summer months, ozone levels can be exceeded on hot, sunny days as the ozone precursors including volatile organic compounds, nitrogen oxides, and carbon monoxide gases heat in the sun. The highest concentrations of ozone are measured in the communities downwind of large urban areas. The Enumclaw monitor is one of the ones that record the highest ozone concentrations in the Sound (PSCAA, 2011).

Primary sources of noise pollution at the project area come from traffic on surface streets. As the project area is away from heavily utilized thoroughfares, overall the noise level is low, typical for a semi-rural area.

4.8 CULTURAL RESOURCES

The cultural and historic resources of the Green/Duwamish River basin are described in detail in Section 3.16 of the FPEIS (USACE and King County DNR 2000).

Area 1 of the project was previously surveyed for King County in January 2009 by Paragon Research Associates (PRA) (Hoyt et al 2009). Archival research of the Washington State Department of Archaeology and Historic Preservation (DAHP) records database showed that a

portion of a known archaeological site (45-KI-64) is located inside the project area, and intensive shovel testing was completed to accurately relocate site boundaries.

A search of the archaeological and historic site records on the DAHP records database indicated that no properties listed in the National Register of Historic Places (NRHP) or the Washington State historic site register are recorded within Area 2 of the project area. The Corps has required an archaeological investigation of the project area, including a pedestrian reconnaissance survey. Accessible areas of the project area were surveyed and shovel tested, however the impenetrable nature of the project site precluded the ability to thoroughly investigate the site. No archaeological deposits or historic properties were encountered during the investigation.

4.9 TRANSPORTATION

Information characterizing traffic and transportation within the Green/Duwamish River Basin is described in detail in Section 3.10 of the PEIS (USACE and KCDNR, 2002). A synopsis of the site-specific information relevant to the project site is presented below.

Traffic within the vicinity of the project occurs along 244th Avenue SE and SE 424th Street. Both of these streets are local use two lane roads in a semi-rural area.

4.10 AESTHETICS AND VISUAL RESOURCES

Information characterizing visual quality and aesthetic resources within the Green/Duwamish River basin is described in detail in Section 3.13 of the PEIS (USACE and KCDNR, 2002). A discussion of site-specific information relevant to the project site is presented below.

There is little aesthetic value to Big Spring Creek due to its location in roadside ditches for much of its length and the overgrowth of invasive vegetation. The Area I site is pastoral, which provides some aesthetic value; however the dominance of reed canary-grass does not allow other meadow plants to thrive which diminishes the viewshed. The forested wetland (Area II site) is practically impenetrable due to the dense overgrowths of blackberry on the perimeter. It is likely that local residents that border this green space enjoy viewing birds and urban wildlife.

4.11 RECREATION

Recreation in the Middle Basin of the Green/Duwamish Rivers is described in the PEIS, Section 3.12.2 (USACE and KCDNR, 2002). Little developed recreation exists in the immediate area. There are no trails in the project area and approximately 50 percent of the area is densely overgrown with invasive shrubs. There is local access to Newaukum Creek at 236th Avenue SE for fishing, however there is limited parking. The nearest sources of recreation with developed grounds are approximately 7 miles away to the north along the Green River. Flaming Geyser State Park has fishing and boating access, hiking trails, and picnic grounds. The near-by Mahler State Park (northwest corner of 244th Avenue SE and SE 436th Street) does not have developed recreational facilities at this time.

4.12 Hazardous, Toxic, and Radioactive Materials

A preliminary assessment was conducted for the Big Spring Creek restoration project in September, 2011. The assessment was conducted according to engineering regulation ER-1165-2-132, Hazardous, Toxic, and Radioactive Waste (HTRW) Guidance for Civil Works Projects (USACE, 1992), and used adapted checklists from Pre-Acquisition Environmental Assessment Guidance for Federal Land Transactions (DOI and USDA, 2009). This assessment updates and supplements previous environmental assessments conducted in 2005 by King County at the time these parcels and easements were acquired for the project. Based on information reviewed from searching environmental and land use records for the proposed site and adjacent areas, as well as site reconnaissance and interviews, no hazardous, toxic, or radioactive threats or impacts were found. No further HTRW investigation is advised for this project.

5 ENVIRONMENTAL EFFECTS

5.1 Land Use

5.1.1 No Action Alternative

Under the no action alternative, no land use changes are expected.

5.1.2 Restoration Alternative

With the restoration of Big Spring Creek, conservation easements and buffers acquired for the project would allow public access to the stream within the limits of the easement and would prevent livestock grazing immediately adjacent to the stream, which would be expected to result in improved vegetative cover and improved water quality, as sedimentation into the stream is reduced.

5.2 Geology and Soils

5.2.1 No Action Alternative

Under the no action alternative, no impacts to geology and soils would occur.

5.2.2 Restoration Alternative

Information describing the environmental effects on the topography, geology, and soils of the Green/Duwamish River basin is presented in Section 4.4.1 of the PEIS (USACE and KCDNR, 2002).

Under the preferred alternative, impacts to geology and soils are expected to be minimal as the footprint of the project is limited to the new channel alignment, which would receive spawning gravels for coho salmon and be planted with native riparian vegetation (including 3-6 inches of mulch). Disturbance from construction would be short-term and temporary. Topography of the wetland would change slightly due to the creation of the new stream channel. There could be a

pulse of sedimentation following diversion of the stream into the restored streambed, resulting in short term turbidity increases as the streambed adjusts to the new flow, and localized shifting of sediments would continue sporadically as the new stream recovers and adjusts. However, impacts to geology and soils are expected be insignificant.

5.3 WATER RESOURCES AND WATER QUALITY

5.3.1 No Action Alternative

Under the no action alternative, water quality would remain as is, in a degraded state from storm-water run-off received from 244th Avenue SE and SE 424th Street.

5.3.2 Restoration Alternative

Information describing the environmental effects on the water quality of the Green/Duwamish River Basin is presented in Section 4.6 of the PEIS (USACE and KCDNR, 2002).

Temporary increases in turbidity may result from construction activities. There would be a pulse of sedimentation following the diversion of the stream into the restored streambed, resulting in short-term turbidity increases as the streambed adjusts to the new flow. This should be lessened somewhat by allowing the newly created streambed to remain de-watered for a year post-construction. Localized shifting of sediments would continue sporadically as the new stream heals and adjusts. High flows during the winter and spring following construction would continue to mobilize sediments in the project area, potentially contributing to small increases in turbidity over that normally seen during high flow events.

With construction of the berm along the southwest border of Area II, surface flood water storage would be affected. Flooding of the surrounding area was modeled to assess inundation of the Area II and impact to adjacent roads and lots. The new channel is designed with a 2-5 yr flow capacity. During large storm events the surrounding area is expected to be highly saturated. If not contained, high flows that leave the new Area II channel and follow the existing terrain will intersect the north fork, which runs through the adjacent property and through a 36 inch culvert at 424th Street. This culvert is undersized for conveying flood flows that leave the new channel. Preliminary hydraulic modeling has shown that the North Fork ditch and the adjacent property will backwater and flood for approximately 600 ft upstream if the existing 36 inch culvert. The resulting water surface partially inundates SE 424th Street between the proposed new channel crossing and the existing North Fork ditch crossing. Modeling has shown that with a constructed berm along the west side of the site, that ties into existing high ground at each end, all flood flows up to 100 yr will be contained to the Area II site. The proposed berm varies in height from 1-2.5 ft above existing ground and is 660 ft long.

In order to reduce the temporary increases in turbidity and potential related effects on juvenile salmonids, all “in-water” construction work would take place during the established fish window (June 16 through September 15), which is the driest time of the year. Construction techniques, sequencing, and timing would minimize soil disturbance to the extent practical to reduce the generation of turbidity during construction of the new channel to the headwaters and Newaukum Creek. Similarly, the design and implementation of the erosion-control and the Storm Water

Pollution Prevention Plan (SWPPP) would incorporate best management practices (BMPs) such as installation of silt-fence, placement of staging areas in flat areas above the ordinary high water line with either gravel pads or removable "marsh-mats," minimizing the number of trips heavy equipment makes through the site, and revegetation of disturbed areas to further reduce the duration and magnitude of the temporary increases in turbidity. Turbidity monitoring during construction would ensure these temporary increases are in compliance with State Water Quality Standards.

Water quality in Big Spring Creek should improve as a result of the project. Storm water from 244th Avenue SE and SE 424th Street would no longer run off directly into the creek, and the buffering wetland and riparian corridor would filter pollutants from the run-off before it enters the creek. In addition, as the native trees and shrubs along the stream bank mature, they would shade the stream channel, preventing further increases in water temperature. Coniferous large woody debris, which is resistant to breakdown (and therefore has low biochemical oxygen demand), would be placed to enhance fish habitat.

5.4 VEGETATION AND WETLANDS

5.4.1 No Action Alternative

Under the no action alternative, vegetation are expected to remain as is, with dense monoculture of reed canary-grass in the area south of SE 424th Street and the scrub/shrub thicket with an overgrowth of Himalayan blackberry in the area north of SE 424th Street. The younger trees in the forested portion would be expected to mature, slowly converting the area to mature forest.

5.4.2 Restoration Alternative

Information describing the environmental effects on vegetation in the Green/Duwamish River basin is presented in Section 4.8 of the PEIS (USACE and KCDNR, 2002).

The native plant community would be restored by planting Sitka spruce, western red cedar, and a variety of deciduous trees within the wetland to create a vegetated forested condition. Shrubs and emergents would also be planted to complete a vegetative diverse community. Reed canary-grass is the most prevalent species found in the Area I project site (south of SE 424th Street). Because of the height it attains and the dense nature in which it grows, it prevents natural establishment of other plants. By the introduction of native trees and shrubs (Table 3) the reed canary-grass will be shaded and reduced in density. This strategy will then allow natural seeding of those bare areas under the tree canopy with more native species. Landscape fabric would be installed initially to suppress the canary-grass and native plants would be planted into the fabric. This technique would allow the new plants to become established and suppress recolonization of canary-grass.

Approximately 15.1 acres of meadow in the Area I site would be converted to stream (approximately 1.8 acres) and woodland corridor (13.3 acres). North of SE 424th Street, the new channel alignment would be designed to avoid impacts to larger conifers currently present, negating the need to remove them. Approximately 1.1 acres of scrub/shrub habitat would be permanently converted to stream or upland (0.9 acres to stream and 0.2 acres to upland), with an

additional 9.3 acres affected by restoration activities. Some of the earthen material removed from excavating the stream would be utilized to provide small hillocks, less than 5 feet in height which would be replanted with upland plant communities. Throughout the 200 foot wide conservation corridor, native trees and shrubs would be planted to increase habitat for wildlife species (Table 3). This conservation corridor would include various plant community types including aquatic wetlands, emergent wetlands, scrub/shrub, forested, and upland communities.

Table 3. Plantings for Big Spring Creek Restoration

Scientific name	Common name	Scientific name	Common name
Aquatic Wetland Community		*Scrub / Shrub Wetland Community*	
Alisma plantago-aquatica	*Water plantation*	*Cornus stolonifera*	Red-Osier dogwood
Nuphar polysepalum	Yellow pond lily	*Rosa nutkana*	Nootka rose
Potamogeton spp.	Pondweed	*Salix sitchensis*	Sitka willow
Scirpus acutus	Hardstem bulrush	*Forested Wetland Community*	
Sparganium emersum	Narrowleaf bur-reed	*Picea Sitchensis*	Sitka spruce
Emergent Wetland Community		*Fraxinus latifolia*	Oregon ash
Carex obnupta	Slough sedge	*Thuja plicata*	Western red cedar
Carex stipata	Sawbeak sedge	*Alnus rubra*	Red alder
Elocharis palustris	Creeping rush	*Populus trichocarpa*	Black cottonwood
Lysichiton americanum	Skunk cabbage	*Salix lasiandra*	Pacific willow
Juncus ensifolius	Daggerleaf rush	*Salix sitchensis*	Sitka willow
Juncus tenuis	Slender rush		
Upland Community			
Pseudotsuga menziesii	Douglas fir	*Populus trichocarpa*	Black cottonwood
Acer macrophyllum	Big-leaf maple	*Alnus rubra*	Red alder
Sambucus racemosa	Red elderberry	*Symphoricarpos albus*	Snowberry

Temporary impacts to the wetland may result from the staging areas used to access the site and the placement of logs both in-channel and adjacent to the channel. Impacts from the staging areas would occur mainly in areas of scrub/shrub and Himalayan blackberry, and would be returned to their original state (minus the invasive vegetation) following construction. Any impacts to vegetation in the wetland from the construction of the log berm would be compensated by riparian plantings of native species.

The proposed action is consistent with the Corps requirements of Nationwide Permit (NWP) 27 for stream and wetland restoration activities. Under this permit, compensatory mitigation is not required if the authorized work results in a net increase in aquatic resource functions and values in the project area. Although the project would result in the loss of approximately 2.9 acres of the existing pasture (1.8 acres) and forested wetland (0.9 acres) converted to streambed; the newly constructed streambed would provide enhanced functional habitat value for fish, aquatic

invertebrates, amphibians, and other aquatic biota, as well as a similar increase in function and value for mammals, birds, and insects in riparian areas. The plantings would increase the habitat value of the site by creating additional opportunities for foraging, nesting, cover, and refuge for a wide variety of species. King County has the long term goal of planting additional native trees and shrubs in the Area I site now dominated by reed canary-grass, which is indicated in Figure 3 (page 8).

5.5 FISH AND WILDLIFE

5.5.1 No Action Alternative

No changes to wildlife use would occur in the area under this alternative.

Under the no action alternative, fish communities would continue to experience degraded habitat with lack of channel complexity due to the majority of the flow being in roadside ditches, lack of woody debris, and poor water quality conditions from pasture and road runoff. The monoculture of reed canary-grass provides limited wildlife habitat for those species that prefer meadows and grasslands.

5.5.2 Restoration Alternative

Information describing the environmental effects on the fisheries resources of the Green/Duwamish River basin is presented in Section 4.7 of the PEIS (USACE and KCDNR, 2002).

Birds and other wildlife may be temporarily displaced during construction due to noise and presence of construction vehicles. Effects to nesting birds should be minimal as construction is expected to occur outside the typical nesting season, April through July each year. The new stream alignment in Area II is outside King County's year-round 325 ft radius and the nesting season (March 1 through July 31) 660 ft radius Wildlife Habitat Conservation Area for the red-tailed hawk's nest. Further, as the potential effects would only occur during the period of construction, and the great majority of existing trees would be retained, any effects are expected to be inconsequential and temporary.

The enhanced wetland and stream would be more attractive to, and more heavily utilized by wildlife such as river otter (*Lutra canadensis*), beaver (*Castor canadensis*), muskrat (*Ondontra zibethicus*), coyote (*Canis latrans*), bobcat (*Lynx rufus*), wading birds such as the great blue heron (*Ardea herodias*) and the American dipper (*Cincius mexicanus*), as well as raptors, amphibians and reptiles. In addition, the plantings would provide stream cover, bank erosion protection, a future source of woody debris, nutrients for aquatic insects and wildlife, and provide shade to reduce the density of reed canary-grass and other invasive non-native plants.

A large number of logs and wood debris placed extensively both in the stream channel and in the project area wetland will serve to trap sediments and gravel, slow flood flows, improve pool habitat, provide shelter to fish and wildlife, provide nutrients to aquatic insects, and over time provide a more natural and complex floodplain environment. Indirectly, the improved water quality and habitat should aid adult spawning fish survival as well as fry survival. Due to

construction timing and distance from the nest tree, the resident red-tailed hawk is not expected to be affected by construction activities.

5.6 Threatened and Endangered Species

5.6.1 No Action Alternative

Under the no action alternative, the degraded condition of Big Spring Creek would continue to influence downstream conditions for threatened Chinook and steelhead by way of surface water runoff received from SE 424th Street and 244th Avenue SE.

5.6.2 Restoration Alternative

Improved stream habitat should increase recruitment and survival of salmonid species including the threatened bull trout, Puget Sound Chinook salmon, Puget Sound steelhead. As indicated in Table 4, the proposed project is not likely adversely affect salmonids, would have no effect to the designated critical habitat for bull trout as it does not exist within the project area, and is not likely to adversely affect critical habitat for Chinook. The project would have no effect to Canada lynx, gray wolves, grizzly bears, marbled murrelet, spotted owls and the golden paintbrush, or their designated critical habitats as they are not present in the area, based on their preference for high mountain habitat and surveys of the project area. Furthermore, the project would have no effect on the listed candidate species of fisher, wolverine, Oregon spotted frog, yellow-billed cuckoo, or whitebark pine, based on their specific habitat requirements which are not found in the project vicinity.

Table 4. Determination summary

Species	Effect Determination	Critical Habitat Determination
Bull Trout	Not likely to adversely affect	No effect
Puget Sound Chinook Salmon	Not likely to adversely affect	Not likely to adversely affect
Puget Sound Steelhead	Not likely to adversely affect	-
Canada lynx	No effect	No effect
Gray wolf	No effect	-
Grizzly bear	No effect	-
Marbled murrelet	No effect	No effect
Northern spotted owl	No effect	No effect
Golden paintbrush	No effect	-
Candidate Species		
Fisher, West Coast DPS	No effect	-
North American wolverine, contiguous U.S. DPS	No effect	-

SPECIES	EFFECT DETERMINATION	CRITICAL HABITAT DETERMINATION
Oregon spotted frog	No effect	-
Yellow-billed cuckoo	No effect	-
Whitebark pine	No effect	-
Puget Sound Coho salmon	Not likely to adversely affect	-

5.7 AIR QUALITY AND NOISE

5.7.1 No Action Alternative

No changes to air quality would occur under this alternative.

5.7.2 Restoration Alternative

Information describing the environmental effects on air quality and noise in the Green/Duwamish River basin is presented in Sections 4.10 and 4.11, respectively, of the PEIS (USACE and KCDNR, 2002).

Because Enumclaw is located in an attainment area, a general conformity applicability analysis is not required. Further, since no stationary sources associated with the proposed action would generate more than 250 tons per year of emissions, the EPA Prevention of Significant Deterioration (PSD) program analysis is not applicable to the proposed action. Construction vehicles may temporarily increase air emissions and noise in the immediate project vicinity. Noise associated with the use of heavy machinery may disturb local homeowners; however, these impacts would be temporary and highly localized, and would not result in significant impacts. Emissions from construction equipment would not exceed EPA's *de minimus* threshold levels (100 tons/year for carbon monoxide and 50 tons/year for ozone) or affect the implementation of Washington's Clean Air Act implementation plan.

5.8 CULTURAL RESOURCES

5.8.1 No Action Alternative

No changes to cultural resources would occur under this alternative.

5.8.2 Restoration Alternative

Professional cultural resources studies have been conducted for the proposed project. These studies have defined the Area of Potential Effect (APE) as the immediate project area where ground disturbing activities will occur. One archaeological site (45KI64) is partially located within the Area I project APE, but will not be directly impacted by construction activities. A monitoring plan will be implemented, requiring a professional archaeologist to be on site during all ground disturbing activities to the exposure of lahar deposits within 75 meters of 45-KI-64. A "no drive" zone will be established around site boundaries and any vehicle movement within 50

meters of the site will be deemed "ground disturbing activity". All equipment and access routes and staging areas will be located outside of site boundaries.

Long-term impacts of the project may include future degradation of site 45KI64 due to exposure and erosion as a result of stream migration.

For Area II, while there is a low to moderate potential for cultural resources to exist within the project area due to the wet nature of the site, an archaeological monitoring and testing plan will be implemented during vegetation clearing and construction activities.

5.9 TRANSPORTATION

5.9.1 No Action Alternative

No changes to transportation would occur under this alternative.

5.9.2 Restoration Alternative

Information describing the environmental effects on traffic and transportation in the Green/Duwamish River basin is presented in Section 4.12 of the PEIS (USACE and KCDNR, 2002).

Construction vehicles may temporarily increase the volume of traffic in the immediate project vicinity during excavation of the site. Local residents may be inconvenienced by an increase in traffic and during the installation of the culverts which is expected to take approximately one month. During this period, local traffic would be detoured to other area roads. Although the site is considered rural, there are many paved roads in the vicinity, and these temporary detours should add no more than 1 to 2 miles to a trip. Any effects to transportation would be temporary and highly localized, and are not expected to be significant.

5.10 AESTHETICS AND VISUAL RESOURCES

5.10.1 No Action Alternative

Under this alternative, no changes to aesthetics are expected to occur.

5.10.2 Restoration Alternative

Information describing the environmental effects on visual quality and aesthetic resources of the Green/Duwamish River basin is presented in Section 4.15 of the PEIS (USACE and KCDNR, 2002).

Removing Big Spring Creek from the existing roadside ditches and relocating it into a more natural stream channel would greatly improve the visual and aesthetic appeal of the creek. A buffer of trees and shrubs would shield the creek from SE 424th Street and SE 244th Avenue for the majority of the reach. Removal of invasive weeds and the planting of native vegetation would also increase the visual appeal of the site.

During excavation and construction of the site, the aesthetic quality of the general area could be reduced due to the noise and air emissions generated by the construction equipment, which may disturb local homeowners. However, these impacts would be temporary and highly localized, and are not expected to result in significant impacts.

5.11 Recreation

5.11.1 No Action Alternative

Under this alternative, no changes in recreation would occur on site.

5.11.2 Restoration Alternative

Information describing the environmental effects on recreation in the Green/Duwamish River basin is presented in Section 4.14 of the PEIS (USACE and KCDNR, 2002).

Recreation in the project area is not expected to change significantly. There are no plans to put in any access trails; however, the clearing of the invasive shrub vegetation may make access easier for those who would like to enjoy the creek for activities such as fishing or watching wildlife.

5.12 Hazardous, Toxic, and Radioactive Materials

5.12.1 No Action Alternative

Under the no action alternative, conditions are expected to remain unchanged.

5.12.2 Restoration Alternative

During construction and installation activities, fuels, oils, lubricants, and other hazardous materials would be used. An accidental release or spill of any of these substances could occur, resulting in potential adverse impacts to on-site soils and water. However, the amounts of fuels, other lubricants, and oils would be limited, and the equipment needed to limit any contamination quickly would be located on site. To minimize the likelihood of potential spills and leaks of petroleum and hydraulic fluids during project construction, construction equipment would be inspected daily for leaks and petroleum contamination. Additionally, a spill prevention control and containment plan designed to reduce impacts form spills would be in place prior to the start of construction. The project would not introduce any hazardous material to the project areas; therefore, impacts from hazardous and toxic materials are expected to be insignificant.

5.13 Mitigation

Four project alternatives were evaluated in order to select the best alternative for minimizing cost and impact to the environment. The proposed project action was selected because it will have the least negative impact on the environment and generate the greatest potential gains for habitat value and ecosystem functions. Although the project will result in the loss of approximately 2.9 acres of pasture (1.8 acres) and forested (1.1 acres) wetlands to restore Big Spring Creek to a more natural streambed, the gain in habitat value and ecosystem function from moving the

stream away from the road, meandering it through a forested wetland, and planting approximately 22.6 acres of native vegetation will exceed this loss.

5.13.1 Impact Avoidance Measures

Potential impacts to aquatic animals and fish would be avoided by constructing the new channel in the dry, without connection to the inlet to Big Spring Creek and the outlet to Newaukum Creek. Any in-water work would be conducted during designated fish windows, June 16 through September 15.

5.13.2 Impact Minimization and Conservation Measures

The Corps would take all practicable steps during construction of the project to minimize impacts to aquatic resources during in-water construction. Contingencies would be in place if any of the water quality protection measures fail to achieve their intended function. The Corps would observe all construction windows to ensure that impacts to migratory fish would be avoided or minimized. The minimization measures would be as follows:

- Best management practices (BMPs), such as stormwater runoff prevention, will be used to ensure that no unnecessary damage to the environment occurs.
- Connecting the newly excavated stream bed with the headwaters and Newaukum Creek during established in-water work windows.
- During inlet/outlet construction and watering of the new channel with appropriate turbidity control measures (temporary coffer dam, silt curtains, or similar) would be used to isolate construction from the existing Big Spring Creek channel and Newaukum Creek and to minimize turbidity impacts.
- Utilization of marsh mats / swamp pads to minimize impacts to wetland soils.
- All required de-watering activities during construction would use appropriate devices (i.e. pumps, sand bags, sumps). All water removed from the site would be discharged in a vegetated upland location, a de-siltation basin, or location that would not incur damage due to water discharge.
- Drive trains of equipment would not operate in the water.
- All equipment would be cleaned prior to in-water construction work.
- No refueling would occur near Newaukum Creek or the existing Big Spring Creek channel.
- Construction equipment shall be regularly checked for drips or leaks.
- Construction equipment would include dust suppression methods to minimize airborne particulate matter that would be created during any ground disturbing activities that could create dust. Additionally, all equipment and vehicles would be required to be kept in good operating condition to minimize exhaust emissions. Standard practices would be used to control fugitive dust during the construction phase and during daily operations and maintenance of the proposed project.

5.13.3 Findings

The Corps has determined that all appropriate and practicable measures have been taken to minimize potential harm to the environment.

5.14 Unavoidable and Adverse Effects

Unavoidable adverse effects of the proposed project include:

(1) Noise disturbance to wildlife and home owners in the vicinity due to operating heavy machinery during excavation and construction of the restoration site; most wildlife are anticipated to avoid the area while work is in progress. To reduce impacts, work would be conducted only during daylight hours in accordance with local noise ordinances.

(2) Disruption of local traffic in the project vicinity during construction. Proper signage and flagmen would be utilized to address safety concerns and move traffic through the area as quickly as possible.

(3) Excavation and filling of approximately 1.1 acres of existing forested wetland and excavation of about 1.8 acres of pasture wetland to create the streambed and construct an earthen berm. The enhancement of the remaining wetlands (22.6 acres) by routing a creek channel through the area, removing invasive plant species, and planting native species would compensate for this loss by increasing the overall habitat function of the site.

(4) Impacts to turbidity during the connection of the newly aligned stream to the upstream culvert and the downstream existing channel. These temporary impacts would be minimized by the use of best management practices.

Given the temporary, localized, and minor nature of these effects, the Corps has determined that the proposed restoration project would not result in significant adverse environmental impacts.

5.15 Irreversible and Irretrievable Commitments of Resources

The proposed restoration project would not entail any significant irretrievable or irreversible commitments of resources. The construction work would require use of existing machinery and export of the fill material to an existing, licensed landfill for disposal. Installation of the constructed stream channel would require the importation of stream gravel, and large woody. Replanting the newly established stream bank and disturbed wetland areas would require contracting with local existing nurseries for native plant materials and hiring existing contractors to plant the site.

5.16 Cumulative Impacts

Cumulative impacts result from the “individually minor but collectively significant actions taking place over a period of time” (40 CFR 1508.7). As such they include the impacts of this restoration project considered in conjunction with current and future restoration projects constructed or planned within the lower Green/Duwamish River watershed.

Multiple restoration projects are ongoing in the Green-Duwamish basin, both associated with the Corps and the Green-Duwamish ERP and associated with other efforts. Specifically, other projects proposed for implementation in the near future include: Riverview Park Side Channel Construction, Upper Russell Road Levee Realignment in Kent, Meridian Creek Outlet and

Wetland Restoration in Kent, and Mill Creek Wetland Restoration in Auburn, to name a few. In addition, other restoration projects have been completed in recent past (i.e. Site 1 Estuarine Restoration, Codeiga Farms Side Channel Construction, Hamm Creek Realignment, Upper Springbrook Creek, and Meridian Valley Creek Realignment). Additional projects not associated with the Green-Duwamish Ecosystem Restoration Project which are planned or on-going in the Green-Duwamish watershed include invasive species removal and replanting with native trees and shrubs, gravel nourishment, removal of fish barriers or culvert replacements, levee realignment, limiting livestock access to creeks, and public outreach efforts to educate the public about land use impacts. All of these efforts would result in long-term, cumulative benefits to the amount and functional value of restored habitat, improvements in the overall watershed condition, and would ultimately increase the ability of the watershed to support critical life history stages of native fish and wildlife populations. Other less beneficial activities in the watershed include ongoing levee and dam repairs and continued development and ongoing land use practices, all of which perpetuate the degraded condition of the Green River.

Negative effects of the Big Spring Creek Restoration project add to the cumulative negative effects by development and activities in the watershed. However, these negative effects are temporary and are associated only with the actual construction of the project, concentrated mainly in the channel, construction in the forested wetland, and when the new stream channel is hydraulically joined to the old channel. Long-term impacts of the project may include future degradation of the cultural resources site 45KI64 due to exposure and erosion as a result of stream migration. The combination of best management practices (BMPs) reduce the cumulative, short-term (i.e. construction related) impacts of these projects to an insignificant level. More significantly, the long-term beneficial effects generated by the project compensate for these short-term negative effects. Thus, the proposed restoration project would have beneficial cumulative effects within the watershed and would incrementally offset adverse impacts on habitats from past, present, and future redevelopment projects along Big Spring Creek.

6 COORDINATION

The following agencies and entities have been involved with the environmental coordination of the proposed project:

- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- Washington Department of Fish and Game
- Washington Department of Ecology
- King County
- MuckleshootTribe of Indians
- Washington Department of Archaeology and Historic Preservation

The draft EA was made available for public review on May 22 through June 23, 2012 via mailings to local libraries and posting on the public Corps website.

7 ENVIRONMENTAL COMPLIANCE

7.1 NATIONAL ENVIRONMENTAL POLICY ACT

This Environmental Assessment, prepared May 2012, is intended to achieve NEPA compliance for the proposed project. As required by NEPA, this EA describes existing environmental conditions at the project site, the proposed action and alternatives, potential environmental impacts of the proposed project, and measures to minimize environmental impacts.

7.2 ENDANGERED SPECIES ACT

In accordance with Section 7(a)(2) of the Endangered Species Act of 1973, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed or proposed threatened or endangered species and their critical habitats. A Biological Evaluation was prepared and Section 7 ESA consultation has been completed. The Corps has determined that the project may affect, not likely to adversely affect bull trout, Chinook salmon, steelhead, and coho salmon. The project may affect, not likely to adversely affect the critical habitat of Chinook salmon. The project would have no effect on Canada lynx, gray wolf, grizzly bear, marbled murrelet, northern spotted owl, golden paintbrush, fisher, wolverine, Oregon spotted frog, yellow-billed cuckoo, and whitebark pine. The proposed project would have no effect on the critical habitat of bull trout, marbled murrelet, northern spotted owl, and Canada lynx. In correspondence dated May 10, 2012 and June 7, 2012, the NMFS and the USFWS concurred with the findings for the species listed under their respective jurisdictions.

7.3 CLEAN WATER ACT, SECTIONS 401 AND 404

The project will involve a discharge of fill material into waters of the United States. The Corps does not issue permits for its own civil works activities. Nevertheless, the Corps has complied substantively with Section 404, and has received water quality certification under Section 401. The Corps' Big Springs Creek Restoration project meets the criteria for Nationwide Permit (NWP) 27, Aquatic Habitat Restoration, and the requirements for the State water quality certification and coastal zone consistency concurrence under a NWP 27. Therefore, the Corps has concluded that the Big Springs Creek Restoration is functionally analogous to the effects of the conditions of a NWP 27 and that State's water quality certification for NWP 27 applies to this project. In a letter dated June 25, 2012, the Washington Department of Ecology concurred that the project meets the requirements for a Washington State 401 Water Quality Certification and Coastal Zone Management Act under NWP 27.

Section 402 of the Act requires a National Pollutant Discharge Elimination System (NPDES) permit and the associated implementing regulations for General Permit for Discharges from large and small construction activities for construction disturbance over one acre. This project would have land disturbance of approximately 24.6 acres; therefore, a NPDES permit will need to be obtained.

7.4 CLEAN AIR ACT

The operation of heavy equipment during construction activities will result in increased vehicle emissions, and earth moving occurring as part of the project will result in an increase in dust. These effects will be localized and temporary. Emissions will not exceed EPA's *de minimis* threshold levels (100 tons/year for carbon monoxice and 50 ton/year for ozone) or affect implementation of Washington's Clean Air Act implementation plan. Therefore, effects will be insignificant.

7.5 COASTAL ZONE MANAGEMENT ACT (CZMA)

Pursuant to the CZMA, the Corps' actions are required to be consistent to the maximum extent practicable with the approved State Coastal Zone Management Program. The State of Washington has provided CZMA consistency concurrence for NWP 27. The work is functionally analogous to work covered by NWP 27 (restoration, enhancement, and establishment of tidal and non-tidal wetlands and riparian areas and the restoration and enhancement of non-tidal streams and other non-tidal open waters) provided those activities result in net increases in aquatic resource functions and services, the NWP CZMA consistency determination applies to this work and the work is in compliance with CZMA. In a letter dated June 25, 2012, the WDOE verified that the project meets the requirements for their coastal zone consistency concurrence under NWP 27. Therefore, restoration of Big Spring Creek is consistent to the maximum extent practicable with the Washington State Coastal Zone Management Program.

7.6 FISH AND WILDLIFE COORDINATION ACT

The Fish and Wildlife Coordination Act (16 U.S.C. 661) requires that wildlife conservation receive equal consideration and be coordinated with other features of water resource development projects. The Corps has conducted a programmatic consultation with USFWS for the 2002 Green-Duwamish PEIS. As it has been 10 years since coordination for the PEIS was completed, updating the coordination with the USFWS and NMFS has been completed for the Big Spring Creek Restoration Project.

7.7 NATIONAL HISTORIC PRESERVATION ACT

The National Historic Preservation Act (16 USC 470) requires that the effects of proposed federal undertakings on sites, buildings structures, or objects included or eligible for the National Register of Historic Places must be identified and evaluated. The Big Spring Creek project is a Federal undertaking of the type which might affect historic properties. As such it is subject to the Section 106 process. The Corps, in order to comply with Section 106 of the NHPA, has initiated historic properties studies for the proposed project. The APE for the project was defined as all ground disturbing activities, including access roads and staging areas.

Section 106 requires consultation with the Washington State Historic Preservation Officer and a request for tribal concurrence with determinations of eligibility. The Corps has consulted with the Washington State Historic Preservation Officer (SHPO) and the Muckleshoot Tribe of

Indians (Tribe) for the 2012 project. In a letter dated July 18, 2012, the SHPO concurred with the finding of "No Historic Properties Affected Pending Monitoring."

7.8 EXECUTIVE ORDER 12898, ENVIRONMENTAL JUSTICE

Executive Order 12898 directs every federal agency to identify and address disproportionately high and adverse human health or environmental effects of agency programs and activities on minority and low-income populations. Since no adverse human health or environmental effects are anticipated to result from the project, the Corps has determined that no disproportional adverse impacts to low-income or minority populations would occur.

7.9 EXECUTIVE ORDER 11988, FLOODPLAIN MANAGEMENT

Executive Order 11988 requires federal agencies to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy of the floodplain, and to avoid direct and indirect support of floodplain development where there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by flood plains." The proposed action would not create a change that would affect occupancy of the floodplain.

8 SUMMARY / CONCLUSION

Based on this Environmental Assessment and on coordination with Federal agencies, Native American Tribes, and State agencies, the Big Spring Creek Restoration project is not expected to result in significant adverse environmental impacts. The Big Spring Creek Restoration project is not considered a major Federal action having a significant impact on the human environment. Therefore, the preparation of an environmental impact statement is not required. A signed FONSI will complete this environmental review.

9 LIST OF PREPARERS

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11 ACRONYMS AND ABBREVIATIONS

APE	Area of Potential Effect
Cfs	Cubic feet per second
Corps	US Army Corps of Engineers
DOI	Department of Interior
DPS	Distinct Population Segment
ER	Engineering Regulation
ESU	Evolutionary Significant Unit
FIRM	Flood Insurance Rate Map
KCDNR	King County Department of Natural Resources
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
PEIS	Programmatic Environmental Impact Statement, in particular the Green/Duwamish Ecosystem Restoration EIS
PL	Public Law
PSCAA	Puget Sound Clean Air Authority
RM	River mile
SE	Southeast
spp	species, plural
US	United States
USFWS	US Fish and Wildlife Service
WDOE	Washington Department of Ecology
WDFW	Washington Department of Fish and Wildlife
WRDA	Water Resources Development Act
WRIA	Water Resource Inventory Area

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12 APPENDICES

A – Big Spring Creek Wetland Characterization: South of SE 424th Street, between 244th Avenue SE and 236th Avenue Southeast. King County, September 2008.

B – Big Spring Creek Wetland Characterization: Northwest corner of SE 424th Street and 244th Avenue SE, King County, April 2008.

C – Big Spring Creek Wildlife Report, King County Department of Natural Resources and Parks, 2008

D – 404(b)(1) Evaluation

E – Biological Evaluation

F – Endangered Species Act Concurrence Letters from USFWS and NMFS

G – Water Quality Certification and Coastal Zone Consistency Letter from WDOE

H – National Historic Preservation Act Concurrence Letter

I – Notice of Availability of Draft EA and CWA Analysis