Alward 1 and Bridge Street Levee Rehabilitations

Pierce County, Washington

FINDING OF NO SIGNIFICANT IMPACT

1. Background.

The Alward 1 and Bridge Street levees were damaged during flooding in October 2017. The levees provide flood protection to residential properties near the City of Orting, Washington. A total of 625 feet of the riverward levee slope was damaged by flooding at the Bridge Street location, and another 410 feet of the levee was damaged at the Alward 1 location.

Prior to the damaging event, the Bridge Street levee offered a 30-year Level of Protection (LOP), while the Alward 1 levee provided a 500-year LOP. In the current damaged state, both levees provide a 3-year LOP.

2. Proposed Action.

The Corps has determined that the preferred alternative is the Repair In-Place Alternative. The action to be constructed is described in Section 2.4 of the accompanying final Environmental Assessment (EA). Actions under the preferred alternative are briefly summarized below:

a. Total length of the repair is approximately 1,035 feet. The repair would reestablish the levees to the pre-flood LOP, flatten slopes where required to meet minimum levee stability standards of 2H:1V, incorporate a 2 to 4 ton riprap toe design that provides 6-feet of scour protection, and add Class V riprap to protect the riverside slope from erosive river flows.

b. All in-water work will be conducted from August 6 to September 15. Restricting such in-water work to this period is meant to reduce potential impacts to species listed under the Endangered Species Act (ESA).

c. Plantings will be integrated into the repair along the upper slope. Plantings will include a mixture of shrubs within a soil and mulch layer placed above the armored slopes.

3. Impacts Summary.

Pursuant to the National Environmental Policy Act (NEPA) the Corps prepared an EA. The EA evaluates the environmental effects associated with the proposed action and its alternatives, determines whether that action would cause significant impacts to the quality of the human environment, and summarizes compliance of the proposed action with relevant laws, regulations, and executive orders, as briefly summarized below.

a. The Corps does not issue permits for its own civil works activities. Nevertheless, the Corps has accepted responsibility for the compliance of its civil works projects with Section 404 of the Clean Water Act (CWA), as well as, the obligation to seek Water Quality Certification under Section 401 for activities within the jurisdiction of Section 404. After examining the proposed repairs, the Corps concluded that the proposed repairs are not subject to regulation under Sections 401 and 404 of the CWA. The exemption from the requirement to evaluate the effects of discharges of fill material into waters of the United States under 33 USC 1344(f)(1)(B) applies because all riverward work at the repair sites will be conducted on a currently serviceable structure (i.e., the levee) within the pre-damaged levee footprint and the character, scope, and size of the resulting structure will not change as compared to the original fill design. Therefore, the proposed repairs do not require a Section 404 (b)(1) evaluation or Section 401 Water Quality Certification. Section 402 of the CWA is triggered when a construction site would have greater than one acre of ground disturbance. The repairs will have more than one acre of ground disturbance. A Stormwater Pollution Prevention Plan and an application for a National Discharge Elimination System Construction General Permit will be submitted to the EPA prior to construction.

b. The project location is within the coastal zone and must comply with the Coastal Zone Management Act (CZMA). The Corps prepared and submitted a Consistency Determination to the Washington Department of Ecology (Ecology) with the determination that the work is consistent with Washington's CZMA. On 14 June 2018, Ecology concurred with the Corps' determination.

c. Section 106 of the National Historic Preservation Act (16 USC 470) requires Federal agencies to take into account the effects of proposed Federal undertakings on historic properties included or eligible for the National Register of Historic Places. The implementing regulations for Section 106 (36 C.F.R. § 800) require Federal agencies to consult with various parties, including the Advisory Council on Historic Preservation, the State Historic Preservation Office (SHPO), and Indian Tribes and Tribal Historic Preservation Offices, to identify and evaluate historic properties, and to assess and resolve effects to historic properties.

The project area has been surveyed, and a finding of No Historic Properties Affected was submitted to the SHPO on 25 May 2018. In a letter dated 29 May 2018, the SHPO concurred with the Corps' effects finding, completing consultation.

d. A Biological Assessment (BA) documenting the effects of the proposed repair on listed species was submitted on 27 April 2018 to the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) for consultation. Consultation with USFWS and NMFS is ongoing.

Due to the urgent nature of completing the emergency actions to protect human life and property and the effort to limit impacts to listed species by working within the fish work windows, and because the repairs are time-critical in light of the ensuing flood season, the Corps plans to proceed with construction prior to completion of the consultation with

NMFS and USFWS pursuant to the "emergency circumstances" provisions of the Endangered Species Act (ESA) consultation regulation. The Corps will commit to fully funding and performing all Reasonable and Prudent Alternatives necessary to avoid the likelihood of jeopardy to listed species or destruction or adverse modification of designated critical habitat, as well as, Reasonable and Prudent Measures necessary and appropriate to minimize the impact of Incidental Take, that are described if a Biological Opinion is received from USFWS and NMFS. The EA will be reevaluated after consultation is complete. If necessary, the EA will be supplemented with necessary and applicable corresponding modifications to the scope and/or nature of the project, the procedures and practices used to implement the project, and/or the type and extent of compensatory mitigation associated with the project and this associated Finding of No Significant Impact reassessed.

e. Unavoidable adverse effects associated with the Repair In-Place Alternative would be: (1) temporary and localized increases in noise, activity, and emissions which may affect fish and wildlife in the area; (2) temporary and localized disruption of local traffic by construction activity and vehicles; (3) irretrievable commitment of fuels and other materials for repairs; (4) a temporary and localized increase in turbidity levels during in-water construction which may affect aquatic organisms in the area; and (5) removal of vegetation from within the proposed construction areas in the riparian zone. The vegetation removal has the longest duration of impact due to the length of time needed for vegetation to regrow to a similar size. However, plantings proposed along the upper riverward slope of the levee will offset this unavoidable adverse effect.

4. Conclusion.

I find that the proposed action will not result in significant adverse environmental impacts and complies with all applicable laws, regulations, and agency consultations, including the CWA, ESA, NHPA, and NEPA, as well as, applicable Executive Orders. Based on the analysis described above, and provided in more detail in the accompanying EA, the Alward 1 and Bridge Street Levee Rehabilitations are not a major Federal action significantly affecting the quality of the human environment, and therefore, do not require preparation of an environmental impact statement.

29 JUN 18
DATE

MARK A. GERALDI
COL, EN
Commanding

ENVIRONMENTAL ASSESSMENT

2018 CARBON RIVER ALWARD 1 AND BRIDGE STREET LEVEE REHABILITATION PROJECTS

PIERCE COUNTY, WASHINGTON

JUNE 2018

US Army Corps of Engineers®
Seattle District

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ACRONYMS

AIRFA	AMERICAN INDIAN RELIGIOUS FREEDOM ACT
APE	AREA OF POTENTIAL EFFECT
BMPS	BEST MANAGEMENT PRACTICES
CA	COOPERATION AGREEMENT
CAA	CLEAN AIR ACT
CEQ	COUNCIL OF ENVIRONMENTAL QUALITY
CH	CRITICAL HABITAT
CORPS	U.S. ARMY CORPS OF ENGINEERS
CWA	CLEAN WATER ACT
CZMA	COASTAL ZONE MANAGEMENT ACT
DBH	DIAMETER AT BREAST HEIGHT
EA	ENVIRONMENTAL ASSESSMENT
ECOLOGY	WASHINGTON DEPARTMENT OF ECOLOGY
EFH	ESSENTIAL FISH HABITAT
EIS	ENVIRONMENTAL IMPACT STATEMENT
ESA	ENDANGERED SPECIES ACT
LOP	LEVEL OF PROTECTION
MSA	MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT
NAAQS	NATIONAL AMBIENT AIR QUALITY STANDARDS
NEPA	NATIONAL ENVIRONMENTAL POLICY ACT
NMFS	NATIONAL MARINE FISHERIES SERVICE
NRHP	NATIONAL REGISTER OF HISTORIC PLACES
RM	RIVER MILE
SHPO	WASHINGTON STATE HISTORIC PRESERVATION OFFICER
USFWS	U.S. FISH AND WILDLIFE SERVICE

1.0 PROPOSAL FOR FEDERAL ACTION

The Council on Environmental Quality (CEQ) regulations, 40 CFR § 1500.1(c) and 40 CFR § 1508.9(a)(1), interpreting the National Environmental Policy Act (NEPA) of 1969 (as amended) require Federal agencies to "provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact" on actions authorized, funded, or carried out by the Federal government to ensure such actions adequately address "environmental consequences, and take actions that protect, restore, and enhance the environment." This environmental assessment (EA) evaluates environmental consequences for the implementation of flood risk management actions carried out by the U.S. Army Corps of Engineers (Corps) in cooperation with Pierce County in response to the flood event described in this document.

On 22 October 2017, high flows on the Carbon River resulted in scour of the levee slope and toe, including loss of riprap and some embankment material at the Alward 1 and Bridge Street levees. Damage on the Alward Levee occurred at three non-contiguous sites with various ranges of damage to the slope and toe with lengths totaling about 410 feet, including transitions. The Carbon River has meandered significantly since the levee was constructed. The project site is within the Carbon River channel migration zone. The riprap and toe rock volume designed in 2006 is undersized compared to current channel hydraulics at the damage site. The toe armor is essential for scour protection performance in this river setting. The levee was designed for a 500-year level of protection (LOP), but in the damaged condition, the levee provides only a 3-year LOP.

The high river flows on the Carbon River also resulted in scour of the levee slope and toe, including loss of riprap and embankment material at the Bridge Street site. The approximate cross section shape of missing material is triangular, 8 feet high and 16 feet wide. The damage is in two discontinuous sites, referred to as Site 1and Site 2, with lengths totaling approximately 625 feet long, including transitions. The levee was designed for a 30-year LOP, but in the damaged condition, the levee only provides a 3-year LOP.

Photos of the damaged sites are located in Appendix A.

1.1. Project Location

The two levees are located along the left bank of the Carbon River, upstream of Orting, WA (Figure 1). The Carbon River flows approximately 30 miles from the Carbon Glacier on Mount Rainier to the Puyallup River. The river contributes approximately 30% of the Puyallup River flow. The Carbon basin is almost 80 square miles. From the mouth to approximately river mile 12.5 the river is a low to moderate gradient with a pool-riffle channel.

Alward 1 Levee

The Alward 1 Levee is located at approximately river mile 6.4. Damages at the Alward 1 levee are located at three separate sites (Figure 2). All three sites are missing embankment and toe material along the riverward side. This damage occurred at three sites with various ranges of damage to the slope and toe. Site 1 is about 115 feet long between Stations 82+75 to 83+90. Site 2 is about 115 feet long between Stations 75+00 to 76+15. Site 3 is 180 feet long between Stations 39+20 to 41+00. The lower toe of the slope has become vertical due to rock loss.

The levee embankment is constructed out of compact, sandy gravel and cobbles up to 8 inches in diameter. The riverward slopes are armored with riprap along its entire length. The armor is composed

of a 3 to 4 thick blanket of Class IV riprap with a toe of varying size along the levee's entire length. The levee height varies between 3 and 5 feet while the levee width varies between 12 to 45 feet wide. The riverward side is sloped at a 1.5 – 2 horizontal to 1 vertical (1.5-2H:1V). Landward slopes are 2H:1V.

Bridge Street Levee

The Bridge Street Levee is located at approximately river mile 3.2. Damages at the Bridge Street levee are located at two separate sites (Figure 3). Both sites have been scoured, missing embankment and toe material along the riverward side. The approximate area of missing material is triangular, 7 feet high and 14 feet wide. The damage is in two discontinuous sites, referred to as Site 1 (225 feet long from station 2+25 to 4+50) and Site 2 (400 feet long from station 17+75 to 21+75).

The levee embankment is constructed out of compacted local material, including silty, sandy gravel, cobbles, and boulders up to 24 inches in diameter. The riverward slopes are armored with riprap along its entire length. The armor is composed of a 3 thick blanket of Class IV riprap with a toe of varying size along the levees entire length. The levee height varies between 2 and 8 feet while the levee top width varies between 10 to 20 feet wide. The riverward slope is 1-2H:1V and landward slopes are 2H:1V.

1.2. Authority

The proposed levee repair is authorized by Public Law 84-99 (33 U.S. Code Section 701n). The Corps' rehabilitation and restoration work under this authority is limited to the repair of flood control works damaged or destroyed by floods. The statute authorizes rehabilitation to the condition and level of protection exhibited by the flood control work prior to the damaging event. Pierce County is the non-Federal sponsor for the proposed action.

1.3. Purpose and Need

The purpose of the project is to repair and return the damaged levees to the level of flood protection found prior to the October 2017 flood event (500 year LOP for Alward 1 and 30-year LOP for Bridge Street) in order to protect lives and property from subsequent flooding. The Corps has determined that failure to repair the levee increases the risk of levee failure, thereby increasing the probability of injury, loss of life, severe economic damage, and disruption of commercial, agricultural, and governmental practices and services.

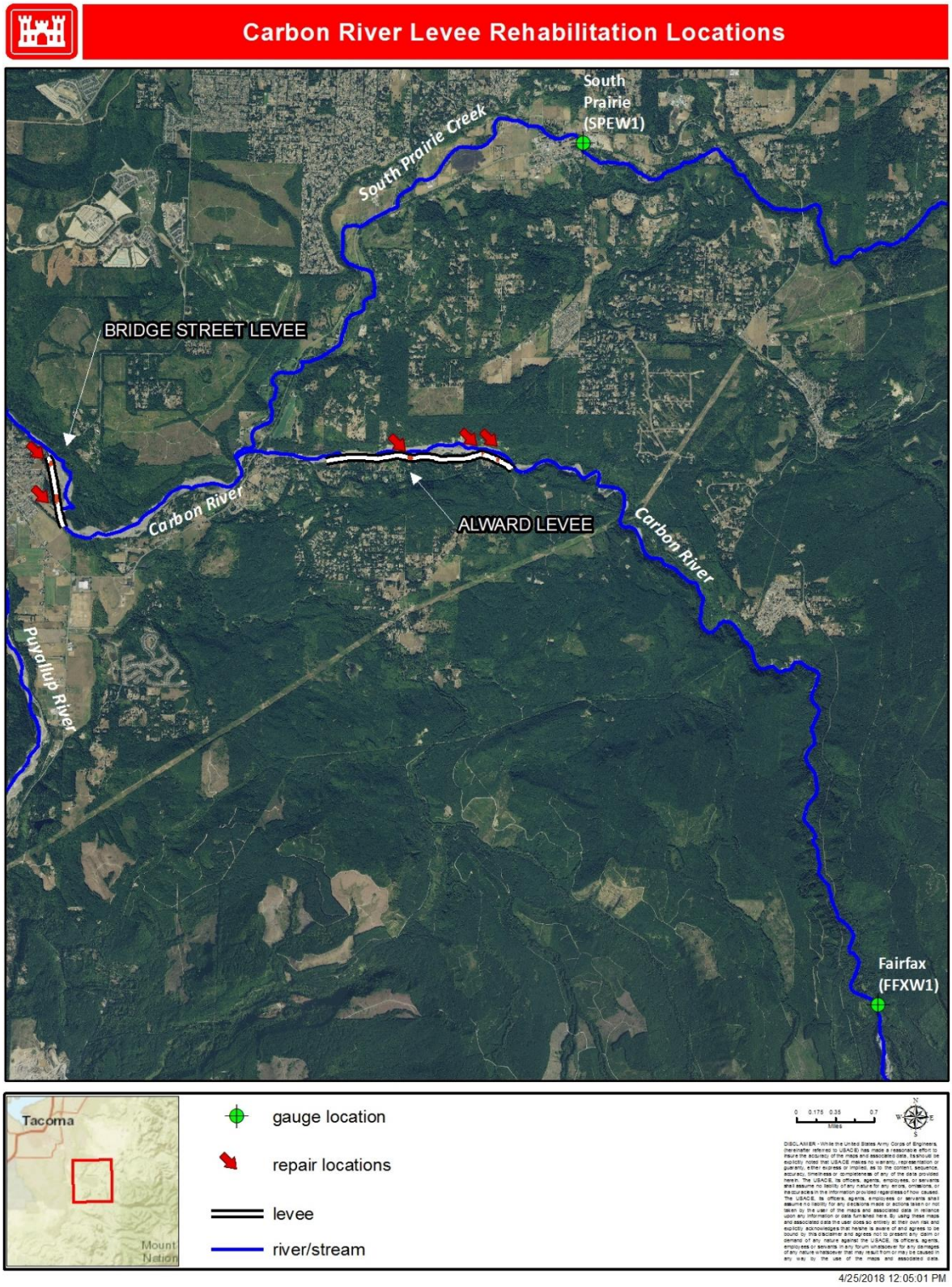

Figure 1. Project location map.

Figure 2. Alward 1 Levee - Damaged Locations.

Figure 3. Bridge Street Levee - Damaged Locations.

2.0 ALTERNATIVE ACTIONS

2.1. No-Action Alternative

The No-Action Alternative would leave the levees in their current damaged condition. This alternative was not selected because it does not meet the purpose of the project to restore the levee to its pre-flood level of protection. This alternative is included and analyzed in order to evaluate the relative merits and disadvantages of the action alternative. This alternative was carried through the alternative comparison to provide a baseline for comparison of future conditions.

2.2. Repair In-Place Alternative

The Repair In-Place Alternative would restore the damaged levee segments to a condition similar to existing undamaged sections in the vicinity. This alternative consists of repairing slope damage and replacing lost armor rock with suitably sized toe and slope rock and is the least cost alternative. The levee toe would be reconstructed to align with the adjacent undamaged toe, ensuring the project stays within the pre-flood footprint.

2.3. Alternatives considered but not selected

2.3.1. Non-structural Alternative

The Non-Structural Alternative consists of floodplain management strategies generally involving changes in land use offered by other Federal and State programs. Such strategies would include zoning, easements, flood warning, floodplain evacuation, and flood insurance. Non-structural strategies involve acquisition, relocation, elevation, and flood proofing existing structures. This alternative could also include relocation of some or all existing structures, utilities, and other infrastructure from the areas protected by the levee. The extensive array of development behind the levees makes this alternative infeasible in the immediate future. The local sponsor has been informed of their option to pursue this alternative for both levees, but has chosen not to for either one. The Corps does not have authority to pursue a non-structural alternative in the absence of participation by the non-Federal interest. Additionally, the costs associated with this alternative were deemed too high for the level of benefit associated with this alternative.

2.3.2. Levee Setback Alternative

The Alward 1 Levee Setback Alternative would shift the alignment of the levee embankment landward to 177th St. East in order to avoid or minimize direct contact with the river current. This setback was identified as a potential future levee setback in the Pierce County Levee Setback Study. Typically, the setback would be a newly-constructed armored earth embankment structure and would abandon the existing levee located on the river bank. Because of the nature of the levee damage, constructing a new levee results in far greater material quantities than has been incurred from flood damage, resulting in greater cost. Additionally while Pierce County has been acquiring the necessary parcels for the setback, not all the real estate affected by a setback like this is currently in Pierce County's ownership and the time and cost involved in obtaining the necessary lands would be an additional expense and may endanger the Corps' ability to restore the pre-damage level of flood protection prior to the next flood season. Additionally, the short length of the damage and required repairs compared to the total length of the levee mean that a setback levee would be substantially more costly to pursue even if the necessary real estate interests were available. Accordingly, setback alternative is not a viable alternative to restore the pre-damage level of flood protection of the Alward 1 Levee prior to the next flood season.

The Bridge Street Levee Setback Alternative has also been identified as a potential future levee setback in the Pierce County Levee Setback study. At this time, the necessary property to implement the

setback alternative has not been acquired by the County. The time and cost involved in obtaining the necessary lands would be an additional expense and may endanger the Corps' ability to restore the pre-damage level of flood protection prior to the next flood season. Similar to the Alward 1 levee, the short length of the damage and required repairs compared to the total length of the levee mean that a setback levee would be substantially more costly to pursue even if the necessary real estate interests were available. Accordingly, setback alternative is not a viable alternative to restore the pre-damage level of flood protection of the Bridge Street levee prior to the next flood season.

2.4. Preferred Alternative

The recommended plan is the Repair In-Place Alternative. The proposed repair would restore along the damaged section of the levee to the 30-year LOP for Bridge Street and 500-year LOP for Alward 1.

At Alward 1 work would be done along a total length of 410 feet of the riverward levee slope at the three sites to reestablish the levee to the pre-flood level of protection, flatten slopes where required to meet minimum levee stability standards of 2H:1V, incorporate a 2-4 ton riprap toe design that provides adequate 6-feet of scour protection, and add Class V riprap to protect the levee from scouring river flows. The existing scour protection is undersized and some of the riprap exhibits cracking and degradation. The repair would involve removal of all existing riprap, re-grading the levee slope to a consistent 2H:1V slope, adding a filter blanket, and finally placing the new scour protection. The levee crest would be topped with a 6-inch layer of crushed surfacing base course to repair any rutting or damages.

The Bridge Street proposed repair includes repair of levee slope and toe along a total length of 625 feet split between two sites. Repair at both sites would reestablish the levee to the pre-flood LOP, flatten slopes where required to meet minimum levee stability standards of 2H:1V, incorporate a 2-4 ton riprap toe design that provides 6-feet of scour protection, and add Class V riprap to protect the riverside slope from erosive river flows. The existing erosion protection is undersized and some of the riprap exhibits cracking and degradation. The repair would involve removal of all existing riprap and re-grading the levee slope to a consistent 2H:1V slope, adding a quarry spall blanket, and finally placing the new erosion protection.

The repair actions described under this alternative would require the removal of trees from the riverward slope of the levee. The trees being removed are predominantly red alder (*Alnus rubra*) ranging from 1 to 12 inches in diameter at breast height (DBH) but also includes a few Douglas-fir (*Pseudotsuga menziesii*; 1 to 7 inch DBH), a number of small willow (*Salix* sp.) and bigleaf maple (*Acer macrophyllum*) saplings (less than 1 inch DBH and 4 to 10 feet in height) at the sites. The repair actions described above would require the removal of approximately 90 large trees greater than 4 inches DBH from the riverward slope of the levee (10 at Alward 1, 80 at Bridge Street). Any woody debris generated from the repair would be placed, unanchored, along the levee slope or toe (there is adequate space to place this unanchored material on the lower levee slope). This includes tree logs, rootwads, and woody shrub debris.

Design plans for the proposed repairs are located in Appendix B. A typical cross section is shown below in Figure 4.

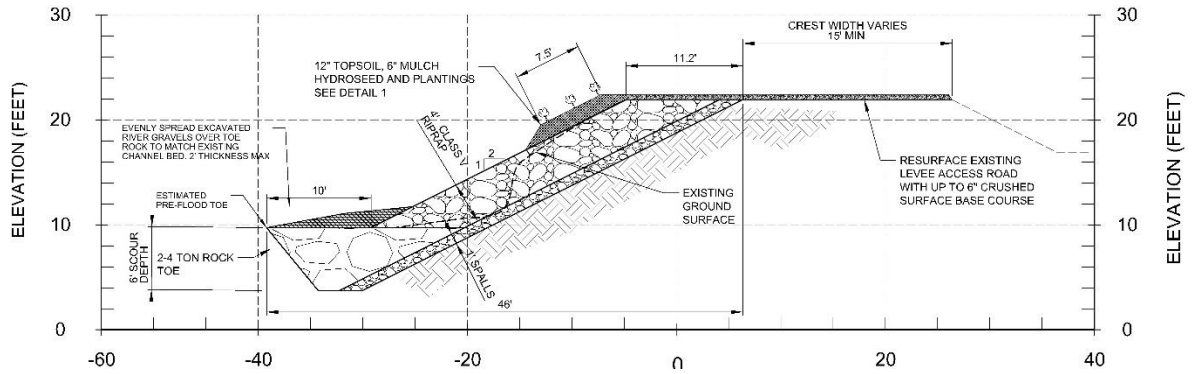

Figure 4. Typical cross section for the proposed repairs under the preferred alternative.

All repairs would be completed in a single construction period and would include the following four components:

Component 1: Site Preparation

This phase includes preparing the existing prism for material removal. The site limits would be clearly marked using stakes and flagging by the government representative. Staging areas would be established where shown in the design plans (Appendix B). Staging activities consist of temporary stockpiling of excess rock, supplies, equipment, and vehicles.

Component 2: Levee Repair Construction

Construction would begin with deconstruction of the riverward portion of the levee in the area of failure. Deconstruction would include excavating the levee embankment from the levee toe landward to the extents of the repair at the base of the excavation. Approximately 90 trees greater than 4 inch DBH would be removed during this phase of the project. Any woody debris generated from the repair would be placed along the levee toe. This includes tree logs, rootwads, and woody shrub debris. The woody debris is typically placed along the levee toe above the waterline and would be placed to avoid damaging plantings and soil placed for plantings. Placement is likely to occur after repairs are completed, so LWD may be stored in the staging areas until ready for placement.

If the existing riprap is not competent, or any other spoil is deemed unacceptable during this phase, the removal, salvage, and stockpiling of unused riprap and other material spoil shall be in Pierce County approved areas or disposed of off-site. The replacement of the riverward buried toe rock would be below the channel bottom and have dimensions of 10 feet wide by 6 feet deep. A 1 foot thick bedding layer of quarry spalls would be overlain by a 4 foot thick blanket of Class V riprap along the riverward slope.

The recommended construction methods for the buried toe are as follows. The toe installation would occur from the upstream end of the project to the downstream end. A toe trench would be dug with sides as close to vertical as practicable. Rock placement would be within the project footprint and in-water encroachment would be minimized as much as practicable and would not extend beyond the pre-flood footprint and toe size (to match the adjacent levee segments). The rock placement of upstream to downstream would act as a localized flow deflector and help manage flows in the installation areas. The buried toe shall be constructed from the levee crest. It is anticipated that only the excavator bucket with thumb attachment would extend into the water for the replacement of buried toe rock. Spoil from the excavation would need to be removed from the site or placed in a Pierce County approved location.

Component 3: Substantially Finish Construction Work
Upon completion of all construction activities, areas disturbed by levee construction, staging activities, or road access would be reseeded with native grasses, except for the 7.5 foot planted area (see Component 4). All areas disturbed by construction equipment (asphalt roads, shoulders) would be restored to an undamaged condition. A 1-foot layer of topsoil would be placed on the upper levee slope and, in lieu of hydroseeding the topsoil, topped with 6 inches of mulch.

Specific existing conditions for the location(s) where the fill material would be purchased are unknown. However, the materials would be purchased from local, privately owned and permitted companies. The site(s) would be chosen through a contract bidding process prior to construction. Any borrow site, quarry, or gravel mine would be fully permitted by the state.

Component 4: Environmental Plantings:
At a later time once repairs are completed, likely in late February or early March, native plant species would be placed in three alternating rows at 3 foot on center spacing in the 7.5 foot wide planting area along the upper levee slope. Proposed species include snowberry, Sitka willow, Pacific willow, and vine maple. Equivalent native substitutions may be chosen. The acquired plantings would be delivered and planted as bare root stock.

See Appendix B for design drawings.

2.5. Best Management Practices and Mitigation Features

Listed below are the best management practices (BMPs) that would be incorporated into the proposed action. Many of these BMPs are those suggested by the Washington State Department of Ecology (Ecology) during previous rehabilitations and flood fights. Some are integrated into the repair, while others are guides to operation and care of equipment. Note, some of these have been mentioned above.

- Refueling would occur on the backside of the levee.
- At least one fuel spill kit with absorbent pads would be onsite at all times.
- All work done in the water is scheduled to occur during the in-water work window for the Carbon River (6 August to 15 September).
- Water quality monitoring for turbidity in the Carbon River would be accomplished. Monitoring would be accomplished for a minimum of one day at the start of each new sediment-generating activity. See Appendix C for sampling protocols. In the event that significant sediment enters the river and high levels of turbidity occur, work would be halted until the situation can be assessed and corrected. Results of turbidity monitoring would be recorded and provided to Corps biologist once in-water work is completed.
- Vegetation removal would be limited to the repair sites.
- Removed woody vegetation would be placed along the completed toe of the repaired levees to provide habitat function to the aquatic environment. This includes any tree trunks and large shrubs. This woody debris should be placed where it can provide shade or organic input into the river. The woody debris is expected to be a temporary feature as the river may carry it away during high flows.
- Equipment used near the water would be cleaned prior to construction.
- Construction equipment shall be regularly checked for drips or leaks. Any leak would be fixed promptly or the equipment would be removed from the project site.

- Drive trains of equipment would not operate in moving water and work would occur from the top of the bank. Only the excavator bucket with thumb attachment would extend into the water.
- Biodegradable hydraulic fluids would be used in machinery where appropriate.
- Following repair of the levee embankment, an 18 inch layer of topsoil and mulch would be placed on the upper 7.5 feet of the riverward slope. This would be planted in the February or March with native shrubs.
- Material placed into the water shall be placed individually or in small bucket loads. No end dumping of rock into the water would occur.
- Native bed materials would be used to cover the buried toe to the extent possible.
- Rock placement would occur only within the project footprint.
- Rock placement would occur from the upstream end of the project to the downstream end so that the placed rock would act as a localized flow deflector and help manage flows in the installation areas.
- At least one Corps biologist and geotechnical engineer would be available via phone during construction. Corps biologists may visit the construction site and provide periodic updates to the Services on construction including an onsite visit with staff. Corps biologist may schedule a visit to construction sites with the Services. The geotechnical engineer may also visit the construction site. All visits would be coordinated with the PM, and Construction Manager

In addition, the Corps would develop a Fueling and Spill Recovery Plan prior to construction that would include specific BMPs to prevent spills and to react quickly should an incident occur. The Corps would develop a Water Quality Monitoring Plan to outline turbidity monitoring procedures during construction (Appendix C). Should construction efforts exceed the maximum state turbidity standards, work would be halted and construction methods adjusted to ensure that further exceedances do not occur.

Several measures would be employed during construction to avoid and minimize adverse project effects. Under the proposed action, construction is limited to the damaged levee segment. The levee would be repaired to the pre-flood level of protection. Construction is proposed to begin in mid-July 2018. The in-water work portion of the proposed repair would be constructed during the coordinated work window for the project (6 August – 15 September) to limit impacts to sensitive species and be limited to the placement of rock to re-establish the pre-flood toe. All rocks would be carefully placed and no end-dumping of rocks into the water would occur. As permitted by site characteristics, placement of the toe rock would be pulled in as close as possible to the present shoreline so that existing restrictions to channel capacity are maintained and not increased. The work area is restricted to areas of existing and functional flood control structures. Vegetative removal is limited to the repair sites. Any large wood removed as part of the clearing process would be stockpiled and placed unanchored at the toe of the levee when construction is complete.

Mitigation measures for effects of proposed actions are evaluated as part of the NEPA process. Mitigation measures could take any of the following forms:

1. Avoiding the effect altogether by not taking a certain action or parts of an action.
2. Minimizing effects by limiting the degree or magnitude of the action and its implementation.
3. Rectifying the effect by repairing, rehabilitating, or restoring the affected environment.
4. Reducing or eliminating the effect over time by preservation and maintenance operations during the life of the action.
5. Compensating for the effect by replacing or providing substitute resources or environments.

The Corps has developed a list of mitigation measures and incorporated these into the levee repair to reduce environmental impacts. This list may need to be amended as work progresses. For this project the measures are:

Hydroseed and Mulch

Hydroseeding disturbed areas would reduce runoff potential from the site and speed up revegetation by providing an organic base and help in retaining a soil layer.

Post-Construction Review of Mitigation Measures

The repair sites would be examined after the repair is completed. If measures and repairs are different than described here, or what is depicted in the plans, they would be recorded and described.

Repair Sequence

Conducting repairs in an upstream to downstream fashion acts as a localized flow deflector and helps manage flows in the installation areas. Constructing in this manner reduces impacts related to turbidity and isolates the site further from the river.

Native Plantings

The Corps imposes rigorous safety considerations on levees, one aspect of which is restricting vegetation growth on levees within 15 feet of the levee toe (as determined by the elevation of the landward grade). Maintaining these safety measures is generally the responsibility of the levee system owner, but in conducting repairs under PL 84-99 the Corps would adhere to its vegetation standards. The Corps integrates vegetation in light of impacts to endangered and threatened listed species, but must consider levee structural integrity, as well as accessibility and inspectability. For the proposed repairs the Corps is integrating plantings along the top 7.5 feet of the upper riverward slope.

Due to the expected velocities at the sites and concern with levee stability, limited tree planting opportunities exist at the project site. The upper 7.5 feet of the riverward slope would be covered with a 1-foot layer of topsoil and covered with 6 inches of mulch. This topsoil would be planted using the mulch for erosion control. Plants would include snowberry (*Symphoricarpos albus*), Pacific willow (*Salix lucida*), Sitka willow (*Salix sitchensis*), and vine maple (*Acer circinatum*). The bare root plants would be planted in the spring (February-March) after structural repairs have been completed, in three alternating rows at 3 feet on center. Plantings would be continuous for a maximum of 60 feet with a 15-foot vegetation free inspection corridor separating planting sections (Figure 5). The plantings would offset vegetation loss due to the proposed project. Planting of a proposed mix of native vegetation as described above would involve replacement at approximately a 2:1 ratio of the trees removed, to offset the temporal loss of the pre-flood event vegetation. The mature height of the shrubs is not expected to inhibit inspection or increase the vulnerability of the rock slope or toe, so that Corps safety standards are maintained to the greatest extent possible.

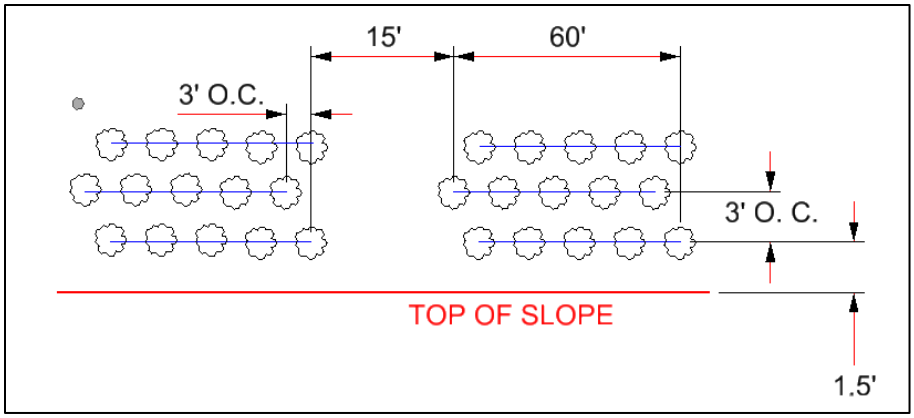

Figure 5. Planting plan along the upper slope of the proposed repair. Planting pattern repeats every 75 feet and consists of bare root plants.

3.0 ENVIRONMENTAL RESOURCES OF CONCERN

3.1. Topography, Hydrology, and Soils

The Puyallup River Basin lies in the Puget Sound lowland and Cascade Range of western Washington. The White River and the Carbon River are two of the larger tributaries to the Puyallup River. The basin is approximately 972 square miles, of which 494 square miles constitute the White River watershed. These rivers are largely unregulated and have high sediment loads and moderate volumes of large woody debris carried down from upstream riparian forests.

Elevations within the basin range from 14,411 feet at the summit of Mt. Rainier, down to as much as 11 feet below mean sea level at extreme low tide near the mouth at Commencement Bay. Since it is only 43 air miles from the summit of Mt. Rainier to the river's mouth, the slopes of the rivers draining the basin are generally quite steep. The rivers typically exhibit a classic concave profile with very steep slopes in their upper reaches and comparatively gentle slopes in the lower reaches. The Puyallup River in the project vicinity occupies a broad floodplain bounded by valley walls hundreds of feet high. The valley was carved by the continental glaciers, and then partially refilled by mudflows from the episodic disintegration of the mountain glaciers.

The majority of the lower river has been altered, with intense urban development occurring in the lower reaches. The river has been extensively constrained by levees and bank protection from its mouth to the Champion Bridge at River Mile 28.5. This has reduced river capacity and led to a recurring need for additional bank protection. Increased urbanization in the lower reaches of the basin and extensive logging of the upper basin have also decreased the amount of infiltration occurring and the travel times for storm water runoff from these disturbed lands.

The Carbon River basin is almost 80 square miles. The river flows approximately 30 miles from the Carbon Glacier on Mount Rainier to the Puyallup River. Formed by glacial meltwater, the Carbon River contains a heavy load of sediment and contributes approximately 30% of the flow to the Puyallup River. The river is split into two broad, flood-prone valleys separated by a narrow gorge between the cities of Fairfax and Carbonado, Washington. From the mouth to approximately river mile 2.5, the river has a low to moderate gradient with a pool-riffle channel.

The Puyallup River basin has a modified marine climate with a dry season during the summer and mild, wet winters. This is a result of three major geographic factors: the ocean to the west, the mountains to the northwest and the mountain range to the east. Because of the moderating influence of the ocean, the area generally enjoys cooler summers and warmer winters than other North American areas in these latitudes. The mountains also have an extensive influence on the weather by reducing the intensity of oceanic storms, inhibiting the movement of cold arctic air into the region, and increasing rainfall due to orographic lift. Measured annual average precipitation within the basin ranges from 40 inches at Puyallup to 77 inches at Electron (Kerwin 1999). Over eighty percent of the precipitation occurs in the six fall and winter months.

Peak runoff events in the area are typically the result of a warm Pacific storm following a cold storm in the late autumn. In the mountains, the heavy rain and warm temperatures associated with the warm Pacific storm melt the accumulated snow. When the ground is either saturated from rainfall, snowmelt or frozen solid, runoff rates increase out of proportion to rainfall rates, and large areas of the flat valley floors become inundated. In years when this combination of storms does not occur, the annual peak flow may occur during late spring, due to rapid snowmelt. Spring snowmelt floods are usually of lesser magnitude, but greater regularity, than autumn/winter storm floods.

Since the Carbon River has its source in high mountain glaciers, and then flows for many miles through steep walled alluvial valleys, it normally carries a heavy bedload of sediment out of the mountains onto the floodplain. The river has a natural tendency to deposit the larger materials at the upper end of the floodplain, and the finer materials in the lower reaches, forming braided or meandering channels respectively. Much of the diking in the lower river has been an effort to control this riverine process in order to develop the valley floor as agricultural or urban land.

Soils in the basin are derived from glacial deposits except in the mountains where bedrock is exposed, and some valley soils are derived directly from the rock. Elsewhere, successive stages of glaciation have re-worked the subsoils to depths of several thousand feet. Thus the parent material of the soil is usually a glacial or riverine deposit.

Soils in the area are classified as predominately aquic xerofluvents with areas of riverwash and isolated areas of Pilchuck fine sand, xerochrepts, Barneston gravelly coarse sandy loam, and Puyallup fine sandy loam (NRCS 2018). According to the Natural Resource Conservation Services soil survey classifications, aquic xerofluvents are somewhat excessively drained to poorly drained, and form in unconsolidated alluvium.

3.1.1. No-Action Alternative

Continued erosion on the levee within the damaged segment and a higher risk of damage from flooding of the river would persist under the No-Action Alternative. The soil conditions and topography would not be affected. The levee would not be repaired and the possibility of failure would increase. In the event of a levee breach during a flood event, the river channel could migrate into developed areas, changing the hydrology in the immediate area of the breach and throughout the affected reach of the river. Emergency flood fight measures would likely be initiated to prevent such a breach to maintain the current river channel to the extent possible. Flood fight activities could require more rock placement and require the use of larger rocks, depending on the specific events at the time of the emergency when compared with the Repair In-Place Alternative below.

3.1.2. Repair In-Place Alternative

Actions under the Repair In-Place alternative would minimize continued erosion of the river bank. The repair would reshape the bank and restore lost armoring to the damaged vertical riverward levee slope along 1,035 feet. The armor rock is designed to extend to the river bottom; with a compressed buried toe being constructed.

3.2. Vegetation

Prior to European colonization (roughly 150 years ago), vegetation in the lower Puyallup and Carbon River basins consisted of an extremely dense cover of very large trees with a thick understory of shrubs and herbs. Dominant species present likely included thick stands of Sitka spruce (*Picea sitchensis*), western red cedar (*Thuja plicata*), Douglas fir (*Pseudotsuga menziesii*), western hemlock (*Tsuga heterophylla*), big leaf maple (*Acer macrophyllum*), red alder (*Alnus rubra*), vine maple (*Acer circinatum*), hardhack (*Spiraea douglasii*), and various other berries, currants, and herbs. Much of this area was wetland and marsh with hummocks of dry land interspersed. Beaver activity was integral in shaping the landscape, consuming woody vegetation and creating wetlands and ponds. This plant community covered most of the floodplains, valley walls, rolling plateaus and mountainsides.
As early as 1860, land clearing for timber sales and agriculture began to alter the conditions of the region. Levees and revetments were built to prevent flooding in highly productive farming areas along the rivers where nutrient rich sediments had been deposited by flood events. These structures effectively drained many of the floodplain wetlands, thereby modifying the vegetation communities significantly. Today, the lower Puyallup River (including the area of confluence with the Carbon River) is characterized by rapid development and urbanization. Much of the forest land has been cleared through logging or for agriculture and development; little remains of the absorptive cover that historically served to moderate flooding in the watershed.

The Alward 1 Levee is moderately vegetated with black cottonwood, red alder, Douglas fir, various willow species, and snowberry along the riverward slope. Red alder saplings are the dominant species found on the riverward slope. Land behind the levee is mostly undeveloped coniferous forest dominated by Douglas fir with some residential development.

Much like the Alward 1 Levee, the Bridge Street Levee is moderately vegetated along the riverward slope with red alder and black cottonwood. Immediately landward of the levee is undeveloped deciduous forest dominated by cottonwood trees. Behind that is primarily residential developments and fields. Most of the riverward vegetation is red alder, some of which exceed 30 feet in height.

3.2.1.No-Action Alternative

Depending upon the magnitude and duration of future flood events, the levee may start to fail. Under these circumstances, a flood fight would likely be conducted to try to save the levee and protect properties, facilities, and lives from threat. Construction during a flood event is difficult and is completed as quickly as possible; therefore, vegetation would be removed or buried as needed to accomplish the levee rescue under difficult construction conditions, regardless of the type of vegetation. Levees typically are not revegetated following the flood fight actions due to the rapid nature of construction and high water levels. If a flood fight was unsuccessful and the levee failed, inundation and possible channel migration could have impacts on area vegetation.

3.2.2. Repair In-Place Alternative

Vegetation within the project site would be removed for construction. Riparian vegetation is important for recruitment of large woody debris in the river, shading, cover, complexity of shoreline, nutrient input, and as perching and nesting habitat for birds.

The repair actions would require the removal trees from the riverward slope of the levee. The trees being removed are predominantly red alder (*Alnus rubra*) ranging from 1 to 12 inches DBH, but also includes a few Douglas-fir (*Pseudotsuga menziesii*; 1 to 7 inch DBH), a number of small willow (*Salix* sp.) and bigleaf maple (*Acer macrophyllum*) saplings (less than 1 inch DBH and 4 to 10 feet in height) at the sites. The repair would require the removal of approximately 90 large trees greater than 4 inches DBH from the riverward slope of the levee (10 at Alward 1 and 80 at Bridge Street). The Alward 1 site is largely devoid of large trees due to frequent repairs. Any woody debris generated from the repair would also be placed, unanchored, along the levee slope or toe. This includes tree logs, rootwads, and woody shrub debris.

Replanting would include upper bank plantings along the entire 625 feet of the repair for Bridge Street and 410 feet for Alward 1. If river conditions allow for work at the toe of the levee, an attempt would be made for retaining bank vegetation at Alward 1 Site 3 and only placing toe rock. That action would require topping existing vegetation but root stock would remain, accelerating regeneration of vegetation. Natural red alder recruitment along with mitigation plantings is anticipated to restore pre-construction habitat characteristics within 5 to 7 years. Vegetation maintenance along the levee would be expected to be minimal due to levee vegetation maintenance agreements Pierce County has with the Puyallup Tribe of Indians. Due to the relatively short length of the vegetation removal, the replanting efforts, and the robust vegetation on the opposite bank, the temporal loss of vegetation from the levee repair is not expected to be a significant impact for this alternative.
Overall the effect of the Repair In-Place Alternative on vegetation would be less than significant given the limited vegetation present and the mitigation plantings proposed.

3.3. Fish and Wildlife

The lower Carbon River in the project reach is used for spawning by steelhead (*Oncorhynchus mykiss*), coho (*O. kisutch*), and Chinook (*O. tshawytscha*). Additionally, bull trout (*Salvelinus confluentus*), chum (*O. keta*), and odd-year pink salmon (*O. gorbuscha*) are present. The WRIA 10 Salmon Habitat Limiting Factor Report (Kerwin 1999) states that the Carbon River has been considered the largest and most productive habitat available for natural salmonid production in the Puyallup River basin. In the Lower Carbon this report names South Prairie Creek as the backbone of natural salmonid production in the Lower Carbon subbasin. The mainstem Carbon from river mile (RM) 3 to the confluence with South Prairie Creek (near RM 6) has the highest spawning densities of all species compared to the rest of the mainstem (Bridge Street levee occurs in this reach). The highest spawning densities of all species are observed in this reach. Above the South Prairie Creek confluence (including the reach where Alward 1 Levee is located), the Carbon mainstem has a slightly higher gradient and as a result contains less spawning habitat, which is used in reduced densities.

Other aquatic species known to occur in the vicinity are cutthroat trout (*O. clarki*), mountain whitefish (*Prosopium williamsoni*), northern pikeminnow (*Ptychocheilus oregonensis*), peamouth chub (*Mylocheilus caurinus*), three-spine stickleback (*Gasterosteus aculeatus*), largescale sucker (*Catostomus snyderi*), longnose dace (*Rhinichthys cataractae*), brook lamprey (*Lampetra richardsoni*), Pacific lamprey (*Lampetra tridentata*), and several species of sculpin (*Cottus spp*)(Pierce County 2005).

The project area provides habitat for a variety of birds and their prey. Common birds include several species of flycatchers and wood warblers, black-capped and chestnut-backed chickadees, and red-breasted nuthatches. Song sparrows, fox sparrows, spotted towhees, American robins, and Swainson's thrushes are found in the shrub layer. House sparrows, house finches, European starlings, Brewer's blackbirds, and crows are found in open urban and suburban areas (Pierce County 2005). Waterfowl, including mergansers and mallards are likely present. Red-tailed hawks and bald eagles use the taller trees in the region for perching and foraging. A search of the Washington State Priority Habitat Species database did not identify any eagle nests or roost sites in the project vicinities.

Terrestrial mammals expected to use the habitats found within the project area include coyote (*Canis latrans*), raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), skunks (family *Mephitidae*), black-tailed deer (*Odocoileus hemionus columbianus*), muskrat (*Ondatra zibethicus*), river otter (*Lutra Canadensis*), moles (family *Talpidae*), mice (family *Muridae*), eastern grey squirrel (*Sciurus carolinensis*), and similar species, as well as dogs (*Canis lupus familiaris*) and feral cats (*Felis catus*) (Pierce County 2005). Amphibians such as the Pacific chorus frog (*Pseudacris regilla*) and ensatina salamander (*Ensatina eschscholtzii*), and reptiles like the common garter snake (*Thamnophis sirtalis*) and the northern alligator lizard (*Elgaria coerulea*) are common in the area.

3.3.1. No-Action Alternative

Implementing the No-Action Alternative could lead to additional flood damages and potentially levee failure, necessitating flood fights that would result in a less carefully designed and implemented construction effort. Emergency actions could disrupt spawning, displacing adults from redds and potentially reducing spawning success. Emergency actions could also have negative effects on redds near repair areas. Sediment inputs during emergency actions do not add substantially to the water turbidity and sediment deposition in redds due to the naturally high turbidity of high flows during a storm event. Plantings and mitigation elements are not included in construction design during emergency repairs. The exact effect to fish and wildlife with emergency flood actions is difficult to quantify or predict but does have the potential to be substantial if the flood event warrants levee repair or results in a levee breach.

3.3.2. Repair In-Place Alternative

Effects to fish and wildlife would be temporary and occur primarily during construction. Any fish and wildlife in the project area could be temporarily displaced due to construction activities. Excavation, transportation, and placement of embankment materials would require the use of heavy construction equipment whose presence and noise may temporarily displace some species at the construction site. Fish and wildlife would be expected to return to the area immediately after construction is complete. Forested areas along the levee would be lost under this repair. Replanting wwould be done to offset this impact throughout the full length of the repair sites. The armored bank that existed prior to the flood damage would be rebuilt with no footprint change. The levee footprint would not encroach on the river beyond the historic levee footprint, so river substrate would not be altered. The impact of this alternative would be short term and would not be significant.

3.4. Threatened and Endangered Species

In accordance with Section 7(a)(2) of the Endangered Species Act (ESA), federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed and proposed threatened or endangered species. Three species protected under the ESA may occur in the vicinity of the project (Table 1). The following sections briefly summarize relevant information for the protected

species; synthesizes current knowledge on the presence and utilization of the project and action areas by these species; and then evaluates how the proposed project may affect the species concluding with a determination of effect. Pursuant to Section 7 of the ESA, the Corps submitted a Biological Assessment to the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) regarding effects to these species.

Table 1. Protected species potentially occurring in the project vicinity

Species	Listing Status	Critical Habitat (CH)
Coastal-Puget Sound Bull Trout *Salvelinus confluentus*	Threatened	Designated (in action area)
Puget Sound Steelhead *Oncorhynchus mykiss*	Threatened	Designated (in action area)
Puget Sound Chinook *Oncorhynchus tshawytscha*	Threatened	Designated (in action area)

Other listed species may occur in Pierce County as well but have no potential to be affected by the proposed project. The proposed project would have "no effect" on the following species and their designated critical habitat due to specialized habitat needs not found in the action area, lack of tolerance for human activity, or both. These species include the Canada lynx (*Lynx canadensis*), grizzly bear (*Ursus arctos horribilis*), gray wolf (*Canis lupus*), Roy Prairie Pocket Gopher (*Thomomys mazama glacialis*), Southern Resident Killer Whale (*Orcinus orca*), northern spotted owl (*Strix occidentalis caurina*), yellow-billed cuckoo (*Coccyzus americanus*), streaked horned lark (*Eremophila alpestris strigata*), Puget Sound/Georgia Basin distinct population segment (DPS) of yelloweye rockfish (*Sebastes ruberrimus*), Puget Sound/Georgia Basin DPS of bocaccio (*Sebastes paucispinus*), Southern DPS of eulachon (*Thaleichthys pacificus*), Southern DPS of North American green sturgeon (*Acipenser medirostris*), golden paintbrush (*Castilleja levisecta*), marsh sandwort (*Arenaria paludicola*), and water howellia (*Howellia aquatilis*).

Marbled murrelet (*Brachyramphus marmoratus*) could transit the project area while travelling between nesting and feeding areas; however, the proposed project would have "no effect" on murrelet. There is no critical habitat in the project area. The additional noise and human presence is not expected to significantly increase over the ambient conditions as the project area is within a developed rural community near the City of Orting, WA. Additionally, murrelet typically fly at altitudes (Stumpf et al. 2011) that are beyond the reach of ground-based noise impacts. Murrelet behavior is not expected to be affected by the proposed construction.

Puget Sound Chinook Salmon

The Puget Sound Chinook salmon was listed as a threatened species in March 1999 and reaffirmed in June 2005. Three stocks are found in the Puyallup River; Puyallup River Chinook (formerly fall Chinook), White River spring Chinook, and White River fall Chinook. The Carbon River in the project area is designated as critical habitat for Chinook (NMFS 2005).

Chinook salmon are one of five salmon species belonging to the genus *Oncorhynchus*. They commonly reach 36 inches in length and typically weigh 10-50 lbs. All Chinook salmon require cold, freshwater streams that contain gravel beds suitable for reproduction. Spawning occurs from November to January, with the eggs hatching the following spring. After emerging, Chinook fry seek shallow, nearshore habitat with low water velocities, and eventually move to progressively deeper, faster water

as they grow. Most Chinook return to their native streams to spawn after spending two to four years maturing in the open ocean.

Chinook would spawn in a wide range of gravel sizes, water depths, and water flows (Healey 1991). Generally, gravels up to six inches in size containing less than 20 percent fine material provides suitable spawning habitat (Bjornn and Reiser 1991, Bell 1986). Excessive fine materials in spawning areas can result in poor aeration of eggs and poor survival to the fry stage. Chinook typically prefer to spawn in areas with high subgravel flow and less than 20 percent fines in the gravel (Bell 1986; Bjornn and Reiser 1991; Healey 1991). Chinook would spawn in water temperatures ranging from 33.8 to 68.0°F, but survival of eggs is best when water temperatures are in the range of 42.1 to 57.0°F during spawning and 41.0 to 57.9°F during incubation (Bell 1986).

Like all other Puget Sound Chinook, those in the Puyallup system are of the ocean-type (NMFS 1998). Ocean-type Chinook migrate to the sea during their first year of life, normally within three months after emergence from spawning gravel. Peak emigration generally occurs from March to June. Growth and development to adulthood occurs primarily in estuarine and coastal waters (NMFS 1998). According to the National Marine Fisheries Service, the White River early-run Chinook stock is the last remaining early-run spring Chinook stock in south Puget Sound. The Puyallup River Chinook population spawns in the Carbon and the Puyallup Rivers, as well as their tributaries. Early-returning Chinook adults may be present in the river during levee construction. Puyallup River Chinook spawning occurs up to Electron Dam, as well as in the lower Carbon River. Spring Chinook enter the river as early as May and hold in the river until the spawn in August. Fall runs of Chinook enter the Lower Puyallup in June and continue to move through the system as late as November.

Chinook salmon, and other wild salmon, have declined in number from historic levels in the Puyallup River and tributaries. Historic Chinook abundance in the Puyallup has been estimated at 42,000, but run sizes averaged only about 2,500 during the eight years leading up to preparation of the Puget Sound Chinook Recovery Plan (NMFS 2007a). Contributing factors to Chinook salmon declines include loss of spawning/rearing habitat, water withdrawals from the river, dam operations, poor logging practices, development of wetland and riparian zones, and effects of hatchery fish (NMFS 2007a). Flood control projects, port activities and urbanization have also degraded habitat and habitat functionality (NMFS 2007a). Lack of large woody debris is also cited as a factor.

It is anticipated that Chinook could spawn adjacent to the project sites.

Puget Sound Steelhead

Puget Sound steelhead were listed as threatened in May of 2007 (NMFS 2007b) and critical habitat was designated in 2016 (NMFS 2016). The project area is within proposed critical habitat.

There are three stocks of Puget Sound steelhead using the Puyallup system: Puyallup River winter steelhead, White River winter steelhead, and Carbon River winter steelhead. They are native stocks sustained by wild production. All three stocks have gone from healthy in 1992 to depressed in 2002 (WDFW 2002). Steelhead are anadromous rainbow trout which mature in saltwater. Unlike salmon, steelhead can spawn more than once during their lives, returning to saltwater afterwards. The three Puyallup steelhead stocks spawn from early March to mid-June. Eggs hatch in summer. There is a large variety of combinations of freshwater rearing and saltwater residence times (Scott and Crossman 1973). According to Wydoski and Whitney (1979), Washington steelhead adults often spend two years at sea;

according to the Puget Sound Steelhead Biological Review Team (2005), about 70 percent of Puyallup system steelhead spawn for the first time at age 2, and 30 percent at age 3. Most (about 89 percent for the Puyallup system) rear for two years in freshwater before outmigrating as smolts to the estuary and saltwater, generally from April through June and peaking in mid-April. This makes juvenile steelhead likely to be in the general project area during construction. Wydoski and Whitney (1979) indicate that two-year-old steelhead smolts may be about 140-160 mm in length. That is larger than smolts and fry of other salmon such as Chinook which outmigrate in the same spring in which they emerge from stream gravel. Steelhead smolts are also larger and more mobile than Chinook smolts, so they are more able to avoid some adverse circumstances as well.

Winter steelhead have been observed in the mainstem of the Puyallup River. Spawning occurs in lower mainstem tributaries from early March through mid-June (Puget Sound Steelhead Biological Review Team 2005). Spawning has also been observed in the mainstem just upstream from the White River confluence (Puyallup Tribe 2005). Outmigration in the Puyallup River system ranges from April through July, with a peak in mid-May (Berger and Williamson 2005). Adult freshwater entry occurs from November through May (Puget Sound Steelhead Biological Review Team 2005). Factors in the decline of steelhead would be similar to those for Chinook. Low flows may at times also be a concern for rearing habitat.

Puyallup River winter steelhead use the river reach surrounding the project area for spawning (Ecology 2007). The construction period would not coincide with spawning or migrating, but could overlap with incubation given the late spawning period. Also as steelhead spend one to two years in freshwater before outmigrating, it is expected that juvenile steelhead may be rearing in the project area during construction.

Coastal/Puget Sound Bull Trout

The Coastal/Puget Sound bull trout DPS was listed as a threatened species under the ESA in October 1999. The Carbon River in the project area is designated as critical habitat for this species (USFWS 2010). Bull trout populations have declined through much of the species' range; some local populations are extinct, and many other stocks are isolated and may be at risk (Rieman and McIntyre 1993). A combination of factors, including habitat degradation, expansion of exotic species, and exploitation, has contributed to the decline and fragmentation of indigenous bull trout populations. Washington's native char exhibit four life histories. The three freshwater forms include adfluvial, which migrate between lakes and streams; fluvial, which migrate within river systems; and resident, which are non-migratory (Rieman and McIntyre 1993). The fourth and least common strategy, anadromy, occurs when the fish spawn in fresh water after rearing for some portion of their life in the ocean. Bull trout movement in response to developmental and seasonal habitat requirements, making their movements difficult to predict both temporally and spatially. Newly emergent fry tend to rear near spawning areas, while foraging juvenile and sub-adults may migrate through river basins looking for feeding opportunities (WDFW 1999). Adults of the non-resident life form would vacate the spawning areas quickly after spawning and move downstream to forage, some returning to their "home" pool for additional rearing. Anadromous sub-adults and non-spawning adults are thought to migrate from marine waters to freshwater areas to spend the winter.

Bull trout have more specific habitat requirements than most other salmonids (Rieman and McIntyre 1993). Cold water temperatures play an important role in determining bull trout habitat, as these fish are primarily found in colder streams. Temperatures in rearing habitats typically range less than 59.0°F and temperatures in spawning habitats are generally less than 48.2°F (USFWS 2004, WDFW 1998,

Rieman and McIntyre 1993, Pratt 1992). Although bull trout are found primarily in cold streams, occasionally these fish are found in larger, warmer river systems (Rieman and McIntyre 1993, WDFW 1998). Factors that can influence bull trout ability to survive in warmer rivers include availability of cold water patches and food productivity (WDFW 1998). All life history stages of bull trout are associated with complex forms of cover, including large woody debris, undercut banks, boulders, and pools (Pratt 1992, WDFW 1998). Juvenile and adult bull trout frequently inhabit side channels, stream margins, and pools with suitable cover (Pratt 1992, USFWS 2004). Preferred spawning habitat consists of low gradient stream reaches with loose, clean gravel. Redds are often constructed in stream reaches fed by springs or near other sources of cold groundwater (Rieman and McIntyre 1993).

Spawning occurs in in the upper watershed from late August to early or mid-November but is more typically seen between the first week in October and the first week in November when water temperature drops between 46.4° and 48.2°F (WDFW 1998). Bull trout are apex predators that remain in places where prey is abundant and would follow prey species such as migrating juvenile salmon.

The Carbon River basin contains resident and migratory life history forms of bull trout and the lower Puyallup provides important foraging, migration and overwintering habitat for the species (USFWS 2004). Bull trout have been captured in seining efforts in the lower Puyallup River during the summer (Pierce County 2005), so their presence in the lower system is assumed. The life history forms most likely to be present near the project area are the anadromous and fluvial forms. The potential for bull trout presence is low, based on declining populations rather than timing; however some use of the project area should be expected. Migratory adult bull trout would be expected to move through the project area as they ascend the river to upstream spawning grounds and again as they return downstream (Ecology 2007). Bull trout also utilize the project area for rearing (Kerwin 1999).

3.4.1. No-Action Alternative

The No-Action Alternative could lead to additional damage from a future flood event, resulting in increased flooding frequency and flood damages to infrastructure. Levees that are in disrepair during flood events receive attention through flood fight actions. Emergency repair actions would likely occur during a time when more eggs are in the gravel; therefore, construction effects on listed species may be greater. Effects to riparian areas may be greater due to the rapid emergency response; therefore, cover may be further reduced relative to other alternatives. Mitigation actions are not typically included in emergency repairs. Emergency repairs associated with the No Action Alternative could have substantial impacts on threatened and endangered species.

3.4.2. Repair In-Place Alternative

A Biological Assessment, assessing the effects the proposed repairs, was submitted to NMFS and USFWS on 27 April 2018. Table 2 summarizes the effect determinations made in the Biological Assessment for each of the species potentially occurring in the project vicinity.

Table 2. ESA Effects Determination Summary

Species	Effect Determination	Critical Habitat Determination
Bull Trout	May Affect Not likely to adversely affect	Likely to adversely affect
Chinook	May Affect Not likely to adversely affect	Likely to adversely affect
Steelhead	May Affect Not likely to adversely affect affect	Likely to adversely affect

The effect determinations were made by the Corps based on the following:

- Repairs would occur in summer during low flow and higher water temperatures.
- All in-water work would occur within the in-water work window coordinated with the Puyallup Tribe, NMFS, and the Washington Department of Fish and Wildlife (6 August – 15 September).
- The repair locations are within the range of bull trout, chinook, and steelhead.
- Bull trout do not spawn in the river adjacent to the repair areas.
- Chinook and steelhead do spawn in the river adjacent to the repair areas and juveniles may rear in the river segment. In-water work would occur outside of spawning times.
- Any fish present within the project footprint where in-water work is occurring, or areas adjacent to these, has the potential to be directly or indirectly impacted by in-water work. In-water work could cause injury, death or interrupt habitat use or migratory behavior. However, it is highly unlikely fish would remain in the project area once construction begins, so the risk of take is very small.
- Impacts would be offset through the mitigation features incorporated into the project design, as well as the implementation of BMPs during construction.

The project ***may affect, but is not likely to adversely affect Chinook salmon***. The project construction would occur during the fish window when few if any juvenile Chinook salmon would be in the action area. Additionally, mitigation features have been incorporated to offset the temporary impacts from construction and would provide additional refuge habitat within the project reach. Adult spawning at the project site was not observed during previous rehabilitation projects (2011 and 2015). Mitigation measures and BMPs would be used to minimize the impacts to water quality, shoreline habitat, and food availability. The proposed action is ***likely to adversely affect designated critical habitat for Chinook salmon***. This is based on the analysis of effects to physical or biological features (water quality, water quality, groundwater, habitat complexity, nonnative species etc.).
The proposed project ***may affect, but is not likely to adversely affect Puget Sound steelhead***. This determination is made based upon the limited scope and duration of the project, the temporary and minor nature of project impacts, implementation of mitigation features, and BMPs. The proposed action is ***likely to adversely affect designated critical habitat for Puget Sound steelhead***. This is based on the analysis of effects to physical or biological features (water quality, water quality, groundwater, habitat complexity, nonnative species etc.).

The proposed project ***may affect, but is not likely to adversely affect bull trout***. This determination is based upon the low likelihood that bull trout would be present in the action area during construction activities, the mitigation measures and BMPs implemented during construction, and the benefit from plantings and slope layback. Based on the analysis of effects to physical or biological features (water quality, water quality, groundwater, habitat complexity, nonnative species, etc.), the proposed action is ***likely to adversely affect designated bull trout critical habitat***.

Overall, the Repair In-Place Alternative would not have significant impacts on threatened or endangered species due to implementation of conservation measures and BMPs.

3.5. Cultural Resources

The Corps has coordinated its environmental review of impacts on cultural resources for NEPA with its responsibilities to take into account effects on historic properties as required by Section 106 of the National Historic Preservation Act. The Corps has determined and documented the area of potential effect (APE) for both direct and indirect effects, as required at 36 C.F.R § 800.4 of the regulations implementing Section 106. The APE includes the length of the levee repair and all staging and access

areas for all locations. The Washington State Historic Preservation Officer (SHPO) agreed with our determination of the APE on 3 May 2018.

The Corps has conducted a records search and literature review of the Washington Information System Architectural and Archaeological Records Database and Corps cultural resources records. The literature review and records search revealed that there are no properties listed in the National Register of Historic Places (NRHP) or the Washington State Historic Site Register in any of the project repair areas, and no cultural resources have been recorded within the Bridge Street APE. One cultural resource, the Alward 1 Levee, is a recorded historic structure within the Alward 1 Levee Project APE. It was determined not eligible for listing on the NRHP in 2016. We also notified the Puyallup Tribe of Indians, Muckleshoot Indian Tribe, and Yakama Tribe about the projects on 1 May 2018 to identify properties to which they may attach religious or cultural significance or other concerns with historic properties that may be affected. The Tribes did not comment on the undertaking.

On 20 March 2018, Corps archaeologists conducted a pedestrian survey of the project APE for the Alward 1 and Bridge Street levees. All accessible areas within the APE were visually surveyed for cultural resources, with kick scrapes performed in areas with loose ground cover. The areas were highly disturbed, both from the construction of the levees, Alward 1 and Bridge Street, and multiple previous repairs within the project APE. The levees were characteristic of a modern Corps designed levee, with no defining characteristics. No new cultural resources were located.

Archival research indicates that the Alward 1 and Bridge Street Levee Systems were originally constructed in the 1960s, and meet the minimum age threshold of 50 years old. The Alward 1 and Bridge Street Levee System has been subject to a number of flood events and repairs, which are considered normal and routine in nature. These actions have led to a loss of integrity through severe erosion as well as changes of prism design and design and structural material.

3.5.1. No-Action Alternative

Under the No-Action Alternative, the Corps would not repair the levee, and the threat of a future levee failure would increase. Future flooding events could result in the erosion or destruction of eligible sites located within the floodplain of the Puyallup River including known prehistoric villages, shell middens, and historic era sites.

3.5.2. Repair In-Place Alternative

As the proposed repairs do not alter the proposed alignment, the levee and its character defining qualities would remain intact as a flood control structure in the protection of life and property. Both levees have been subject to a number of flood events and repairs, which are considered normal and routine in nature, and these actions have led to a loss of integrity through severe erosion as well as changes of prism design and design and structural material. Accordingly, the Alward 1 and Bridge Street levees are not eligible for listing on the NRHP, and the Corps determined that there would be no historic properties affected by the proposed projects. The Corps notified the SHPO of our finding of No Historic Properties Affected on 25 May 2018. The Washington State Historic Preservation Officer agreed with our determination effect on 29 May 2018. Accordingly, the Repair In-Place Alternative would have no adverse impact on cultural resources, as there are no historic properties eligible for the National Register of Historic Places within the project APE.

3.6. Water Quality

The Carbon River is designated for aquatic life uses as char spawning and rearing habitat (WAC 173-201A-602). Per the Washington Administrative Code, the key identifying characteristics of this use are spawning or early juvenile rearing by bull trout and Dolly Varden, or use by other aquatic species similarly dependent on such cold water. Other common characteristic aquatic life uses for waters in this category include summer foraging and migration of native char; and spawning, rearing, and migration by other salmonid species. Water quality standards (i.e., temperature, dissolved oxygen, and turbidity) are established based on this aquatic life use designation.

No water quality issues exist for the Carbon River within the project area (Ecology 2018). Turbidity in the river is typically quite high during the summer due to the natural occurrences of glacial flour.

3.6.1. No-Action Alternative

Under this alternative, the damaged levee could fail during the upcoming flood season resulting in an increase in erosion, turbidity, and sedimentation. Emergency repairs may be required. These repairs could create turbidity, though this effect would be minimal in relation to background levels of turbidity associated with flood levels. Effects of the No Action Alternative and any emergency flood response on water quality would not be significant.

3.6.2. Repair In-Place Alternative

The Repair in Place Alternative would involve minimal, short-term water quality impacts from construction of the repairs. During construction there may be a minor short term increase in turbidity during in-water construction. Water quality monitoring would ensure that no exceedances of state standards occur. Additionally, if precipitation occurs before the plantings and hydroseed grasses stabilize the soils placed on the slope, an increase in runoff may occur. Construction equipment would not enter the water and would remain on dry ground at all times. Only the excavator bucket would enter the water. Machinery to be used for the repair would use vegetable-based hydraulic fluids. BMPs for construction activities would be employed to minimize impacts to water quality. Large, mature trees in the project area are being retained in order to limit impacts to river shading. Plantings would be done to offset the impacts to edge shading and nutrient input. Water quality impacts resulting from this alternative are not expected to be significant.

3.7. Air Quality and Noise

The EPA's Clean Air Act sets National Ambient Air Quality Standards (NAAQS) for several criteria pollutants including ozone (O3), lead (Pb), carbon monoxide (CO), nitrogen oxides (NO, NO2 etc), sulfur dioxide (dioxide), and particle pollutants with diameters less than 10 microns (PM2.5 and PM10). Areas that persistently exceed the standards are designated as nonattainment areas. In Washington, EPA has designated 1 nonattainment area in Tacoma (EPA 2018).

Once a nonattainment area has attained and maintained NAAQS, they may be redesignated as "maintenance areas". According to the Washington Department of Ecology (Ecology 2018b), the project site is located in an area listed as maintenance area for ozone. Ozone pollution is created when certain chemicals in vehicle emissions interact with heat and sunlight. The closest monitoring site for ozone is located near Enumclaw, WA. The limit for ozone set by NAAQS is 0.075 ppm. The monitoring site at Enumclaw has not exceeded 0.06 ppm. In the Puget Sound area, ozone pollution is greatest during the hottest summer days and tends to be at the highest levels downwind from urban centers.

The project site is in a developed rural community near Orting, WA. Noise levels are low due to the lower population density in the immediate areas but heavy traffic noise may occur at times as the City of Orting and SR 162 are located nearby. Rural homes are within close proximity of the levees and associated noises from family homes and small agricultural plots contribute to the ambient noise levels.

3.7.1. No-Action Alternative

The No-Action Alternative would mean the Corps would not repair the damaged levee. Therefore, this alternative would have no effects to air quality or noise. Emergency actions may be required to protect lives and property in the event of a flood. These actions would likely have similar air emissions and noise effects as the Repair In-Place Alternative. Effects to air quality and noise would not be significant.

3.7.2. Repair In-Place Alternative

During construction there would be a localized increase in ambient noise levels from construction equipment operating. Equipment would only operate during daylight and typical construction hours. Proposed work would be done from 7AM to 7 PM to limit noise impacts on surrounding properties. Wildlife in this agricultural area is likely habituated to periodic human activity and noise. No significant effects from noise are anticipated.

Construction vehicles and heavy equipment used in construction would temporarily and locally generate increased gasoline and diesel exhaust fumes. The small area of construction and the short duration of the activities would limit the impact to air quality. The activity would constitute routine repair of an existing facility, generating an increase in direct emissions of a criteria pollutant or its precursors that would be clearly *de minimis*, and would therefore be exempted by 40 CFR Section 93.153(c)(2)(iv) from the conformity determination requirements. Emissions generated by the construction activity are expected to be minor, short-term, and well below the *de minimis* threshold. Unquantifiable but insignificant exacerbation of effects of CO_2 emissions on global climate change would be anticipated.

3.8. Utilities and Public Services

The levees provide protection for residences, commercial properties, state and local roads and highways (including SR 162), and associated public infrastructure. One buried utility line was observed along the Bridge Street alignment. The levee crowns of the two levees are not open for public recreation. However, local landowners likely use them for passive recreation.

3.8.1. No-Action Alternative

Under the No-Action Alternative, a higher risk exists for flood damage to residences, commercial properties, roads, and other infrastructure. If the levee is not repaired and flooding occurs due to failure of the damaged levee, local area traffic could be greatly affected. This could affect commercial traffic, access to private residences, evacuations, and emergency response services. Emergency flood fight efforts would likely be needed to protect lives and property during a flood event.

3.8.2. Repair In-Place Alternatives

The proposed repair would prevent disruption of utilities and public services by protecting residences, commercial properties, roads, and other infrastructure from the potential damages resulting from flooding up to the pre-damaged level of protection. During construction activities, vehicles and equipment associated with the project may have disrupted or may disrupt local traffic due to road closures, merging, turning, and traveling together. Reuse of materials would reduce the number of truck trips to and from the site, and traffic controls would be used as needed to ensure public safety.

Effects to utilities and public services as a result of these repairs were or would be short-term and would not be significant.

3.9. Land Use and Recreation

The levees are located outside of any incorporated towns, but are between the towns of Orting and Carbonado, Washington. All repair sites are zoned as Rural 10 (Pierce County Ord.# 2014 – 72). The county ordinance defines Rural 10 as a rural residential area which is a buffer between urbanized areas and resource land. Rural 10 lands may be added to an urban growth area over time. The Rural Residential zones also allow for commercial and industrial uses related to and dependent upon natural resources and public and commercial recreational and associated uses related to the outdoors, along with rural residential, agricultural, and other resource uses. Private property and residences, along with forested areas are located behind the levees. Passive recreation (Fishing, walking and running, bird watching) occurs in the area.

3.9.1. No-Action Alternative

Implementation of the No-Action Alternative would not be expected to result in any land use changes. Under the No-Action Alternative, a higher risk exists for flood damage to residences, commercial properties, roads, and other infrastructure. Emergency flood fight efforts would likely be needed to protect lives and property during a flood event. These activities and local efforts to maintain the levees would be expected to be sufficient to maintain the existing land use and zoning within the floodplain behind the levee. No effects to recreation would result from the No-Action Alternative.

3.9.2. Repair In-Place and Preferred Alternatives

During construction activities, landowners surrounding the project areas may be disrupted while equipment and personnel access the construction areas via land easements. After completion of the entire project, residences, commercial properties, roads, and other infrastructure would be protected from potential damage resulting from floods up to the pre-damaged level of protection. No effect to land use is expected.
During construction, to ensure public safety, access to the project site would be prohibited during construction. Implementation of the Repair In-Place Alternative would not have a significant effect on recreation at the repair sites or on the river in general.

4.0 CUMULATIVE EFFECTS

CEQ regulations implementing NEPA require that the cumulative effects of a proposed action be assessed (40 CFR Parts 1500-1508). A cumulative effect is an “impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions” (40 CFR § 1508.7). Cumulative impacts can result from individually minor but collectively significant actions taking place (40 CFR § 1508.7). CEQ’s guidance for considering cumulative effects states that NEPA documents “should compare the cumulative effects of multiple actions with appropriate national, regional, state, or community goals to determine whether the total effect is significant” (CEQ 1997).

The Corps has repaired segments of the Alward 1 Levee in 1977, 1990, 1995, 1996, 2007 and 2015. Since 2004 the combined Corps and Pierce County Levee repairs have totaled approximately 9,800 feet. The repairs mainly focused on RM 6.5, 7.5 and 8.0. The repairs would return the levees to their pre-flood level of protection and remove existing vegetation. While mitigation would result in planting of vegetation to partially compensate for removal of the existing riparian vegetation, overall the combined

removal of riparian vegetation has altered the riparian character of this reach in the areas where the main river channel impinges on the levee prism.

Since 2006, the Bridge Street levee has had approximately 1,200 feet of levee repairs. A recent shift in the main channel flow has resulted in more flow in the Carbon River directly along the Bridge Street Levee. As of present the riparian character of the Bridge Street Levee has not significantly changed. However, given the current channel change, it can be anticipated that additional repairs would be needed altering the riparian character of the levee prism, similar to what has occurred at the Alward 1 Levee.

5.0 ENVIRONMENTAL COMPLIANCE

5.1. Federal Statutes

5.1.1. American Indian Religious Freedom Act

The American Indian Religious Freedom Act of 1978 (AIRFA) (42 U.S.C. 1996) establishes protection and preservation of Native Americans' rights of freedom of belief, expression, and exercise of traditional religions. Courts have interpreted AIRFA to mean that public officials must consider Native Americans' interests before undertaking actions that might affect their religious practices, including effect on Traditional Cultural Properties.

The project area falls within the traditional territory of the Puyallup Tribe of Indians, Muckleshoot Indian Tribe, Nisqually Indian Tribe, Squaxin Island Tribe and Yakama Nation. The Corps notified the Puyallup Tribe of Indians, Muckleshoot Indian Tribe, Nisqually Indian Tribe, Squaxin Island Tribe and Yakama Nation on 1 May 2018 and asked the Tribes to identify any concerns and sought information about properties of religious or cultural significance that might be affected by the project. The Tribes did not identify any resources within the Area of Potential Effect.

5.1.2. Bald and Golden Eagle Protection Act

The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d) prohibits the taking, possession or commerce of bald and golden eagles, except under certain circumstances. Amendments in 1972 added to penalties for violations of the act or related regulations.

No take of either bald or golden eagles is likely through any of the actions discussed in this EA since no known nests occur near the project site; however, if nests are observed, the Corps would consult with USFWS and depending on their advice, construction may be halted until the young fledge.

5.1.3. Clean Air Act

The Clean Air Act (CAA) (42 U.S.C. 7401 et seq.), amended in 1977 and 1990, was established "to protect and enhance the quality of the nation's air resources so as to promote public health and welfare and the productive capacity of its population." The CAA authorizes the Environmental Protection Agency to establish the National Ambient Air Quality Standards to protect public health and the environment. The CAA establishes emission standards for stationary sources, volatile organic compound emissions, hazardous air pollutants, and vehicles and other mobile sources. The CAA requires the states to develop implementation plans applicable to particular industrial sources.

This EA analyzes effects on air quality from the proposed action; effects would be minimal, the project is exempt from the conformity requirements of the CAA because it would not exceed the *de minimis* threshold of emissions.

5.1.4. Coastal Zone Management Act

Under the Coastal Zone Management Act (CZMA) of 1972 (16 USCA 1451-1465), Sec. 307(c)(1)(A), "each Federal agency activity within or outside the coastal zone that affects any land or water use or natural resource of the coastal zone shall be carried out in a manner which is consistent to the maximum extent practicable with the enforceable policies of approved state management programs."

Pierce County is considered coastal under the CZMA. The Corps prepared and submitted a consistency determination to Ecology on 26 April 2018 for the Alward 1 and Bridge Street sites. Pursuant to 15 CFR 930.32(b), the Corps has determined that the work is consistent to the maximum extent practicable with the enforceable policies of the State Coastal Zone Management Program. The project is also consistent with the five other enforceable policies of the CZMA. Verification from Ecology of the project's consistency with the enforceable polices of the Washington State Coastal Zone Management Program was received on 14 June 2018 (Appendix D).

5.1.5. Endangered Species Act

The ESA (16 U.S.C. 1531-1544), amended in 1988, establishes a national program for the conservation of threatened and endangered species of fish, wildlife, and plants and the habitat upon which they depend. Section 7(a) of the ESA requires that Federal agencies consult with NMFS and USFWS, as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or to adversely modify or destroy their critical habitats. A Biological Assessment documenting the effects of the proposed repair on listed species was submitted on 27 April 2018 to the Services for formal consultation. Consultation is not yet concluded with NMFS and USFWS.

Flood season is considered to begin in the Puyallup River basin on 1 November and the in-water work window for the project area is 6 August – 15 September in order to reduce impacts to listed species. Due to the urgent nature of completing the emergency actions to protect human life and property and the effort to limit impacts to listed species by working within this window, and because the repair is time-critical in light of the ensuing flood season, the Corps may proceed with construction prior to completion of the consultation with the Services pursuant to the "emergency circumstances" provisions of the ESA consultation regulation. The Corps may then complete ESA consultation after the fact rather than delaying the urgent work in order to complete ESA consultation before construction. The applicable regulation is set out at 50 CFR Section 402.05 (a) and (b) and provides as follows:

> (a) Where emergency circumstances mandate the need to consult in an expedited manner, consultation may be conducted informally through alternative procedures that the Director determines to be consistent with the requirements of section 7(a)-(d) of the Act. This provision applies to situations involving acts of God, disasters, casualties, national defense or security emergencies, etc.
>
> (b) Informal consultation shall be initiated as soon as practicable after the emergency is under control. The Federal agency shall submit information on the nature of the emergency actions(s), the justification for expedited consultation, and the impacts to endangered or threatened species and their habitats. The Service would evaluate such information and issue a biological opinion including the information and recommendations given during emergency consultation.

Though consultation with NNMFS and USFWS is not complete, the Corps has reached an agency determination of species/habitat effect, based on the best factual and technical information available at

the time of decision, and following preliminary coordination with the Services. Section 3.4 summarizes the effect determinations made in the Biological Assessment for each of the species potentially affected by the project. In light of the mitigation measures and BMPs that would be employed, the project is not reasonably expected to generate take of listed species by: (1) creating the likelihood of injury to listed species by significantly disrupting normal behavior patterns including breeding, feeding, or sheltering, or (2) significantly modifying or degrading habitat to the extent that individual members of species would be actually killed or injured by significantly impairing essential behavior patterns including breeding, feeding, or sheltering.

The Corps believes that the levee is a part of the baseline condition of the river in this reach and that the proposed repair actions, with the BMPs/mitigation measures and proposed mitigation, would have minimal impact on listed species. The Corps would commit to fully funding and performing any Reasonable and Prudent Alternatives necessary to avoid the likelihood of jeopardy to listed species or destruction/adverse modification of designated critical habitat, as well as Reasonable and Prudent Measures necessary and appropriate to minimize the impact of Incidental Take, that are described when a Biological Opinion is received from the NMFS and the USFWS. The EA would be reevaluated at the time that consultation is complete. If necessary, this EA would be supplemented with necessary and applicable corresponding modifications to the scope and/or nature of the project, the procedures and practices used to implement the project, and/or the type and extent of compensatory mitigation associated with the project.

5.1.6. Clean Water Act

The Clean Water Act (CWA) is the primary legislative vehicle for Federal water pollution control programs and the basic structure for regulating discharges of pollutants into waters of the United States. The CWA was established to "restore and maintain the chemical, physical, and biological integrity of the nation's waters." The CWA sets goals to eliminate discharges of pollutants into navigable waters, protect fish and wildlife, and prohibit the discharge of toxic pollutants in quantities that could adversely affect the environment.

The Corps does not issue permits for its own civil works activities. Nevertheless, the Corps has accepted responsibility for the compliance of its civil works projects with Section 404, as well as the obligation to seek water quality certification under Section 401. The Corps concludes that the proposed repair is not subject to regulation under Sections 401 and 404 of the CWA. The exemption from the requirement to evaluate the effects of discharges of fill material into waters of the United States under 33 USC 1344(f)(1)(B) applies because all riverward work would be conducted on a currently serviceable structure (i.e. the levee) within the pre-damaged levee footprint and the character, scope, and size of the resulting structure would not change as compared to the original fill design. Therefore, the proposed repair does not require a 404 (b)(1) evaluation.

Section 402 of the CWA would be triggered by construction because the area of disturbance including the staging and disposal areas would be greater than 1 acre. A Storm Water Pollution Prevention Plan would be prepared and an application for a National Pollutant Discharge Elimination System Construction General Permit would be submitted to the Environmental Protection Agency prior to construction.

This EA evaluates possible effects to water quality, primarily with respect to suspended solids, turbidity, and temperature. There are no other water quality effects anticipated.

5.1.7. Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), (16 U.S.C. 1801 et. seq.) requires Federal agencies to consult with NMFS on activities that may adversely affect Essential Fish Habitat (EFH). The objective of an EFH assessment is to determine whether the proposed action(s) "may adversely affect" designated EFH for relevant commercial or Federally-managed fisheries species within the proposed action area. The assessment describes conservation measures proposed to avoid, minimize, or otherwise offset potential adverse effects to designated EFH resulting from the proposed action. Effects on EFH are considered in this EA. The Corps has initiated consultation with NMFS on the effects to EFH in conjunction with consultation under Section 7 of the Endangered Species Act. Consultation under the MSA is ongoing for this this action.

EFH includes those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 U.S.C. 1801 et seq.). In order to qualify as freshwater EFH for Pacific salmon, four major components must exist:

- Spawning and incubation
- Juvenile rearing
- Juvenile migration corridors
- Adult migration corridors and adult holding habitat

Effects of the proposed work on EFH would be essentially identical to those discussed in Section 3.4 above, including temporary turbidity increases and loss of sporadic riparian vegetation. Substrate composition would remain largely unchanged from pre-flood conditions. Short-term water quality changes may occur during construction due to increased turbidity. Overall, this effect is expected to be minimal. Water quantity, depth, velocity, channel gradient, stability, space, access, and passage would be unaffected or returned to pre-flood conditions. Levees artificially create channel stability and reduce floodplain connectivity. The proposed repair would maintain this diminished habitat function on the Carbon River within the Carbon River Valley.

5.1.8. National Environmental Policy Act

NEPA (42 U.S.C. 4321 et seq.) provides a commitment that Federal agencies would consider the environmental effects of their actions. NEPA requires that an Environmental Impact Statement (EIS) be completed in every recommendation or report on proposals for legislation and other major Federal actions significantly affecting the quality of the human environment. Major Federal actions determined not to have a significant effect on the quality of the human environment are evaluated through an EA. NEPA documents must provide detailed information regarding the proposed action and alternatives, the environmental effects of the alternatives, appropriate mitigation measures, and any adverse environmental effects that cannot be avoided if the proposal is implemented. Agencies are required to demonstrate that these factors have been considered by decision makers prior to undertaking actions.

This EA evaluates the environmental effects of the proposed 2018 Alward 1 and Bridge Street levee repairs. The following discussion assesses how the Corps has complied with NEPA requirements.

The Cooperation Agreement (CA) with the local sponsor was signed on 19 April 2018. The Corps' obligations under NEPA must be satisfied to the fullest extent possible prior to implementation of the Federal action of signing the CA. The CA was required to be signed by the Seattle District Commander no later than 20 April 2018 in order to meet solicitation, contracting, and construction schedules. Contracting schedules are constrained by the need to meet the in-water work window of 16 July – 31

August (since updated to 6 August to 15 September in response to coordination during the NEPA process). Meeting the in-water work window is critically important for reduction of impacts to sensitive species (i.e. ESA-listed salmonids and important tribal fisheries). If these dates were not met, the project would have been in jeopardy of delay until the next available work window in summer 2019, leaving the levee in its damaged condition through the upcoming flood season.

The proposed repair is considered an "emergency action" because it is necessary to protect human life and property and because it is critical to the restoration of the pre-flood level of protection prior to the upcoming flood season, which is considered to occur from 1 November – 31 March. Under NEPA, the Corps is required to comply with NEPA to the fullest extent possible (Section 102). The Corps' NEPA regulation regarding "Emergency Actions" does allow for completion of NEPA documentation after the fact in emergency situations. Emergency actions are discussed in 33 CFR 230.8 as follows:

> "Section 230.8 - Emergency actions. In responding to emergency situations to prevent or reduce imminent risk of life, health, property, or severe economic losses, district commanders may proceed without the specific documentation and procedural requirements of other sections of this regulation. District commanders shall consider the probable environmental consequences in determining appropriate emergency actions and when requesting approval to proceed on emergency actions, would describe proposed NEPA documentation or reasons for exclusion from documentation. NEPA documentation should be accomplished prior to initiation of emergency work if time constraints render this practicable. Such documentation may be accomplished after the completion of emergency work, if appropriate. Emergency actions include Flood Control and Coastal Emergencies Activities pursuant to Public Law 84-99, as amended, and projects constructed under sections 3 of the [Rivers and Harbors] Act of 1945 or 14 of the Flood Control Act of 1946 of the Continuing Authorities Program. When possible, emergency actions considered major in scope with potentially significant environmental impacts shall be referred through the division commanders to HQUSACE (CECW-RE) for consultation with CEQ about NEPA arrangements."

Due to the funding timeline, it was not feasible for the Corps to complete all NEPA procedures prior to committing to and initiating the Federal action by signing the CA with Pierce County. The damaging flood event occurred in October 2017 and Pierce County's request for assistance was dated 13 December 2017. Project approval and funding for Alward 1 and Bridge Street was received on 12 March 2018 and 9 March 2018, respectively.

Completion of the entire NEPA documentation prior to signing the CA– while still fulfilling the agency's emergency levee rehabilitation authorities and responsibilities under Public Law 84-99 – was impossible in this instance. Since the arrival of funding, insufficient time was available to identify alternatives, and coordinate, assess, and document the environmental impacts prior to the date on which the signing of the CA was necessary. Therefore, the agency complied with NEPA "to the fullest extent possible" under the circumstances and documented the status of environmental compliance in a memorandum signed by the Seattle District Commander just prior to signature of the CA.

In accordance with NEPA, federal projects are required to disclose potential environmental impacts and provide opportunity for public involvement. A Notice of Preparation for the Alward 1 Levee and Bridge Street Levee Rehabilitation was issued for a public comment period from 7 May 2018 to 9 June 2018. Two comments were received (See Appendix E for the comments and the Corps responses).

This EA has been prepared pursuant to NEPA Sec. 102(C) to disclose the environmental impacts prior to award of construction contracts to perform the Alward 1 and Bridge Street levee repairs. Effects on the quality of the human environment as a result of the proposed project are anticipated to be less than significant. The EA has incorporated any necessary and applicable modifications to the scope and/or nature of the project, any effects to the human environment resulting from these modifications, the procedures and practices used to implement the project, and/or the type and extent of compensatory mitigation associated with the project. Accompanying this EA is a Finding of No Significant Impact.

5.1.9. National Historic Preservation Act

Section 106 of the National Historic Preservation Act requires that a federally assisted or federally permitted project account for the potential effects on sites, districts, buildings, structures, or objects that are included in or eligible for inclusion in the National Register of Historic Places. All project areas have been surveyed, and a finding of No Historic Properties Affected was submitted to the SHPO on 25 May 2018. In a letter dated 29 May 2018, the SHPO concurred with the Corps effects finding, completing consultation.

5.1.10. Treaty Rights

The Federal trust responsibility to Native American Tribes arises from the treaties signed between them. Under Article VI, Clause 2 of the U.S. Constitution, treaties with the Tribes are the supreme law of the land, superior to State laws, and equal to Federal laws. In these treaties, the United States made a set of commitments in exchange for tribal lands, including the promise that the United States would protect the tribe's people. The Supreme Court has held that these commitments create a trust relationship between the United States and each treaty tribe, and impose upon the federal government "moral obligations of the highest responsibility and trust." The scope of the Federal trust responsibility is broad and incumbent upon all Federal agencies. The U.S. government has an obligation to protect tribal land, assets, and resources that it holds in trust for the Tribes, and a responsibility to ensure that its actions do not abrogate Tribal treaty rights.

In the mid-1850s, the United States entered into treaties with many Native American tribes in the Northwest. These treaties guaranteed the signatory tribes the right to "take fish at usual and accustomed grounds and stations . . . in common with all citizens of the territory" [U.S. v. Washington, 384 F. Supp. 312 at 332 (WDWA 1974)]. In U.S. v. Washington, 384 F. Supp. 312 at 343 - 344, the court resolved that the Treaty tribes had the right to take up to 50 percent of the harvestable anadromous fish runs passing through those grounds, as needed to provide them with a moderate standard of living (Fair Share). Over the years, the courts have held that this right comprehends certain subsidiary rights, such as access to their "usual and accustomed" fishing grounds. More than *de minimis* effects to access to usual and accustomed fishing area may violate this treaty right [Northwest Sea Farms v. Wynn, F. Supp. 931 F. Supp. 1515 at 1522 (WDWA 1996)]. In U.S. v. Washington, 759 F.2d 1353 (9th Cir 1985) the court indicated that the obligation to prevent degradation of the fish habitat would be determined on a case-by-case basis. The Ninth Circuit has held that this right encompasses the right to take shellfish [U.S. v. Washington, 135 F.3d 618 (9th Cir 1998)].

The proposed project has been analyzed with respect to its effects on the treaty rights described above. Project information was sent to the Puyallup Tribe of Indians, Muckleshoot Indian Tribe, Nisqually Indian Tribe, Squaxin Island Tribe and Yakama Nation. See Appendix E for received comments and the Corps responses.

With the proposed design, the Corps believes the following:

1) The work would have no impact on access to usual and accustomed fishing and gathering areas;
2) The work, with the proposed mitigation, would not cause the degradation of fish runs in usual and accustomed fishing grounds or with fishing activities or shellfish harvesting and habitat; and The work would not impair the Treaty tribes' ability to meet moderate living needs.

5.2. Executive Orders

5.2.1. Executive Order 11990, Protection of Wetlands

Executive Order 11990 encourages Federal agencies to take actions to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands when undertaking Federal activities and programs. This EA concludes that the project would have no effect on wetlands as none exist within the project area.

5.2.2. 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."

By Corps policy (Engineering Regulation 500-1-1), the provisions of EO 11988 are normally not applicable to the repair of flood control works to the pre-disaster condition, as the repair actions do not directly affect either the modification or occupancy of floodplains, and do not directly or indirectly impact floodplain development. The proposed project does not constitute a major rehabilitation project, require extensive engineering and design, or significantly change the project footprint and therefore is not required to be evaluated for its impact on the floodplain.

5.2.3. Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations

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.

The project does not involve establishing a facility that would discharge pollutants or contaminants, so no human health effects would occur. The levee rehabilitation work would not decrease property values in the area, or socially stigmatize local residents or businesses in any way. No interference with Native American Nations' treaty rights would result from the proposed project. The Corps has determined that no disproportionate effects would occur for minority or low-income populations.

6.0 AGENCIES CONSULTED

The Corps contacted the following entities during the environmental coordination of these projects:

- National Marine Fisheries Service
- U.S. Fish and Wildlife Service
- Environmental Protection Agency
- Puyallup Tribe of Indians
- Muckleshoot Indian Tribe

- Nisqually Indian Tribe
- Squaxin Island Tribe
- Yakama Nation
- Sauk-Suiattle Tribe
- Washington Department of Fish and Wildlife
- Washington Department of Ecology
- Washington State Department of Archaeology and Historic Preservation

Coordination with the above listed agencies and tribes consisted of providing project information at the start of the public comment period, phone conversations, and e-mail exchanges. Topics discussed during this coordination include project design, project construction timing, effects to listed species, and other environmental concerns.

A Notice of Preparation for the Alward 1 and Bridge Street Levee Rehabilitation Projects was issued for a public comment period from 7 May 2018 to 9 June 2018. Two comments were received. See Appendix E for comments and the Corps responses.

7.0 CONCLUSION

In light of the minor expected effects and the mitigation actions that are included, the Repair in-Place Alternative for the 2018 Carbon River Alward 1 and Bridge Street Levee Rehabilitation would not generate significant impacts on the quality of the human environment, and thus the preparation of an Environmental Impact Statement is not required.

8.0 REFERENCES

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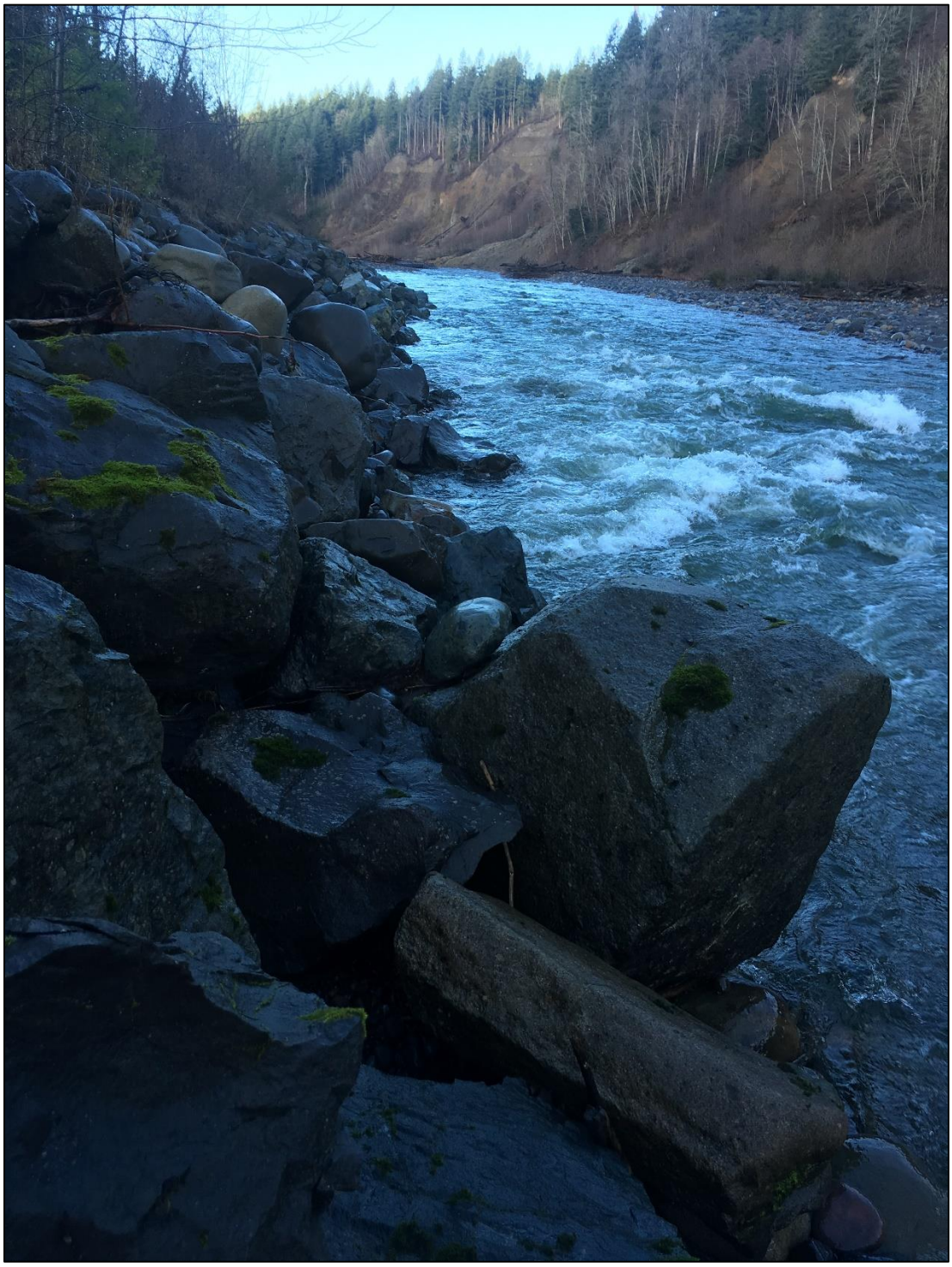


Photo 1. Alward 1 Site 1, damage to the lower slope and toe.

Photo 2. Alward 1 Site 2, missing riprap and damage to the lower slope and toe.

Photo 3. Alward 1 Site 3, missing riprap and damage to the slope and toe.

Photo 4. Bridge Street Site 1, looking downstream the levee slope is a certical face at the waterline.

Photo 5. Bridge Street Site 2, looking downstream the levee slope is a vertical cut.

Photo 6. Bridge Street, levee measurements at Bridge Street show approximately 7 feet high repair is required.

Photo 7. Bridge Street Site 2, looking downstream at the repair site.

US Army Corps of Engineers®
Seattle District

FY18 LEVEE REHABILITATION

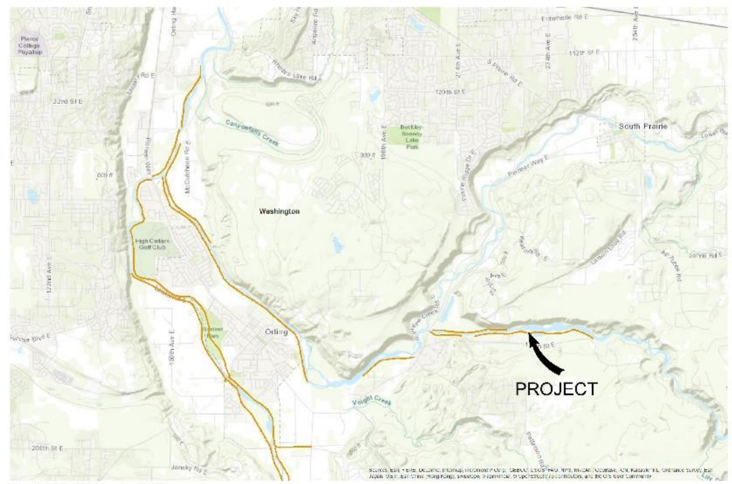
CARBON RIVER ALWARD SEGMENT NO. 1 LEVEE

CAR-01-18

PIERCE COUNTY, WASHINGTON

SHEET ID	TITLE
	GENERAL
G-001	TITLE, LOCATION AND VICINITY MAPS
	CIVIL
C-100	SITE LOCATION, ACCESS & STAGING
C-101	SITE PLANS AND STAGING AREAS
C-301	TYPICAL SITE SECTION

PROJECT VICINITY MAP
NTS



SAFETY PAYS

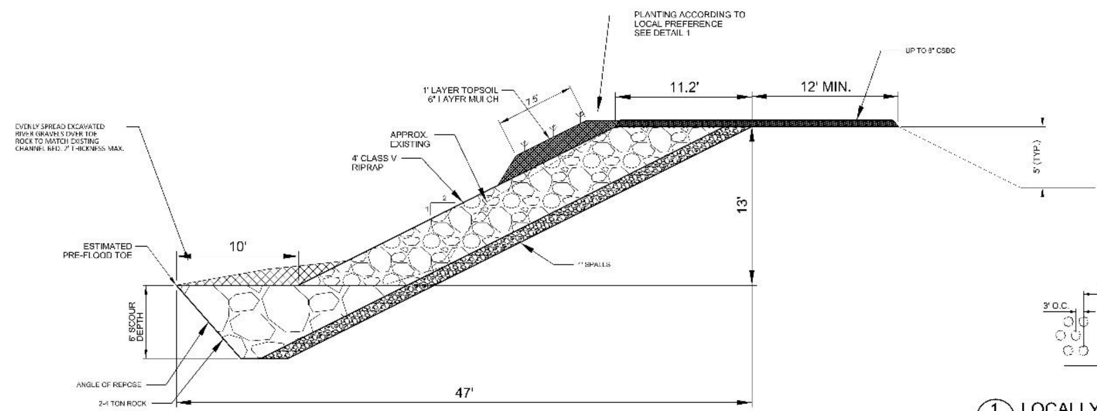
PROJECT LOCATION MAP
NTS

IF SHEET MEASURES LESS THAN 22" X 34" IT IS A REDUCED PRINT. REDUCE SCALE ACCORDINGLY.

US Army Corps of Engineers Seattle District
Date: 26 MARCH 2018
File No.: E-6-7-39
TITLE, LOCATION AND VICINITY MAPS
SHEET IDENTIFICATION
G-001

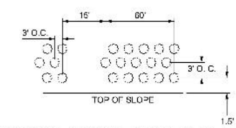

STAGING AREAS
SITE 2
SITE 3
SITE 1
FLOW
176TH ST. SE
HIGHWAY 162
TO ORTING, WA
LEGEND
ACCESS & STAGING LIMITS
LEVEE CENTERLINE
REPAIR AREA
STATION
1 C-100 SCALE: 1" = 600'
SITE LOCATION, ACCESS & STAGING
FLOW
10+00
18+00
23+50
35+00
38+50
SITE 3
STAGING AREAS
2 C-100 SCALE: 1" = 130'
SITE ACCESS & STAGING
US Army Corps of Engineers
SITE LOCATION, ACCESS & STAGING
SHEET IDENTIFICATION
C-100


LEGEND
ACCESS LIMITS
LEVEE CENTERLINE
STAGING AREA
REPAIR AREA
STATION
NOTES:
1. HORIZONTAL DATUM IS WASHINGTON STATE PLANE COORDINATE SYSTEM SOUTH ZONE NAD 83.
2. VERTICAL DATUM BASED ON NAVD 1988.
3. REPAIR ANY ACCESS ROAD AND STAGING DAMAGE WITH UP TO A 6" LAYER OF CSBC.
4. SEE SHEET C 301 FOR PLANTING AND SITE FINISHING DETAILS.
CARBON RIVER
FLOW
SITE 3
ACCESS TO 177TH ST. E
SEE C-100
TO SITES 1 & 2
177TH ST. E
STAGING AREA
1 SITE 3 (180 LF)
SCALE: 1" = 60'
SITE 2
CARBON RIVER
FLOW
SITE 1
ACCESS TO SITE 3
AND STAGING AREAS
TO 177TH ST. E
2 SITE 1 (115 LF) AND SITE 2 (115 LF)
SCALE: 1" = 60'
US Army Corps of Engineers
SITE PLAN VIEWS
SHEET IDENTIFICATION
C-101



A TYPICAL SITE SECTION - ALL SITES

C-301 SCALE: 1" = 4'



1 LOCALLY PREFERRED PLANTING PLAN

C-301 NTS

NOTES:

1. CONSTRUCTION TEAM SHALL BE RESPONSIBLE FOR LOCATING UNDERGROUND AND OVERHEAD UTILITIES AS APPLICABLE BEFORE BEGINNING WORK.
2. QUARRY SPALLS SHALL CONFORM TO GRADATION IN TABLE 1 AND SHALL CONSIST OF CLEAN, ANGULAR, SCREENED, CRUSHED ROCK.
3. CLASS V RIPRAP ROCK SHALL CONFORM TO TABLE 2 AND BE HARD, SOUND, AND DURABLE MATERIAL FREE FROM SEAMS, CRACKS, AND OTHER DEFECTS TENDING TO LEAD TO PREMATURE WEATHERING.
4. 2 - 4 TON STONE SHALL COMFORM TO TABLE 4.
5. CRUSHED SURFACING BASE COURSE (CSBC) WILL BE USED FOR REPAIRING DISTURBED PORTIONS OF THE CROWN AND ACCESS ROADS AND SHALL CONFORM TO TABLE 3. CSBC SHALL BE 100% ANGULAR WITH ALL SIDES FRACTURED.
6. CSBC QUANTITIES INCLUDE REPAIR SITES (175 CY) & ACCESS ROAD REPAIR (1800 CY).
7. EXISTING RIPRAP MAY BE SALVAGED FOR REUSE IN THIS REPAIR. SALVAGED ROCK SHALL BE COMPETENT AND FREE OF CRACKING AND WEATHERING PER THE CMP.
8. TOPSOIL SHALL CONFORM TO ASTM D5268, AS SHOWN IN THE DESIGN DOCUMENTATION REPORT. MULCH SHALL FOLLOW GUIDANCE IN THE CMP.
9. LIMIT CONSTRUCTION ACTIVITIES TO WORK AREA SHOWN EXCEPT WHEN REPAIRING LEVEE CROWN AND ACCESS ROADS.
10. REFER TO THE CMP FOR BEST MANAGEMENT PRACTICES AND ENVIRONMENTAL CONSIDERATIONS TO USE BEFORE, DURING, AND AFTER CONSTRUCTION.
11. PLANTINGS SHALL CONSISTS OF AN EVEN MIXTURE OF SNOWBERRY, STIKA WILLOW, PACIFIC WILLOW, & VINE MAPLE. EQUIVILANT SUBSTITUTIONS WILL BE ALLOWED.
12. CONSTRUCTION TEAM SHALL PRESERVE VEGETATION AT SITE 3 AS PRACTICABLE.

REPAIR STEPS

1. EXCAVATE SLOUGHED MATERIAL FROM TOE OF SLOPE, REMOVE EXISTING RIPRAP, AND RETAIN AS PRACTICABLE.
2. DIG TOE TRENCH, THEN INSTALL SPALL LAYER AND 2 - 4 TON STONE AS INDICATED.
3. CONSTRUCT SPALL LAYER AND CLASS V RIPRAP BLANKET TO TOP OF SLOPE.
4. PLACE SPOIL MATERIALS FROM TOE EXCAVATION OVER THE BURIED TOE AS SLOPE ARMOR IS INSTALLED. FINAL GRADE SHALL MATCH THE EXISTING CHANNEL.
5. MATCH UPSTREAM AND DOWNSTREAM ENDS OF THE REPAIR TO MAKE A SMOOTH TRANSITION TO EXISTING SLOPE AND ELEVATION.
6. PROVIDE 12" OF TOPSOIL AND 6" OF MULCH TO THE TOP OF RIPRAP DOWN THE SLOPE FOR 7.5' (SLOPE LENGTH).
7. RESTORE CROWN AND OTHER DAMAGED ACCESS AREAS WITH CSBC.
8. HYDROSEED EXPOSED GROUND WITH NATIVE SPECIES. DO NOT HYDROSEED TOPSOIL.
9. PLANTINGS WILL OCCUR IN LATE FEB/EARLY MARCH ACCORDING TO THE PLANTING PLAN.

TABLE 1. QUARRY SPALL GRADATION

SIEVE SIZE	PERCENT PASSING
8"	100
4"	0

TABLE 2. CLASS V RIPRAP GRADATION

100% SMALLER THAN	1,800 LB (27")
50% SIZE	750 LB (20")
90% LARGER THAN	350 LB (16")
10% RANGE	25-350 LB (6"-16")

TABLE 3. CSBC GRADATION

SIEVE SIZE	% PASSING BY WEIGHT
1.25"	100
1"	80-100
5/8"	50-80
NO. 4	25-45
NO. 40	3-18
NO. 200	7.5 MAX

TABLE 4. 2 - 4 TON STONE

100% SMALLER THAN	8,000 LB
100% LARGER THAN	4,000 LB

TABLE 5. EARTHWORK QUANTITIES

MATERIAL	VOL (CY)
CLASS V RIPRAP	1400
QUARRY SPALLS	690
TOPSOIL	250
2 - 4 TON STONE	1000
CSBC	1975
PLANTINGS	85
MULCH	125

US Army Corps of Engineers

TYPICAL SITE SECTION

SHEET IDENTIFICATION

C-301

US Army Corps
of Engineers ®
Seattle District

FY18 P2-338544 BRID
LEVEE REHABILITATION CARBON RIVER BRIDGE STREET LEVEE
CAR-02-18

PIERCE COUNTY, WASHINGTON

PROJECT VICINITY MAP
NTS

PROJECT LOCATION MAP
NTS

SAFETY PAYS

IF SHEET MEASURES LESS THAN 22" X 34" IT IS
A REDUCED PRINT. REDUCE SCALE ACCORDINGLY.

US Army Corps of Engineers Seattle District

Date: 16 APRIL 2018
Solicitation No.: -
File No.: E-6-7-40

Recommended by: GUY L. GREEN, P.E. 04/06/18 Chief, Design Branch Date
Approved by: JoANN T. WALLS, P.E. 04/06/18 Chief, Engineering Div. Date

Submitted by: DARYL S. DOWNING 04/06/18 Project Manager Date
Reviewed by: MICHAEL GONIA, P.E. 04/06/18 Levee Safety Program Manager Date

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
SEATTLE, WASHINGTON
Prepared by: KIMBALL L. OHSIEK 04/06/18 Chief, Soils Section Date

FY18 P2-338544 BRID
LEVEE REHABILITATION CARBON RIVER BRIDGE STREET LEVEE
CAR-02-18
PIERCE COUNTY, WASHINGTON
TITLE: LOCATION AND VICINITY MAPS

SHEET IDENTIFICATION
G-001

1 BRIDGE STREET SITE ACCESS PLAN
1"=200'

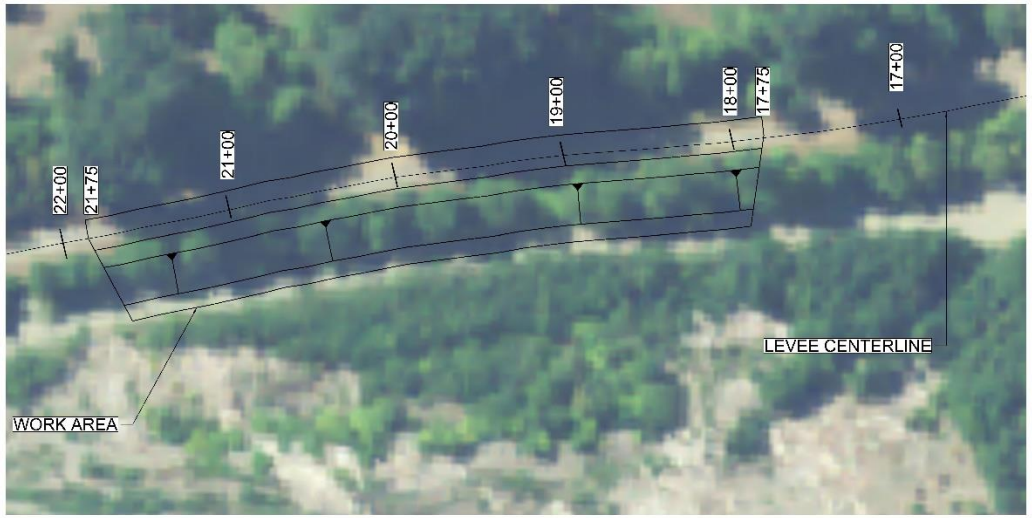
NOTES:

1.SITE ACCESS FROM BRIDGE STREET OR FOOTHILLS TRAIL. LOOP ROUTE OR TURN AROUND IS PERMITTED.

US Army Corps of Engineers

SITE ACCESS PLAN

SHEET IDENTIFICATION
C-100



1 BRIDGE STREET SITE 1 PLAN (400 LF)
1" = 30'

1 BRIDGE STREET SITE 2 PLAN (225 LF)
1"= 30'

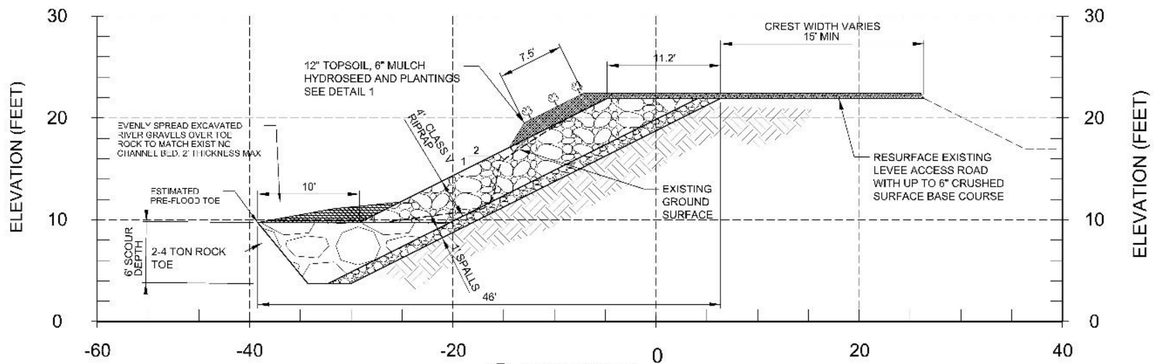
NOTES:

1. HORIZONTAL DATUM IS WASHINGTON STATE PLANE COORDINATE SYSTEM SOUTH ZONE NAD83.
2. VERTICAL DATUM BASED ON NAVD88.
3. LEVEE STATION NUMBERS WERE TAKEN FROM THE NATIONAL LEVEE DATABASE.

US Army Corps of Engineers

BRIDGE STREET LEVEE REPAIR
OVERALL SITE PLAN

SHEET IDENTIFICATION
C-101



A TYPICAL SECTION
1" = 5'

NOTES:

1. CONSTRUCTION TEAM SHALL BE RESPONSIBLE FOR LOCATING UNDERGROUND AND OVERHEAD UTILITIES AS APPLICABLE BEFORE BEGINNING WORK.
2. QUARRY SPALLS SHALL CONFORM TO GRADATION IN TABLE 1 AND SHALL CONSIST OF CLEAN, ANGULAR, SCREENED, CRUSHED ROCK.
3. CLASS V RIPRAP ROCK SHALL CONFORM TO TABLE 2 AND BE HARD, SOUND, AND DURABLE MATERIAL FREE FROM SEAMS, CRACKS, AND OTHER DEFECTS TENDING TO LEAD TO PREMATURE WEATHERING.
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11. PLANTINGS SHALL CONSISTS OF AN EVEN MIXTURE OF SNOWBERRY. STIKA WILLOW, PACIFIC WILLOW, & VINE MAPLE. EQUIVALENT SUBSTITUTIONS WILL BE ALLOWED.

TABLE 1. QUARRY SPALL GRADATION

SIEVE SIZE	PERCENT PASSING
8"	100
4"	0

TABLE 2. CLASS V RIPRAP GRADATION

100% SMALLER THAN	1,800 LB (27")
50% SIZE	750 LB (20")
90% LARGER THAN	350 LB (16")
10% RANGE	25-350 LB (6"-16")

TABLE 3. CSBC GRADATION

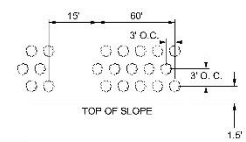
SIEVE SIZE	% PASSING BY WEIGHT
1.25"	100
1"	80-100
5/8"	50-80
NO. 4	25-45
NO. 40	3-18
NO. 200	7.5 MAX

TABLE 4. 2 - 4 TON STONE

100% SMALLER THAN	8,000 LB
100% LARGER THAN	4,000 LB

TABLE 5. EARTHWORK QUANTITIES

MATERIAL	VOL (CY)
CLASS V RIPRAP	2000
QUARRY SPALLS	1140
TOPSOIL	320
2 - 4 TON STONE	1540
CSBC	2000
PLANTINGS	130
MULCH	160



1 PLANTING DETAIL NOT TO SCALE

REPAIR STEPS

1. EXCAVATE SLOUGHED MATERIAL FROM TOE OF SLOPE, REMOVE EXISTING RIPRAP, AND RETAIN AS PRACTICABLE.
2. DIG TOE TRENCH, THEN INSTALL SPALL LAYER AND 2 - 4 TON STONE AS INDICATED.
3. CONSTRUCT SPALL LAYER AND CLASS V RIPRAP BLANKET TO TOP OF SLOPE.
4. PLACE SPOIL MATERIALS FROM TOE EXCAVATION OVER THE BURIED TOE AS SLOPE ARMOR IS INSTALLED. FINAL GRADE SHALL MATCH THE EXISTING CHANNEL.
5. MATCH UPSTREAM AND DOWNSTREAM ENDS OF THE REPAIR TO MAKE A SMOOTH TRANSITION TO EXISTING SLOPE AND ELEVATION.
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7. RESTORE CROWN AND OTHER DAMAGED ACCESS AREAS WITH CSBC.
8. HYDROSEED EXPOSED GROUND WITH NATIVE SPECIES. DO NOT HYDROSEED TOPSOIL.
9. PLANTINGS WILL OCCUR IN LATE FEB/EARLY MARCH ACCORDING TO THE PLANTING PLAN.

US Army Corps of Engineers

TYPICAL SECTION

SHEET IDENTIFICATION
C-301

Monitoring would occur during in-water sediment-generating activities. Each new type of sediment generating activity would be monitored. If monitoring shows that a particular type of activity is not causing exceedances, then that type of activity would not be monitored at each new site unless the existing conditions at the sites are notably different. For example, in-water buried toe construction would occur at multiple sites. This activity would be monitored at the first three sites where it occurs. If no exceedances occur, or if an exceedance is shown to be remedied by a modified construction method that can be repeated at all future sites, then this sediment-generating activity would not be further monitored. Sediment-generating activities expected to occur during construction include, but are not limited to the following:

- In-water toe or bank excavation,
- Rock placement for toe rock, and
- Rock placement for bank construction.

Monitoring would consist of the following procedures:

- Sampling would be completed on a Hach Turbidimeter, or equivalent, calibrated weekly at a minimum.
- Turbidity would be monitored 100 ft upstream (background level) and 300 ft downstream of the site (point of compliance, per WAC 173-201A-200), as safety permits, twice in the first hour of the work day and then once every 3 hours, if no exceedance is noted, until the end of the work day.
- Maximum turbidity levels would meet WAC 173-201A-210. Turbidity must not exceed 5 NTU over background when the background is 50 NTU or less; or a 10 percent increase in turbidity when the background turbidity is more than 50 NTU.
- If, after a minimum of one full day, the monitoring results verify that turbidity levels from a certain sediment-generating activity is remaining consistent with the above values, turbidity monitoring may be reduced or stopped for that activity. Monitoring would be resumed during new sediment-generating activities or if precipitation events or any other changes would result in higher or lower project-related turbidity.
- Visual monitoring for turbidity would continue throughout construction. Any noticeable plume would trigger re-commencement of physical monitoring to ensure compliance.
- If turbidity levels exceed the above values, activities would cease and actions would be taken to avoid or reduce turbidity levels. After an exceedance, the Corps would assess the site BMPs and update or improve BMPs to prevent recurrence. When construction recommences, downstream monitoring would occur every fifteen minutes, through construction until readings show three consecutive measurements below the thresholds. Then the Corps would continue monitoring as normal.
    - Ecology would be notified of any exceedance within 24 hours, per the water quality certification.
- The Corps would complete a final monitoring report after construction

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PO Box 47775 • Olympia, Washington 98504-7775 • (360) 407-6300
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

June 14, 2018

U.S. Army Corps of Engineers, Seattle District
Planning, Environmental and Cultural Resources Branch
ATTN: Evan Lewis, Deputy Chief
PO Box 3755
Seattle, WA 98124-3755

RE: Coastal Zone Consistency for 2018 Rehabilitation of the Alward, Bridge Street, and Leach Road Levees, Carbon and Puyallup Rivers, Pierce County, Washington

Dear Mr. Lewis:

On April 30, 2018, you submitted a Certification of Consistency with the Washington State Coastal Zone Management Program (CZMP) for the 2018 Rehabilitation of the Alward, Bridge Street, and Leach Road Levees. The proposed federal activity includes the repair of 1,325 feet of riverward slope and toe at six discontinuous locations on three levees along the left bank of the Carbon and Puyallup Rivers, located near Orting, Pierce County, Washington.

Pursuant to Section 307(c)(3) of the Coastal Zone Management Act of 1972 as amended, Ecology concurs with your determination that the proposed work is consistent with Washington's CZMP.

If you have any questions regarding Ecology's consistency determination please contact Lori Kingsbury at (360) 407-6926.

YOUR RIGHT TO APPEAL

You have a right to appeal this decision to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this consistency determination. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do all of the following within 30 days of the date of receipt of this consistency determination:

- File your appeal and a copy of this consistency determination with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

- Serve a copy of your appeal and this consistency determination on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.

You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

ADDRESS AND LOCATION INFORMATION

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503 **Pollution Control Hearings Board** 1111 Israel RD SW, Suite 301 Tumwater, WA 98501	**Department of Ecology** Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608 **Pollution Control Hearings Board** PO Box 40903 Olympia, WA 98504-0903

Sincerely,

Perry J Lund, Section Manager
Shorelands and Environmental Assistance Program
Southwest Regional Office

By Certified Mail 9489 0090 0027 6019 1525 14

cc: Mike Scuderi, U.S. Army Corps of Engineers

e-cc: ecyrefedpermits@ecy.wa.gov
Loree' Randall, Ecology, HQ-SEA
Zach Meyer, Ecology, SW-SEA

APPENDIX E: PUBLIC COMMENTS

A

The Puyallup Tribe Fisheries Department wishes to provide the following comments concerning proposed repairs at the above three Notice of Repair locations. Although all three locations are relatively small in terms of total length, our primary concern relates to cumulative vegetation loss and removal of limited riparian thermal protection. Mitigation for lost thermal protection and shading has never been addressed to any satisfaction as replanting a levee face will not provide similar function for decades. With summer time stream temperatures becoming more of an issue throughout the Puyallup drainage, every precaution should be exercised to protect in-place shading elements and allow for the maturation of existing vegetation. Construction of LWD jams can provide added cover and important habitat elements that are currently lacking. However, debris jams might have limited or no shading value and therefore not provide mitigation for project specific impacts.

B

It's also important to remember that the concept of weighted toes or buried toes was never a component of the original construction (David Lewis, personal communication, June 11, 2018). Mr. Lewis also points out the fact that the original levees along the upper Puyallup and Carbon Rivers were not engineered structures to start with which is why no drawings exist. Any engineered or weighted toe that might be encountered is a reflection of more recent levee work by either the Army Corps or Pierce County.

C

As Dr. Fox pointed out in his comments, it's imperative to maintain the existing/original levee contour and that any new work not provide any encroachment or intrusion into the channel. We feel this request is only common sense as further confinement will only increase flow velocity leading to additional erosion and/or scour downstream. We also ask that larger rock size/class material is utilized so we're not constantly returning to the same location and performing similar repairs. Application of larger size material should also help reduce the introduction of orphan rip-rap material into the channel that is so prevalent throughout managed reaches. The need for repetitive repairs along any reach should trigger a review of causal mechanisms with the goal of attaining a long term solution.

D

Lastly, we are concluding the largest winter-run steelhead (ESA listed) escapement since 1992 and redds have been identified in each of the project reach areas. To safely avoid any mechanical and/or vibration related impacts to developing embryos and alevins, work should be delayed until at least August to allow for emergence.

Thanks for your consideration of these comments.

Russ Ladley
Resource Protection Manager
Puyallup Tribal Fisheries

A) The Corps integrates vegetation into repair projects as a conservation measure to minimize impacts to endangered and threatened listed species, while also considering levee structural integrity, as well as accessibility and inspectability. For the proposed repairs, the Corps is integrating plantings along the top 7.5 feet of the upper riverward slope. Additionally, the Corps is placing all large woody debris generated from the repairs along the levee. Anchored structures would require additional riprap likely result in encroachment into the river, which the Corps wants to avoid. For more information see Section 2.5 of the EA.

B) The Corps has design and as-built documentation from a levee repair to the Leach Road Levee in 1977 which clearly shows a buried toe as part of the cross-section. As-built documentation of other past levee repairs in the Puyallup Basin going back several decades also show a buried or weighted toe in most instances.

C) The Corps would match the undamaged upstream and downstream extents of the levee so that no encroachment into the river occurs.

A) The Corps would conduct all in-water work activities between 6 August and 15 September. This would avoid and/or reduce mechanical and vibrational impacts. However, work out of the water would still occur prior to August so restoration of the pre-flood level of protection can be completed prior to the upcoming flood season

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June 14, 2018

Mr. Michael Scuderi
Project Biologist
Planning, Environmental and Cultural Resources Branch
U.S. Army Corps of Engineers, Seattle District
P.O. Box 3755
Seattle, WA 98124-3755

RE: Alward Road and Bridge Street Non-Federal Levee Rehabilitation, Reference: PMP-18-14, Notice of Environmental Assessment Preparation under NEPA

Dear Mr. Scuderi:

Our Habitat Program staff have reviewed the Corps of Engineers Notice of Preparation (NOP) for an Environmental Assessment under NEPA for the proposed levee repair projects along Alward Road and Bridge Street near Orting, WA. We offer the following comments and recommendations in the interest of protecting and restoring the Tribe's treaty-protected fisheries resources.

River Encroachment

We are concerned that these projects will result levee repairs that extend further water-ward into the Carbon River causing further hydraulic constrictions and impacts to salmon habitat. Based on our observations, we have found other levee repairs where the levee profile and associated rock extends further into the channel than the original footprint. In our comments on the Pierce County SWIF (attached), we raised this issue and quantified the extent to which levee repairs encroach into the channel, which averaged 2,245 ft^2 per project in this assessment. Pierce County staff have claimed that this extended fill into the channel was to restore the original levee footprint. We disagree. If this were the case, the repair profile should match the adjacent, undamaged levee profiles. From our assessments, it is clear that the repair profile often pushes out into the channel further than the adjacent existing profiles.

The basis for these concerns is the details on Sheet 301the project drawings. We unaware of any existing as-built levee figures to establish the original levee footprint, and there are no horizontal controls established for reference to show that the proposed repair will not exceed the original footprint. Additionally, the existing levee footprint of these facilities did not include a buried toe or launchable rock; however, the proposed levee proposes to construct these features into the repair. As such, this will require more invasive excavation into the channel bed beyond the existing levee profile. This more rigorous approach to repairs will compromise the channel in its

ability to deform for pool formation, substrate composition, and other fish habitat features. For example, the proposed repairs will excavate and fill rock into the buried toe rock in an area of the channel where a steelhead redd was observed during our April 20, 2018 field visit. Due to the reworking of the bed, the coarseness of the new material that will be placed, and the simplification of bed features typical of levee repair work, there is little certainty that the habitat here will support further spawning activity in the future. The project needs to ensure that these repairs do not extend further out into the channel than the adjacent, undamaged levee, and the channel bed is not disturbed beyond the existing footprint to avoid further adverse impacts to the Carbon River and salmon habitat forming processes.

Riparian Impacts

We are also concerned that this levee repair will severely compromise riparian vegetation along the Carbon River. Based on our observations of levee repairs in this watershed, they have essentially eliminated most of the established riparian vegetation, reducing necessary functions to support salmon habitat and setting the recovery clock to zero. The removal of trees for these repairs impacted shade needed to reduce water temperatures, wood recruitment, and other riparian functions that create and sustain salmon habitat. Shade reduction is a significant concern for these projects due to their relative southerly aspects relative to solar inputs to the river. The projects should avoid tree removal and shade reduction by protecting the existing largest trees to fullest extent possible. Options may include creating equipment operation openings designed around the largest trees; conducting repairs from the channel if the bed is dry during operations; or other means to operate from the channel with minimal tree removal. If trees cannot be retained through the SWIF variance, then mitigation should be proposed.

Setback Alternatives

Many of these concerns could be addressed by doing levee setback projects that avoid or minimizes impacts in the long term. These alternatives will take more planning to implement and should occur concurrently with the proposed levee maintenance. A levee setback should be considered in light of estimated costs and benefits with the repair. For example, in 2016, Pierce Co. Public Works staff in 2016 estimated the cost of reconstructing the Alward Road setback levee at 177th St E. at nearly $15 million. However, the assessed value of the properties behind 177th St. E levee to the valley wall was less than $10 million. The additional acquisition of these properties would save more than $5 million, provide better habitat for salmon, and require no levee construction or long-term maintenance. The valley wall is a natural feature that will negate the need for and costs of rebuilding a damaged levee or building a new setback levee. Setting the levee to the valley wall also provides the best functional means to restore floodplain and riparian processes for salmon, and provide flood storage that will help reduce flooding downstream. Maintaining the levee at its current location reduces the incentive to relocate homes, roads, utilities, etc. out of harm's way from behind the levee, and prolongs the much needed restoration of floodplain habitat that has compromised salmon production in the Puyallup/Carbon valley. Additionally, the levee at Bridge Street could be setback to the higher terrace to the west where the levee would not need to be as large and costly to build and maintain, since this natural feature already provides some level of flood protection. It is also important to note that both these sections of the river are within the Pierce County Floodplain, the FEMA DFIRMS, and the Severe Channel Migration zone (as mapped by the 2012 Pierce Co. Flood Hazard Management Plan) (Figures 1 and 2), where the levee will likely continue to have maintenance issues that

cause further impacts to salmon habitat by restricting floodplain processes and natural channel migration.

Mitigation

The potential adverse impacts to salmon habitat outlined above have not been fully assessed, nor has mitigation been proposed for unavoidable impacts for this levee repair project. The Corps needs to address these deficiencies and create a project that avoids, minimizes, and fully mitigates for unavoidable impacts in coordination with the MITFD.

We appreciate the opportunity to provide comments. If you have further questions, please contact me at 253-876-3121 or at martin.fox@muckleshoot.nsn.us.

Sincerely,

Martin J. Fox, Ph.D.
Fisheries Biologist

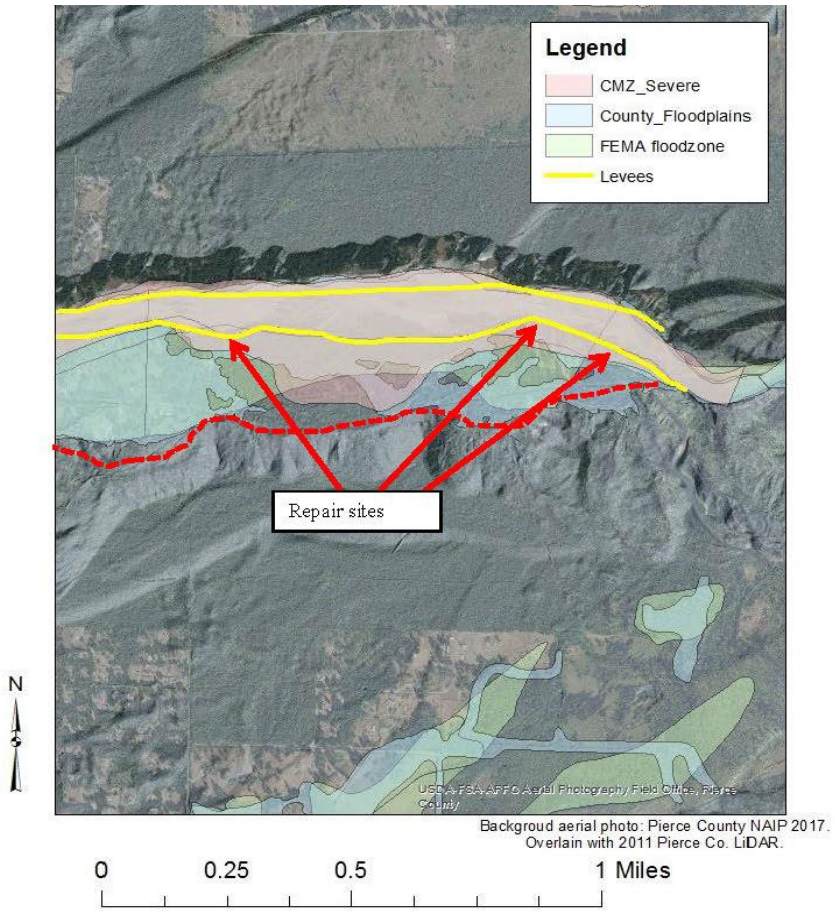

Figure 1. The Alward Rd project site relative to flood and channel migration hazards. A long-range levee setback opportunity could extend from the current levee south to the valley wall, as delineated by the red dashed line, where no new levee would be necessary due to the use of the valley wall as the extent of river process.

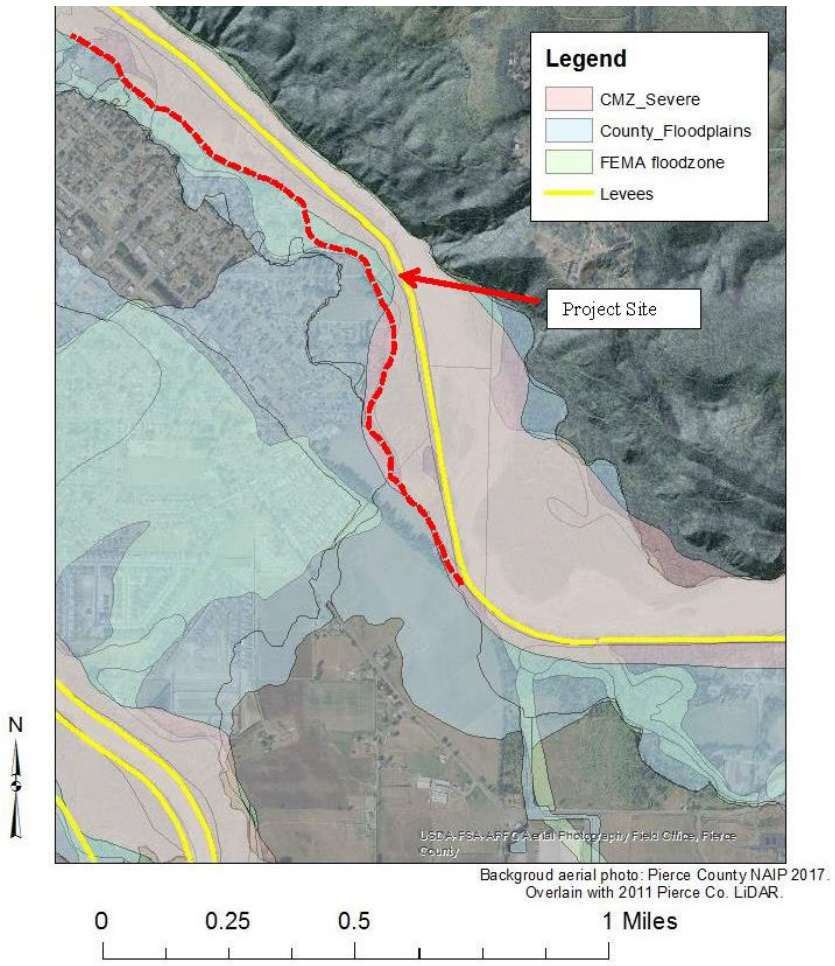

Figure 2. The Bridge St. project site relative to flood and channel migration hazards. A long-range levee setback opportunity could be constructed to the west on a higher geomorphic terrace (approx. as delineated by the red dashed line), minimizing the size of the levee, improving salmon habitat, and increasing flood storage.

River Encroachment

The Corps plans to match the undamaged upstream and downstream extents of the levees so that no encroachment into the river occurs. The Corps has design and as-built documentation from both levees from repairs in the 1970s which clearly show the extent of the repair would be within the levees footprint.

Riparian Impacts

The Corps integrates vegetation into repair projects as a conservation measure to minimize impacts to endangered and threatened listed species, while also considering levee structural integrity, as well as accessibility and inspectability. For the proposed repairs, the Corps is integrating plantings along the top 7.5 feet of the upper riverward slope to offset removal of riparian vegetation.

Setback Alternative

While Pierce County has been acquiring the necessary parcels for an Alward 1 setback, not all the real estate is in Pierce County's ownership and the time and cost involved in obtaining the necessary lands would be an additional expense and may endanger the Corps' ability to repair the levee prior to the next

flood season. The Bridge Street Levee Setback Alternative has also been identified in the Pierce County Levee Setback study but at this time the necessary property to implement the setback alternative has not been acquired by the County. The time and cost involved in obtaining the necessary lands would be an additional expense and may endanger the Corps' ability to repair the levee prior to the next flood season.

Mitigation

The Corps has integrated features into the repair to offset impacts to salmonids, such as plantings and in-water work windows. The Corps would commit to fully funding and performing any Reasonable and Prudent Alternatives necessary to avoid the likelihood of jeopardy to listed species or destruction/adverse modification of designated critical habitat, as well as Reasonable and Prudent Measures necessary and appropriate to minimize the impact of Incidental Take, that are described when a Biological Opinion is received from the NMFS and the USFWS.