AMENDED FINDING OF NO SIGNIFICANT IMPACT (FONSI)
AND
CLEAN WATER ACT SECTION 404 STATEMENT OF FINDINGS
YAKIMA RIGHT BANK FEDERAL LEVEE AND YAKIMA WASTEWATER TREATMENT PLANT LEVEE REPAIR
YAKIMA, WASHINGTON

The U.S. Army Corps of Engineers, Seattle District (Corps) has conducted an environmental analysis in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended. The December 2021 Final Environmental Assessment (EA) for the Yakima Right Bank Federal (RB) and Yakima Wastewater Treatment Plant (WWTP) Levees addressed flood damage to these levees in the city of Yakima, Washington. A FONSI for the Federal action was signed on January 2, 2022. At that time, Section 7 Endangered Species Act (ESA) consultation was ongoing with the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS). On January 12, 2022 the Corps received a Biological Opinion (BO) from NMFS. The Corps reviewed the BO and completed a Supplemental Information Report (SIR) documenting the status of ESA consultation with the NMFS on January 19, 2022. The Final EA and SIR, incorporated herein by reference, evaluates various alternatives to restore flood protection to the damaged levee. One major Federal action required NEPA compliance and analysis, which is summarized below.

Proposed Action: The selected alternative is the Repair In-Kind Alternative. This alternative will repair the Yakima RB and WWTP Levees within the horizontal and vertical profiles as they were designed and as they existed when first built. All riverward repairs will remain within the pre-damage levee footprint, i.e., the levee will not encroach farther into the river. Repair activities for all sites under this alternative are summarized in section 2.4 of the Final EA and are hereby incorporated by reference.

Alternatives: In addition to a "no action" alternative, three other alternatives were evaluated: a Nonstructural, a Levee Setback, and the Repair In-Kind. Of these, the potential effects were evaluated for the No Action and Repair In-Kind Alternatives. See section 2 of the Final EA for alternative formulation and selection. A summary assessment of the potential effects of the selected plan are listed in Table 1.

Table 1. Summary of Potential Effects of the Proposed Action.

	Insignificant effects	Insignificant effects as a result of mitigation	Resource unaffected by action
Vegetation	☐	☒	☐
Navigation	☐	☐	☒
Water Resources	☐	☒	☐
Geology and Soils	☐	☐	☒
Wetlands	☐	☐	☒

	Insignificant effects	Insignificant effects as a result of mitigation	Resource unaffected by action
Threatened and Endangered Species	☐	☒	☐
Fish and Wildlife	☐	☒	☐
Cultural Resources	☒	☐	☐
Hazardous, Toxic, and Radiological Waste	☐	☐	☒
Air Quality and Noise	☒	☐	☐
Land Use, Utilities, and Infrastructure	☒	☐	☐
Recreation	☒	☐	☐

Impact Minimization: All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the selected plan. Best management practices (BMPs), as detailed in section 2.7 in the Final EA, will be implemented to minimize impacts. Measures include water quality monitoring, restricting in-water work from October 15th to February 15th to minimize construction related impacts to protected salmon, and mitigate impacts to water quality and vegetation.

Mitigation: The selected plan will result in unavoidable adverse impacts to water quality and vegetation due to construction activities**.** To mitigate for these unavoidable adverse impacts, the Corps will incorporate approximately 600 coyote willow (*Salix exigua*) and red-osier dogwood (*Cornus stolonifera*) bundles into the levee repairs and plant 400 willow and red-osier dogwood stakes and 50 cottonwood (*Populus balsamifera*) trees at an off-site mitigation location. The willow bundles, trees, and shrubs will provide shade and other beneficial habitat functions to aquatic and terrestrial species in the Yakima River. See Section 2.5 in the Final EA for more mitigation details, including details on the monitoring and adaptive management plan.

Public Review: Public review and comment of the Draft EA/FONSI for the proposed Yakima RB and WWTP Levee Repair Project was completed on December 4, 2021. Comments and responses are included in the Final EA. After receiving the NMFS BO and reviewing potential impacts of the reasonable and prudent measures and the terms and conditions on the selected alternative, the Corps determined supplementation of the Final EA and additional public review is not required.

Treaty Tribes: The Confederated Tribes and Bands of the Yakama Indian Nation were contacted regarding the levee repairs. The Corps will continue to coordinate with the Confederated Tribes and Bands of the Yakama Nation throughout the project to meet Tribal Treaty obligations. To date, the Corps has not received any comments from this Tribe.

Compliance:

a. Endangered Species Act:

The NMFS, and the USFWS are responsible for implementing the ESA of 1973. The Corps evaluated potential effects to endangered species in June 2021 Biological Assessment (BA). ESA consultation was initiated through the submission of the BA to the USFWS and NMFS on June 14, 2021 and August 13, 2021, respectively. On January 12, 2022, the Corps received a BO and Magnuson Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) consultation for the levee repairs from NMFS. The BO's Incidental Take Statement included terms and conditions to implement the reasonable and prudent measure related to the installation, maintenance, and monitoring of willow plantings in the levee. In a letter dated January 18, 2022, the Corps responded to NMFS that it cannot meet one of the terms and conditions due to structural integrity, levee performance, and flood protection concerns created by planting willows as outlined in the BO. Planting the willows in the requested manner would "alter the basic design" of the action and would entail more than "only minor changes" pursuant to 50 CFR § 402.14(i)(2). Therefore, the Corps has advised NMFS that Term and Condition 1.b. cannot be fully implemented in order to maintain the structural integrity of the levee. Consultation with the USFWS is ongoing. The Corps reached the following effect determinations for ESA-listed species from the project in the BA:

- May affect, is likely to adversely affect steelhead (*Oncorhynchus mykiss)* and steelhead critical habitat.
- May affect, not likely to adversely affect bull trout (*Salvelinus confluentus*) and may affect, likely to adversely affect bull trout critical habitat.
- May affect, not likely to adversely affect yellow-billed cuckoo (*Coccyzus americanus*) and no effect to yellow-billed cuckoo critical habitat.

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 USFWS pursuant to the "emergency circumstances" provisions of the 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 BO is received from USFWS. 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 FONSI reassessed.

b. Magnuson-Stevens Fishery Conservation and Management Act:
The Corps determined that the proposed action will adversely affect EFH for Chinook (*O. tshawytscha*) and coho (*O. kisutch*) salmon. This determination was included in the BA sent to NMFS on August 13, 2021. In the BO, NMFS included EFH conservation recommendations that were identical to the ESA terms and conditions. In a letter dated 18 January 2022 the Corps responded to the NMFS EFH recommendations that it cannot meet one of the terms and conditions for the reasons described above.

c. Clean Water Act:
The Corps has determined that the proposed project substantively conforms to the provisions of Nationwide Permit (NWP) 3 *Maintenance*. The Corps prepared a functional analogy evaluation outlining the proposed project's conformity with this NWP and provided it to the Washington Department of Ecology (Ecology) on September 17, 2021. In a letter dated September 27, 2021, Ecology verified that the project meets the requirements of NWP 3 and an Individual 401 Water Quality Certification was not required.

d. National Historic Preservation Act:
The Corps initiated consultation with the Washington State Department of Archeology and Historic Preservation (DAHP) on the Area of Potential Effect (APE) on February 12, 2021. The DAHP concurred with the APE for both levee repairs on March 3, 2021. The Corps also coordinated with the Confederated Tribes and Bands of the Yakama Nation about the APE for the Yakima RB and WWTP Levees on March 11th and 12th, 2021, respectively. The Corps completed a cultural resource survey of the APE and consulted with the DAHP on the survey results and effects determination on April 6, 2021. The DAHP concurred with Corps determination of no historic properties affected on April 13, 2021. Results of the cultural resource survey were provided to the Confederated Tribes and Bands of the Yakama Indian Nation on April 6, 2021. To date, the Corps has not received comments from the Confederated Tribes and Bands of the Yakama Indian Nation.

Determination:

Summary of Impacts and Compliance: Impacts of the proposed work will be minor, short-term, and temporary. This project is undergoing ESA consultation; a BA was prepared and transmitted to NMFS and USFWS. Impacts to ESA listed fish and their prey will be minimized by construction during the approved in-water work window of October 15th to February 15th. ESA and EFH consultations are ongoing. The project complies with the Clean Water Act. The project complies with the National Historic Preservation Act and the Corps has coordinated the work with the Washington State Department of Archaeology and Historic Preservation and affected Indian Tribes.

District Engineer's Findings and Conclusion: I have evaluated the repair in light of the public interest factors prescribed in 33 CFR 336.1(c). The following factors were evaluated as considerations potentially impacting the quality of the human environment in the accompanying EA and reconsidered in the SIR: navigation and the Federal standard for dredged material disposal; water quality; wetlands; endangered species; historic resources; scenic and recreation values; fish and wildlife; and applicable state/regional/local land use classifications, determinations, and/or policies. In accordance with 33 CFR 337.1(a)(14) and 325.3(c)(1), the following additional relevant factors were also considered: air quality, noise, land use, utilities, and infrastructure.

The selected alternative represents the least costly alternative constituting the discharge of dredged or fill material into waters of the U.S.; in the least costly manner and at the least costly and most practicable location; is consistent with sound engineering practices; and meets the environmental standards established by the Clean Water Act Section 404(b)(1) evaluation process. Execution of the selected alternative, following consideration of all applicable evaluation factors is in the public interest.

All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on the analysis presented in the Final EA and SIR, which have incorporated or referenced the best information available; the reviews by other Federal, state, local agencies, and Tribes; input of the public; and the review by my staff, it is my determination that the selected alternative will not cause significant effects on the quality of the human environment and does not require preparation of an environmental impact statement.

1/20/22
_____
Date

BULLOCK.ALEXANDER.LAWRENCE.1161324236
Digitally signed by BULLOCK.ALEXANDER.LAWRENCE.1161324236
Date: 2022.01.20 10:23:59 -08'00'

Alexander "Xander" L. Bullock
Colonel, Corps of Engineers
District Commander

U.S. Army Corps of Engineers – Seattle District

Supplemental Information Report to the Final Environmental Assessment

Yakima Right Bank Federal Levee and Yakima Wastewater Treatment Plant Levee Repair

19 January 2022

This Supplemental Information Report (SIR) is prepared and adopted in accordance with 33 CFR. § 230.13(d). The Seattle District, U.S. Army Corps of Engineers (Corps) prepared a Final Environmental Assessment (EA) in December 2021, for the Yakima Right Bank Federal (RB) Levee and Yakima Wastewater Treatment Plant (WWTP) Levee Repair. The Final EA supported a Finding of No Significant Impact (FONSI) that was signed on 2 January 2022. The purpose of this SIR supplements the Final EA to include new information regarding consultation under the Endangered Species Act (ESA) Section 7(a)(2) and Magnuson Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) with the National Marine Fisheries Service (NMFS) and the United States Fish and Wildlife Service (USFWS).

The 2 January 2022 FONSI and Final EA, herein incorporated by reference, analyzed approximately 600 linear feet of repairs at three sites to restore the Yakima RB Levee to the 100-year level of protection and the Yakima WWTP Levee to the 20-year level of flood protection. The selected alternative is the Repair In-Kind Alternative. This alternative will repair the Yakima RB and WWTP Levees within the horizontal and vertical profiles as they were designed and as they existed when first built. All riverward repairs will remain within the pre-damage levee footprint, i.e., the levee will not encroach farther into the river. Repair activities for all sites under this alternative are summarized in section 2.4 of the Final EA.

Sections 7.4 and 7.5 in the Final EA describe the status of the ESA and EFH consultation with NMFS and USFWS. ESA and EFH consultation as ongoing with NMFS and USFWS when the FONSI was signed on 2 January 2022. On 12 January 2022 the Corps received a Biological Opinion (BO) from NMFS for the repairs described in the Final EA. The BO's Incidental Take Statement (ITS) included terms and conditions to implement the Reasonable and Prudent Measure (RPM) related to the installation, maintenance, and monitoring of willow plantings in the levee. In a letter dated 18 January 2022 the Corps responded to NMFS that it cannot meet one of the terms and conditions due to structural integrity, levee performance, and flood protection concerns created by planting willows as outlined in the BO (enclosed). Planting the willows in the requested manner would constitute an "alter[ation of] the basic design" of the action and involve more than "only minor changes" pursuant to 50 CFR § 402.14(i)(2). Therefore, the Corps has advised NMFS that Term and Condition (T&C) 1.b. cannot be fully implemented in order to maintain the structural integrity of the levee.

On 18 January 2022 the Corps received a draft ITS from USFWS that included the following draft T&Cs which implement the RPMs to minimize impacts of incidental take to bull trout. The Corps will implement these draft T&Cs as follows:

1. To implement RPM 1, the Corps shall insure that no more than 600 feet of levee is reconstructed. Because it is quite hard to find a dead bull trout within large construction sites, and because there will be no fish salvage or area exclusion, we will utilize the distances of the proposed levee repairs as a surrogate to monitor direct take of bull trout.
    i. YRBF levee - Site 1 is 200 lineal feet, Site 2 is 100 lineal feet

ii. WWTP levee - 300 lineal feet

RESPONSE: The Corps will comply with this T&C. Changes to the project designs and construction methods are not necessary.

2. To implement RPM 2, the Corps shall implement water quality monitoring to determine the downstream extent of sedimentation/turbidity. To monitor take to bull trout from sedimentation/turbidity, water quality shall be monitored prior to project implementation, during implementation, and after implementation.
    i. Monitoring at each levee repair site should include upstream and downstream stations.

    ii. Monitoring shall occur at 100 feet below each levee repair site. Because of the in-water work, the lack of sediment/turbidity exclusion (i.e. sediment barriers/curtains), and the fact that bull trout could be present in the area, a monitoring station shall be set at 100 feet below each site during in-water work. Should a sediment plume be visible at 100 feet below each site or if the plume covers the full width of the Yakima River, monitoring and operational changes will serve to minimize take. The outcome of the monitoring will inform the contractor when to start and stop in order to dissipate sediments. If a sediment plume is observed, the Corp shall begin a pulsed or “start –stop” type of approach to working in water. For example, if a plume is observed at 100 feet, cease in-water work until sediment/turbidity dissipates. Begin work again when the plume has cleared up. Continue this in-water work approach, at each site, to monitor and reduce potential take from sedimentation/turbidity.

    iii. If sediment/turbidity exceeds background levels more than 300 feet (91 m) downstream of each site, the Corps will cease sediment-generating activities until turbidity levels decline to background levels at the 300-foot monitoring station location.

RESPONSE: The Corps will comply with this T&C by modifying the construction methodology as necessary. Changes to the project designs are not needed. During in-water work the Corps will visually monitor 100 feet downstream of work. If a plume is visible at 100 feet below the work site or covers the full width of the Yakima River, the Corps will initiate pulsed construction as described in the draft T&C 2(ii).

3. To implement RPM 3, the Corps shall require the contractor to implement a “graduated” pounding/hammering technique (starting with a few lighter taps) before using full force. The graduated ramping up of noise levels will alert any bull trout and other fish in the area, and should cause them to avoid the area or not to linger while the levees are deconstructed, reconstructed, and riprap is interlocked into place. To reduce take, this technique should occur at the start of work each day or after longer breaks.

RESPONSE: The Corps will comply with this T&C as described by modifying the construction methodology as necessary. Changes to the project designs are not needed.

4. To implement RPM 4, the Corps shall maintain/improve as much as possible, all native vegetation, utilizing BMPs, ground protection cloth/materials, and replanting guidelines. This area of the Yakima River is a harsh growing environment that experiences high summer temperatures and cold winters. To ensure successful restoration of the stream channel, floodplain, and revegetation of disturbed ground in the riparian areas, continue monitoring for a period of up to three years or, when there is 80% survival and a positive trajectory for revegetation.

RESPONSE: The Corps will comply with this T&C. The Corps will maintain or improve as much as possible, all native vegetation, utilizing BMPs, ground protection cloth/materials, and replanting guidelines. The Corps will monitor vegetation areas and after the first year, replant in accordance with the adaptive management plan if survival does not exceed 80%. The Corps will monitor vegetation areas for a second year. If replanting was required after the first year, the Corps will monitor vegetation areas for a third year. If replanting was not required after the first year and the vegetation area exceeds 80% survival after the second year, the Corps will not monitor for a third year.

5. To implement RPM 4, the Corps shall monitor the extent of vegetation and site disturbances. To further minimize take, the acres of disturbed vegetation and lineal feet of removal will serve as a surrogate for take. We utilized numbers provided in the BA
    i. YRBF levee – At Site 1, up to 200 feet of riparian vegetation will be removed in a 15 foot wide swath (0.07 acres), along with up to 0.31 acres of other area disturbances. At Site 2 approximately 0.18 acres of are expected to be disturbed. The staging area will disturb an additional 0.28 acres.
    ii. WWTP levee **–** This site will include up to 0.47 acres of disturbance. The staging area will disturb and additional 0.13 acres.

RESPONSE: The Corps will comply with this T&C. Changes to the project designs and construction methods are not necessary.

6. To implement RPM 5, the Corps shall submit a preliminary report to the USFWS within six months of completion of all work a report every year for any monitoring/adaptive management associated annual revegetation monitoring for up to 3 years or until vegetation recovery objectives of 80% have been met. The applicant shall report on the final implementation of BMPs and conservation measures, and implementation and long term monitoring items such as, installation of conservation measures, sediment/turbidity water quality measurements, noise measurements, etc., taken during implementation. The report should also include the following:

    i. Dates and area of construction-related activities, and total square footage of disturbed stream channel, riparian areas, fill, and excavation activities,

    ii. Any fish affects observed,

    iii. Water quality monitoring information, such as, sample sites, numbers of times samples, sampling protocols, and results; and,

iv. Restoration/revegetation activities, such as, acres of recontouring, revegetation, numbers of plantings, conditions of plants, watering schedule, etc.

The report shall be submitted to the USFWS's Central Washington Field Office in Wenatchee, Washington. The report should have the project name and reference number, and be addressed to:

Tom McDowell, Assistant Field Supervisor
Eastslope Cascades and Western Washington Forest and Alpine Zones
Attn: Judy Neibauer
U.S. Fish and Wildlife Office
215 Melody Lane, Suite 103
Wenatchee, Washington 98801

RESPONSE: The Corps will comply with this T&C. The Corps will submit a preliminary report to the USFWS within six months of completion of work, and will submit a report every year in accordance with the response to draft T&C 4. The report will include the criteria discussed in draft T&C 6.

All proposed actions are identical to actions already analyzed in the Final EA. The effects of following the NMFS BO conditions will be similar to the impacts described in the original project. Additional environmental compliance documents that apply to this proposal are the following:

- Clean Water Act – Compliance status is not affected by the NMFS BO. The Corps has determined that the proposed project conforms to the provisions of Nationwide Permit 3 *Maintenance*. The Corps prepared a functional analogy evaluation outlining the proposed project's conformity with this Nationwide Permit and provided it to the Washington Department of Ecology on 17 September 2021. In a letter dated 27 September 2021, Ecology verified that the project meets the requirements of Nationwide Permit 3 and an Individual 401 Water Quality Certification is not required.

- National Historic Preservation Act – Compliance status is not affected by the NMFS BO. The Corps initiated consultation with the Washington State Department of Archeology and Historic Preservation (DAHP) on the Area of Potential Effect (APE) on 12 February 2021. The DAHP concurred with the APE for both levee repairs on 3 March 2021. The Corps coordinated with the Confederated Tribes and Bands of the Yakama Nation about the APE for the Yakima RB and WWTP Levees on 11 and 12 March 2021, respectively. The Corps completed a cultural resource survey of the APE and consulted with the DAHP on the survey results and effects determination on 6 April 2021. The DAHP concurred with Corps determination of no historic properties affected on 13 April 2021. Results of the cultural resource survey were provided to the Confederated Tribes and Bands of the Yakama Indian Nation on 6 April 2021. To date, the Corps has received no comment from the Confederated Tribes and Bands of the Yakama Indian Nation.

- Coordination with Native American Tribes – Compliance status is not affected by the NMFS BO. The Confederated Tribes and Bands of the Yakama Indian Nation were contacted regarding the levee repairs. The Corps will continue to coordinate with the Confederated Tribes and Bands of the Yakama Nation throughout the project to meet Tribal Treaty obligations. To date, the Corps has received no comments from this Tribe.

- National Environmental Policy Act – Supplementation of the Final EA and additional public review is not necessary. The FONSI will be amended and signed by the District Commander prior to construction of the proposed levee repairs.

The Final EA expressly covered the effects of levee repairs in January 2022. Receipt of the NMFS BO and implementation of the terms and conditions therein does not have potential to significantly affect the quality of the human or natural environment. The action will result in no ascertainable incremental or cumulative environmental impacts on resources or coordination requirements beyond the type and level of impacts previously identified and evaluated in the Final EA.

After receiving the NMFS BO and the USFWS Draft ITS, and reviewing potential impacts on the selected alternative, the Corps determined supplementation of the Final EA is not required. Repairs to the Yakima RB Levee and Yakima WWTP Levee will not cause significant effects on the quality of the human environment and do not require preparation of an environmental impact statement. Compliance with all applicable environmental laws, statutes, and Executive Orders as discussed in the Final EA and updated in this SIR, remains applicable to the selected alternative. The FONSI will be amended and signed.

BOERNER.LAURA.A.1251907443
Digitally signed by BOERNER.LAURA.A.1251907443
Date: 2022.01.19 13:57:54 -08'00'

____1JAN2022_
Date

LAURA BOERNER, LG, LHG
Chief, Planning, Environmental, and
Cultural Resources Branch

Enclosure

DEPARTMENT OF THE ARMY
U.S ARMY CORPS OF ENGINEERS, SEATTLE DISTRICT
4735 EAST MARGINAL WAY SOUTH BLDG 1202
SEATTLE, WA 98134-2388

January 18, 2022

Planning, Environmental, and Cultural Resources Branch

Michael Tehan
Assistant Regional Administrator
National Marine Fisheries Service
Interior Columbia Basin Area Office
1201 NE Lloyd Blvd, Suite 1100
Portland, OR 97232

RE: Endangered Species Act Section 7(a)(2) Biological Opinion and Magnuson–Stevens Fishery Conservation and Management Act Essential Fish Habitat Response for the Repair of the Yakima Right Bank Authorized Levee and Yakima Wastewater Treatment Plant Levee, WCRO-2021-02144.

Dear Michael:

On January 12, 2022, the Seattle District U.S. Army Corps of Engineers (Corps) received an Endangered Species Act Section 7(a)(2) Biological Opinion (BO) and Magnuson Stevens Fishery Conservation and Management Act Essential Fish Habitat (EFH) Consultation for the Repair of the Yakima Right Bank Authorized Levee and Yakima Wastewater Treatment Plant Levee from the National Marine Fisheries Service (NMFS).

The Corps regrets that the emergency nature of this repair action and the associated Section 7 consultation, as emphasized in section 1 of the Biological Assessment (BA), precluded the opportunity for an exchange of comments on a Draft BO described in 50 CFR § 402.14(g)(5), in which the Corps' engineering perspective could have been more thoroughly discussed.

This letter transmits the Corps' response to the EFH conservation recommendations as required by Section 305(b)(4)(B) of the Magnuson-Stevens Conservation and Management Act. We note that the EFH conservation recommendations are identical to Reasonable and Prudent Measure (RPM) 1 and its terms and conditions outlined in the BO. This letter also constitutes a response to the BO pursuant to the provisions of 50 CFR §§ 402.14(i)(2) and 402.15. The Corps has determined that it cannot fully implement one of the terms and conditions (b) outlined in the BO for RPM 1. For clarity, RPM 1 and its terms and conditions are reproduced below with the Corps response.

RPM 1: Minimizing effects to riparian vegetation:

Response: The Corps is minimizing effects to riparian vegetation by avoiding unnecessary vegetation loss, minimizing unavoidable loss, and compensating for unavoidable loss through a planting, monitoring, and adaptive management plan.

1. *The following terms and conditions implement RPM 1:*

a. Ensure that willows grow on all repaired sections of levee.

Response: It is inferred that this generally-phrased term is fully encompassed within the conditions specified in terms 1.b through 1.f, and invokes no additional operative requirements. See responses below.

b. Installation of willow poles will follow the specifications of the Natural Resources Conservation Service (NRCS) publication: TN Plant Materials No. 21: Planting Willows and Cottonwood Poles under Rock Riprap (NRCS 2007), including but not limited to:

i. Willow poles will be installed in bundles installed between 45 degrees and vertical along every 6 feet of repaired bank length.

ii. Willows poles must be installed to reach a minimum of 6 inches deep into the seasonal low water table and extend above the typical high water line and 6–12 inches above the riprap.

Response: Construction of a well-engineered riprap layer that will remain stable and functional is most effective when compacted horizontal riprap lifts are placed from the bottom up. Installing willow poles oriented between vertical and 45 degrees (an angle) cannot be accomplished without creating weak spots in the erosion protection and would destroy the willow poles as successive lifts of riprap are placed.

Vertical or angled willow poles create structural weakness in the slope protection layer by creating a larger zone of poor riprap gradation; a zone of poor compaction, and creation of a seepage pathway (Enclosure 1, pages 5-7). The larger zone of small riprap size and poor compaction increases the zone of structural weakness in the slope protection layer. The larger weak zone increases the likelihood of erosion and loss of protection during periods of high river flow. The loss of protection is located where potential seepage pathways have been created by inserting the willows in the embankment. From an engineering perspective, the risk to structural integrity, levee performance, and flood protection created by an angled willow lift is unacceptably high. Therefore, the Seattle District cannot support the installation of angled willow poles. Installing willows at the angle and depth as cited in the NRCS publication will create an unacceptable risk to levee performance and is not technically feasible.

Furthermore, as referenced in paragraph 6 and Figure 2 of the Enclosure, planting willow poles in this manner would constitute an "alter[ation of] the basic design" of the action and would involve more than "only minor changes" pursuant to 50 CFR § 402.14(i)(2). Therefore, Term and Condition 1.b. is not both “necessary and appropriate.”

c. Soil must be installed such that at least the lowest 60% of the length of each pole is in contact with soil substrate that is stabilized by a filter layer.

Response: Bundles and poles will be installed so that 60 to 80% of each bundle is covered. The empty voids between riprap will be filled with embankment material and spall rock where plantings are placed. This will reduce soil loss from voids and gaps. Additionally, the soil used in plantings will be sorted through a ½" sieve so that small rocks may be retained for soil structure.

d. Ensure that willow poles survive the establishment period by watering as necessary. This will be most important for willows installed during summer and early fall.

Response: The Corps will water plantings as necessary during their installation.

e. Ensure that willows are allowed to grow and provide habitat functions by coordinating with entities responsible for levee maintenance, including Yakima County and others as appropriate.

Response: The Corps will inform the sponsor that willow plantings are part of the repair as mitigation and should only be trimmed to the minimal amount necessary to retain adequate visual fields for safety inspection of the structure.

f. Ensure that at least 80% of bundles have at least one live pole surviving in October 2022. (If willows are installed after April 1, 2022, then monitoring should occur in October 2023.) If less than 80% of the bundles have at least one live pole, replace the failed bundles and soil (as necessary), and monitor for an additional year.

Response: The Corps will inspect the plantings per the dates described above to monitor the plantings and replant as necessary. In the event that any replanting is necessary, the Corps will monitor those new plantings for an additional year.

If you have any questions or need additional information, Mr. Zachary Wilson is the Environmental Coordinator for this project and can be reached at (206) 316-3896 or zachary.m.wilson@usace.army.mil; and Mr. Fred Goetz, Seattle District Endangered Species Coordinator, can be reached at (206) 764-3515 or frederick.a.goetz@usace.army.mil. I may also be contacted at (206) 764-6761 or laura.a.boerner@usace.army.mil.

Sincerely,

BOERNER.LAURA.A.1251907443

Digitally signed by BOERNER.LAURA.A.1251907443
Date: 2022.01.18 10:58:52 -08'00'

Laura A. Boerner, LG, LHG
Chief, Planning, Environmental, and
Cultural Resources Branch

Enclosure

CC:
Sean Gross

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

CENWS-END-G

MEMORANDUM FOR RECORD

SUBJECT: Willow Plantings in Levee Rehabilitations

1. References:

a. EP 1110-2-18, “Guidelines For Landscape Planting And Vegetation Management At Levees, Floodwalls, Embankment Dams, And Appurtenant Structures,” dated 1 May 2019.

b. USDA-Natural Resources Conservation Service (NRCS) Technical Note TN Plant Materials No. 21, “Planting Willow and Cottonwood Poles under Rock Riprap,” dated October 2007.

c. PowerPoint presentation - “Case Study: Groundbreaking Bank Protection, Missouri River at the Lewis & Clark Regional Water System, Vermillion, SD,” by Dave Derrick, dated April 2002.

d. National Marine Fisheries Service (NMFS) Biological Opinion (BiOp) dated 10 May 2019, WCR-2019-00027 and WCR-2019-00119, for Elmway Levee and Okanogan River Levee Projects.

2. PURPOSE: The purpose of this memo is to provide the technical engineering and construction assessment of planting willows in horizontal lifts and at an angle (between 45 and 90 degrees from horizontal) in a USACE engineered levee. This includes an evaluation of the degree to which plantings would affect the structural integrity of the levee, risk to levee performance, and impacts to the flood protection the levee provides.

3. BLUF: Willows planted in horizontal lifts in levees create risk to levee performance. Seattle District has concluded that the increased risk is not significant. Willows planted at an angle in levees create unacceptable risk to levee performance by creating unacceptable structural defects in the engineered features of the levees.

4. BACKGROUND: USACE guidelines and standards in EP 1110-2-18 (reference a.) only provide for landscape planting and vegetation management on levee surfaces as part of a system for flood damage reduction where the safety of the structure is not compromised, and only where effective surveillance, monitoring, inspection, maintenance, and flood-fighting are not adversely impacted. In such situations, reasonable judgment and practicality may determine appropriate landscape planting

(trees, shrubs, vines, forbs, and grasses) which may be incorporated under certain situations into the design of a particular flood damage reduction project, and, in such instances, involves an interdisciplinary approach with the local sponsor and the following professional disciplines: civil engineer, landscape architect, levee and/or dam safety engineer, environmental engineer, geologist, biologist, and other disciplines as appropriate (reference a, paras 1-1 and 1-2.a). Incorporation of environmental enhancements such as native plants and willow plantings are generally not consistent with the vegetation-free zone (which applies to all vegetation except grass) and root-free zones, which are part of the applicable USACE standards for flood control structures (reference a, para. 2-2). This is because trees and other woody vegetation, such as shrubs and vines, can create both structural and seepage instabilities to flood control structures, prevent adequate inspection, and create obstacles to maintenance and flood fighting (reference a, para. 3-1a). In certain situations, the local sponsor may request a variance from the standards and guidelines (reference a, para 1-2.b).

In some prior Endangered Species Act (ESA) Section 7 Interagency Consultations for federal actions conducted pursuant to 15 U.S.C. § 1531, et. seq.; 50 CFR § 402.02, regarding rehabilitation of existing flood control structures pursuant to 33 C.F.R. §§ 203.41-51, NMFS has included provisions that indicate, in the opinion of NMFS, that USACE must construct emergency levee rehabilitation projects that incorporate willows planted in the levee in order to minimize incidental take (reference d). NMFS has, in certain situations, explicitly included certain specific construction methods and design revisions to the proposed action in Terms and Conditions (T&C) to implement a Reasonable and Prudent Measure (RPM), as provided an Incidental Take Statement (ITS) issued under Section 9 of the ESA, as part of the conclusion to a formal ESA Section 7 inter-agency consultation where a Biological Opinion was issued by NMFS. In the most recent consultation where this occurred (reference d), USACE provided NMFS a written response indicating its determination that it could not fully implement aspects of the terms and conditions as provided in the ITS, because of technical infeasibility, as well as because in the opinion of the USACE the T&C would constitute an “alter[ation] of the basic design” of the action and would entail more than “only minor changes” pursuant to 50 C.F.R. § 402.14(i) (2). This is because the provision in the T&C was not both “necessary and appropriate.” The USACE seeks to engage in further discussion with NMFS to explain its perspective regarding concerns with levee vegetation and structural stability to flood control structures, specifically as it pertains to horizontal willow placement and the USACE’s engineering and construction assessment.

5. HORIZONTAL WILLOW PLACEMENT ENGINEERING AND CONSTRUCTION ASSESSMENT: USACE Seattle District has been incorporating willow lifts in levee rehabilitation projects since about 1995. To limit performance risk and maintain levee integrity, willow poles (also called stakes and sometimes placed in bundles) are placed horizontally within the riprap slope protection layer in a horizontal topsoil layer (lift) one foot above the ordinary high water (OHW) elevation. The riprap below and above the willow lift is compacted to minimize discontinuity created by the topsoil lift in the riprap slope protection layer. This method results in an accepted level of risk to levee performance because it minimizes disruptions to the riprap slope protection layer integrity, the required range of rock sizes (the gradation), and interlocking of the rock pieces.

Seattle District levee rehabilitation designs typically include a compacted riprap layer on the riverward slope of the levee embankment prism for scour and erosion protection. During the engineering and design phase of levee rehabilitation, engineers analyze the levee performance requirements, forces on the levee from the projected river flow and velocity, and levee geometry to design the required range of rock sizes (referred to as the riprap gradation) and thickness of the riprap slope protection layer (also referred to as the armor blanket). The riprap layer is typically 3 to 4 feet thick and is underlain by a 1-foot thick layer of filter material (quarry spalls) placed directly on the compacted levee embankment. A typical riprap gradation has a specific range of rock sizes with an average size of 750 pounds and a maximum size of 3,000 pounds, but design gradations can be much larger depending on site-specific conditions.

Seattle District typically constructs horizontal willow lifts as illustrated in Figure 1.

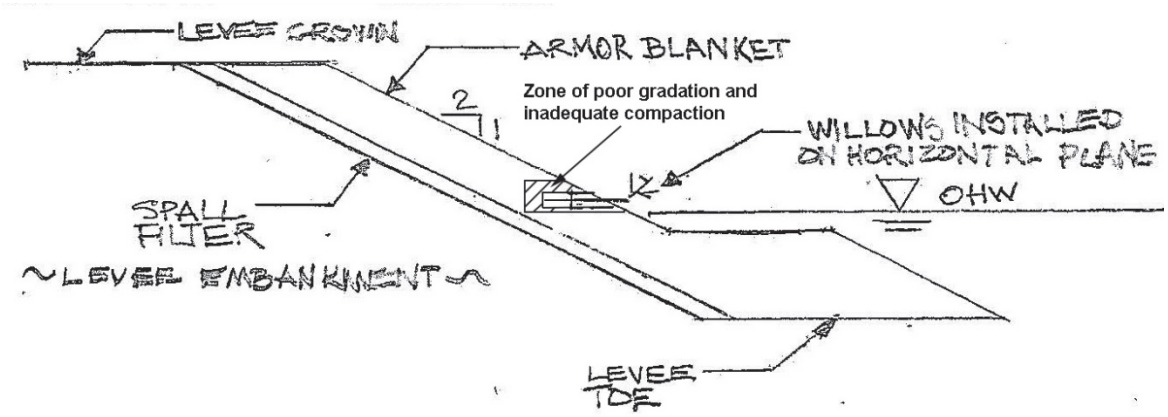


Figure 1 – Horizontal Willow Installation Typically Constructed by NWS for Levee Rehabilitation Mitigation

Construction of a levee slope protection layer with a horizontal willow lift generally follows this sequence:

a. Place the quarry spalls filter layer on the compacted levee embankment from the bottom to the levee crown.

b. Place and compact riprap beginning at the levee toe and continuing up the slope to the elevation of the willow lift. Rocks are manipulated during placement to achieve particle interlock. Interlock is a function of compaction, manipulation, and gradation (the range of rock sizes). The interlocked rocks provide structural integrity and enhanced erosion resistance to the slope protection layer.

c. Place and compact a horizontal surface in the riprap. Larger rocks must be excluded in order to create the horizontal surface, resulting in a small zone of poor (smaller) riprap gradation.

d. Construct the horizontal willow lift by placing a horizontal lift of topsoil, placing willow poles on the topsoil, and covering the willow poles with a second lift of topsoil.

e. Place and compact riprap over the willow lift, pushing some rocks into the topsoil and gaining some interlock between rock above and below the willow lift.

f. Continue placing compacted and interlocked riprap to the levee crown to complete the slope protection layer.

The horizontal willow lift creates an erosion-susceptible zone in the riprap slope protection layer. The smaller riprap gradation under the willow lift is also more susceptible to erosion because of the absence of larger rock pieces. When the topsoil and smaller riprap erodes during periods of high river flow, the overlying riprap will shift and settle to fill the eroded gap. The shifting loosens the riprap resulting in poor riprap compaction and loss of particle interlock, further increasing risk of damage to the slope protection layer. However, positive performance history since about 1995 of levees constructed with horizontal willow lifts indicates the risk of horizontal willow lifts to levee performance is minimal from an engineering perspective.

6. ANGLED WILLOW PLACEMENT ENGINEERING AND CONSTRUCTION ASSESSMENT: Planting willows at an orientation of 45 to 90 degrees from horizontal (i.e., at an angle) requires a sloped riprap surface on which to place a willow lift as shown in Figure 2.

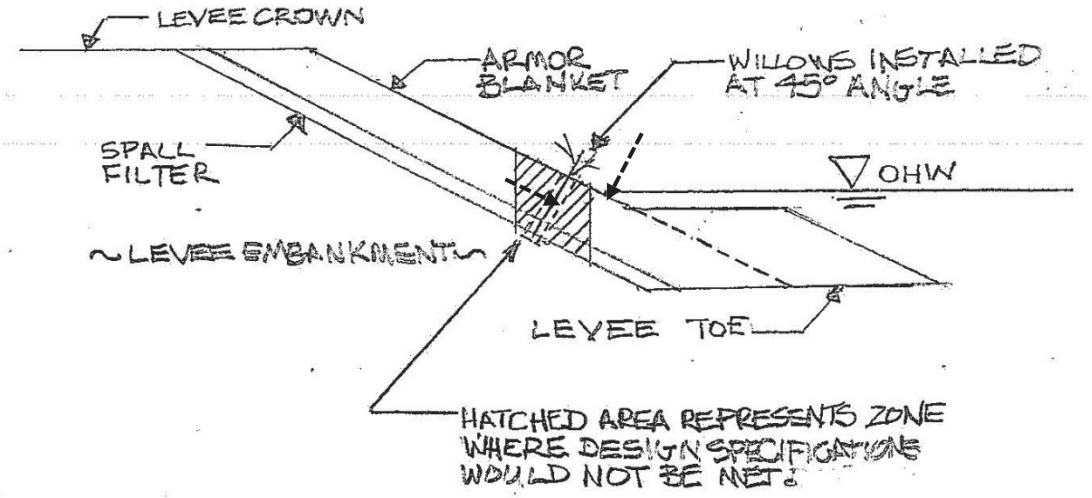


Figure 2 - Willow Lift Planted at an Angle

Planting willows at an angle creates:

a. Larger zone of poor riprap gradation.

Poor riprap gradation is a range of riprap rock sizes that does not include the full range of sizes specified in the design. The full range of design-specified rock sizes is required to properly construct and compact an interlocked slope protection layer. A vertical or angled willow lift results in a pocket of soil that extends into the levee interrupting the interlocking riprap and creating a boundary line between the riprap and the soil. The riprap along this boundary line (hatched area in figure 2) necessarily excludes larger size rock which would otherwise extend into the soil layer and prevent willows from being installed. This results in a zone of relatively small rock above and below the soil pocket. The smaller rock immediately below and above the willow lift combined with the soil pocket for the willow lift itself creates a relatively large zone of weakness in the slope protection layer.

b. Zone of poor compaction.

The levee slope protection layer is constructed by placing, manipulating, and compacting riprap, working gradually from the toe to the top. As the riprap is placed, the excavator bucket is used to maneuver the individual rock pieces to achieve interlocking and minimize the size of voids between adjacent pieces. While manipulating the riprap, the excavator also compacts or tamps the riprap with the bucket to force the rocks tightly together. The bucket is used to thoroughly tamp the slope protection layer from the top and against the face as construction progresses up the levee, forcing the riprap to pack tightly against the levee embankment and the

underlying riprap. The riprap pieces pack tightly because the compactive force is resisted by the immovable underlying embankment fill and previously compacted riprap, in effect squeezing the riprap pieces closer together. If the compactive force is not opposed by a relatively immovable material, then the riprap will simply shift and move as the compactive force is applied. When the riprap surface is sloped for an angled willow lift (see dashed arrows on Figure 2), tamping of the sloped riprap surfaces directs the compactive force perpendicular into the sloped riprap surfaces but because there is no immovable material resisting or opposing that force the riprap will shift resulting in a zone of poor compaction. After the willow lift and overlying slope protection layer is constructed, some additional compaction of the outer face of the riprap around the willow lift is possible but poorly compacted riprap is likely to remain at depth.

When compacting riprap or any earthen material, the compactive force dissipates with depth so materials are compacted in thin lifts or layers. The riprap is compacted continuously as the slope protection layer is constructed rather than waiting to compact until after the entire layer is placed. The riprap in the lower portion of the “V”-shaped notch above the willow lift will be difficult to compact properly because the bucket size prevents reaching into the notch and tamping the riprap without contacting the sides of the notch. If the bucket compacts vigorously against the sides of the notch, not only will the willow lift be damaged, but the quarry spall filter layer will be damaged too. When the notch is filled with riprap to the point where the bucket can compact without hitting the sides, then proper compaction can resume but the materials within the notch may be too deep to be properly compacted.

c. Potential creation of seepage pathway.

Figure 2 shows the willow pole extending into the levee embankment. The method is described in the NRCS Technical Note TN 21 (reference b.). This method inserts willow bundles by pushing an excavator bucket into the embankment at a 45 degree angle, lifting the bucket slightly to open a slot, inserting the bundle, and then dropping the soil back down over the bundle. Because the levee prism is constructed of compacted embankment fill, it is important to sufficiently re-compact the disturbed soil after inserting the bundle. If the disturbed soil is not properly re-compacted, then the loose soil will be more permeable and lead to increased seepage velocity and a shortened seepage path through the levee prism.

The larger zone of small riprap size and poor compaction increases the zone of structural weakness in the slope protection layer. The larger weak zone increases the likelihood of erosion and loss of protection during periods of high river flow. The loss of protection is located where potential seepage pathways have been created by inserting the willows in the embankment. Consequently the risk to structural integrity, levee performance, and flood protection created by an angled willow lift is greater from an

engineering perspective than the risk created by a horizontal willow lift. For these reasons, Seattle District cannot support the installation of angled willows.

One construction method that has been considered is construction of a horizontal riprap surface below the willow lift, and then placement of a thicker topsoil lift in which the willows are placed at an angle. This method results in a large zone of highly erodible topsoil in the slope protection layer that introduces a large structural defect such that the District cannot assure performance.

The risk of slope protection failure is very high and therefore unacceptable from an engineering perspective. Based on a review of the NMFS cited methods and Seattle District's own investigation of other potential design and construction approaches, Seattle District does not believe vertical willows can be installed in a levee while maintaining an adequate level of structural stability and flood protection.

7. COMPARISON TO OTHER MEANS AND METHODS:

We acknowledge that in other instances willows have been planted using other methods.

A vertical planting method has been tried in another USACE District, which consisted of punching holes in the completed slope protection layer with a "stinger" on an excavator arm and inserting willow poles in the holes down to the embankment fill. This method loosens the slope protection layer to an unacceptable level. By hammering a stinger into the interlocked slope protection layer to create an open hole into which the willow pole is inserted, riprap pieces are broken and dislodged, larger voids are opened as the particles shift, and particle interlock is destroyed.

Another method that has been used on one levee in the Seattle District entails placing a topsoil layer on top of the launchable toe and planting willow poles vertically in the topsoil. A launchable toe is a thick riprap layer placed at the toe of the slope protection layer and the top of the launchable toe typically forms a horizontal bench. This method is feasible under certain conditions but is dependent upon levee and launchable toe geometry, launchable toe level relative to OHW level, river level fluctuation range, river velocities, and other site-specific variables.

The NRCS Technical Note (reference b) publication describes streambank stabilization by constructing "vertical willow bundles under rock riprap" and "the 45 degree bundle method" of planting willow bundles. The Missouri River PowerPoint presentation (reference c) describes a riverbank stabilization project that incorporated riprap and willow bundles placed in a near-vertical configuration. The BiOp for the Elmway and

Okanogan Levees (reference d) includes terms and conditions of RPM 2(c) that require installing willow poles in accordance with the NRCS Technical Note (reference b), including planting willow poles “in bundles between 45 degrees and vertical” that reach “a minimum of 6 inches deep into the seasonal low water table and extend above the typical high water line and 6-12 inches above the riprap.”

The references describe placing smaller rock sizes in a thin layer on relatively flat bank slopes where the native soils can be loose and permeable. These instances differ from the Okanogan River Basin levees in size, slope, riprap size, slope protection layer thickness, and seepage performance requirements. Levees have an embankment prism constructed of compacted fill and permeability is a significant concern. High permeability in levees leads to excessive seepage velocity, internal erosion (piping), and ultimately levee failure.

The “vertical” method described in the NRCS Technical Note places willow bundles on the streambank, with the bundles extending from the low water level to the top of riprap. While it is possible to adapt this method to a low-height levee on a river with small water level fluctuations and with slope protection that does not extend far above the OHW elevation, it is not feasible for the Okanogan levees, for example, because the riprap extends too high above the prescribed low water level. The Okanogan levees would require willow bundles ranging in length from 20 to 40 feet, which are not feasible.

The 45 degree method described in the NRCS Technical Note inserts willow bundles in the streambank as described previously. In order for the willow bundle to extend through 1 foot of quarry spalls and extend 1 foot above the surface of a 4-foot thick layer of riprap, a bundle embedded 1 foot into the embankment prism must be at least 7 feet in length and the orientation must be perpendicular to the slope. If the bundle is allowed to lean from the perpendicular position during spalls or riprap placement, then the bundle top will be buried. Regardless of length, placement of the quarry spalls and riprap in direct contact with (below, around, and above) a projecting willow bundle as shown in the NRCS Technical Note will result in the bundle being destroyed as the riprap is compacted to create an interlocked riprap layer.

The Missouri River bank protection case study (reference c) discusses placement of willow poles at a near-vertical configuration. The case study photos and descriptions show the riprap placed in loose windrows on a flat riverbank with willow poles placed in gaps between windrows. The gaps are filled with topsoil and the riprap is choked with topsoil. Levee slopes are much steeper and levee slope protection riprap cannot be constructed loose without unacceptable risk of slope protection failure. Constructing a gap in the riprap that is wide enough to allow vertical insertion of willow poles and then backfilling the gap with topsoil will create a major flaw in the structural integrity of the

slope protection. This creates unacceptable risk to levee performance and flood protection.

8. CONCLUSION:
When following our current horizontal planting procedures, Seattle District has had some success in establishing willows in levee rehabilitation projects since 1995 with tolerable risk to levee performance. Horizontal willow lifts in levees in Western Washington tend to be more successful than those in Eastern Washington. While planting willows within a levee introduces structural weakness regardless of the orientation, planting at a 45 to 90 degree angle will create an unacceptable risk to levee performance. In order to accommodate the requested non-horizontal willow plantings, Seattle District would be required to further compromise sound engineering practice to install them. This would introduce more unknowns and variables that result in a levee which is less reliable. When a levee decreases in reliability, there is a corresponding increase in the possibility that the structure could be compromised. This can interfere with the public's expectation of flood risk reduction provided by the system as a whole.

9. Point of contact for this memorandum is Charles Ifft at (206) 764-6938 or charles.h.ifft@usace.army.mil.

JOANN T. WALLS, P.E.
Levee Safety Officer
Chief, Engineering Division
Seattle District, USACE

23-Jun-2020
(Date)

AMY R. REESE, P.E.
Chief, Operations Division
Seattle District, USACE

23-Jun-2020
(Date)

FINDING OF NO SIGNIFICANT IMPACT (FONSI)
AND
CLEAN WATER ACT SECTION 404 STATEMENT OF FINDINGS
YAKIMA RIGHT BANK FEDERAL LEVEE AND YAKIMA WASTEWATER TREATMENT PLANT LEVEE REPAIR
YAKIMA, WASHINGTON

The U.S. Army Corps of Engineers, Seattle District (Corps) has conducted an environmental analysis in accordance with the National Environmental Policy Act (NEPA) of 1969, as amended. The Final Environmental Assessment (EA) dated December 2021, for the Yakima Right Bank Federal (RB) and Yakima Wastewater Treatment Plant (WWTP) Levees addresses flood damage to these levees in the city of Yakima, Washington.

The Final EA, incorporated herein by reference, evaluates various alternatives to restore flood protection to the damaged levee. There is one major federal action requiring NEPA compliance and analyzed in the Final EA summarized below.

Proposed Action: The selected alternative is the Repair In-Kind Alternative. This alternative will repair the Yakima RB and WWTP Levees within the horizontal and vertical profiles as they were designed and as they existed when first built. All riverward repairs will remain within the pre-damage levee footprint, i.e., the levee will not encroach farther into the river. Repair activities for all sites under this alternative are summarized in section 2.4 of the Final EA and are hereby incorporated by reference.

Alternatives: In addition to a “no action” plan, three alternatives were evaluated. The alternatives include the Nonstructural, Levee Setback, and the Repair In-Kind Alternatives. Of these, the potential effects were evaluated for the No Action and Repair In-Kind Alternatives. See section 2 of the Final EA for alternative formulation and selection. A summary assessment of the potential effects of the selected plan are listed in Table 1.

Table 1. Summary of Potential Effects of the Proposed Action.

	Insignificant effects	Insignificant effects as a result of mitigation	Resource unaffected by action
Vegetation	☐	☒	☐
Navigation	☐	☐	☒
Water Resources	☐	☒	☐
Geology and Soils	☐	☐	☒
Wetlands	☐	☐	☒
Threatened and Endangered Species	☐	☒	☐
Fish and Wildlife	☐	☒	☐
Cultural Resources	☒	☐	☐
Hazardous, Toxic, and Radiological Waste	☐	☐	☒
Air Quality and Noise	☒	☐	☐
Land Use, Utilities, and Infrastructure	☒	☐	☐
Recreation	☒	☐	☐

Impact Minimization: All practicable and appropriate means to avoid or minimize adverse environmental effects were analyzed and incorporated into the selected plan. Best management practices (BMPs), as detailed in section 2.7 in the Final EA, will be implemented to minimize impacts. Measures include water quality monitoring, restricting in-water work to October 15 to February 15 to minimize construction related impacts to protected salmon, and mitigating impacts to water quality and vegetation.

Mitigation: The selected plan will result in unavoidable adverse impacts to water quality and vegetation due to construction activities**.** To mitigate for these unavoidable adverse impacts, the Corps will incorporate approximately 600 coyote willow (*Salix exigua*) and red-osier dogwood (*Cornus stolonifera*) bundles into the levee repairs and plant 400 willow and red-osier dogwood stakes and 50 cottonwood (*Populus balsamifera*) trees at an off-site mitigation location. The willow bundles, trees, and shrubs will provide shade and other beneficial habitat functions to aquatic and terrestrial species in the Yakima River. See section 2.5 in the Final EA for more mitigation details.

Public Review: Public review and comment of the Draft EA/FONSI for the proposed Yakima RB and WWTP Levee Repair Project was completed on December 4, 2021. Comments and responses are included in the Final EA.

Treaty Tribes: The Confederated Tribes and Bands of the Yakama Indian Nation were contacted regarding the levee repairs and the Corps will continue to coordinate throughout the project to meet Tribal Treaty obligations. To date, the Corps has received no comments from this Tribe.

Compliance:

a. Endangered Species Act:

The National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS), and the U.S. Fish and Wildlife Service (USFWS) are responsible for implementing the Endangered Species Act of 1973 (ESA). The Corps evaluated potential effects to endangered species in a Biological Assessment (BA) June 2021. ESA consultation was initiated through the submission of the BA to the USFWS and NMFS on 14 June 2021 and 13 August 2021, respectively. Consultation is ongoing. The Corps reached the following effect determinations for ESA-listed species from the project in the BA:

- May affect, is likely to adversely affect steelhead (*Oncorhynchus mykiss)* and steelhead critical habitat.
- May affect, not likely to adversely affect bull trout (*Salvelinus confluentus*) and may affect, likely to adversely affect bull trout critical habitat.
- May affect, not likely to adversely affect yellow-billed cuckoo (*Coccyzus aericanus*) and no effect to yellow-billed cuckoo critical habitat

b. Magnuson-Stevens Fishery Conservation and Management Act:

The Corps determined that the proposed action will adversely affect Essential Fish Habitat (EFH) for Chinook (*O. tshawytscha*) and coho (*O. kisutch*) salmon. This determination was included in the BA sent to NMFS on 13 August 2021. Consultation is ongoing.

c. Clean Water Act:

The Corps has determined that the proposed project substantively conforms to the provisions of Nationwide Permit 3 *Maintenance*. The Corps prepared a functional analogy evaluation outlining the proposed project's conformity with this Nationwide Permit (NWP) and provided it to the Washington Department of Ecology on 17 September 2021. Ecology verified that the project meets the requirements of NWP 3 and an Individual 401 Water Quality Certification is not required in a letter dated 27 September 2021.

d. National Historic Preservation Act:

The Corps initiated consultation with the Washington State Department of Archeology and Historic Preservation (DAHP) on the Area of Potential Effect (APE) on 12 February 2021. The DAHP concurred with the APE for both levee repairs on 3 March 2021. The Corps also coordinated with the Confederated Tribes and Bands of the Yakama Nation about the APE on and 11 and 12 March 2021. The Corps completed a cultural resource survey of the APE and consulted with the DAHP on the survey results and effects determination on 6 April 2021. The DAHP concurred with Corps determination of no historic properties affected on 13 April 2021. Results of the cultural resource survey were provided to the Confederated Tribes and Bands of the Yakama Indian Nation on 6 April 2021. To date the Corps has received no comment from the Confederated Tribes and Bands of the Yakama Indian Nation.

Determination:

Summary of Impacts and Compliance: Impacts of the proposed work will be minor, short-term, and temporary. This project is undergoing ESA consultation; a BA has been prepared and transmitted to NMFS and USFWS. Impacts to ESA listed fish and their prey will be minimized by construction during the approved in-water work window of October 15 to February 15. ESA and EFH consultations are ongoing. The project complies with the Clean Water Act. The project complies with the National Historic Preservation Act and the Corps has coordinated the work with the Washington State Department of Archaeology and Historic Preservation and affected Indian Tribes.

District Engineer's Findings and Conclusion: I have evaluated the repair in light of the public interest factors prescribed in 33 CFR 336.1(c). The following factors were evaluated as considerations potentially impacting the quality of the human environment in the accompanying EA: navigation and the federal standard for dredged material disposal; water quality; wetlands; endangered species; historic resources; scenic and recreation values; fish and wildlife; and applicable state/regional/local land use classifications, determinations, and/or policies. In accordance with 33 CFR 337.1(a)(14) and 325.3(c)(1), the following additional relevant factors were also considered: air quality, noise, land use, utilities, and infrastructure.

The selected alternative represents the least costly alternative constituting the discharge of dredged or fill material into waters of the U.S.; in the least costly manner and at the least costly and most practicable location; is consistent with sound engineering practices; and meets the environmental standards established by the CWA Section 404(b)(1) evaluation process. Execution of the selected alternative, following consideration of all applicable evaluation factors is in the public interest.

All applicable laws, executive orders, regulations, and local government plans were considered in evaluation of alternatives. Based on the analysis presented in the Final EA that has incorporated or referenced the best information available; the reviews by other federal, state, local agencies, and Tribes; input of the public; and the review by my staff, it is my determination that the selected alternative will not cause significant effects on the quality of the human environment and does not require preparation of an environmental impact statement.

2 Jan 2022

Date

BULLOCK.ALEXANDER.LAWRENCE.1161324236

Digitally signed by BULLOCK.ALEXANDER.LAWRENCE.1161324236
Date: 2022.01.02 09:25:06 -08'00'

Alexander "Xander" L. Bullock
Colonel, Corps of Engineers
District Commander

ENVIRONMENTAL ASSESSMENT AND CLEAN WATER ACT, SECTION 404 PUBLIC INTEREST REVIEW

YAKIMA RIGHT BANK FEDERAL LEVEE AND YAKIMA WASTEWATER TREATMENT PLANT LEVEE REPAIR YAKIMA, WASHINGTON

December 2021

Seattle District
Corps of Engineers

Cover shows the view looking downstream the Yakima Right Bank Federal Levee Site 1.

Table of Contents

Figures

Tables

Appendices

Acronyms and Abbreviations

AEP	Annual Exceedance Probability
BA	Biological Assessment
BMP	Best Management Practices
cfs	Cubic feet per second
CFR	Code of Federal Regulation
Corps	U.S. Army Corps of Engineers, Seattle District
CWA	Clean Water Act
CY	Cubic yards
DAHP	Washington State Department of Archeology and Historic Preservation
dB	Decibel
DPS	Distinct Population Segment
EA	Environmental Assessment
Ecology	Washington State Department of Ecology
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
EPA	Environmental Protection Agency
ER	Engineering Regulation
ESA	Endangered Species Act
FONSI	Finding of No Significant Impacts
H:V	Horizontal to Vertical ratio, measured in feet
LF	Linear Feet
LWM	Large Woody Material
NAAQS	National Ambient Air Quality Standard
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service / NOAA Fisheries
OHWM	Ordinary High-Water Mark
PL	Public Law
RB	Right Bank Federal
Sp., Spp	species (singular and plural)
U.S.C.	United States Code
USFWS	United States Fish and Wildlife Service
WDFW	Washington Department of Fish and Wildlife
WWTP	Wastewater Treatment Plant

1 INTRODUCTION

The purpose of an Environmental Assessment (EA), as reflected in 40 Code of Federal Regulation (CFR) sections 1500.1(c) and 1508.9(a)(1) of the Council on Environmental Quality regulations implementing the National Environmental Policy Act of 1969 (NEPA), as amended, is to "*provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement [EIS] or a finding of no significant impact [FONSI]*" on actions authorized, funded, or carried out by the federal government, and "*to help public officials make decisions that are based on understanding of environmental consequences, and take actions that protect, restore, and enhance the environment*." Pursuant to Section 102(C) of the NEPA, this assessment evaluates environmental consequences of the proposed rehabilitation action to be implemented by the U.S. Army Corps of Engineers (Corps) at the Yakima Right Bank Federal (RB) Levee and Yakima Wastewater Treatment Plant (WWTP) Levee located in the city of Yakima, Washington. In accordance with Section 404 of the Clean Water Act (CWA), this integrated document also evaluates whether it is in the public interest to undertake the federal action.

This document integrates a review of factors underlying a determination of whether executing the rehabilitation would be in the public interest, pursuant to CWA Section 404 and rules and regulations published as 33 CFR Part 335, "*Operation and Maintenance of Army Corps of Engineers Civil Works Projects Involving the Discharge of Dredged or Fill Material into Waters of the U.S. or Ocean Waters*"; 33 CFR Part 336, "*Factors to be Considered in Evaluation of Army Corps of Engineers Dredging Projects Involving the Discharge of Dredged Material into Waters of the U.S. and Ocean Waters*"; 33 CFR Part 337, "*Practice and Procedure*"; and 33 CFR Part 338, "Other Corps Activities Involving the Discharge of Dredged Material or Fill into Waters of the U.S.

1.1 BACKGROUND

1.1.1 Project Design

Construction of the Yakima RB Levee was authorized by the 1938 Flood Control Act, Public Law (PL) 75-761 (incorporating H.R. Doc. No. 75-579). Initial construction was completed in 1948, with additional work being accomplished in 1949 to repair flood-damaged sections. The Corps has completed repairs to this levee in the past but not at the proposed repair locations. The levee provides a 100-year flood (1 percent annual exceedance probability [AEP]) level of protection to 19,261 people, 4,413 buildings, and $2.81 billion worth of property (Corps 2021). The levee was constructed with a 2 horizontal to 1 vertical (2H:1V) or 3H:1V side-slope with a launchable toe. The levee is armored with Class III riprap. Sheets C-301 and C-302 in the design plans (Appendix A) show the projected as-built section, as best estimated from field conditions, overlaying the proposed repair design.

The Yakima WWTP Levee was originally constructed by local interests prior to 1958. The city of Yakima owns the levee and is responsible for its operation and maintenance. The levee provides a 20-year flood (5 percent AEP) level of protection to the 40 people, 4 buildings, and $1.4 million worth of property (Corps 2021). Most of the protection is to the city of Yakima WWTP, which serves nearly all of the homes, industries, and businesses in Yakima. The levee was rehabilitated by the city of Yakima in 1965 after acquiring the property. Previous PL 84-99 repairs have been made to this levee in 1978 and in 2009. The 2009 repair included a 2H:1V side-slope with a launchable toe. The levee is armored with Class III riprap. Sheet C-301 in the design drawings (Appendix B) show the 2009 as-built section, overlaying the proposed repair design.

1.1.2 Disaster Incident

In the first week of February 2020, an atmospheric river event brought abundant amounts of rain, warmer temperatures, and higher snow levels to Washington. Subsequent heavy rainfall and rapid snowmelt caused flooding across Washington, with some places exceeding record values. While the Yakima River was spared the more extreme flooding, a smaller discrete event occurred on February 2, 2020 with a peak flow of 10,500 cubic feet per second (cfs) and a stage height of 43.68 feet (gage height) above Ahtanum Creek at Union Gap, Washington (USGS Gage 12500450; Figure 1). A second peak occurred on February 8 with a peak flow of 19,900 cfs and a stage height of 46.51 feet (USGS Gage 12500450). Based on a flow analysis at the Union Gap gage, this event corresponded to a 69 percent AEP or approximately a 1.5-year flood event.

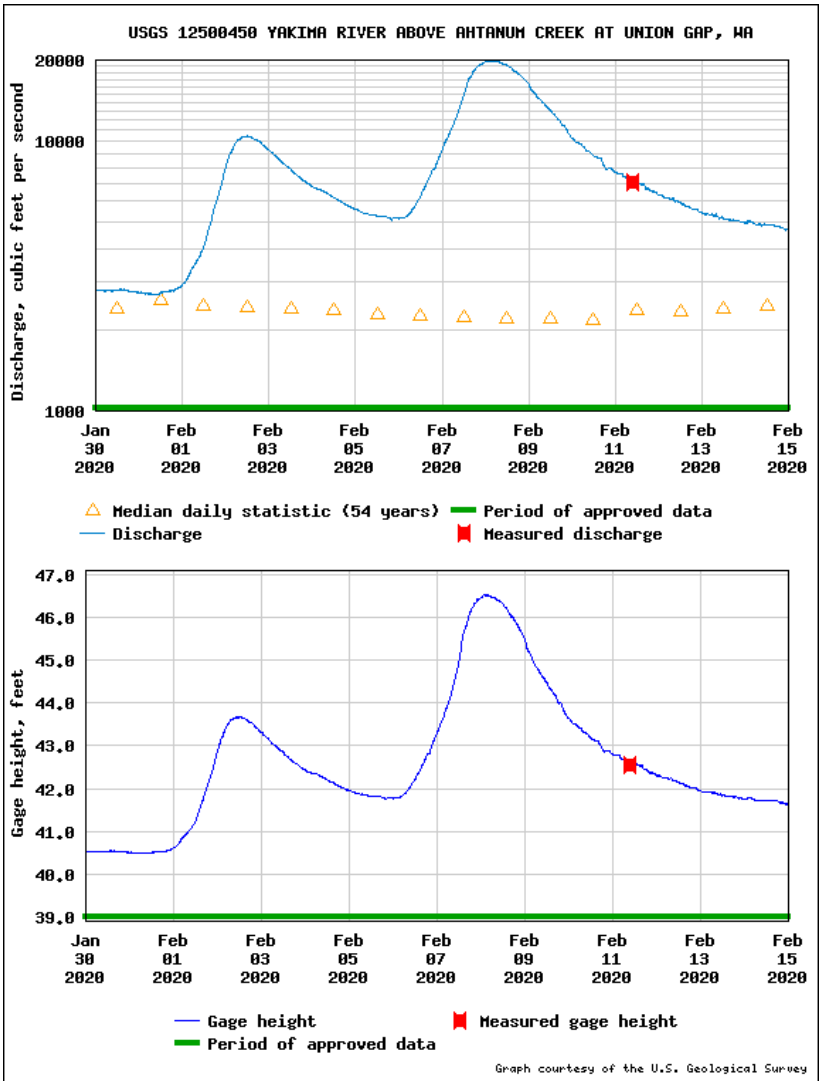


Figure 1. Flow and stage hydrograph at the USGS Gage 12500450 in early February (USGS 2021).

Approximately 300 linear feet (LF) of the Yakima RB Levee was damaged at two separate locations: Site 1 (200 LF; Station 120+00 to Station 122+00) and Site 2 (100 LF; Station 138+00 to Station 139+00). The event caused toe scour and loss of toe rock at each site. At Site 2, slope armor was also scoured along with embankment material from within the levee prism. In an undamaged state, the Yakima RB Levee reduces flood risk to public infrastructure and residential, commercial, and park properties by preventing overtopping up to a 100-year flood (1 percent AEP). In the damaged state, the Yakima RB Levee provides a 2-year flood (50 percent AEP) level of protection. See Appendix C (Photos C1 to C8) for photos of the damaged levee.

Approximately 300 LF of the Yakima WWTP Levee was damaged at a single location between Stations 10+00 and 13+00. The event scoured riprap from the levee's riverward toe and slope. In an undamaged state, the Yakima WWTP Levee provides flood risk reduction by preventing overtopping up to a 20-year flood (5 percent AEP). In the damaged state, the levee provides a 2-year flood (50 percent AEP) level of protection. See Appendix C (Photos C9 to C12) for photos of the damaged levee.

1.2 AUTHORITY

PL 84-99 (33 U.S. Code [U.S.C.] § 701n) provides the Corps the authority for "the repair or restoration of any flood control work threatened or destroyed by flood, including the strengthening, raising, extending, realigning, or other modification thereof as may be necessary in the discretion of the Chief of Engineers for the adequate functioning of the work for flood control and subject to the condition that the Chief of Engineers may include modifications to the structure or project, or in implementation of nonstructural alternatives." The Corps' repair work under this authority is limited to the repair of flood control works damaged or destroyed by floods. The statute authorizes rehabilitation to the level of protection exhibited by the flood control work prior to the damaging event. This authority is delegated to Seattle District through 33 CFR, Part 203 and Engineer Regulation (ER) 500-1-1. From ER 500-1-1: "Improvements to design and equipment (e.g., geomembranes) that are a result of state of the art technology, and are commonly incorporated into current designs in accordance with sound engineering principles, are permissible, and are not considered betterments." Yakima County is the local non-federal sponsor for the proposed Yakima RB Levee repair. The city of Yakima is the local non-federal sponsor for the Yakima WWTP Levee repair.

1.3 PROJECT LOCATION

The Yakima RB Levee is a federal levee located on the right bank of the Yakima River as it passes through Yakima, Washington. The levee is approximately 25,300 LF long and ties into a railroad embankment at its upstream end and into W. Birchfield Road at its downstream end. Repairs are proposed along 200 LF at Site 1 and 100 LF at Site 2 (Figure 2).

The Yakima WWTP Levee is a non-federal levee located on the right bank of the Yakima River as it passes through Yakima, Washington. The levee is approximately 3,000 LF long and ties into the bridge abutment of State Route 24 at its upstream end and into high ground at its downstream end. Repairs are proposed at one site approximately 300 LF long (Figure 3).

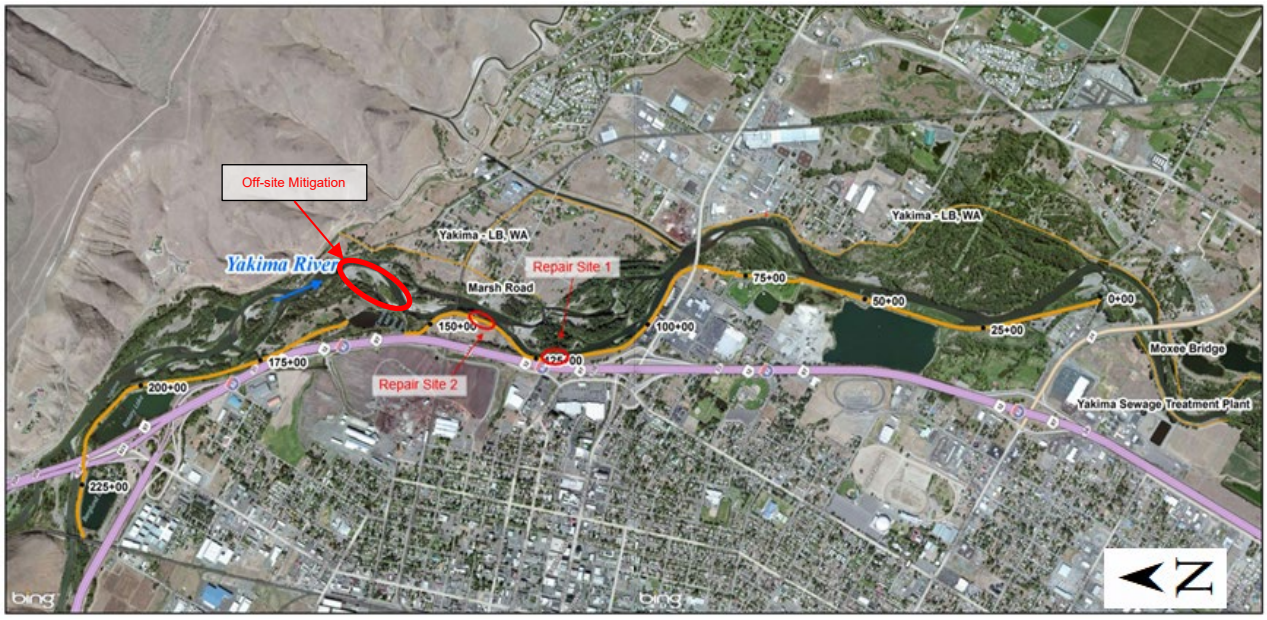


Figure 2. Location of the Yakima RB Levee Site 1 and 2 repair sites.

Figure 3. Location of the Yakima WWTP Levee repair site.

1.4 PURPOSE AND NEED

The purpose of the project is to repair the Yakima RB Levee to the 100-year level of protection and the Yakima WWTP Levee to the 20-year level of flood protection. The repairs are needed because the levees were damaged by the February 2020 flood event described in section 1.1.2 and no longer provides the designed level of protection against flooding. Repairs would restore adequate and reliable flood protection to the same level provided by the levees prior to the damaging flood event. If the levees were to fail, there would be an increased risk to human safety, improved property, and public infrastructure. Per PL 84-99, the Corps is authorized to repair damaged flood control works to the pre-flood level of protection.

2 PROPOSED REPAIR ACTION AND ALTERNATIVES

A preliminary evaluation has been conducted on the alternatives for fulfilling the purpose of restoring the level of protection, as discussed below. Viable alternatives must restore reliable flood protection to the level of protection prior to the damaging event, must be environmentally acceptable, and should address the identified flood risk. The preferred alternative must be the least cost alternative that restores the level of protection while fulfilling all legal, technical and environmental requirements.

2.1 ALTERNATIVE 1: NO ACTION ALTERNATIVE

Under the No Action Alternative, the Yakima RB and WWTP Levees would remain in their damaged condition. This alternative would not meet the project purpose because the levee would likely be further damaged in future flood events and could fail, which would endanger protected homes, businesses, and public infrastructure. During any flood event that threatens the integrity of the levee system, the Corps or other federal and non-federal agencies may act under emergency authorities to preserve the levee system and, to the extent possible, maintain protection of life and property behind the levee. Any response to damages during a flood event would be temporary, less certain of success, potentially more expensive, and could be less protective of environmental and cultural resources. A response would also take time to activate and execute, so there is risk that it would not prevent levee failure, such as overtopping or breaching.

The No Action Alternative is not recommended because it would maintain the increased likelihood of damages or breaching of the levees, presenting a risk to life and property. It does not meet the project purpose and need, nor is it acceptable to Yakima County and the city of Yakima, the non-federal sponsors. While the No Action Alternative is not recommended, it is carried forward for further evaluation to serve as a base condition for evaluation of other alternatives.

2.2 ALTERNATIVE 2: NONSTRUCTURAL ALTERNATIVE

This alternative consists of floodplain management strategies that are offered by other federal and state programs and generally involve changes in land use. Such strategies would include zoning, easements, flood-warning procedures, floodplain evacuation, and flood insurance. Nonstructural strategies involve acquiring, relocating, elevating, and flood-proofing existing structures. The cost and timeframe for implementing this alternative make it impractical. The participation of the non-federal sponsors would be required to implement a nonstructural alternative, and Yakima County and the city of Yakima have not agreed to meet their various obligations in executing a nonstructural alternative. Therefore, this alternative is not carried forward for detailed consideration.

2.3 ALTERNATIVE 3: LEVEE SETBACK ALTERNATIVE

This alternative would shift the alignment of the levee embankment landward to avoid or minimize direct contact with the river and provide additional space for water conveyance. Typically, the setback would involve construction of a new earthen embankment structure and abandonment of the existing levee located on the riverbank. In this instance, a setback levee may be more costly than other alternatives due to the need for more embankment material and real estate requirements. This approach could also encroach on existing structures, privately-owned land, and public infrastructure. Implementing this alternative would also require participation of the non-federal sponsor. While a setback levee would meet the project purpose, Yakima County and the city of Yakima have not agreed to meet their obligations, including land acquisition and additional cost-share funding, to execute a setback alternative. Therefore, this alternative is not carried forward for detailed consideration.

2.4 ALTERNATIVE 4 – REPAIR IN-KIND

This alternative is the preferred alternative and meets the project's purpose and need. The Corps proposes to repair the Yakima RB and the Yakima WWTP Levees to their pre-damage level of protection. Each site would be repaired as shown in the cross sections in Appendices A and B. The levees would be rebuilt within the horizontal and vertical profiles as they were designed and as they existed when first built. The repairs would increase the riprap size from Class III, which corresponds to a median diameter of 15 inches and a maximum rock diameter of 20 inches, to Class V armor at the three repair sites. Class V armor has a median size of 21 inches and a maximum rock diameter of 34 inches. Repair activities for all sites are summarized below.

The design would be within the existing footprint of currently serviceable structures with minor deviation in rock size based on hydraulic analysis under the current Seattle District rock sizing guidelines. The design is based on updated hydrology information from the hydraulic model of the Gap to Gap reach of the Yakima River, which was updated in 2015 to a 2D HEC-RAS hydraulic model. Hydraulic analysis was used to estimate the minimum size rock recommended for the levee repairs. The analysis found that the minimum acceptable riprap class is Class V, with a recommended blanket thickness of 48-inches on the levee slope.

Materials would be purchased from local, privately owned companies. However, any borrow site, quarry, or gravel mine would be fully permitted by the state. Armor rock pieces would be inspected upon delivery and prior to placement for quality, integrity, and absence of excessive imported sediments. Additionally, any onsite material suitable for reuse would be incorporated into the repair. Construction vehicles would access the repair sites from existing levee roads and paths. Excavated materials would be staged within the levee footprint and at designated staging areas.
Work would require removing streamside shrubs and trees from the levee within the construction project footprint, primarily at Yakima RB Levee Site 1 where a 15-foot-wide swath of black locust (*Robinia pseudoacacia*) saplings would be cleared. Material excavated from the levee may be repurposed in the repair, provided it meets the general requirements for suitable levee embankment fill. No fill material would be added beyond the existing levee footprint (i.e. the levees would not encroach farther into the river).

Construction is scheduled to start in January 2022. Work is planned to occur in a single construction period over the course of 6 weeks. All in-water work would occur within the NMFS-approved in-water work window, which is from October 15 to February 15. A typical work week would include six days of construction, eight to ten hours a day depending on available daylight.

Armor rock pieces would be inspected upon delivery and prior to placement for quality, integrity, and absence of excessive imported sediments. All work on the levee would be from land, no equipment drive trains would enter the Yakima River. Some excavation and placement of repair materials would take place below the ordinary high-water mark (OHWM) elevation. During the designated work window, in-water work would include the salvage and replacement of riprap on the toe and riverward face of the levee. Salvaged riprap would be temporarily stockpiled on the levee crown to enable sorting for reuse. Tables 1 and 2 list anticipated equipment and estimated materials involved in the preferred alternative.

Table 1. Estimated materials and quantities for the proposed 2022 repair under the preferred alternative.

Material	Quantity			Location	Use
	RB Site 1	RB Site 2	WWTP		
Quarry Spalls (cubic yards [CY])	416	184	420	Levee slope between riprap and levee embankment material	Bedding course
Class V Riprap (CY)	2,000	970	2,200	Levee slope	Levee armor
Topsoil (CY)	30	20	20	With willow bundles	Soil medium for willows
Willows and red-osier dogwood stakes in bundles	200	100	300	In bundles of 6, 4-ft. long and 6-ft. on center as close to the OHWM as possible.	Riparian habitat, onsite
Crushed Surface Base Course	450	0	0	Levee crown	Access road.
Willows and Red-Osier dogwood Stakes (4 ft. long, 1 ft. on center)	400	0	0	As close to the OHWM as possible at the off-site mitigation location	Riparian habitat for off-site mitigation
Cottonwood (1-gallon container)	50	0	0	Off-site riparian planting area	Riparian habitat for off-site mitigation
Typical Class V riprap is between 11-34 inches diameter, weight between 110-3,800 lbs. Quarry spalls are between 4-8 inches in diameter. Embankment material consists of soil mixed with unsorted small rock. Suitable existing bank material would be reused. Crushed Surface Base Course is small gravel material, typically sized at 1 ¼ inches.					

Table 2. Anticipated equipment needed for the proposed 2022 repair under the preferred alternative.

Equipment	Equipment Notes	Number	Location	Activities	General Description	In-water?
Bulldozer	Blade length 12 ft.	1	Throughout the repair footprint	Manipulates materials. Move and place rock, vegetation, and other materials	Move and place material	No, placement from levee top
Grader	Similar to 12H, min hp 140, min lbs. 30,000, min blade length 12 ft.	1	Haul route	Road grading, blade levels dirt or gravel for roads	Road construction	No
Excavator	Track Mounted Hydraulic Excavator w/hydraulic thumb, similar to 300 series, min hp 200, min lbs. 70,000, min reach 30 ft.	2	Throughout the repair footprint	Workhorse of the repair. Manipulates materials. Move and place rock, vegetation, and other materials	Move and place material	Only bucket and thumb attachment
Vibratory Compactor		1	Levee top	Compact Fill material	Compact material	No
Water truck	Holds up to 3,000 gal.	1	Haul route Existing roads	Wets road surfaces to control dust	Dust control	No
Dump truck	10-12 CY Solo Dump Truck, haul up to Class V riprap	Dependent on delivery	Haul route Existing roads	Transport of materials to and from the project	Material transport	No

2.4.1 Yakima RB Levee Repairs

The Corps proposes to repair the Yakima RB Levee Site 1 in-kind to restore its pre-damage level of protection. The repaired levee would remain within the pre-damage footprint. Riprap would be placed at the original as-built slope, which varies between 2H:1V and 3H:1V. The launchable toe below the bench would have a 2H:1V slope. Sloughed material would be excavated from the scoured toe and the slope re-graded. A launchable toe would be reconstructed within the existing footprint using Class V riprap. The damaged slope would be armored with a 48-inch-thick blanket of Class V riprap backed by a 12-inch layer of quarry spalls. To achieve good compaction and tight interlocking, the slope would be “plated.” Plating involves mechanically working the rock until it locks up. This could be applied force perpendicularly, or a smoothing motion while applying force. This action occurs after all the riprap has been placed on the slope. The upstream and downstream ends would smoothly

transition into the existing slopes. Total construction length is approximately 200 LF at Site 1, including any necessary transitions. Repairs to Yakima RB Levee Site 2 would be similar, however, the waterward edge of the toe would be setback approximately two feet from the pre-damage location. As a consequence of pulling the toe landward, the slope of the Yakima RB Levee Site 2 would be altered from approximately 2.5H:1V to 2H:1V. Total construction length is approximately 100 LF at Site 2, including any necessary transitions.

2.4.2 Yakima WWTP Levee Repairs

The Corps proposes to repair the Yakima WWTP Levee in-kind to restore its pre-damage level of protection. The repaired levee would remain within the pre-damage footprint. Sloughed material would be excavated from the scoured toe and the slope re-graded. The slope and launchable toe would be reconstructed within the existing footprint to their pre-damage slopes of 2H:1V and 1.5H:1V, respectively. The launchable toe would be reconstructed using Class V riprap. The damaged slope would be armored with a 48-inch-thick blanket of Class V riprap backed by a 12-inch layer of quarry spalls and plated. The upstream and downstream ends would smoothly transition into the existing slopes. Total construction length is approximately 300 LF, including any necessary transitions.

2.4.3 Construction Overview

- Hold pre-construction meeting to ensure project goals, objectives, and all environmental responsibilities are understood.
- Field-stake project footprints; clearly identify vegetation clearing limits; and install proper best management practices (BMPs).
- Establish staging and material re-handling site (as necessary).
- Clear and prepare site as necessary.
- Construct the levee embankment rehabilitation project in accordance with the details shown in the plans:
    - Remove remnant riprap and other materials from levee slope. Salvage and stockpile materials to be re-used, as practicable or for removal from the site.
    - Excavate sloughed embankment material at the scoured riverward toe and regrade slope. Repair scour with quarry spalls (as necessary).
    - Reconstruct launchable toe and place slope armor. Work larger rock toward levee toe. Material would not be end-dumped. Riprap would be placed individually or in small bucket loads. Spalls would be placed using the excavator bucket.
    - Incorporate coyote willow (*Salix exigua*) and red-osier dogwood (*Cornus stolonifera*) bundles within topsoil units approximately 2 feet in width, 12 inches thick and 3 feet deep, spaced 6 feet on center. Target elevation is approximately the OHWM elevation and matching the lowest vegetation line established by observing preexisting conditions upstream and downstream.
    - Place slope armor above the soil lift to the height of the existing levee, and finish constructing the slope using embankment material, as per plans and specifications (Appendices A and B).
    - Transition upstream and downstream ends of the repair to smoothly tie into existing slope.
    - To achieve good compaction and tight interlocking, the slope would be plated after all the riprap has been placed on the slope.
- All disturbed soils of the project not covered by armor rock would be covered with topsoil and hydroseeded. This includes the staging areas and portions of the access roads.
- Restore asphalt pathway on the levee crown as necessary.

- Clean up and restore all disturbed landward staging and access sites.
- Hydroseed all disturbed areas.
- Plant off-site mitigation area – willow and red-osier dogwood stakes, and containerized cottonwood plants.

2.4.4 Construction Sequence

Site Preparation

The first component of construction includes the preparation of access routes and the existing prism for material removal. Preparing the prism entails removing and clearing of any vegetation, preparing access, and establishing a consistent surface. Site limits would be clearly marked using stakes and flagging. Staging activities would consist of temporarily stockpiling construction materials, supplies, equipment, and vehicles. Work and staging areas would be limited to the areas shown in the plans for each site (Appendix A and B). The area that would be disturbed for reconstruction for Yakima RB Levee Sites 1 and 2 is approximately 0.31 acre at Site 1 and 0.18 acre at Site 2, and 0.28 acre for the staging site. For the Yakima WWTP Levee the area that would be disturbed for reconstruction is approximately 0.47 acre at the reconstruction site and 0.13 acre for the staging area.

Deconstruct Damaged Levee

The damaged portion of the levee would be deconstructed by removing, salvaging, and stockpiling remnant riprap and other existing material as practicable. As necessary, sloughed embankment material would be excavated from the scoured riverward toe. A mid-slope bench would also be excavated to grade the levee embankment to the pre-existing levee slope. Excavated materials would be stockpiled in approved areas or disposed of off-site.

Construct Levee Repair

Scour damage at the toe of the levee prism would be repaired by placing quarry spalls to restore the slope. Subsequently, the launchable toe would be reconstructed. The toe below the bench would have either a 2H:1V slope (Yakima RB Levee) or a 1.5H:1V slope (Yakima WWTP Levee). A 12-inch layer of quarry spalls would be placed over the levee embankment material, and the slope re-armored riprap.

Once slope armor has been placed to as close as possible to the elevation of the upstream and downstream existing vegetation, willow bundles would be installed horizontally within a 12-inch thick, 2-foot wide and 3-foot-deep unit of topsoil. The topsoil and willow unit would be spaced every 6 feet on center. The bundles are located to match the upstream and downstream vegetation line along its lowest slope elevation approximately at the OHWM. Acceptable species include coyote willow and red-osier dogwood. Slope armor would subsequently be placed to the top of the levee slope.

Complete Construction

Upon completion of all construction activities, areas disturbed by levee construction, staging activities, or road access would be re-seeded with native grasses, as appropriate. Any damages caused to the asphalt pavement on top of the levee crown during construction would be repaired.

2.5 Environmental Mitigation

Riparian vegetation is important for recruitment of LWM in the river, shading, cover, food, complexity of shoreline, nutrient input, and as perching and nesting habitat for birds. Shoreline habitat in Yakima along the Yakima River is degraded due to the presence of levees along most

of its length but vegetation is still present and provides an ecological benefit. Existing vegetation is described in section 3.1. As part of the repair, the Corps is proposing the following measures to mitigate habitat impacts from the work.

- On-site: At all repair sites, coyote willow and red-osier dogwood bundles would be incorporated into the levee slope at 6-foot intervals along a line matching the lowest vegetation line, approximately at the OHWM. See sheet C-301 in Appendix A and B for the bundle cross section. Substitutes for coyote willow and red-osier dogwood may be used after review and approval by the project biologist. Possible substitutes are arroyo willow (*S. lasiolepsis*), dusky willow (*S. melanopsis*), Scouler's willow (*S. scouleriana*), or stakes collected from nearby stands of native willows.
- Off-site: Repair work along 200 LF at the Yakima RB Levee Site 1 would remove a 15-foot-wide swath of black locust saplings, which provides overhanging vegetation to the Yakima River. The maximum area of vegetated aerial coverage impacted is estimated at 0.07 acre. To offset the loss of overhanging cover and localized shade, vegetation projected to yield 0.20 acre of foliage cover at full maturity would be planted at an off-site location upstream of the repair (Figure 4). Off-site plantings include 50 black cottonwood (*Populus balsamifera*) containers and 400 coyote willow or red-osier dogwood stakes. No off-site mitigation is proposed in compensation for the repair work on the Yakima RB Levee Site 2 and the Yakima WWTP Levee because they are bare or sparsely vegetated with a few shrubs (see section 3.1). See L-101, L-102, and L-501 in Appendix A for the planting details.

Figure 4.Off-site mitigation planting area.

Monitoring and adaptive management of on-site and off-site plantings, including replacement and maintenance, after the first year would be conducted by the Corps. If after the first year less than 80 percent of the plantings survive, all the dead plantings would be replaced. Each site would be evaluated separately. In preparation for any required adaptive management re-

plantings, the Corps would evaluate why the plantings failed and plan the best path forward for successful replacement. The Corps would engage with the non-federal sponsor to assist in identifying the problem and alternative planting practices for successful re-planting. These may include planting different species, changing the planting location, or adding pest control or exclusion devices. If replacement occurs, the plantings would be monitored for an additional year by the Corps. The Corps would report the success of the mitigation plantings to the resource agencies with which it coordinated for the repair. The plantings would be evaluated in September of each applicable year before leaf drop.

The following information would be provided in a post-construction report to the National Marine Fisheries Service (NMFS) and U.S. Fish and Wildlife Service (USFWS) by December 1, 2022, and constitutes the maintenance, monitoring and adaptive management plan:

1. Project identification:
    i. Project name: Yakima Right Bank Federal Project and Yakima Wastewater Treatment Plant Levee PL 84-99 Repair
    ii. Corps contact person
2. Construction details
    i. Starting and ending dates for work completed for construction
    ii. Total area (sq ft) of in-water construction footprints
    iii. Total area (sq ft) of riparian disturbance (i.e., waterward face of the levee)
    iv. Results of turbidity monitoring
    v. A description of any elements of the project that were constructed in a manner different from that depicted in the BA, associated addendums, and communications.
    vi. Percent survival of installed bundles at the end of the first growing season and, if survival is less than 80 percent, remedial measures planned or undertaken to replace dead plants. Each repair site would be evaluated separately.
    vii. Plant survival, based on how many of the total plants installed survive, at the off-site mitigation area at the end of the first growing season and, if survival is less than 80 percent at each off-site location, remedial measures planned or undertaken to replace dead plants.
3. If re-planting is required due to survival of less than 80 percent, the Corps would submit an additional monitoring report of the survival status of all plantings following one growing season after re-planting.

2.6 In-Water Work Windows

The NMFS office in Ellensburg was contacted on September 16, 2020 with a request to clarify the in-water work window for the Yakima River. Based on past repair projects in the area, NMFS suggested an in-water work window to account for the altered hydrology in the river from irrigation management. Because of irrigation water storage, low-flow does not occur in the summer, but instead in the winter. The NMFS recommended in-water work window is October 15 to February 15. The Corps would use the NMFS recommended the October 15 to February 15 in-water work window for the proposed repairs.

2.7 Best Management Practices

Below are BMPs that would be incorporated into the action. Some are integrated into the repair, while others are guides to operation and care of equipment.

1. In-water work would be limited to the in-water work window (October 15 to February 15) and minimized to the extent possible.

2. Water quality monitoring for turbidity would be performed for a minimum of one day at the start of each new sediment-generating activity. See Water Quality Monitoring Plan for sampling protocols (Appendix D). In the event that Washington State Water Quality Turbidity standards (WAC 173-201A) are exceeded, or a visual plume is detected, work would be halted until the situation can be assessed and corrected.
3. Temporary erosion control measures would be installed for all phases of work to be conducted. As construction advances, installation of silt fencing would occur during the full length of disturbed area of the project site. Additional erosion control measures would be used as needed to manage the discharge or accumulation of sediment into the river, adjacent swales, catch basins, storm drains and off-site. Accumulations of sediment in adjacent swales or storm drains would be monitored daily and cleared to ensure continued service throughout construction.
4. Vegetation removal would be limited to the repair sites.
5. Should any large woody material (LWM) be generated or found on site during repairs, it shall be salvaged and placed along the completed toe of the repaired levee where it can continue to provide habitat function. This includes any tree trunks and large shrubs. The LWM may be placed after a section of levee is completed or after the entire repair. Depending on the water height, the material may be placed above or below the willow/dogwood stakes.
6. Noxious weeds would be disposed of separately from other organic materials at an approved off-site location.
7. Equipment that would be used near or in the water would be cleaned prior to construction.
8. Drive trains would not work in the water. Only the excavator bucket with thumb attachment would extend into the water.
9. Fueling would occur on the back side of the levee 100 feet away from the waterline, and biodegradable hydraulic fluids would be used as appropriate in any portion of the equipment that would work in the water.
10. Construction equipment would be regularly checked for vehicle-fluid drips or leaks.
11. At least one fuel spill kit with absorbent pads would be onsite at all times.
12. Material placed into the water would be placed individually or in small bucket loads. No end dumping of rock into the water or on the levee slope would occur.
13. Rock placement would occur only within the project footprint.
14. Rock placement would occur from the upstream end of the project to the downstream end so that placed rock would act as a localized flow deflector and help manage flows in the installation areas.
15. All work construction activities would occur during daylight hours to minimize noise impacts to the surrounding community.
16. After construction is complete, the disturbed areas not covered in armor, asphalt, or other rock would be reseeded using a native grass seed mix including a mulch base. All disturbed soils (e.g., staging areas and access) above the OHWM not covered by riprap would be topped with topsoil and hydroseeded.
17. All trash and unauthorized fill generated by the repair would be removed from the project and staging area, including concrete blocks or pieces, bricks, asphalt, metal, treated wood, glass, floating debris, and paper, and dispose of properly after work is completed.

2.8 CONSERVATION MEASURES

The Corps has developed a list of conservation measures and incorporated these into the levee repair to reduce environmental impacts of the proposed repair. For this project the measures are the following:

- Willow, red-osier dogwood, and cottonwood planting, maintenance, monitoring, and adaptive management on site.
- Additional off-site planting of willow, red-osier dogwood, and cottonwood to compensate for loss of vegetation cleared due to construction at the Yakima RB Site 1.
- Follow-up post-construction review of conservation measures. The repair site would be examined after the repair is completed. If conservation measures and repairs are different from described here or what is depicted in the plans, they would be recorded and described.

3 ENVIRONMENTAL RESOURCES OF CONCERN AND EFFECTS

This section evaluates impacts to various resources by the different alternatives carried forward for evaluation. A list of the resources considered for evaluation are shown in Table 3. Not all resources are carried forward for analysis.

Table 3. List of resources considered for detailed effects analysis and rationale for inclusion or exclusion.

Resource	Included in Detailed Analysis	Rationale for Inclusion or Exclusion
Vegetation	Yes	Aquatic vegetation is not located in or immediately adjacent to the project area, but shoreline vegetation is present. Analysis is required to investigate what vegetation exists and to determine the extent of any potential effects.
Navigation	No	Repairs to the levee would not affect navigation.
Water Resources	Yes	The proposed action may affect water quality. Analysis is required to investigate what water quality conditions are present and to determine the extent of any potential effects.
Geology and Soils	No	The proposed action repairs an existing structure. While there would be ground disturbance, it is restricted to the project footprint, which is artificially placed material. Repairs would cause insignificant affects to soil conditions and would not affect geology.
Wetlands	No	Wetlands are not located in or immediately adjacent to the project area. The proposed repair would have no effect on wetlands.
Threatened and Endangered Species	Yes	The proposed action may affect listed species in the project area. Analysis is required to determine what species are present and the extent of potential effects.
Fish and Wildlife	Yes	Same rationale as above.
Cultural Resources	Yes	Analysis is required to investigate cultural resources and to determine the extent of any potential effects.
Hazardous, Toxic, and Radiological Waste	No	The project area does not have contaminants. The closest superfund site is approximately 1.45 miles away. This resource is not carried forward for evaluation.
Air Quality and Noise	Yes	The proposed action involves construction equipment that generate exhaust and noise. Analysis is required to investigate

Resource	Included in Detailed Analysis	Rationale for Inclusion or Exclusion
		what air quality and noise conditions there are and to determine the extent of any potential effects.
Land Use, Utilities, and Infrastructure	Yes	The proposed action may affect land use, utilities, and infrastructure within the project area. Analysis is required to investigate what conditions at the project site and surrounding area are, and to determine the extent of any potential effects.
Recreation	Yes	The proposed action may affect recreational uses on the levee during construction. Analysis is required to investigate what recreation is present, and to determine the extent of any potential effects

3.1 VEGETATION

3.1.1 Existing Conditions

Vegetation across the Yakima Subbasin is a mixture of forest, grassland (shrub/steppe), and croplands. Historically the Yakima Valley was shrub-steppe habitat. Today 95 percent of that habitat has been converted to cropland and grazing (YSFWPB 2004). Riparian and wetland conditions in the Yakima River subbasin range from severely degraded to high quality depending on the level of impact by human activities. Impacts include hydrologic alteration, land use conversion, agricultural practices, levees, and urban development projects, resulting in constriction of floodplains and reduced riparian wetland habitats. Irrigation needs have led to stream side-channels and distributaries being converted to canals and drains where timing of flows been highly altered, causing loss of natural function (YSFWPB 2004). Loss of native vegetation and replacement by non-native species is the result of these widespread hydrologic alterations.

Riparian habitat, including wetlands, covers a relatively small area of the basin, yet it supports a higher diversity and abundance of fish and wildlife than any other habitat (YSFWPB 2004). Riparian habitat provides important fish and wildlife breeding habitat, seasonal ranges, and movement corridors. It has important social values, including water purification, flood control, recreation, and aesthetics; however, it is vulnerable to alteration. Riparian habitat has been lost on a large scale because floodplains have been converted to human uses, such as development, shoreline protection, irrigated agriculture, pasture, or gravel mining.

Yakima RB Levee Repair Site 1 is vegetated with black locust saplings and scattered patches of golden currant (*Ribes aureum*), rugosa rose (*Rosa rugosa*), and clematis (*Clematis sp.*). The total maximum area of vegetated aerial coverage is estimated at 0.07 acres. There is one sapling maple (*Acer sp.*) and one sapling elm (*Ulmus sp.)*, but no mature trees or native vegetation. The landward side of the levee at Site 1 is dominated by non-native grasses and shrubs. Yakima RB Levee Repair Site 2 is vegetated with only a few coyote willows along the water line and some scattered rugosa rose and black locust shrubs. The landward side of the levee at Site 2 is dominated by black locust shrubs and grass. In general, the landward side of the Yakima RB Levee near the damaged sites are sparsely vegetated with grasses. The riverward side of the Yakima WWTP Levee repair segment is unvegetated and the landward side is vegetated with grasses.

3.1.2 No Action

Depending upon the magnitude and duration of future flood events, the levee at the damaged site may start to erode and 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 repair under difficult construction conditions, regardless of the type of vegetation. Willow bundles are not included during flood fights because river conditions prevent their installation. An emergency response is focused on maintaining the integrity of the flood control structure. Furthermore, flood conditions mean that any willows would be installed below the waterline during high flows. These conditions are not appropriate for willow installation. The Corps' involvement during flood fight activities is limited to the flood event. If flood fights were unsuccessful and the levees failed, inundation and possible channel migration could have significant impacts on area vegetation.

3.1.3 Repair In-Kind Alternative

Under this alternative construction activities would clear vegetation from within the repair footprints at the Yakima RB Levee repair sites, including black locust saplings and scattered shrubs, and saplings with an estimated maximum aerial coverage of 0.07 acres. To mitigate for the vegetation removal the repair includes on-site and off-site mitigation, as described in section 2.5. A 3:1 replacement ratio was used to calculate the required area of off-site plantings to compensate for the loss of vegetation at the Yakima RB Levee repair site. This ratio is greater than 1:1 replacement ratio since there would be a temporary loss in habitat until the vegetation establishes. As the mitigation plantings grow, they would regain ecological functions, providing food and substrate for insects and contributing organic material to the river, including LWM. Shading and other functions along the levee, however, could be limited by maintenance trimming and clearing to protect levee integrity and allow inspection through the non-federal sponsor's maintenance regimen. The willow bundles and off-site plantings would not be cleared. The non-federal sponsor may trim the willow bundles when they grow large enough to prevent an adequate visual field for levee safety inspections. Off-site mitigation would not be trimmed because they are located outside of the levee footprint and vegetation free zone. The off-site mitigation plantings would provide greater benefits because of this and their location within the active floodplain and not on or behind the levee. Effects on vegetation would be temporary and negligible.

3.1 WATER RESOURCES

3.1.1 Existing Conditions

The proposed repairs are located in what is locally referred to as the Gap-to-Gap Reach, which is a 10 mile stretch of Yakima River between the bedrock constrictions at Selah Gap (river mile 117) and Union Gap (river mile 107) near the Wapato dam. The Gap to Gap Reach of the Yakima River is notable for extensive gravel mining operations. Close to twenty active or abandoned gravel pits are present along the river and floodplain within this reach. The largest single pit, Buchanan Lake (also referred to as Beech Street pit) covers nearly 40 acres of formerly active channel and is disconnected from the river by the Yakima RB Levee. The city of Yakima WWTP effluent treatment ponds and outfall to the river are located behind the Yakima WWTP Levee repair site. With the exception of the lower two miles along the left bank, armored levees and highway embankments act as controls on channel migration and confine the Yakima River to a much narrower active width. The Wapato Dam, which is located approximately 3.7 miles downstream of the Yakima WWTP Levee repair site, acts as a control on channel elevation and has been attributed to upstream aggradation.

The five Yakima Project reservoirs in the upper basin have been operated by the U.S. Bureau of Reclamation since the early 1900s for agricultural flow augmentation and flood control. The reservoirs store water at times of high flow and release it for irrigation during spring and

summer. This reduces flood flows in the winter and increases otherwise low flows in the summer in some of the upstream tributaries (locally referred to as “flip-flop”). Yakima River flows primarily originate from snowmelt and rainfall on the eastern slope of the Cascade Mountains in the fall and winter and are augmented by reservoir releases in dry months. Average flows are highest during the months of April, May, and June as a result of spring snowmelt runoff (Figure 5), however peak flood flows typically occur during the winter. Winter flood flows are associated with warm temperatures and rainfall on melting snowpack and typically follow precipitation periods that have saturated soils, producing greater rates of runoff (Yakima County 2007).

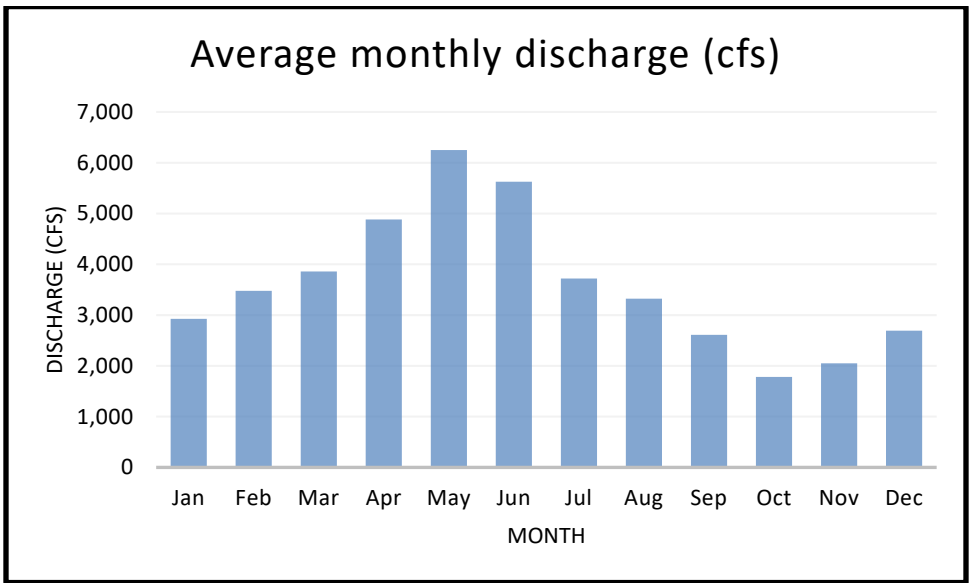


Figure 5. Monthly average streamflow summary, Gap to Gap (USGS 2021).

The Washington State Department of Ecology (Ecology) designated water resource uses in the Yakima River (Table 4). Ecology also lists the Yakima River adjacent to the Yakima WWTP Levee repair site and downstream approximately 3,500 feet from the Yakima RB Levee repair site on the 303(d) list for pH. Ecology lists the Naches River, where it meets the Yakima River upstream of the repair sites, on the 303(d) list for pH and temperature. USGS Gage 12500450 records average monthly water temperature for the Yakima River in 1981, 2005, and 2006 (Figure 6; USGS 2021). The average highest and lowest water temperatures are recorded in August and December, respectively. In-water work would occur within the in-water work window (October 15 to February 15).

Table 4. Designated aquatic uses for Yakima River at the damaged sites (Ecology 2021a)

Use	Type of Use
Aquatic Life	Salmonid spawning, rearing, and migration
Recreation	Primary contact (includes swimming, skin diving, and water skiing)
Water Supply	Domestic
	Industrial
	Agricultural
	Stock
Miscellaneous	Wildlife Habitat
	Harvesting
	Commerce and Navigation
	Boating
	Aesthetics

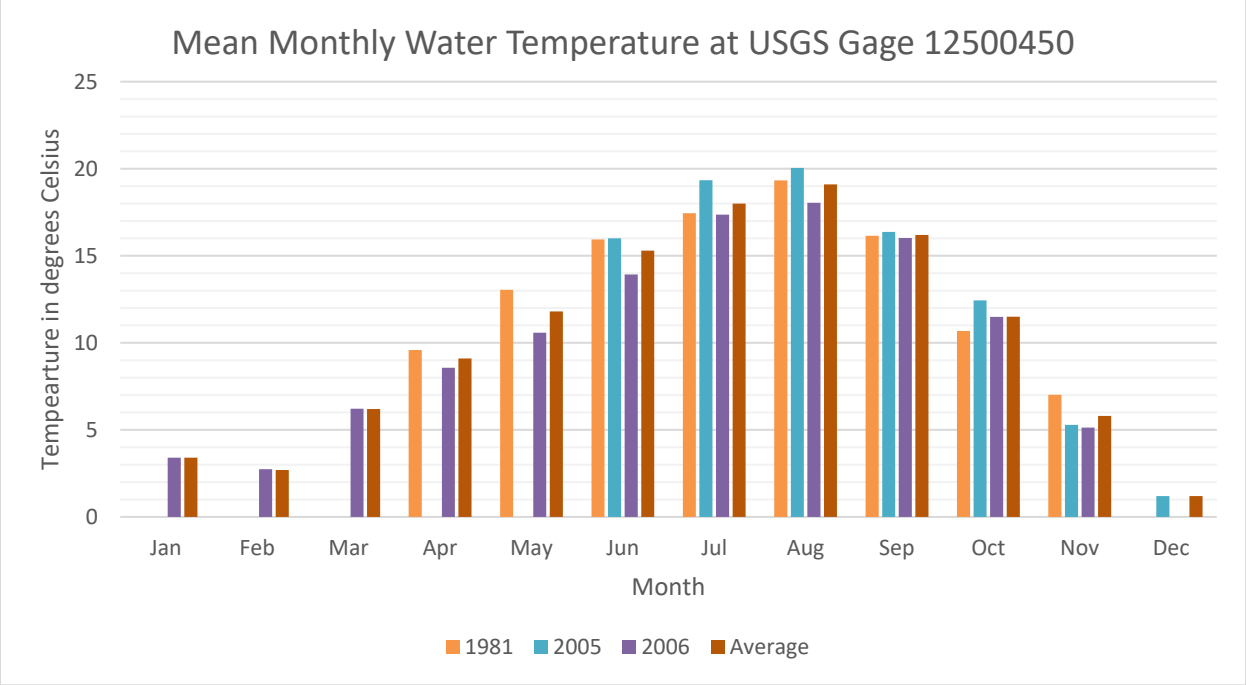


Figure 6. Mean monthly water temperature in degrees Celsius for the years recorded at the USGS gage 12500450 (USGS 2021).

3.1.2 No Action

Under this alternative, the damaged levee could sustain further damage, which may lead to flood fighting measures and fill placement during future high-water events. This would increase sediment and turbidity in the river, which may be a minor concern during a flood event. Levee failure, if flood fighting efforts were unsuccessful, could allow floodwater to transport debris, sediment, and pollutants back into the river from adjacent properties with substantial impacts to water quality and potential for sediment contamination. Adjacent properties include the city of Yakima WWTP, residential homes, various business, industry, and public infrastructure.

3.1.3 Repair In-Kind Alternative

Under this alternative, the Yakima RB and WWTP Levees would be repaired in-kind, with a minor deviation of rock size at each site and setting back the waterward edge of the toe approximately two feet from the pre-damage location at the Yakima RB Levee Site 2 repair location. The proposed design is considered to be a minor deviation in the structure's configuration due to the increase in rock size. The repaired slopes would be similar to the adjacent slopes so there would be no measurable change in the flow and/or erosional forces of the water. All riverward repairs would occur within the pre-damage levee footprint, i.e., the levee would not encroach farther into the river.

Repairing the levee in-kind would require work in the active channel with some work below the OHWM. Construction could be expected to cause minor, temporary, and localized increases in turbidity. BMPs, including restrictions on fueling and prevention of fluid leaks from construction equipment, would be employed to minimize and prevent discharge of pollutants into the river. Materials used for the repair would be clean and contaminant free, and purchased through a contract bidding process from vendors fully permitted by the state. Turbidity would be monitored upstream and downstream of the project site during construction (Appendix D). If turbidity exceeds state water quality standards, particulate-generating activities would be halted until standards are met and construction methods would be changed to avoid further exceedances.

This alternative would remove shoreline vegetation, primarily at the Yakima RB Levee Site 1 repair location and replace it with rock armor, reducing shading and increasing localized water temperatures along the shoreline. No significant changes in nutrient inputs that could change pH or decrease dissolved oxygen are anticipated as part of the project. No changes to contamination in the water would occur because only clean fill material would be used in the repairs. The repairs would affect vegetation, but most of the repair areas provide minimal shading or other temperature-moderating effects in these channel reaches. Native tree and shrub plantings described in section 2.5 would mitigate for minimal effects on temperature of the vegetation removal in project areas. Effects to water quality due to the Repair In-Kind alternative would be temporary and localized.

3.2 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. The species listed in Table 5 are protected under the ESA and may occur in the project area. The following sections briefly summarize relevant information about the protected species; 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 (BA) to the USFWS and the NMFS regarding effects to these species. See section 7.4 for compliance details with the ESA consultation.

Table 5. ESA listed species potentially located within the project area during the proposed action.

Species (Common and Scientific Name)	Distinct Population Segment (DPS) or Evolutionarily Significant Unit	Federal Listing	Critical Habitat in Project Area	Potential Occurrence (Likely, Unlikely, or Absent) in Action Area
Fish				
Steelhead (*O. mykiss*)	Middle Columbia River Steelhead DPS	Threatened, Critical Habitat Designated	Yes	Likely
Bull trout *(Salvelinus confluentus)*	Columbia DPS	Threatened, Critical Habitat Designated	Yes	Likely
Birds				
Yellow-billed cuckoo *(Coccyzus aericanus)*	Western	Threatened, Critical Habitat Proposed	Proposed, not in project area	Unlikely

Other listed species are highly unlikely to occur in the project vicinity and thus would not be affected by the proposed actions, because of intolerance of the level of human activity already present in the action area, specialized habitat requirements that aren't present in the action area, or both. These species include the Canada lynx (*Lynx canadensis*; threatened; reclusive and very unlikely in the urbanized project vicinity), grizzly bear (*Ursus arctos horribilis*; threatened; presence in Washington not well documented and likely scarce; very unlikely to be found in the urban project environment), marbled murrelet (*Brachyramphus marmoratus*; threatened; requires old-growth forest for nesting, and feeds in marine environment; no critical habitat is designated within Yakima County), northern spotted owl (*Strix occidentalis caurina*; threatened; requires old-growth forest for nesting and feeding; designated critical habitat includes parts of Yakima County but not project area), and Ute ladies-tresses (*Spiranthes diluvialis*; threatened; found in wetlands including spring habitats, and mesic to wet meadows and floodplains, and possibly continuously wet gravel bars; in Washington may be known only in Chelan and Okanogan counties [Burke Museum 2021]). Thus, these species and their critical habitat would not be affected by the proposed action and are not discussed further in this document.

3.2.1 Existing Conditions

3.2.1.1 Middle Columbia River Steelhead

The Middle Columbia River population of steelhead was listed as a threatened in 1999 (NMFS 1999), reaffirmed in 2005 (NMFS 2005). The threatened status once again affirmed during 5-year status reviews on August 15, 2011 (NMFS 2011), and again on May 26, 2016 (NMFS 2016). The Yakima River is designated as critical habitat for steelhead (NMFS 2005b). NMFS (2006) cites continued low returns of Yakima steelhead, at about 10 percent of interim recovery target, as a source of concern. Despite significant efforts to improve habitat conditions in the range of steelhead, much of the habitat remains degraded. Steelhead can be divided into two basic run types based on their level of sexual maturity at the time they enter fresh water and the duration of the spawning migration. The stream-maturing type, or summer steelhead, enters fresh water in a sexually immature condition and requires several months in fresh water to mature and spawn. The ocean-maturing type, or winter steelhead, enters fresh water with well-developed gonads and spawns relatively shortly after river entry. Fish in the Middle Columbia

River steelhead DPS are predominantly summer steelhead. Summer run steelhead enter the river between May and October. During this time, they rarely eat and grow very little. Adults cease movement in the cold winter months and then resume migration in February and March. Generally, spawning of Yakima summer steelhead occurs early March-early June in tributaries to the Yakima River (YBFWRB 2009; YSFWPB 2004). Fry emergence occurs in early June through early July. Rearing occurs in the natal stream until the following October, when juveniles migrate to lower positions in the basin. Steelhead adults migrate through the action area to reach spawning streams, with migration occurring from November through April (YBFWRB 2009). Juveniles rear in mainstem river habitat year-round and are expected to be rearing in the project area during construction.

3.2.1.2 Columbia River Bull Trout

The USFWS listed the Columbia River population of bull trout as threatened in 1998 (USFWS 1998). Bull trout are estimated to presently occur in 45 percent of their estimated historical range (Quigley and Arbelbide 1997). The Yakima River is designated as critical habitat for bull trout (USFWS 2010). Bull trout spawn and rear in or near the coldest sections of the stream network, which are usually small, high-elevation, and unproductive headwater streams. They often move from these areas to larger streams, lakes, reservoirs, or even marine environments that provide resources for improved growth and reproductive potential. The Yakima River supports fluvial bull trout which spawn and rear in smaller tributaries and then move downstream into the mainstem where major growth and maturation occur. Spawning occurs from August to December during periods of decreasing water temperature. Incubation typically takes 100 to 145 days and fry normally emerge from April to May, depending on stream flows and water temperature (YSFWPB 2004). The USFWS 5-year review estimates the population in the Yakima River to be between 250-1,000, noting a very rapid decline of the population and ranking the population as in substantial imminent threat (USFWS 2008 and 2015). Specific data on bull trout use of the mainstem Yakima River below Roza Dam (10 miles north of Yakima) is lacking. However, based on the available data from the Washington Department of Fish and Wildlife (WDFW 2016), bull trout could be present in the project vicinity. WDFW identifies the presence of bull trout in the project area; however, spawning and rearing activity are not currently documented in the project vicinity and their occurrence is thought to be rare (WDFW 2021a).

3.2.1.3 Yellow-billed Cuckoo

The yellow-billed cuckoo is a neotropical migrant bird that winters in South America and breeds in western North America. It was listed as federally threatened in 2014 (USFWS 2014). Historically, yellow-billed cuckoos nested in riparian woodlands along rivers in eastern Washington, as well as in various locations in western Washington. The last confirmed breeding records for the species in the state are from the 1930s, and it is likely the species is extirpated as a breeder (USFWS 2013). Yellow-billed cuckoos breed in large blocks of riparian habitat, particularly woodlands with cottonwoods and willows (USFWS 2013). The subspecies' preferred habitat contains a combination of a dense willow understory for nesting and a cottonwood overstory for foraging (Gaines and Laymon 1984). Most nesting in the western region occurs between June and early August but can extend from late May until late September (Hughes 1999). Critical habitat was designated in 2021 for the yellow-billed cuckoo but not in the project area (USFWS 2021). Although several recent surveys have been conducted in eastern Washington to check locations of previous sightings (Okanogan County) and potential habitat (Yakima County), no cuckoos were detected, despite a small number of statewide accounts in recent years (USFWS 2013). No nesting has been recorded in Washington; however, in eastern Washington, individual cuckoos have been occasionally sighted during summer (WDFW 2013). Recent sightings of individuals have been recorded in 2012 and 2015 in northern Washington

(Martha Jensen, USFWS, personal communication, March 2016). None of the sightings are located in Yakima County. Based on this information, yellow-billed cuckoos are extremely unlikely to be present in the project area.

3.2.2 No Action

The No Action Alternative could result in continued erosion of the bank, especially in a flood event, and could leave the levee vulnerable to continued damage and breaching. A breach would result in inundation behind the levee with associated severe turbidity and potential pollution impacts to the river. A flood fight would likely be undertaken to prevent a breach and could require in-water work that could affect steelhead and bull trout near the emergency action site but not yellow-billed cuckoo as they are likely extirpated from the area. Emergency actions would entail more in-water work and could have greater impact on aquatic dependent ESA-listed species habitat than a scheduled repair action. Flood fight actions that remove vegetation and disturb the river would have negative impacts, the severity of which is determined by timing, location, and extent which cannot be accurately predicted. If flood fights were unsuccessful and the levee failed, inundation and possible channel migration could have significant impacts on ESA-listed species. The size of the flood and the degree of levee failure would determine the magnitude of impacts to ESA-listed species and their critical habitat.

3.2.3 Repair In-Kind Alternative

Pursuant to Section 7 of the ESA, the Corps submitted a BA to the USFWS and NMFS regarding effects of the Repair In-Kind alternative to the ESA-listed species and their critical habitat listed in Table 5. See section 7.4 for compliance details with the ESA consultation. Effects on ESA-listed species and their critical habitat would be negligible.

3.2.3.1 Middle Columbia River Steelhead

Salmonids, including steelhead, may be absent from in-water work areas during construction but are present in the action area year-round. If present in the work area, steelhead juveniles rearing in the project area and adults holding or migrating past could be affected. Adult steelhead typically winter in the Yakima River between Prosser and Sunnyside dams between October and February before migrating upstream between January and May (Hockersmith et al. 1995 as cited in YBFWRB 2009; WDFW 2020b). During construction adults are expected to be holding in the action area, though are unlikely to be located directly in the footprint of the repair. Impacts to steelhead from the proposed levee repair would be similar to those from previous repairs. The 600 feet of repairs would be completed over 6 weeks, starting in January, when average river flows are low, almost comparable to river flows before flip-flop when water management flips from releasing waters in the upper Yakima reservoirs, to releasing water from basins in the Naches River.

Impacts from in-water work may include elevated turbidity, physical disturbance, and noise from the excavation and placement of material that could result in interruption of foraging and migration behavior, elevated stress levels, and physical damage. In general, larger fish, like adult steelhead, would be less impacted and better able to avoid these stressors. Juvenile steelhead would be the most vulnerable because of their tendency to seek refuge along the shoreline. At the Yakima WWTP Levee repair site, which is on the outside bend of the river, it is anticipated that adult and juvenile steelhead would avoid the high velocities of the thalweg and would take refuge along the opposite bank where lower velocities occur, and less energy has to be expended. The Yakima RB Levee repair sites are in an area of lower velocities where steelhead may congregate. In this case, steelhead would most likely experience some impact from elevated turbidity levels, but because those levels would be well below levels that cause physical damage, impacts to steelhead would be minor.

Physiological effects of increased turbidity can include gill trauma (Servizi and Martens 1987; Noggle 1978; Redding and Schreck 1987), and affect osmoregulation, blood chemistry (Sigler, 1988), growth, and reproduction. Behavioral responses include feeding disruption from olfactory and visual impairment (Sigler 1988); gill flaring; and curtailment of territorial defense (LaSalle 1988). Turbidity would be monitored during in-water work to ensure it remains below standards thereby minimizing its effects on aquatic biota (Appendix D).

The proposed action could produce underwater sound from the removal and placement of rock along the shoreline. The construction activity's greatest underwater sound levels would likely be generated by removal and placement of rock below the waterline. Work conducted above the waterline could create sound that propagates through the ground to the water, albeit at a lower level than the source (Reinhall and Dahl 2011, Hawkins and Johnstone 1978). Studies directly measuring underwater sound from underwater rock placement are lacking (Wyatt 2008; Maritime Limited 2015). Underwater sound generated from rock placement along a riverbank has not been studied. One study did measure sound from rock placement from a vessel through a steel/HDPE pipe in an open-water marine environment. This study measured sound levels up to 120 decibels (dB) which were attributed primarily to the vessel (Nedwell and Edwards 2004). Underwater removal of rock conducted under the proposed action has similarities with backhoe dredging with respect to the equipment and material involved. A backhoe dredge is significantly larger and more powerful than excavators that would be used to conduct work under the proposed action, so the sound created by a backhoe would be expected to be more intense than that which could occur from the proposed action. Sound from backhoe dredging was measured between 124 and 148 dB at 60 meters (Reine and Dickerson 2012). The authors estimated a maximum intensity at 1 meter of 179 dB.

NMFS fish injury thresholds for both continuous and pulsed sound are 183 dB (for cumulative sound) and 206 dB (for peak sound) (NMFS et al. 2008). The limited data available suggests sound potentially created by the proposed action would not exceed these thresholds and therefore not cause fish injury. Popper et al. (2014) and Reine and Dickerson (2012) both indicate there is no direct evidence for fish mortality or mortal injury from continuous sound such as that resulting from the proposed action.

The NMFS threshold for fish harassment is 150 dB (NMFS et al. 2008). It is possible this harassment threshold could be exceeded by the proposed in-water excavation work based on Reine and Dickerson (2012) discussed above. If this were to occur, it would result in salmon moving away from the immediate project site. This behavior is likely to occur regardless simply due to the ground and water disturbance associated with removing and placing rock along the levee. Since at the repair sites the river is approximately 160 feet wide at the Yakima RB Levee repair sites and 130 feet at the Yakima WWTP Levee repair site, it is anticipated that the harassment threshold would extend across the river during rock placement activities. Exceedance of this threshold would be intermittent and only during rock placement activities below the waterline. Therefore, there could be intermittent periods when movement of fish is hindered.

It is anticipated that intermittent passage would occur during breaks in the work and at night when work is not occurring. Potential noise impacts are minimized by operating within the approved fish window.

Bank excavation and placement of rock in the water may lead to elevated turbidity levels downstream. Suspension of sediments can increase biochemical oxygen demand and reduce dissolved oxygen levels in the water. Salmonids may be naturally exposed to some elevation in

suspended sediment levels in estuaries and in streams carrying heavy loads of glacial silt (Gregory and Northcote 1993). Therefore, it is not inevitable that salmonids would suffer major impacts from such levels of turbidity, but ideal conditions tend toward lower turbidity levels. For the proposed levee repairs, rock free of excessive sediment would be used, and turbidity during project construction would be monitored (Appendix D). In order to reduce temporary increases in turbidity and potential related effects on salmonids, all in-water construction work would take place during the in-water work window (October 15 to February 15). Construction techniques, sequencing, and timing would minimize soil disturbance to the extent practical to reduce the generation of turbidity during construction. Similarly, BMPs, placement of staging areas in uplands, minimizing the number of trips heavy equipment makes through the site, and revegetation of disturbed areas would further reduce the duration and magnitude of the temporary increases in turbidity. If a plume is noted, measurements would be taken downstream of the project at the downstream point of compliance (300 feet), which allows for acceptable mixing and dilution of any released sediment. It is anticipated at this time that effects of increased turbidity would be insignificant. If rain occurs during construction, it is possible that soil would be washed into the river although this should be minimized by BMPs.

Repairs to the Yakima levees would increase the rock size of the levee from Class III to Class V. Class V rock has a median size of 21 inches and a maximum rock size of 34 inches, which is approximately 6 inches wider in median diameter and 14 inches wider in maximum diameter than Class III. However, a minor change in rock size along an already stabilized bank has not been shown to have significant effects on fish species. In fact, in some cases larger rock size has been shown to be better (Lister et al. 1995; Schmetterling et al. 2001; Zale and Rider 2003). For example, artificially-placed boulders and shoreline irregularities associated with a stabilized bank likely attract juvenile salmon, especially in severely degraded river reaches. However, riprap does not provide the intricate habitat requirements for multiple age classes or species provided by natural vegetated banks. This deviation in rock size is not expected to adversely impact steelhead or its habitat. The rock would be tightly interlocked so that interstitial spaces used by invasive species are reduced. Furthermore, the larger rock size is expected to increase the durability of the levee by avoiding or reducing the need for future repairs.

At Yakima RB Levee Site 2, there would be a minor benefit due to the setting back of the toe approximately 2 feet. As a consequence, the side slope would change from approximately 2.5H:1V to 2H:1V. The shoreline at the repair site is heavily modified and lacks a natural riparian buffer. The temporary loss of 200 LF of riparian vegetation at the Yakima RB Levee Site 1 could decrease shading and organic input to the river. This would negatively impact foraging opportunities from insect fall for fish that steelhead forage on. This loss would be mitigated by the plantings described in section 2.5. Overall, river temperatures are not expected to discernibly change due to this project.

3.2.3.2 Columbia River Bull Trout

There is low likelihood of bull trout presence in the project area during the repair due to its location at the lower reach of recorded bull trout range in the Yakima River basin. By October 15 bull trout have spawned and started moving out of their spawning locations to move to overwintering habitat. A WDFW study (Mizell and Anderson 2015) examined migratory behavior and habitat use of the Yakima River basin bull trout population and identified the overwintering period ranging from November through March. This study identified the mid- to upper Naches River from the Wapatox Irrigation Diversion on the Naches River and upstream as the prime wintering locations for bull trout. Only two bull trout were detected below Wapatox dam, the lowest of which was detected just downstream of Naches, Washington, well outside of the proposed repair site. Most bull trout are expected to be overwintering above the Wapatox

diversion dam. Therefore, increases in sediment and noise disturbance during construction activities are expected to result in discountable effects to bull trout. If bull trout were to be present within the project area the impacts would be similar to those described above for steelhead. No short-term impacts to bull trout from the proposed repairs, such as vibration or noise disturbance as discussed above, are anticipated as the fish are unlikely to be present during in-water work.

3.2.3.3 Yellow-billed Cuckoo

Yellow-billed cuckoo are likely extirpated as a breeder in Washington and vagrant birds are very rarely seen in the state. Use of the site by this species is unlikely; however, yellow-billed cuckoo habitat does occur in the project reach. Most likely use would be as foraging and resting habitat by migrating adults. Impacts from the 6 weeks of construction could cause birds to avoid or flee the work area and increased noise and human presence. Based on the in-water work window (October 15 to February 15) sapling removal would be conducted outside of the most likely period of yellow-billed cuckoo migration in order to reduce impacts. Yellow-billed cuckoo rely on large tracts of mature riparian forest habitat and there are large tracts of riparian forest habitat in the vicinity of the project, but none of these areas would be affected by the project. In fact, the off-site mitigation may improve potential nesting habitat for this species once it has matured.

3.3 Fish and Wildlife

3.3.1 Existing Conditions

The levee system has effectively channelized the reach through the study area, leading to localized sediment aggradation/degradation and increased erosional forces, which in turn impacts instream habitat. Natural processes such as channel migration, development of side channels, and LWM recruitment are hampered within the project area due to the channel constraints, including levees, which limit channel-floodplain interaction. The degradation and loss of aquatic habitat, especially side channels, are limiting factors for ESA-listed steelhead and bull trout, as well as other organisms. Specific problems include the following:

- Degraded channel structure and complexity which limits available rearing, foraging, migratory, and overwintering habitat.
- Loss of refuge and rearing habitats such as side channels, back channels, shallow habitat with cover from predators, slow-water refuge areas, riparian wetlands, and other off- channel habitat.
- Reduced floodplain connectivity and lost functions such as floodwater storage, groundwater recharge, exchange of nutrients and organic material between land and water, and floodplain sediment sink.
- Degraded riparian vegetation contributing to elevated water temperatures and reduced availability of terrestrial food sources for aquatic organisms.
- Fewer pools and less cover for juvenile fish, historically provided by LWM recruited into the channel from the floodplain.

Anadromous salmonids currently using the Yakima basin include the Middle Columbia River steelhead; spring, summer (reintroduced), and fall Chinook; sockeye (reintroduced); and coho (reintroduced). There is only one non-salmonid anadromous fish species currently using the Yakima basin—the Pacific lamprey (*Entosphenus tridentatus*), which is a federal species of concern. Resident native salmonids in the Yakima River basin include the Columbia River bull trout, westslope cutthroat trout (*O. clarkii lewisi*), rainbow trout (*O. mykiss*), kokanee (*O. nerka*), mountain whitefish (*Prosopium williamsoni*), and pygmy whitefish (*P. coulterii*; Pearsons et al. 1998). Eastern brook trout (*S. fontinalis)*, a nonnative (introduced) salmonid, is also present.

Thirty-seven resident nonsalmonid species are present in the Yakima River basin (Pearsons et al. 1998). The most abundant of these in the upper Yakima River basin are speckled dace (*Rhinichthys osculus*), longnose dace (*R. cataractae*), redside shiners (*Richardsonius balteatus*), northern pikeminnow (*Ptychocheilus oregonensis*), largescale suckers (*Catostomus macrocheilus*), bridgelip suckers (*C. columbianus*), and sculpins (*Cottus spp.*). Other less abundant species of special concern include the mountain sucker (*C. platyrhynchus*) and leopard dace (*R. falcatus*; Pearsons et al. 1998; WDFW 2021b).

In addition to aquatic habitat, the existing levees also negatively impact adjacent riparian habitat by preventing overbank flooding and sediment deposition, and by reducing hydrologic connectivity with the river. Specific problems include the following:

- Reduced floodplain connectivity and lost functions such as floodwater storage, groundwater recharge, exchange of nutrients and organic material between land and water, and floodplain sediment sink.
- Degraded riparian vegetation contributing to elevated water temperatures and reduced availability of terrestrial food sources for aquatic organisms, and reduced habitat for mammals and birds.

Wildlife diversity and habitat in the project area is limited due to human development. Due to the disturbed condition of the project site and proximity to urbanized areas, medium to small mammals are expected to use the levee and surrounding floodplain. These would include raccoons (*Procyon lotor*), foxes (*Vulpes spp.*), coyote (*Canis latrans*), skunks *(Mephitis mephitis*), ground squirrels (*Spermophilus* spp.), marmots (*Marmota* spp.), mice (*Peromyscus* spp.), voles (*Microtus* spp.), and small reptiles like the common sharp-tailed snake (WDFW 2021b). Bald eagles, which are protected under the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act, are known to congregate during the winter near the project site. Bald or golden eagles are not known to nest in the vicinity of the repair sites but are likely present during the non-breeding season in association with the communal roost located just upstream of the city of Yakima WWTP. This time period coincides when the repair work might be completed. Communal roosts for eagles wintering on the east side of the Cascade Mountains have been shown to be composed of mostly northern birds who fly south into Washington State for the winter.

3.3.2 No Action

The No Action Alternative could result in continued erosion of the bank, especially in a flood event, and could leave the levee vulnerable to continued damage and breaching. A breach would result in inundation behind the levee with associated severe turbidity and potential pollution impacts to the river. A flood fight would likely be undertaken to prevent a breach. Such activities would likely cause fish and wildlife to leave the area. Emergency actions would entail more in-water work and vegetation clearing that would have greater impact on fish and wildlife than a scheduled repair action. The exact effect to fish and wildlife associated with emergency flood actions is difficult to quantify or predict but does have the potential to be significant if the flood event warrants repairs at a damaged site.

3.3.3 Repair In-Kind Alternative

Repairs under this alternative would cause short-term impacts to fish and wildlife. The primary impacts would be a temporary increase in turbidity and an increase in noise, vibration, and human activity caused by heavy equipment use. These impacts may temporarily displace fish and wildlife during the 6 weeks of construction, but fish and wildlife would be expected to return as soon as construction is complete. No eagle nests are known to be present near the repair

sites and construction activities are not expected to impact any eagles overwintering in the area. Effects to fish and wildlife due to the Repair In-Kind alternative would be temporary and localized.

3.4 CULTURAL RESOURCES

3.4.1 Existing Conditions

Construction of the Yakima RB Levee was authorized in 1938 by the Flood Control Act, PL 75-761 (incorporating H.R. Doc. No. 75-579). Initial construction was completed in 1948, with additional work being accomplished in 1949 to repair flood-damaged sections. The Yakima WWTP Levee was originally constructed by local interests prior to 1958. Since the levees are over 50 years old, they may be potential historic property as per the National Historic Preservation Act (NHPA). A literature review and a records search found no previous surveys for cultural resources in the repair footprint. However, it did indicate seven previously recorded historic period archaeological sites within one mile of the Yakima RB Levee repair sites and 3 sites within one mile of the Yakima WWTP Levee repair site. No archaeological sites are recorded within the repair footprints at either levee.

A cultural resource survey was completed by a Corps archaeologist on October 22, 2020. The project footprint at each levee repair site is highly disturbed by modern development of the adjacent roadways, the Yakima Greenway, and the levee. The off-site mitigation site is a gravel/sand bar that is heavily influenced by the river and so has a low potential for archaeological materials.

3.4.2 No Action

The No Action Alternative would result in continued degradation of the levees through natural processes. It is likely that at an unknown time the levees would fail causing irreparable damage to the structure potentially causing an adverse effect to a historic structure that is potentially eligible for inclusion on the National Register of Historic Places.

3.4.3 Repair In-Kind Alternative

Under this alternative, the Yakima RB and WWTP Levees would be repaired and would avoid effects to known historic structures and archaeological sites. Consultation with the Washington State Department of Archeology and Historic Preservation (DAHP) and the Confederated Tribes and Bands of the Yakama Indian Nation has been completed (see section 7.8). Based on the literature review and a records search, cultural resource survey, and coordination with DAHP and the Confederated Tribes and Bands of the Yakama Indian Nation, the Corps determined that the proposed repairs would have no effect to historic properties. Effects on cultural resources would be negligible.

3.5 AIR QUALITY AND NOISE

3.5.1 Existing Conditions

Air quality in Yakima County is regulated by the Yakima Regional Clean Air Agency (Ecology 2021b). The main sources of outdoor air pollution are motor vehicles, outdoor burning, and wood smoke.

Under the Clean Air Act, the Environmental Protection Agency (EPA) sets standards for air quality to regulate harmful pollutants. National ambient air quality standards (NAAQS) are set for six common air pollutants: ozone, carbon monoxide, nitrogen dioxide, particulate matter (solid and liquid particles suspended in the air), sulfur dioxide, and lead. Areas that do not meet

the NAAQS are designated non-attainment areas. The EPA sets *de minimis* thresholds for pollutants in non-attainment areas. NAAQS are met across Washington state, but Ecology and other clean air agencies continue to monitor air quality at 55 locations (Ecology 2021c). One of these sites is in Yakima and measures particulate matter. At this time, all areas of Washington except a small area in Whatcom County meet air quality standards (Ecology 2021c).

The project site and its surroundings have been developed, with myriad activities contributing to ambient noise levels. Human-related existing noise sources at the project site include traffic, construction, internal combustion engines, and agricultural activities.

3.5.2 No Action

The No Action Alternative would have no direct effect on 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 preferred alternative but could differ depending on the scope of the emergency action. Effects to air quality and noise would be temporary and within the range of intensity of noise produced by on-going activities in the area. Effects on air quality and noise would be negligible.

3.5.3 Repair In-Kind Alternative

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 *de minimis*, and would therefore be exempt 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 would not affect the implementation of Washington's Clean Air Act implementation plan. Unquantifiable but insignificant exacerbation of effects of CO_2 emissions on global climate change would be anticipated.

During construction activities there would be a localized increase in ambient noise levels from equipment operation. Proposed repairs would be conducted during daylight hours from 7 AM to 7 PM to limit noise impacts on surrounding properties. No long-term change in air quality and noise would occur as a result of the project. Effects on air quality and noise would be negligible.

3.6 Land Use, Utilities, and Infrastructure

3.6.1 Existing Conditions

Land uses surrounding the project sites are a mixture of residential, industrial, agricultural, and recreational. Utilities, including utility poles, stormwater pipes, and the city of Yakima WWTP, are present near the damaged sites but not in the construction footprint. The WWTP receives wastewater from Yakima, Union Gap, Terrace Heights, and Moxee. Land use within the project footprint includes recreational use of the Yakima Greenway Trail, which run along the paved surface of the levee crest at each repair site. Several highways and bridges are in the area, including Interstate 82, U.S. Route 12, Terrace Heights bridge, State Route 24, and a railroad bridge.

3.6.2 No Action

Under the No Action Alternative, a higher risk exists for flood damage to land use, utilities, and infrastructure. If the levee isn't repaired, and flooding occurs due to breaches in weak sections of the levee, public infrastructure could be damaged or lost and local area traffic could be

affected. This could affect commercial traffic, access to private residences, evacuations, and emergency response services. Depending on the severity of flooding, emergency flood fight efforts may occur to protect lives and property. These activities and local efforts to maintain the levees are expected to be sufficient to maintain existing land use, utilities, and infrastructure. Effects on land use, utilities, and infrastructure would be negligible.

3.6.3 Repair In-Kind Alternative

Under the Repair In-Kind Alternative, land use in the project footprint would be temporarily disrupted during construction activities but would be restored after repairs are completed. Construction equipment could cause temporary and minor disruption to traffic on roads and bridges in the area. Flaggers and signs would be used, as needed, to direct traffic safely around the construction site. Before work is started, a utility locate would be completed to ensure that no utilities are impacted by the repairs. Existing infrastructure like public roads and the levee itself would not be altered to prevent their intended purpose and use. Repairs would protect the Yakima WWTP as a public utility from flooding. Infrastructure and utilities damaged by repair activities would be replaced or repaired as necessary, including the Yakima Greenway Trail. Effects to land use, utilities, and infrastructure would be negligible.

3.7 RECREATION

3.7.1 Existing Conditions

Several public parks are located along the Yakima River including the Yakima Greenway Trail, Sportsman State Park, and the Yakima Area Arboretum. The Yakima Greenway Path is a 20-mile paved walking & biking path system. The trail runs along the right (west) bank of the river on top of the levees and provides access to parks, fishing spots, natural areas, and river access points. The Sportsman State Park is mostly riparian forest on 247 acres along the left bank of the Yakima River. The Park contains camping sites, hiking trails, and fishing access to the Yakima River and several ponds and lakes. The Yakima Area Arboretum is an urban green space and refuge on 46 acres of land cultivated as display gardens, tree collections, and natural areas on the right bank of the Yakima River.

3.7.2 No Action

Under the No Action Alternative, a higher risk exists for flood damage to recreation. If the levee isn't repaired, and flooding occurs due to breaches in weak sections of the levee, recreational use along the levee could be damaged or lost, including parts of the Yakima Greenway Path and the Yakima Area Arboretum. Depending on the severity of flooding, emergency flood fight efforts may occur to protect lives and property. These activities and local efforts to maintain the levees are expected to be sufficient to maintain existing recreation. Effects on recreation would be negligible.

3.7.3 Repair In-Kind Alternative

Under the Repair In-Kind Alternative, there would be minor and temporary impacts to recreation. Construction activities would disrupt recreational use of the Yakima Greenway Path on the levee crest within the repair footprint. After repairs are completed the paved path would be repaired as necessary and access restored. No lasting impacts to recreation would occur. Effects to recreation would be negligible.

4 UNAVOIDABLE ADVERSE EFFECTS OF THE PREFERRED ALTERNATIVE

Unavoidable adverse effects associated with the preferred alternative at each site 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) 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. Vegetation loss and fill into Waters of the U.S. would be mitigated by the proposed plantings.

5 COMPENSATORY MITIGATION

As mitigation for loss of vegetation on the riverward slope due to construction activities the Corps would complete the on- and off-site mitigation described in section 2.5. Plantings would provide shade and other habitat benefits to aquatic and terrestrial species.

The Corps would inform the non-federal sponsors that the on-site mitigation is part of the repair and should only be trimmed to the minimal amount necessary to retain adequate visual fields for subsequent levee safety inspection. No trimming would be done to the off-site mitigation. The Corps would maintain and monitor the on- and off-site plantings for one-year after construction to ensure 80 percent survival. If less than 80 percent survival is recorded after one year, the Corps would replace all the dead plants (via mechanical installation or hand installation) which would be monitored for an additional growing season. The Corps would monitor and replace plantings as needed.

6 COORDINATION

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

- City of Yakima
- Confederated Tribes and Bands of the Yakama Nation
- DAHP
- Ecology
- NMFS
- USFWS
- WDFW
- Yakima County

The Corps released a draft EA/FONSI for the proposed project on November 19, 2021 for a 15-day public review and comment period. Comments were received from the U.S. Environmental Protection Agency and the Washington Department of Fish and Wildlife (Appendix E).

7 ENVIRONMENTAL COMPLIANCE

7.1 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. Bald or golden eagles are not known to nest in the vicinity but are likely present during the non-breeding season in association with the communal roost located just upstream of the Yakima WWTP Levee repair site. This time period coincides when the repair work might be completed. Communal roosts for eagles wintering on the east side of the Cascade Mountains have been shown to be composed of mostly northern birds who fly south into Washington State for the winter. No take of either bald or golden eagles is expected from the proposed project.

7.2 CLEAN AIR ACT OF 1972

The Clean Air Act as Amended (42 U.S.C. § 7401 et seq.) prohibits federal agencies from approving any action that does not conform to an approved State or federal implementation plan. The operation of heavy equipment, removal and placement of rock, and the operation of vehicles during construction would result in increased vehicle emissions and a slight increase in fugitive dust. These effects would be localized and temporary. The project area is not part of a non-attainment area (Ecology 2021c). The Corps has determined that the proposed repairs constitute a routine facility repair generating an increase in emissions that is clearly *de minimis*, and thus a conformity determination is not required, pursuant to 40 CFR 93.153 (c)(2)(iv).

7.3 CLEAN WATER ACT – FEDERAL WATER POLLUTION CONTROL ACT

The Federal Water Pollution Control Act (33 U.S.C. § 1251 et seq.) is more commonly referred to as the CWA. This act is the primary legislative vehicle for federal water pollution control programs and the basic structure for regulating discharges of pollutants into waters of the U.S. 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.

This EA evaluates possible impacts to water quality, primarily with respect to suspended solids, turbidity, and temperature. The proposed permanent repair action would require work in the active channel with some work below OHWM for most of the repair areas along the Yakima RB and WWTP Levees, approximately 300 feet at each levee. Construction could be expected to cause minor, temporary, localized increases in turbidity. BMPs, including restrictions on fueling and prevention of fluid leaks from construction equipment would be employed to minimize and avoid discharge of pollutants into the river.

Three sections of the CWA are pertinent to the proposed actions: Section 401 covers water quality standards and evaluation of the effect's discharges would have on those standards; Section 402 addresses non-point discharges including, but not limited to, stormwater runoff from construction sites; and Section 404 addresses discharge of fill into Waters of the U.S. Requirements of those three CWA sections are briefly discussed below.

Section 404 and 401: The Corps does not issue Section 404 permits to itself for its own civil works activities, but the Corps accepts responsibility for the compliance of its civil works projects with Sections 401 and 404 under the CWA. Repairs to the Yakima RB and WWTP Levees are functionally analogous to activities addressed by NWP 3. A NWP 3 authorizes the repair, rehabilitation, or replacement of any currently serviceable structure, provided the structure or fill is not to be put to a different use. Necessary minor deviations in the structure's configuration are authorized. The Corps concludes that the proposed repairs to the Yakima RB and WWTP Levees are functionally analogous to work authorized under NWP 3 pursuant to Section 404 of the CWA (Appendix F). The Corps has analyzed the repairs pursuant to the general conditions established by the State associated with authorization under NWP 3 and has concluded that the proposed work satisfies those conditions. Based on review of the NWP 3 State Specific Regional Certification Conditions, this project is covered by the certification approved for this NWP and an individual Section 401 Water Quality Certification is not required. The Corps prepared a functional analogy evaluation outlining the proposed project's conformity with this Nationwide Permit and provided it to the Washington Department of Ecology on September 17, 2021 (Appendix F). Ecology verified that the project meets the requirements of NWP 3 and an

Individual 401 Water Quality Certification is not required in a letter on September 27, 2021 (Appendix F).

Section 402: Section 402 of the CWA is triggered when a construction site would have greater than 1 acre of ground disturbance. Proposed repairs to the Yakima RB and WWTP Levees do not exceed 1 acre of ground disturbance.

7.4 ENDANGERED SPECIES ACT

In accordance with Section 7(a)(2) of the ESA of 1973, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed or proposed threatened or endangered species and their critical habitats. Table 6 lists the Corps' determinations made for ESA-listed species and critical habitat that would be affected by the proposed repair. These determinations were included in a BA sent to the USFWS and NMFS on June 14, 2021 and August 13, 2021, respectively. Consultation is ongoing.

Table 6. Species and Effects determinations of the proposed project made by the Corps in the BA sent to the USFWS and NMFS.

Species	Species Effects Determination	Critical Habitat Effects Determination
Middle Columbia River Steelhead	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Coastal/Puget Sound Bull Trout	May Affect, Not Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Yellow-billed Cuckoo	May Affect, Not Likely to Adversely Affect	No Effect

Due to the urgent nature of completing the repair, 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, and may complete ESA consultation after the fact rather than delaying the urgent work in order to complete ESA consultation before construction begins. The applicable regulation is set out at 50 CFR § 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 sections 7(a)-(d) of the Act. This provision applies to situations involving acts of God, disasters, casualties, national defense or security emergencies, etc.

b) Formal 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 action(s), the justification for the expedited consultation, and the impacts to endangered or threatened species and their habitats. The Service will evaluate such information and issue a biological opinion including the information and recommendations given during the emergency consultation.

To facilitate conclusion of consultation prior to the necessary date to commence construction, in submitting its BA the Corps has also requested institution of expedited consultation pursuant to 50 CFR 402.14(*l*).

Though consultation 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. Table 6 summarizes the effect determinations made in the Biological Assessment for each of the species potentially occurring in the project vicinity. Key conservation measures intended to minimize impacts on listed species and habitat include the BMPs addressed in section 2.7 and the conservation measures addressed in section 2.8.

The Corps has concluded that the levee is a part of the baseline condition of the Yakima River in this reach and that the proposed action, with the best management practices/conservation measures and proposed compensatory mitigation, would minimize impacts on listed species.

The Corps would 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 (RPMs) necessary and appropriate to minimize the impact of Incidental Take that are described if documents concluding consultation are received from USFWS and NMFS.

This 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 the associated FONSI will be reassessed.

7.5 MAGNUSON-STEVENS FISHERY CONSERVATION AND MANAGEMENT ACT

The Magnuson-Stevens Fishery Conservation and Management Act, (16 U.S.C. § 1801 *et. seq.*), as amended by the Sustainable Fisheries Act of 1996 (PL 104-267) requires federal agencies to consult with the NMFS regarding actions that may adversely affect EFH for Pacific coast groundfish, coastal pelagic species, and Pacific salmon. The Act defined EFH as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity.” EFH is the habitat (waters and substrate) required to support a sustainable fishery and a managed species’ contribution to a healthy ecosystem. Waters include aquatic areas and their associated physical, chemical, and biological properties used by fish. Substrate includes sediment, hard bottom, structures underlying the waters, and associated biological communities.

The Pacific Fishery Management Council has designated EFH for the Pacific salmon fishery, federally managed ground fishes, and coastal pelagic fisheries (PFMC 2016). Though primarily focused on marine species, anadromous fishes like the Pacific salmon have EFH that can occupy freshwater habitats critical to their life cycle. Freshwater EFH for Pacific salmon consists of four major components: spawning and incubation, juvenile rearing, juvenile migration corridors, and adult migration corridors. Chinook also require adult holding habitat (PFMC 2016). The project action area includes EFH for Chinook salmon and coho salmon (*O. kisutch*). Habitat areas of particular concern within the action area include complex channel, floodplain habitat and spawning (Chinook only; PFMC 2016).

The Corps determined that the proposed project may adversely affect EFH designated for Chinook and coho salmon (Table 7). Effects of the proposed work on EFH would be essentially identical to those discussed above for steelhead in section 3.2. There could be temporary

impacts during construction to include substrate disturbance, increased noise, vibration, and minor turbidity. Additionally, the repairs would perpetuate the existing poor shoreline conditions and limit channel migration and floodplain function. Longer lasting impacts include vegetation removal. Potential adverse effects to EFH have been reduced or eliminated by use of conservation measures and BMPs. The Corps provided this determination in the BA sent to NMFS on August 13, 2021. Consultation is ongoing.

Table 7. EFH species and their life history stage that may be found in the project area.

Species	Adult	Juvenile	Larvae	Egg
Pacific Salmon				
Chinook salmon	X	X		
Coho salmon	X	X		

7.6 Migratory Bird Treaty Act of 1918 and Executive Order 13186, Responsibilities of Federal Agencies to Protect Migratory Birds

The Migratory Bird Treaty Act (16 U.S.C. § 703-712) as amended protects over 800 bird species and their habitat and commits that the U.S. will take measures to protect identified ecosystems of special importance to migratory birds against pollution, detrimental alterations, and other environmental degradations. EO 13186 directs federal agencies to evaluate the effects of their actions on migratory birds, with emphasis on species of concern, and inform the USFWS of potential negative effects to migratory birds.

Work is proposed outside of the prime nesting season (April to mid-June). None of the vegetation that would be removed provides adequate nesting habitat. Mitigation to offset removal of saplings at Yakima RB Levee Site 1 would provide good nesting habitat as the plantings mature. Implementation of the preferred alternative would not have any direct and deliberate negative effect to migratory birds. There would be no adverse effect on habitat and the project would only have minimal and temporary effects to a small number of individual birds that may be present in the project area. No permit application for “take” of migratory birds is required.

7.7 National Environmental Policy Act

The NEPA (42 U.S.C. § 4321 et seq.) commits federal agencies to considering, documenting, and publicly disclosing the environmental effects of their actions. It requires that an EIS be included in every recommendation or report on proposals for legislation and other major federal actions significantly affecting the quality of the human environment. The EIS 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 decision makers have considered these factors prior to undertaking actions. Major federal actions determined not to have a significant adverse effect on the quality of the human environment may be evaluated through an EA.

7.7.1 NEPA / Proposed Action

The prospective federal action is the proposed repair of the Yakima RB and WWTP Levees as discussed in the body of this EA. The proposed action would include both the levee repair and mitigation. This EA has been prepared pursuant to NEPA. Effects on the quality of the human

environment as a result of the proposed levee repair 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.

7.7.2 NEPA Summary

A draft EA/FONSI for the proposed project was made available for public review and comment on November 19, 2021. The comment period ended on December 4, 2021. Comments were received from the U.S. Environmental Protection Agency and the Washington Department of Fish and Wildlife. The comments and responses are provided in Appendix E.

7.8 National Historic Preservation Act of 1966

Section 106 of the NHPA (16 U.S.C. § 470) requires that federal agencies evaluate the effects of federal undertakings on historical, archeological, and cultural resources and afford the Advisory Council on Historic Preservation opportunities to comment on the proposed undertaking if there is an adverse effect to an eligible Historic Property. The lead agency must examine whether feasible alternatives exist that avoid eligible cultural resources. If an effect cannot reasonably be avoided, measures must be taken to minimize or mitigate potential adverse effects.

The Corps initiated consultation with DAHP and the Confederated Tribes and Bands of the Yakama Indian Nation on February 12, 2021 and March 11 and 12, 2021, respectively. Initial concurrence with the Area of Potential Effect for both of the undertakings was received from DAHP on March 3, 2021 (Appendix G).

A cultural resource survey was completed by a Corps archaeologist on October 22, 2020. No cultural resources were observed during the cultural resources survey. The Corps consulted with DAHP on the survey results and effects determination on April 6, 2021. DAHP concurred with Corps determination of no historic properties effected on April 13, 2021 (Appendix G). Results of the cultural resource survey were provided to the Confederated Tribes and Bands of the Yakama Indian Nation on April 6, 2021. To date the Corps has received no comment from the Confederated Tribes and Bands of the Yakama Indian Nation.

7.9 Executive Order 11990 Protection of Wetlands

EO 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. No wetlands would be destroyed, lost, or degraded by the proposed action.

7.10 Executive Order 11988 Floodplain Management

EO 11988 requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. The proposed project is to repair two existing levees to pre-flood conditions and does not include or support construction of any other structures in the flood plain.

7.11 Executive Order 12898, Environmental Justice in Minority Populations and Low-Income Populations, and Executive Order 14008, Tackling the Climate Crisis

EO 12898 directs federal agencies to take the appropriate steps to identify and address any disproportionately high and adverse human health or environmental effects of federal programs, policies, and activities on minority and low-income populations. Minority populations are those persons who identify themselves as Black, Hispanic, Asian American, American Indian/Alaskan Native, and Pacific Islander. A minority population exists where the percentage of minorities in an affected area either exceeds 50% or is meaningfully greater than in the general population.

An analysis of demographic data was conducted to derive information on the approximate locations of low-income and minority populations in the community of concern. Since the analysis considers disproportionate impacts, three areas were defined to compare the area affected by the project and a larger regional area that serves as a basis for comparison and includes the area affected. The larger regional area is defined as the smallest political unit that includes the affected area and is called the community of comparison. For purposes of the analysis, the affected area is approximately a five-mile radius around the project area, and the city of Yakima, Washington is the community of comparison. Demographic information was also compared against the State of Washington for reference. The EPA's Environmental Justice (EJ) Screening and Mapping tool, also known as the EJScreen tool, was used to obtain the study area demographics (EPA 2021).

As shown in table 8, the aggregate minority population is estimated at 48% in the affected area, 52% in the city of Yakima, and 31% in the state of Washington. The aggregate population percentage in the affected area does not exceeds 50% but is more than the state average. The EO does not provide criteria to determine if an affected area consists of a low-income population. For purposes of the assessment, the CEQ criterion for defining low-income population was adapted to identify whether the population in an affected area constitutes a low-income population. An affected geographic area is considered to consist of a low-income population (i.e., below the poverty level, for purposes of this analysis) where the percentage of low-income persons: 1) is greater than 50%, or 2) is meaningfully greater than the low-income population percentage in the general population or other appropriate unit of geographic analysis. The U.S. Census Bureau poverty assessment weighs income before taxes and excludes capital gains and non-cash benefits (such as public housing, Medicaid, and food stamps). Table 8 provides a summary of the income and poverty status for the study area. As shown in the table, 48% of the individuals in the affected area are considered low-income. This percentage in the affected area does not exceed 50%. In addition, the affected area low-income population percentage is roughly equivalent to the low-income population in the city (47%) but more than the percentage of the State (27%). Therefore, the affected area is not considered to have a high concentration of low-income population.

Table 8. Environmental Justice Demographic and Income Statistics (EPA 2021).

Demographic Affected	Affected Area	City of Yakima	Washington State
Minority Population	48%	52%	31%
Low-Income Population	48%	47%	27%

The EPA's EJScreen tool also provides an index on environmental indicators (EPA 2021). The EJ index is a combination of environmental and demographic information. There are eleven EJ Indexes in EJSCREEN reflecting the 11 environmental indicators. The EJ Index uses the concept of "excess risk" by looking at how far above the national average the block group's

demographics are. EPA considers a project to be in an area of potential EJ concern when an EJScreen analysis for the impacted area shows one or more of the eleven EJ Indexes at or above the 80th percentile in the nation and/or state. All eleven EJ Indexes are at or above the 80th percentile in the nation and state (EPA 2021).

The preferred alternative of repair of existing levee systems does not involve a facility siting decision and will not disproportionately affect minority or low-income populations nor have any adverse human health impacts. While the area is at or above the 80th percentile in the nation and/or state for all eleven EJ indexes, the project will not cause long-term increases to any. Only minor and temporary increases related to construction equipment emissions are anticipated. Other EJ Indexes unrelated to emissions will remain unaffected (e.g., Superfund proximity, wastewater discharge indicator, etc.). The project maintains flood protection for the affected area. No interaction with other projects will result in any such disproportionate impacts. No cumulative impacts to environmental justice is expected from interaction of the proposed levee repairs with other past, present, and reasonably foreseeable projects. Further, tribal governments that are also environmental justice communities in the project area have been engaged and informed about the proposed action. The proposed action will not directly or through contractual or other arrangements, use criteria, methods, or practices that discriminate on the basis of race, color, or national origin, nor would it have a disproportionate effect on minority or low-income communities.

EO 14008 updates EO 12898 and has expanded Federal agencies' responsibilities for assessing environmental justice consequences of their actions. Because the levees protect the city of Yakima from overflooding of the Yakima River, the area of analysis for environmental justice purposes also includes the Yakima River floodplain. The preferred alternative, which repairs the Yakima RB and the Yakima WWTP Levees to their pre-damage level of protection, will provide a universal benefit to persons, including disadvantaged minority, low-income, and tribal communities, residing in the floodplain. Thus, there are no disproportionate adverse impacts imposed on those communities, as compared with the larger reference population, through repair of the levees.

7.12 Executive Order 13007 Native American Sacred Sites

EO 13007, Native American Sacred Sites, directs federal agencies to accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners. Agencies are to avoid adversely affecting the physical integrity of such sacred sites and to maintain the confidentiality of sacred sites when appropriate. The act encourages government-to-government consultation with Tribes concerning sacred sites. Some sacred sites may qualify as historic properties under the NHPA.

A literature review, records search, and cultural survey of the site did not find any sacred sites or cultural resources; however, the Corps sent letters to the Confederated Tribes and Bands of the Yakama Indian Nation on March 11 and 12, 2021 soliciting any knowledge or concerns or religious significance for the Area of Potential Effects. A letter was also sent requesting comments on the proposed project and providing the opportunity to initiate Government-to-Government consultation on September 28, 2021. To date the Corps has received no comment on from the Confederated Tribes and Bands of the Yakama Indian Nation.

8 PUBLIC INTEREST EVALUATION FACTORS FOR DISCHARGE OF FILL IN WATERS OF THE U.S.

An evaluation of the discharge of fill into Waters of the United States was conducted in light of the public interest factors prescribed in 33 CFR 336.1(c). These factors include navigation and the federal standard for dredged material disposal; water quality; wetlands; endangered species; historic resources; scenic and recreation values; fish and wildlife;; and applicable state/regional/local land use classifications, determinations, and/or policies. Of these, water quality, wetlands, endangered species, historic resources, scenic values, recreational values, and fish and wildlife have been evaluated in this EA.

As provided in 33 CFR sections 335.4, 336.1(c)(1) and 337.6, the Corps has fully considered, on an equal basis, all alternatives that are both reasonable and practicable, i.e., available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes. The necessary budget resources, including required items of local responsibility assigned to the non-federal sponsors are available and adequate to fully support the action. The preferred alternative represents the least costly alternative, constituting the discharge of dredged or fill material into waters of the United States in the least costly manner and at the least costly and most practicable location, is consistent with sound engineering practices, and meets the environmental standards established by the CWA Section 404(b)(1) evaluation process. Execution of the preferred alternative, following consideration of all applicable evaluation factors, would be in the public interest. The CWA Section 404(b)(1) analysis is in Appendix H.

9 SUMMARY / CONCLUSION

The No Action Alternative (Alternative 1) does not meet the project's purpose and need. The preferred alternative (Alternative 4) fulfills the project’s purpose and need by repairing the Yakima RB Levee to the 100-year level of protection and the Yakima WWTP Levee to a 20-year level of protection. Based on the above analysis the proposed Yakima RB and WWTP Levee Repair Project would not constitute a major federal action significantly affecting the quality of the human environment, and therefore does not require preparation of an EIS.

10 LITERATURE CITED

Burke Museum of Natural History and Culture. 2021. Collections Database. University of Washington, Seattle, Washington. Accessed August 23, 2021 online at: https://www.burkemuseum.org/collections-and-research/collections-databases.

Corps. 2021. National Levee Database. Accessed on August 19, 2021 online at: https://levees.sec.usace.army.mil/#/.

Ecology (Washington State Department of Ecology). 2021a. Water Quality Atlas. Accessed August 23, 2021 online at: http://www.ecy.wa.gov/programs/wq/303d/index.html.

Ecology. 2021b. Washington clean air agencies. Accessed August 23, 2021 online at: https://ecology.wa.gov/About-us/Our-role-in-the-community/Partnerships-committees/Clean-air-agencies.

Ecology. 2021c. Determining if areas in Washington meet national air quality standards. Accessed August 23, 2021 online at: https://ecology.wa.gov/Regulations-Permits/Plans-policies/Areas-meeting-and-not-meeting-air-standards#AreasofConcern.

EPA (Environmental Protection Agency). 2021. EJSCREEN: Environmental Justice Screening and Mapping Tool. Accessed October 22, 2021 online at: https://www.epa.gov/ejscreen.

Gaines, D., and S.A. Laymon. 1984. Decline, status and preservation of the yellow-billed cuckoo in California. Western Birds 15:49-80.

Gregory, R.S. and T.G. Northcote. 1993. Surface, planktonic, and benthic foraging by juvenile Chinook salmon (*Oncorhynchus tshawytscha*) in turbid laboratory conditions.

Hawkins A.D., and A.D.F. Johnstone. 1978. The hearing of the Atlantic salmon, *Salmo salar*. Journal of Fish Biology 13:655–674.

Hughes, J.M. 1999. "Yellow-billed Cuckoo (*Coccyzus americanus*)." In The Birds of North America Online. Edited by A. Poole. Ithaca, NY: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online. http://bna.birds.cornell.edu/ bna/species/418.

LaSalle, M.W. 1988. Physical and chemical alterations associated with dredging: an overview. Presentation in the 1988 "Effects of dredging on anadromous Pacific coast fishes" workshop, Sponsored by Wetland Ecosystem Team, Fisheries Research Institute: University of Washington, Seattle, WA.

Lister, D.B., R.J. Beniston, R. Kellerhals, and M. Miles. 1995. Rock size affects juvenile salmonid use of streambank riprap. In: C. R. Thorne, S.R. Abt, F.B.J. Barends, S.T. Maynord, and K. W. Pilarczyk (eds.). River, coastal and shoreline protection: Erosion control using riprap and armourstone. John Wiley & Sons Ltd. pp. 621- 632.

Maritime Limited. 2015. Underwater noise impact study for Aberdeen Harbor Expansion Project: Impact of construction noise. Technical report 35283-004-V5.

Mizell, M., and E. Anderson. 2015. An Investigation into the Migratory Behavior, Habitat Use and Genetic Composition of Fluvial and Resident Bull Trout (*Salvelinus confluentus*) in the Yakima River Basin. Final Report. Washington Department of Fish and Wildlife, Yakima Regional Office.

Nedwell, J. and B. Edwards. 2004. A review of the measurements of underwater man-made noise carried out by Subacoustech Ltd 1993-2003, Subacoustech: 134.

NMFS (National Marine Fisheries Service). 1999. Endangered and Threatened Species: Threatened Status for Two ESUs of Steelhead in Washington and Oregon. Final Rule. Federal Register 64: 14517 – 14528.

NMFS. 2005a. Endangered and Threatened Species: Final Listing Determinations for 16 ESUs of West Coast Salmon, and Final 4(d) Protective Regulations for Threatened Salmonid ESUs. Final rule. 70 FR 37160.

NMFS. 2005b. Endangered and Threatened Species; Designation of Critical Habitat for 12 Evolutionarily Significant Units of West Coast Salmon and Steelhead in Washington, Oregon, and Idaho. Final Rule. Federal Register 70: 52630 – 52858.

NMFS. 2006. Endangered and Threatened Species: Final Listing Determinations for 10 Distinct Population Segments of West Coast Steelhead. Final Rule. Federal Register 71: 834 – 862.

NMFS, U.S. Fish and Wildlife Service, Federal Highway Administration, California Department of Transportation, California Department of Fish and Game, Oregon Department of Transportation, and Washington Department of Transportation. 2008. Memorandum: Agreement in principle for interim criteria for injury to fish from pile driving.

NMFS. 2011. Endangered and Threatened Species; 5-Year Reviews for 17 Evolutionarily Significant Units and Distinct Population Segments of Pacific Salmon and Steelhead. Final rule. 76 FR 50448.

NMFS. 2016. Endangered and Threatened Species; 5-Year Reviews for 28 Listed Species of Pacific Salmon, Steelhead, and Eulachon. Final rule. 81 FR 33468.

Noggle, C.C. 1978. Behavioral, physiological and lethal effects of suspended sediment on juvenile salmonids. MS thesis. University of Washington, Seattle, WA.

Pearsons, T.N., G.A. McMichael, K.D. Ham, E.L. Bartrand, A.I. Fritts, and C.W. Hopley. 1998. Yakima River Species Interactions Studies. Progress Report 1995-1997.

PFMC (Pacific Fishery Management Council). 2016. Appendix A to the Pacific Coast Salmon Fishery Management Plan, as modified by Amendment 19 to the Pacific Coast Salmon

Plan: Identification and description of essential fish habitat, adverse impacts, and recommended conservation measures for salmon. Pacific Fishery Management Council, Portland, OR. March 2016. Pages 90 and appendices.

Popper, A.N., A.D. Hawkins, R.R. Fay, D.A. Mann, S. Bartol, T.J. Carlson, S. Coombs, W.T. Ellison, R.L. Gentry, M.B. Halvorsen, S. Løkkeborg, P.H. Rogers, B.L. Southall, D.G. Zeddies, and W.N. Tavolga. 2014. Sound exposure guidelines for fishes and sea turtles: a technical report prepared by ANSI-accredited standards committee S3/SC1. ASA S3/SC1.4 TR-2014.

Quigley, T. M. and S. J Arbelbide, eds. 1997. An assessment of ecosystem components in the interior Columbia Basin and portions of the Klamath and Great Basins. Vol. III. USDA-FS, Gen. Tech. Rep.PNW-GTR-405. Pacific Northwest Research Station, Portland, OR.

Redding, J.M., and C.B. Schreck. 1987. Physiological effects of coho salmon and steelhead of exposure to suspended solids. Trans Fish Soc 116:737-744.

Reine, K., D. Clarke, and C. Dickerson. 2012. Characterization of underwater sounds produced by a backhoe dredge excavating rock and gravel. ERDC TN-DOER-E36. December 2012.

Reinhall, P.G. and P.H. Dahl. 2011. Underwater Mach wave radiation from impact pile driving: theory and observations. Journal of the Acoustical Society of America 130: 1209-1216.

Schmetterling, D.A., C.G. Clancy, and T.M. Brandt. 2001. Effects of riprap bank reinforcement on stream salmonids in the western United States. Fisheries 26(7):6-11.

Servizi, J.A., and D.W. Martens. 1987. Some effects of suspended Fraser River sediments on sockeye salmon (*Oncorhynchus nerka*) Canadian Special Publication of Fisheries and Aquatic Sciences 96:254-264.

Sigler, J.W. 1988. Effects of chronic turbidity on anadromous salmonids: Recent studies and assessment techniques perspective. Presentation in the 1988 “Effects of dredging on anadromous Pacific coast fishes” workshop, Sponsored by Wetland Ecosystem Team, Fisheries Research Institute: University of Washington, Seattle, WA.

USGS (U.S. Geological Service). 2021. National Water Information System: Web Interface. USGS 12500450 Yakima River above Ahtanum Creek at Union Gap, WA. Accessed August 23, 2021 online at: https://waterdata.usgs.gov/nwis/uv?site_no=12500450

USFWS (U.S. Fish and Wildlife Service). 1998. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Klamath River and Columbia River Distinct Population Segments of Bull Trout. Final Rule. Federal Register 63: 31647 – 31674.

USFWS. 2008. Bull Trout (*Salvelinus confluentus*) 5-Year Review: Summary and evaluation. U.S. Fish and Wildlife Service, Portland, Oregon. 55 pages.

USFWS. 2010. Endangered and Threatened Wildlife and Plants; Revised Designation of Critical Habitat for Bull Trout in the Coterminous United States. Final Rule. Federal Register 75 63898 – 64070.

USFWS. 2013. Endangered and Threatened Wildlife and Plants; Proposed Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (*Coccyzus americanus*). October 3, 2013. Federal Register 78: 61622 – 61666.

USFWS. 2014. Endangered and Threatened Wildlife and Plants; Determination of Threatened Status for the Western Distinct Population Segment of the Yellow-billed Cuckoo (*Coccyzus americanus*). Final Rule. Federal Register 79 59992 – 60038.

USFWS. 2015. 5-year Review Short Form Summary. Species Reviewed: Bull Trout (*Salvelinus confluentus*). U.S. Fish and Wildlife Service, Boise, Idaho. 8 pages.

USFWS. 2021. Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Western Distinct Population Segment of the Yellow-Billed Cuckoo. Final Rule. Federal Register 86: 20798 – 21005.

WDFW (Washington State Department of Fish and Wildlife). 2013. Threatened and Endangered Wildlife in Washington: 2012 Annual Report. Listing and Recovery Section, Wildlife Program, Washington Department of Fish and Wildlife, Olympia. 251 pp. Accessed August 26, 2021 online at: http://wdfw.wa.gov/publications/01542/wdfw01542.pdf.

WDFW. 2016. SalmonScape. Accessed October 2020 online at: http://apps.wdfw.wa.gov/salmonscape/map.html.

WDFW. 2021a. Salmon Conservation and Reporting Engine (SCoRE). SCoRE interactive map. Accessed August 23, 2021 online at: https://fortress.wa.gov/dfw/score/score/.

WDFW. 2021b. Priority Habitats and Species map. Accessed August 23, 2021 online at: https://geodataservices.wdfw.wa.gov/hp/phs/.

Wyatt, R., Joint Industry Programme on Sound and Marine Life, Review of Existing Data on Underwater Sounds.

WDFW. 2020b. Salmon and Steelhead Species in Washington. Upper Yakima Summer Steelhead. https://fortress.wa.gov/dfw/score/score/species/population_details.jsp?stockId=6894. Accessed August 26, 2016.

Yakima County. 2007. Upper Yakima River Comprehensive Flood Hazard Management Plan River Mile 107 – 128, June 2007 Update. Final. Accessed on August 23, 2021 online at: https://www.yakimacounty.us/328/2007-Upper-Yakima-River-Update

YBFWRB (Yakima Basin Fish and Wildlife Recovery Board). 2009. Yakima Steelhead Recovery Plan, extracted from the 2005 Yakima Subbasin Salmon Recovery Plan with Updates. Final. August 2009.

YSFWPB (Yakima Subbasin Fish and Wildlife Planning Board. 2004. Yakima Subbasin Plan. May 28, 2004. Prepared for the Northwest Power and Conservation Council. Accessed August 23, 2021 online at: http://www.nwcouncil.org/fw/subbasinplanning/yakima/plan/.

Zale, A.V. and D. Rider. 2003. Comparative Use of Modified and Natural Habitats of the Upper Yellowstone River by Juvenile Salmonids. Montana Cooperative Fishery Research Unit, USGS Department of Ecology, Montana State University Bozeman, MT 59717.

11 APPENDICES

(A) Yakima Right Bank Federal Levee Design Plans
(B) Yakima Wastewater Treatment Plant Levee Design Plans
(C) Photos
(D) Water Quality Monitoring Plan
(E) Public Comments
(F) Nationwide Permit 3 Letter of Verification
(G) Cultural Resource Correspondence
(H) Clean Water Act 404(b)1 Analysis

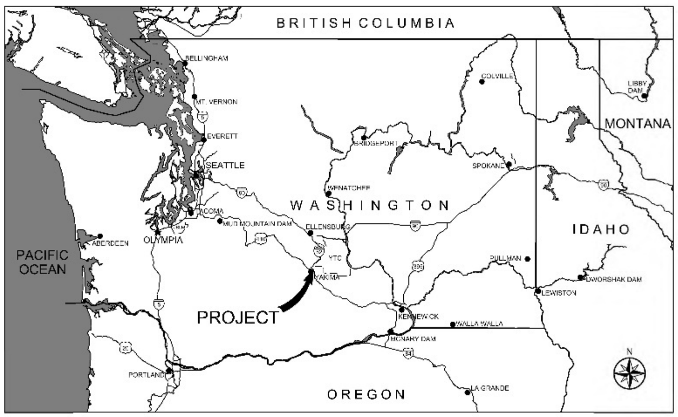
APPENDIX A – YAKIMA RIGHT BANK FEDERAL LEVEE DESIGN PLANS

This page intentionally left blank

US Army Corps
of Engineers ®
Seattle, District

FY20 P2 489177 YRB
YAKIMA RIGHT BANK
LEVEE REHAB 2020

YAKIMA, WASHINGTON



PROJECT VICINITY MAP
NTS

PROJECT LOCATION MAP
NTS

INDEX OF DRAWINGS

SHEET ID	TITLE
	GENERAL
G-001	TITLE, VICINITY MAP, PROJECT MAP, AND INDEX
	CIVIL
CS100	ACCESS AND HAUL ROUTE
CS101	OVERALL SITE PLAN
CS102	PROPOSED SITE PLAN 1
CS103	PROPOSED SITE PLAN 2
C-301	CROSS SECTIONS 1
C-302	CROSS SECTIONS 2
	LANDSCAPE
L101	MITIGATION ACCESS AND HAUL ROUTE
L501	PLANTING DETAILS

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: 30 AUGUST 2020
Solicitation No.: -
File No.: -

Recommended by: GUY L. GREEN P.E., Chief, Design Branch — XX/XX/XX Date
Approved by: JOANN T. WALLS, P.E., Chief, Engineering Div. — XX/XX/XX Date
Submitted by: AARON MEADOW-HILLS, Project Manager — XX/XX/XX Date
Reviewed by: KEITH A. RUDIE, Chief, Specs and Tech Review — XX/XX/XX Date
U.S. ARMY CORPS OF ENGINEERS, SEATTLE DISTRICT, SEATTLE, WASHINGTON
Prepared by: ALICIA N. ROTHERY, Chief, Preparing Section — XX/XX/XX Date

FY20 P2 489177 YRB
YAKIMA RIGHT BANK
LEVEE REHAB 2020
TITLE, VICINITY MAP, PROJECT MAP, AND INDEX

SHEET IDENTIFICATION
G-001

A1 ACCESS AND HAUL ROUTE
1" = 300'

GENERAL NOTES:

1. PROJECT ACCESS WILL BE FROM EAST YAKIMA AVENUE.
2. STAGING AREA WILL BE COVERED IN TOPSOIL, HYDROSEEDED AND MATCH THE EXISTING CONDITIONS PRIOR TO CONSTRUCTION.
3. A HYDROSEED MIXTURE SHOULD CONTAIN THE FOLLOWING SPECIES PLUS MULCH: SANDBERG BLUEGRASS (POA SANBERGII), BLUEBUNCH WHEATGRASS (AGROPYRON SPICATUM), THICKSPIKE WHEATGRASS (AGROPYRON DASYTACHYUM), STREAMBANK WHEATGRASS (AGROPYRON RIPARIUM), AND LADAK ALFLALFA.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY: J. SKINDE	ISSUE DATE: 02 OCT 2020
DRAWN BY: A. ROTHERY	SOLICITATION NO.: WXXXXX
CHECKED BY: G. KATO	CONTRACT NO.: WXXXXX
SUBMITTED BY: PROJECT MANAGER	FILE NUMBER: E-6-7-55
SIZE: ANSI D	

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
4735 EAST MARGINAL WAY SOUTH
SEATTLE, WASHINGTON 98134

FY20 F2-189177 YRB
YAKIMA RIGHT BANK LEVEE 2020
YAKIMA, WA

ACCESS AND HAUL ROUTE

SHEET ID
YRB
CS100

FINAL DESIGN SUBMITTAL

Plot Date: $DATE$ $TIME$ File Path:

A1 OVERALL SITE PLAN

1" = 100'

GENERAL NOTES:

1. PROJECT ACCESS WILL BE FROM EAST YAKIMA AVENUE.
2. STAGING AREA WILL BE COVERED IN TOPSOIL, HYDROSEEDED AND MATCH THE EXISTING CONDITION PRIOR TO CONSTRUCTION.
3. A HYDROSEED MIXTURE SHOULD CONTAIN THE FOLLOWING SPECIES PLUS MULCH: SANDBERG BLUEGRASS (POA SANBERGII), BLUEBUNCH WHEATGRASS (AGROPYRON SPICATUM), THICKSPIKE WHEATGRASS (AGROPYRON DASYTACHYUM), STREAMBANK WHEATGRASS (AGROPYRON RIPARIUM), AND LADAK ALFALFA.
4. IN-WATER WORK WINDOW: 10/15-2/15

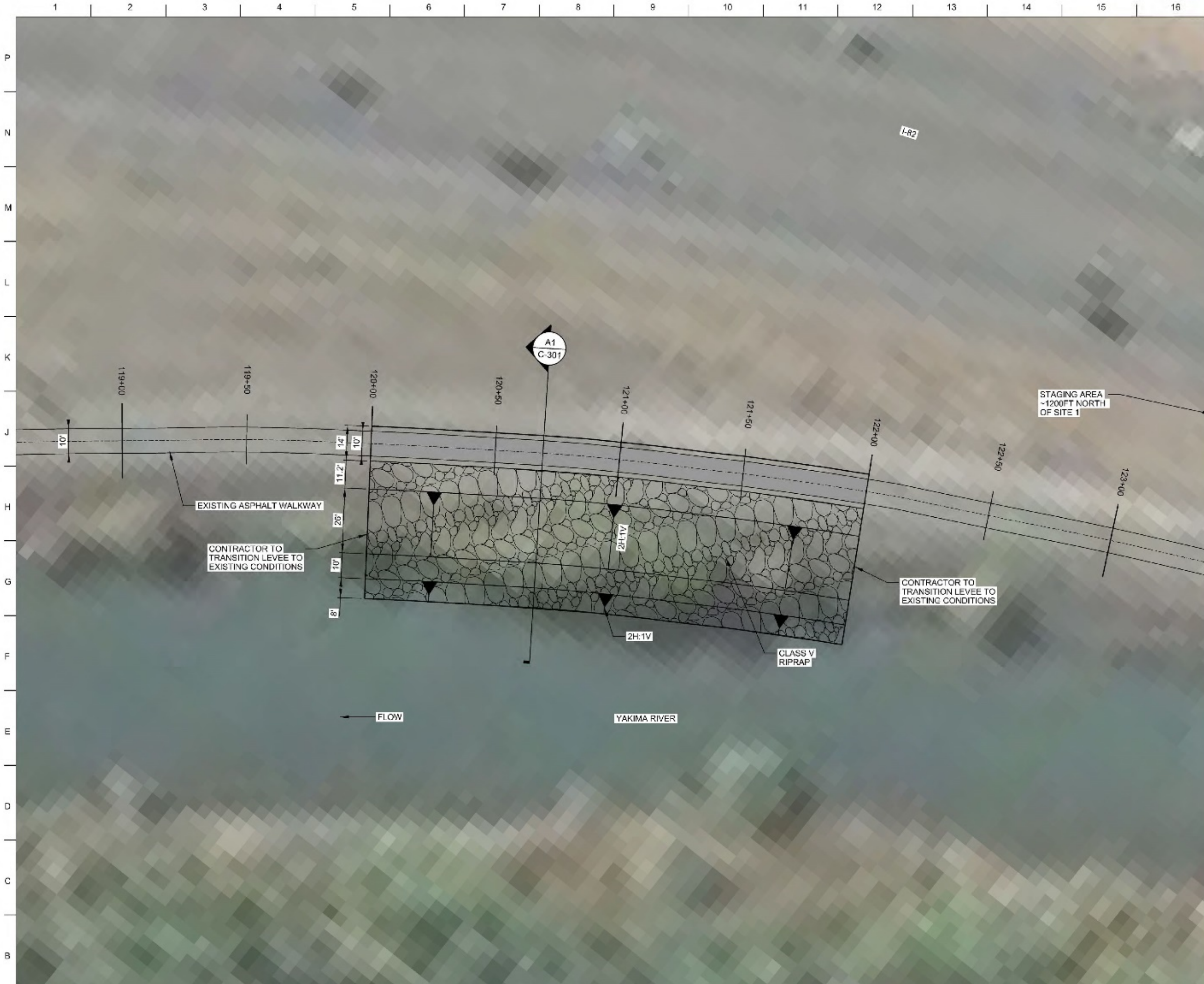
US Army Corps of Engineers ®

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

OVERALL SITE PLAN

SHEET ID
YRB
CS101

FINAL DESIGN SUBMITTAL



A1 PROPOSED SITE PLAN 1
1" = 20'

GENERAL NOTES:

1. STAGING AREA WILL BE COVERD IN TOPSOIL, HYDROSEEDED AND MATCH THE EXISTING CONDITION PRIOR TO CONSTRUCTION.
2. A HYDROSEED MIXTURE SHOULD CONTAIN THE FOLLOWING SPECIES PLUS MULCH: SANDBERG BLUEGRASS (POA SANBERGII), BLUEBUNCH WHEATGRASS (AGROPYRON SPICATUM), THICKSPIKE WHEATGRASS (AGROPYRON DASYTACHYUM), STREAMBANK WHEATGRASS (AGROPYRON RIPARIUM), AND LADAK ALFLALFA.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
4735 EAST MARGINAL WAY SOUTH
SEATTLE, WASHINGTON 98134

DESIGNED BY: J. SKRINDE	ISSUE DATE: 02 OCT 2020
DRAWN BY: A. ROTHERY	SOLICITATION NO.: WXXXXX
CHECKED BY: G. KATO	CONTRACT NO.: WXXXXX
SUBMITTED BY: PROJECT MANAGER	FILE NUMBER: E-6-7-55
SIZE: ANSI D	

FY20 P2-469177 YRB
YAKIMA RIGHT BANK LEVEE 2020
YAKIMA, WA

PROPOSED SITE PLAN 1

SHEET ID
YRB
CS102

FINAL DESIGN SUBMITTAL

Plot Date: $DATE$ $TIME$ File Path:

A1 PROPOSED SITE PLAN 2
1" = 20'

GENERAL NOTES:

1. STAGING AREA WILL BE COVERED IN TOPSOIL, HYDROSEEDED AND MATCH THE EXISTING CONDITION PRIOR TO CONSTRUCTION.
2. A HYDROSEED MIXTURE SHOULD CONTAIN THE FOLLOWING SPECIES PLUS MULCH: SANDBERG BLUEGRASS (POA SANBERGII), BLUEBUNCH WHEATGRASS (AGROPYRON SPICATUM), THICKSPIKE WHEATGRASS (AGROPYRON DASYTACHYUM), STREAMBANK WHEATGRASS (AGROPYRON RIPARIUM), AND LADAK ALFALFA.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
4735 EAST MARGINAL WAY SOUTH
SEATTLE, WASHINGTON 98134

DESIGNED BY: J. SKRINDE	ISSUE DATE: 02 OCT 2020
DRAWN BY: A. ROTHERY	SOLICITATION NO.: WXXXXX
CHECKED BY: G. KATO	CONTRACT NO.: WXXXXX
SUBMITTED BY: PROJECT MANAGER	FILE NUMBER: E-6-7-55
SIZE: ANSI D	

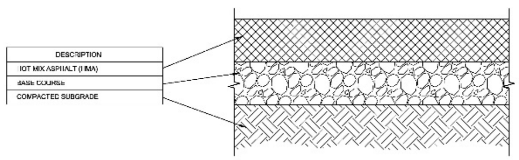
FY20 P2-468177 YRB
YAKIMA RIGHT BANK LEVEE 2020
YAKIMA, WA

PROPOSED SITE PLAN 2

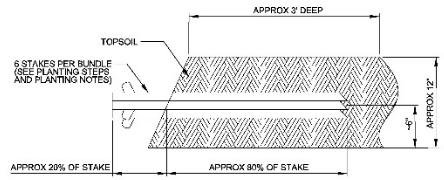
SHEET ID
YRB
CS103

FINAL DESIGN SUBMITTAL

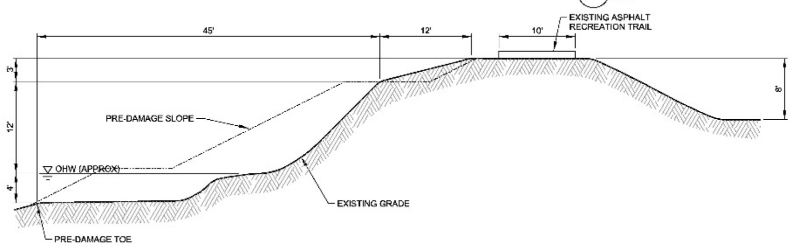
Plot Date: $DATE$ $TIME$ File Path:



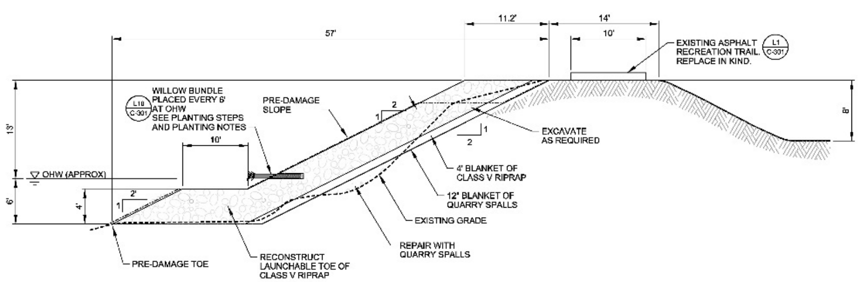
L1 TYPICAL PAVEMENT SECTION
NTS



L10 WILLOW BUNDLE CROSS SECTION
NTS



G1 CROSS SECTION - YAKIMA RIGHT BANK 1 - EXISTING CONDITIONS
NTS



A1 CROSS SECTION - YAKIMA RIGHT BANK 1 - PROPOSED CONDITIONS
NTS

GENERAL NOTES:

1. PROJECT SITE EXTENDS FOR 200 LINEAL FEET INCLUDING TRANSITIONS FROM NATIONAL LEVEE DATABASE (NLD) STATION 120+00 TO STATION 122+00 ACTUAL STATION OF CROSS SECTIONS WILL VARY DEPENDING ON FIELD
2. USACE SHALL BE RESPONSIBLE FOR LOCATING UNDERGROUND AND OVERHEAD UTILITIES AS APPLICABLE PRIOR TO COMMENCING WORK.
3. QUARRY SPALLS SHALL CONFORM TO GRADATIONS IN TABLE 1 ON C-302 AND SHALL CONSIST OF CLEAN, ANGULAR, SCREENED CRUSHED ROCK.
4. CLASS V RIPRAP SHALL CONFORM TO THE GRADATIONS IN TABLE 2 ON C-302 STONE SHALL BE HARD, SOUND, AND DURABLE MATERIAL, FREE FROM SEAMS, CRACKS AND OTHER DEFECTS TENDING TO LEAD TO PREMATURE WEATHERING.
5. SOIL FROM EXISTING LEVEE EMBANKMENT TO BE REUSED ALONG THE EMBANKMENT. ADDITIONAL EMBANKMENT SOIL SHALL CONFORM TO THE GRADATIONS IN TABLE 3 ON C-302.
6. TOPSOIL PLANTING MATRIX SHALL CONSIST OF A 75/25 MIXTURE OF ENGINEERED SOIL AND ORGANIC COMPOST. ENGINEERED TOPSOIL SHALL CONFORM TO GRADATIONS IN TABLE 3 ON C-302 AND SHALL BE FREE OF ROOTS, CHEMICALS, GARBAGE AND DEBRIS.
7. WHERE THE HISTORICAL RIVERWARD TOE EXCEEDS THE EXTENT OF THE LEVEE REPAIR, EFFORT WOULD BE MADE FOR EXISTING MATERIAL TO REMAIN INTACT SUCH THAT SAFE CONSTRUCTION PRACTICE AND STABLE SLOPES ARE STILL MAINTAINED.
8. LIMIT CONSTRUCTION ACTIVITIES TO WORK AREAS SHOWN.
9. TREES AND OTHER WOODY SHRUBS REMOVED AS A RESULT OF THE REPAIR SHALL BE PLACED AT ABOUT 1' ABOVE OHW LINE FOR ALL SITES. DO NOT PLACE VEGETATION ON WILLOW BUNDLES.
10. OHW TO BE VERIFIED IN THE FIELD BY USACE.
11. ALL DIMENSIONS ARE APPROXIMATE AND MUST BE VERIFIED BY THE CONTRACTOR IN THE FIELD.
12. HYDROSEED MIXTURE SHALL CONTAIN THE FOLLOWING SPECIES OF EQUAL PARTS PLUS MULCH: SANDBERG BLUEGRASS (POA SANBERGII), BLUEBUNCH WHEATGRASS (AGROPYRON SPICATUM), THICKSPIKA WHEATGRASS (AGROPYRON DASYTACHYUM), STREAMBANK WHEATGRASS (AGROPYRON RIPARIUM), AND LADAK ALFALFA. SUITABLE SUBSTITUTES MAY BE USED AFTER REVIEW AND APPROVAL BY PROJECT BIOLOGIST.

REPAIR STEPS

1. EXCAVATE SLOUGHED MATERIAL FROM TOE OF SLOPE. REMOVE EXISTING RIPRAP AND RETAIN AS PRACTICABLE.
2. RECONSTRUCT LAUNCHABLE TOE TO PRE-DAMAGE CONDITION USING CLASS V RIPRAP.
3. INSTALL WILLOW/DOGWOOD BUNDLES ACCORDING TO PLANTING STEPS.
4. RECONSTRUCT THE 4' BLANKET AND 1' SPALL LAYER TO THE TOP OF SLOPE.
5. TRANSITION UPSTREAM AND DOWNSTREAM ENDS OF REPAIR TO SMOOTHLY TIE INTO EXISTING SLOPE AND EXISTING ELEVATION.
6. RESTORE CROWN WITH CSBC CREST. MATCH ADJACENT EXISTING.
7. HYDROSEED EXPOSED GROUND WITH REQUIRED LOCAL NATIVE MIX.

PLANTING STEPS

1. AFTER SLOPE ARMOR IS PLACED TO THE PRE-EXISTING VEGETATION LINE (ORDINARY HIGH WATER), CREATE TOPSOIL UNITS WITH WILLOW/DOGWOOD BUNDLES SPACED 6 FEET ON CENTER ALONG THE ENTIRE LENGTH OF THE LEVEE.
2. FOR EACH TOPSOIL UNIT, FIRST PLACE TOPSOIL 6 INCHES THICK, 2 FEET WIDE, AND 3 FEET DEEP ALIGNED HORIZONTALLY.
3. PLACE WILLOW/DOGWOOD BUNDLE HORIZONTALLY IN THE CENTER OF THE TOPSOIL UNIT SO THAT APPROXIMATELY 80% WILL BE EMBEDDED.
4. PLACE TOPSOIL 6 INCHES THICK, 2 FEET WIDE, AND 3 FEET DEEP ON TOP OF THE WILLOW BUNDLE. THEN CONTINUE ROCK PLACEMENT UP THE SLOPE.
5. INSTALL SOIL UNIT WITH WILLOW/DOGWOOD BUNDLES EVERY 6 FEET ALONG THE LENGTH OF THE LEVEE. THERE WILL BE 17 BUNDLE UNITS PER 100 FEET OF LEVEE LENGTH.
6. WATER BUNDLES AFTER PLANTING.

PLANTING NOTES

1. TOPSOIL SPECIFICATIONS ARE IN TABLE 3 BELOW.
2. WILLOW/DOGWOODSTAKES SHALL BE CUT TO 4 FEET IN LENGTH WITH AN ANGLE CUT (45 DEGREES) AT THE BASAL END OF 0.5" TO 1.5" IN DIAMETER AND PERPENDICULAR CUT JUST ABOVE A NODE (BUD) AT THE TOP.
3. WILLOW/DOGWOOD BUNDLES SHALL CONSIST OF SIX 4-FOOT LONG WILLOW/DOGWOOD STAKES PLANTED IN A TOPSOIL MATRIX CONSISTING OF TOPSOIL 12 INCHES IN DIAMETER,2 FEET WIDE, AND 3 FEET DEEP. THE SOIL AND WILLOW/DOGWOOD UNIT SHALL BE SPACED 6 FEET ON CENTER.
4. SUBSTITUTES FOR WILLOWS AND DOGWOOD MAY BE USED AFTER REVIEW AND APPROVAL BY THE PROJECT BIOLOGIST.

TABLE 1: QUARRY SPALL GRADATION

SIEVE SIZE	PRECENT PASSING
8"	100
4"	0

TABLE 2: RIPRAP GRADATIONS (ASSUMED SPECIFIC GRAVITY = 2.60)

DISTRIBUTION	CLASS V	
	SIZE (IN)*	WEIGHT (LB)*
100% SMALLER THAN	34	3000
50% SMALLER THAN	21	750
10% SMALLER THAN	13	188
Cu	2.2	

*A DEVIATION OF +/- 4% IS ALLOWED FOR SIZE AND +/- 10% FOR WEIGHT

TABLE 3: ENGINEERED TOPSOIL GRADATION

SIEVE SIZE	PRECENT PASSING BY WEIGHT
1/2"	100
NO. 4	75-100
NO. 10	40-75
NO. 18	25-55
NO. 40	25-50
NO. 200	10-20

TABLE 4: MATERIAL QUANTITIES

SITE	LENGTH (FEET)	CLASS V RIPRAP (CY)	QUARRY SPALLS (CY)	TOPSOIL (CY)
SITE 1	200	2000	416	30
SITE 2	100	970	184	20
TOTAL	300	2970	600	50

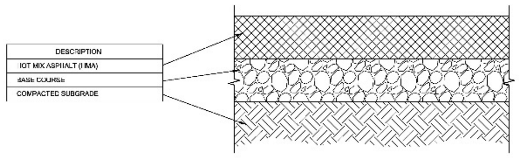
US Army Corps of Engineers

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
4735 EAST MARGINAL WAY SOUTH
SEATTLE, WASHINGTON 98134

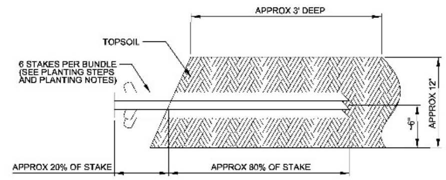
CROSS SECTIONS 1
YAKIMA RIGHT BANK 1

SHEET ID
YRB
C-301

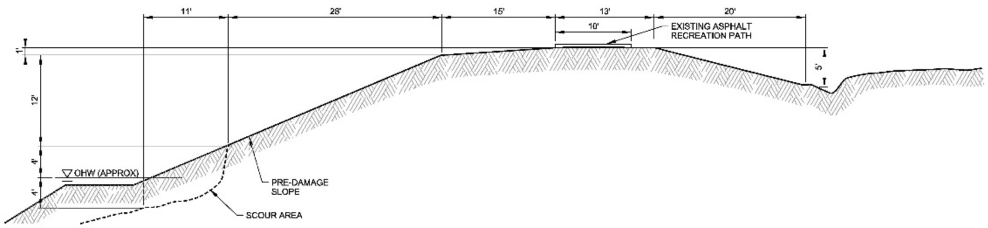
FINAL DESIGN SUBMITTAL



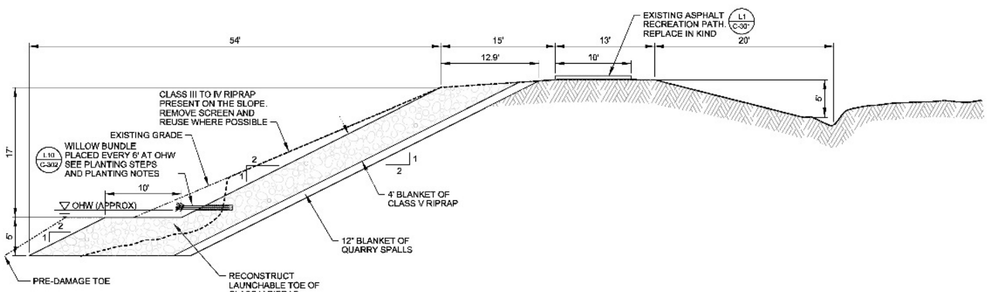
L1 TYPICAL PAVEMENT SECTION
NTS



L10 WILLOW BUNDLE CROSS SECTION
NTS



G1 CROSS SECTION - YAKIMA RIGHT BANK 2 - EXISTING CONDITIONS
NTS



A1 CROSS SECTION - YAKIMA RIGHT BANK 2 - PROPOSED SECTION
NTS

GENERAL NOTES:

1. PROJECT SITE EXTENDS FOR 100 LINEAL FEET INCLUDING TRANSISTIONS FROM NATIONAL LEVEE DATABASE (NLD) STATION 139+00 TO STATION 139+00. ACTUAL STATIONS OF CROSS SECTIONS WILL VARY DEPENDING ON FIELD CONDITIONS.
2. USACE SHALL BE RESPONSIBLE FOR LOCATING UNDERGROUND AND OVERHEAD UTILTIES AS APPLICABLE PRIOR TO COMMENCING WORK.
3. QUARRY SPALLS SHALL CONFORM TO GRADATIONS IN TABLE 1 ON C-302 AND SHALL CONSIST OF CLEAN, ANGULAR, SCREENED CRUSHED ROCK.
4. CLASS V RIPRAP SHALL CONFORM TO THE GRADATIONS IN TABLE 2 ON C-302 STONE SHALL BE HARD, SOUND, AND DURABLE MATERIAL. FREE FROM SEAMS, CRACKS AND OTHER DEFECTS TENDING TO LEAD TO PREMATURE WEATHERING.
5. SOIL FROM EXISTING LEVEE EMBANKMENT TO BE REUSED ALONG THE EMBANKMENT. ADDITIONAL EMBANKMENT SOIL SHALL CONFORM TO THE GRADATIONS IN TABLE 3 ON C-302.
6. TOPSOIL PLANTING MATRIX SHALL CONSIST OF A 75/25 MIXTURE OF ENGINEERED SOIL AND ORGANIC COMPOST. ENGINEERED TOPSOIL SHALL CONFORM TO GRADATIONS IN TABLE 3 ON C-302 AND SHALL BE FREE OF ROOTS, CHEMICALS, GARBAGE AND DEBRIS.
7. WHERE THE HISTORICAL RIVERWARD TOE EXCEEDS THE EXTENT OF THE LEVEE REPAIR, EFFORT WOULD BE MADE FOR EXISTING MATERIAL TO REMAIN INTACT SUCH THAT SAFE CONSTRUCTION PRACTICE AND STABLE SLOPES ARE STILL MAINTAINED.
8. LIMIT CONSTRUCTION ACTIVITIES TO WORK AREAS SHOWN.
9. TREES AND OTHER WOODY SHRUBS REMOVED AS A RESULT OF THE REPAIR SHALL BE PLACED AT ABOUT 1' ABOVE OHW LINE FOR ALL SITES. DO NOT PLACE VEGETATION ON WILLOW BUNDLES.
10. OHW TO BE VERIFIED IN THE FIELD BY USACE.
11. ALL DIMENSIONS ARE APPROXIMATE AND MUST BE VERIFIED BY THE CONTRACTOR IN THE FIELD.
12. HYDROSEED MIXTURE SHALL CONTAIN THE FOLLOWING SPECIES OF EQUAL PARTS PLUS MULCH: SANDBERG BLUEGRASS (POA SANDBERGII), BLUEBUNCH WHEATGRASS (AGROPYRON SPICATUM), THICKSPIKA WHEATGRASS (AGROPYRON DASYTACHYUM), STREAMBANK WHEATGRASS (AGROPYRON RIPARIUM), AND LADAK ALFALFA. SUITABLE SUBSTITUTES MAY BE USED AFTER REVIEW AND APPROVAL BY PROJECT BIOLOGIST.

REPAIR STEPS

1. EXCAVATE SLOUGHED MATERIAL FROM TOE OF SLOPE. REMOVE EXISTING RIPRAP AND RETAIN AS PRACTICABLE.
2. RECONSTRUCT LAUNCHABLE TOE TO PRE-DAMAGE CONDITION USING CLASS V RIPRAP.
3. INSTALL WILLOW/DOGWOOD BUNDLES ACCORDING TO PLANTING STEPS.
4. RECONSTRUCT THE 4' BLANKET AND 1' SPALL LAYER TO THE TOP OF SLOPE.
5. TRANSITION UPSTREAM AND DOWNSTREAM ENDS OF REPAIR TO SMOOTHLY TIE INTO EXISTING SLOPE AND EXISTING ELEVATION.
6. RESTORE CROWN WITH CSBC CREST. MATCH ADJACENT EXISTING.
7. HYDROSEED EXPOSED GROUND WITH REQUIRED LOCAL NATIVE MIX.

PLANTING STEPS

1. AFTER SLOPE ARMOR IS PLACED TO THE PRE-EXISTING VEGETATION LINE (ORDINARY HIGH WATER), CREATE TOPSOIL UNITS WITH WILLOW/DOGWOOD BUNDLES SPACED 6 FEET ON CENTER ALONG THE ENTIRE LENGTH OF THE LEVEE.
2. FOR EACH TOPSOIL UNIT, FIRST PLACE TOPSOIL 6 INCHES THICK, 2 FEET WIDE, AND 3 FEET DEEP ALIGNED HORIZONTALLY.
3. PLACE WILLOW/DOGWOOD BUNDLE HORIZONTALLY IN THE CENTER OF THE TOPSOIL UNIT SO THAT APPROXIMATELY 80% WILL BE EMBEDDED.
4. PLACE TOPSOIL 6 INCHES THICK, 2 FEET WIDE, AND 3 FEET DEEP ON TOP OF THE WILLOW BUNDLE. THEN CONTINUE ROCK PLACEMENT UP THE SLOPE.
5. INSTALL SOIL UNIT WITH WILLOW/DOGWOOD BUNDLES EVERY 6 FEET ALONG THE LENGTH OF THE LEVEE. THERE WILL BE 17 BUNDLE UNITS PER 100 FEET OF LEVEE LENGTH.
6. WATER BUNDLES AFTER PLANTING.

PLANTING NOTES

1. TOPSOIL SPECIFICATIONS ARE IN TABLE 3 BELOW.
2. WILLOW/DOGWOODSTAKES SHALL BE CUT TO 4 FEET IN LENGTH WITH AN ANGLE CUT (45 DEGREES) AT THE BASAL END OF 0.5" TO 1.5" IN DIAMETER AND PERPENDICULAR CUT JUST ABOVE A NODE (BUD) AT THE TOP.
3. WILLOW/DOGWOOD BUNDLES SHALL CONSIST OF SIX 4-FOOT LONG WILLOW/DOGWOOD STAKES PLANTED IN A TOPSOIL MATRIX CONSISTING OF TOPSOIL 12 INCHES IN DIAMETER,2 FEET WIDE, AND 3 FEET DEEP. THE SOIL AND WILLOW/DOGWOOD UNIT SHALL BE SPACED 6 FEET ON CENTER.
4. SUBSTITUTES FOR WILLOWS AND DOGWOOD MAY BE USED AFTER REVIEW AND APPROVAL BY THE PROJECT BIOLOGIST.

TABLE 1: QUARRY SPALL GRADATION

SIEVE SIZE	PRECENT PASSING
8"	100
4"	3

TABLE 2: RIPRAP GRADATIONS (ASSUMED SPECIFIC GRAVITY = 2.60)

DISTRIBUTION	CLASS V	
	SIZE (IN)*	WEIGHT (LB)*
100% SMALLER THAN	34	3000
50% SMALLER THAN	21	750
10% SMALLER THAN	13	188
Cu	2.2	

*A DEVIATION OF +/- 4% IS ALLOWED FOR SIZE AND +/- 10% FOR WEIGHT

TABLE 3: ENGINEERED TOPSOIL GRADATION

SIEVE SIZE	PRECENT PASSING BY WEIGHT
1/2"	100
NO. 4	75-100
NO. 10	40-75
NO. 18	25-55
NO. 40	25-50
NO. 200	10-20

TABLE 4: MATERIAL QUANTITIES

SITE	LENGTH (FEET)	CLASS V RIPRAP (CY)	QUARRY SPALLS (CY)	TOPSOIL (CY)
SITE 1	200	2000	416	30
SITE 2	100	970	184	20
TOTAL	300	2970	600	50

US Army Corps of Engineers ®

ISSUE DATE: 02 OCT 2020
SOLICITATION NO.: WXXXXX
CONTRACT NO.: WXXXXX
FILE NUMBER: E-6-7-55
DESIGNED BY: J. SKRINDE
DRAWN BY: A. ROTHERY
CHECKED BY: G. KATO
SUBMITTED BY: PROJECT MANAGER
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
4735 EAST MARGINAL WAY SOUTH
SEATTLE, WASHINGTON 98134

FY20 P2-488177 YRB
YAKIMA RIGHT BANK LEVEE 2020
YAKIMA, WA

CROSS SECTIONS 2
YAKIMA RIGHT BANK 2

SHEET ID
YRB
C-302

FINAL DESIGN SUBMITTAL

A1 MITIGATION ACCESS AND HAUL ROUTE
1" = 300'

GENERAL NOTES:

1. YAKIMA MITIGATION PLANTING DETAILS ON L-601.
2. OFFSITE MITIGATION PLANTINGS WILL CONSIST OF COYOTE WILLOW (SALIX EXIGUA), AND RED-OSIER DOGWOOD (CORNUS SERICEA) CUTTINGS, AND BLACK COTTONWOOD (POPULUS TRICHOCARPA) CONTAINERS OR BARE-ROOT PLANTS. THE WILLOW AND RED-OSIER DOGWOOD WILL BE PLANTED ON A 200-LINEAR FOOT STRETCH ON 1-FOOT CENTERS IN TWO ROWS (200 LINEAR FEET EACH) APPROXIMATELY STARTING AT 1 FOOT ABOVE OHW ON THE RIVERBANK, WITH A SECOND ROW 2 FEET ABOVE THE FIRST ROW. THE THIRD PARALELL ROW WHICH BLACK COTTONWOOD CONTAINERS OR BARE-ROOT PLANTS WILL PLANTED ON 6-FOOT CENTERS IN THE THIRD ROW BEHIND THE WILLOW AND DOGWOOD STAKES.
3. THE PROJECT BIOLOGIST WILL LOCATE THE BEST AREA FOR THE PALNTINGS IN THE OFF-STE MITIGATION AREA BASED ON CONDITIONS FOUND AT THE TIME OF INSTALLATION. IT IS ACCEPTABLE TO REDUCE THE PLANTINGS OF ONLY ONE ROW OF WILLOWS/DOGWOOD OVER 400 LINEAR FEET WITH THE SAME SPACING. THE COTTONWOOD PLANTS SHOULD STILL BE PLANTED BEHIND THE WILLOW/DOGWOOD ROW IN A SECOND ROW. DO NOT PLANT THE COTTONWOODS AT THE 1-FOOT ABOVE THE OHW MARK.

US Army Corps of Engineers ®

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
4735 EAST MARGINAL WAY SOUTH
SEATTLE, WASHINGTON 98134

FY20 P2-469177 YRB
YAKIMA RIGHT BANK LEVEE 2022
YAKIMA, WA

MITIGATION ACCESS AND HAUL ROUTE

SHEET ID
YRB
L-101

FINAL DESIGN SUBMITTAL

A1 MITIGATION SITE PLAN

GENERAL NOTES:

1. YAKIMA MITIGATION PLANTING DETAILS ON L-501.
2. OFFSITE MITIGATION PLANTINGS WILL CONSIST OF COYOTE WILLOW (SALIX EXIGUA), BLACK COTTONWOOD (POPULUS TRICHOCARPA), AND RED-OSIER DOGWOOD (CORNUS SERICEA) CUTTINGS. THE WILLOW AND RED-OSIER DOGWOOD WILL BE PLANTED ON 1-FOOT CENTERS IN TWO ROWS APPROXIMATELY 1 FOOT ABOVE OHW ON THE RIVERBANK OF THE OFF-SITE MITIGATION SITE. BLACK COTTONWOOD STAKES WILL PLANTED ON 6-FOOT CENTERS BEHIND THE WILLOW AND DOGWOOD STAKES.
3. SUBSTITUTES FOR COTTONWOOD, WILLOWS AND DOGWOOD MAY BE USED AFTER REVIEW AND APPROVAL BY THE PROJECT BIOLOGIST.

MITIGATION AREA CONTROL POINTS

POINT	NORTHING	EASTING
M1-A	N 467 877.39	E 1 643 027.23
M1-B	N 467 932.62	E 1 642 941.26
M1-C	N 468 034.81	E 1 642 871.17
M1-D	N 468 113.34	E 1 642 836.24
M1-E	N 468 156.46	E 1 642 832.51
M1-F	N 468 270.18	E 1 642 813.41
M1-G	N 468 270.15	E 1 642 821.25
M1-H	N 468 128.70	E 1 642 906.85
M1-I	N 468 085.41	E 1 642 949.76
M1-J	N 467 991.09	E 1 643 012.05
M2-A	N 468 180.55	E 1 642 699.38
M2-B	N 468 255.14	E 1 642 668.36
M2-C	N 468 306.01	E 1 642 684.25
M2-D	N 468 400.06	E 1 642 684.66
M2-E	N 468 474.51	E 1 642 684.98
M2-F	N 468 564.71	E 1 642 669.70
M2-G	N 468 599.89	E 1 642 689.45
M2-H	N 468 619.33	E 1 642 724.80
M2-I	N 468 622.87	E 1 642 811.02
M2-J	N 468 513.20	E 1 642 798.79
M2-K	N 468 313.54	E 1 642 754.82
M3-A	N 468 689.88	E 1 642 721.19
M3-B	N 468 830.63	E 1 642 796.25
M3-C	N 468 967.54	E 1 642 851.71
M3-D	N 469 061.54	E 1 642 863.87
M3-E	N 469 183.03	E 1 642 860.48
M3-F	N 469 249.70	E 1 642 849.01
M3-G	N 469 343.73	E 1 642 853.34
M3-H	N 469 433.77	E 1 642 873.32
M3-I	N 469 519.93	E 1 642 885.45
M3-J	N 469 511.80	E 1 642 952.04
M3-K	N 469 347.17	E 1 642 963.08
M3-L	N 469 194.38	E 1 642 954.58
M3-M	N 469 029.95	E 1 642 918.60
M3-N	N 468 920.35	E 1 642 890.69
M3-O	N 468 818.63	E 1 642 851.06
M3-P	N 468 787.35	E 1 642 835.25

US Army Corps of Engineers

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT

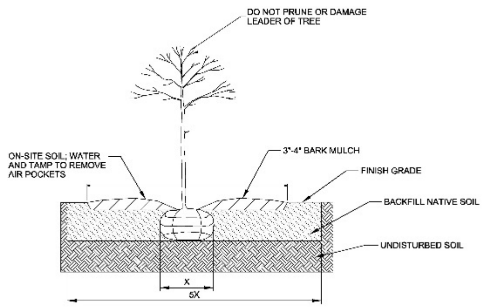
MITIGATION SITE PLAN

SHEET ID
YRB
L-102

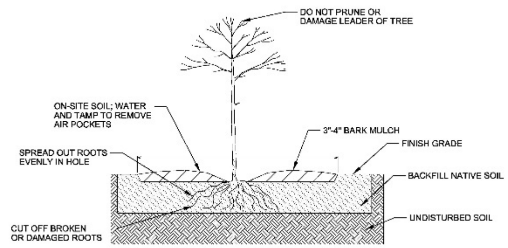
FINAL DESIGN SUBMITTAL

TREE AND SHRUB PLANTING NOTES:

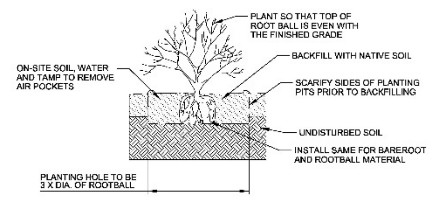
1. NEW TREES SHALL RECEIVE A 4 FT DIAMETER MULCHED CIRCLE.
2. DO NOT STAKE TREES AND SHRUBS
3. PLANT PIT DIMENSIONS ARE TYPICAL FOR ALL TREES AND SHRUBS.
4. PLACE ALL ROOTBALLS SO TOPS ARE LEVEL W/FINISH GRADE.
5. PRUNE ALL DEAD AND BROKEN LIMBS AND ROOTS PER SPECIFICATIONS.



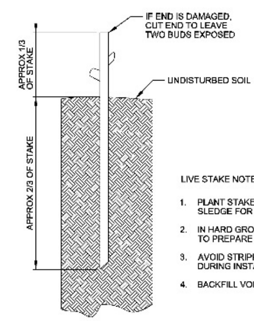
G1 TREE PLANTING, WITH ROOTBALL
NTS



G8 BAREROOT PLANTING
NTS



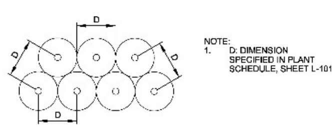
G15 SHRUB PLANTING
NTS



LIVE STAKE NOTES

1. PLANT STAKES BY HAND. DO NOT USE AXE OR SLEDGE FOR DRIVING STAKES.
2. IN HARD GROUND USE AN IRON BAR OR STAR DRILL TO PREPARE HOLES FOR THE STAKES.
3. AVOID STRIPPING BARK OR BRUISING STAKES DURING INSTALLATION.
4. BACKFILL VOIDS AROUND STAKE WITH NATIVE SOIL.

A1 LIVE STAKE/POLE PLANTING
NTS



NOTE:
1. D: DIMENSION SPECIFIED IN PLANT SCHEDULE, SHEET L-101

A7 PLANT SPACING
NTS

PLANTING NOTES

1. STAGING AREA WILL BE COVERED IN TOPSOIL, HYDROSEEDED AND MATCH THE EXISTING CONDITIONS PRIOR TO CONSTRUCTION.
2. A HYDROSEED MIXTURE SHOULD CONTAIN THE FOLLOWING SPECIES PLUS MULCH: SANDBERG BLUEGRASS (POA SANBERGII), BLUEBUNCH WHEATGRASS (AGROPYRON SPICATUM), THICKSPIKE WHEATGRASS (AGROPYRON DASYTACHYUM), STREAMBANK WHEATGRASS (AGROPYRON RIPARIUM), AND LADAK ALFLALFA.
3. FOR ON-SITE PLANTINGS REFER TO PLANTING NOTES ON SHEET C-302.
4. FOR OFF-SITE PLANTINGS REFER TO NOTE 2 ON SHEET L-101.
5. SUBSTITUTES MAY BE USED AFTER REVIEW AND APPROVAL BY PROJECT BIOLOGIST.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
4735 EAST MARGINAL WAY SOUTH
SEATTLE, WASHINGTON 98134

DESIGNED BY: J. SKRINDE	ISSUE DATE: 02 OCT 2020
DRAWN BY: A. ROTHERY	SOLICITATION NO.: WXXXXX
CHECKED BY: G. KATO	CONTRACT NO.: WXXXXX
SUBMITTED BY: PROJECT MANAGER	FILE NUMBER: E-6-7-55
SIZE: ANSI D	

FY20 P2-468177 YRB
YAKIMA RIGHT BANK LEVEE 2020
YAKIMA, WA

PLANTING DETAILS
OFF SITE MITIGATION

SHEET ID
YRB
L-501

FINAL DESIGN SUBMITTAL

Plot Date: $DATE$ $TIME$

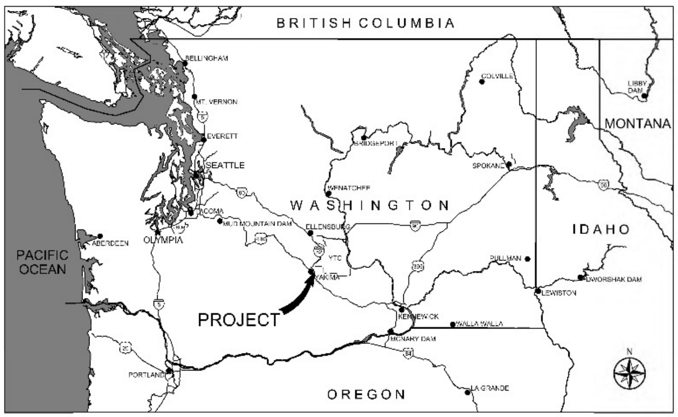
APPENDIX B – YAKIMA WASTEWATER TREATMENT PLANT LEVEE DESIGN PLANS

This page intentionally left blank

US Army Corps
of Engineers®
Seattle District

FY20 P2-489178 WWTP
YAKIMA WASTEWATER TREATMENT PLANT
LEVEE REHAB 2020

YAKIMA, WASHINGTON



PROJECT VICINITY MAP
NTS

PROJECT LOCATION MAP
NTS

INDEX OF DRAWINGS

SHEET ID	TITLE
	GENERAL
G-001	TITLE, VICINITY MAP, PROJECT MAP, AND INDEX
	CIVIL
CS100	ACCESS AND HAUL ROUTE
CS101	PROPOSED SITE PLAN
C-301	CROSS SECTIONS

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: 02 OCT2020
Solicitation No.: -
File No.: E-6-7-56

Recommended by: GUY L. GREEN P.E., Chief, Design Branch — Date
Approved by: JOANN T. WALLS P.E., Chief, Engineering Div. — Date
Submitted by: AARON MEADOWS-HILLS, Project Manager — Date
Reviewed by: Chief, Specs and Tech Review — Date
U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
SEATTLE, WASHINGTON
Prepared by: GABRIEL SIMON, Chief, Preparing Section — Date

FY20 P2-489178 WWTP
YAKIMA WASTE WATER TREATMENT PLANT
LEVEE REHAB 2020

TITLE, VICINITY MAP, PROJECT MAP, AND INDEX

SHEET IDENTIFICATION
G-001

A1 ACCESS AND HAUL ROUTE
1" = 200'

GENERAL NOTES:

1. PROJECT ACCESS FROM S 22ND STREET.
2. UPON PROJECT COMPLETION, STAGING AREA WILL BE COVERED IN TOPSOIL, HYDROSEEDED TO MATCH EXISTING CONDITIONS PRIOR TO CONSTRUCTION.
3. IN WATER WORK ALLOWED OCTOBER 15 TO FEBRUARY 15.

US Army Corps of Engineers

ACCESS AND HAUL ROUTE

SHEET ID
WWTP
CS100

FINAL DESIGN SUBMITTAL

A1 PROPOSED SITE PLAN
1" = 30'

GENERAL NOTES:

1. STATIONING DERIVED FROM THE NATIONAL LEVEE DATABASE (NLD).
2. TRANSITION UPSTREAM AND DOWNSTREAM ENDS OF REPAIR TO SMOOTHLY TIE INTO EXISTING SLOPES AND ELEVATIONS.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
4735 EAST MARGINAL WAY SOUTH
SEATTLE, WASHINGTON 98134

DESIGNED BY: J. SKRINDE
DRAWN BY: G. SIMON
CHECKED BY: G. KATO
SUBMITTED BY: PROJECT MANAGER
SIZE: ANSI D
ISSUE DATE: DD MONTH YYYY
SOLICITATION NO.: WXXXXX
CONTRACT NO.: WXXXXX
FILE NUMBER: FXXXX

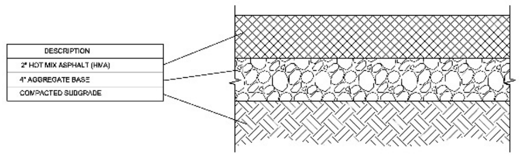
FY20 P2-489176 WWTP
YAKIMA WASTE WATER TREATMENT PLANT LEVEE REHAB 2020
YAKIMA, WA

PROPOSED SITE PLAN

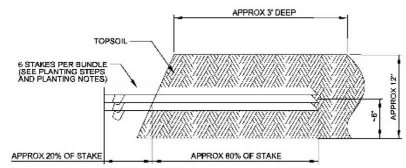
SHEET ID
WWTP
CS101

35% DESIGN SUBMITTAL

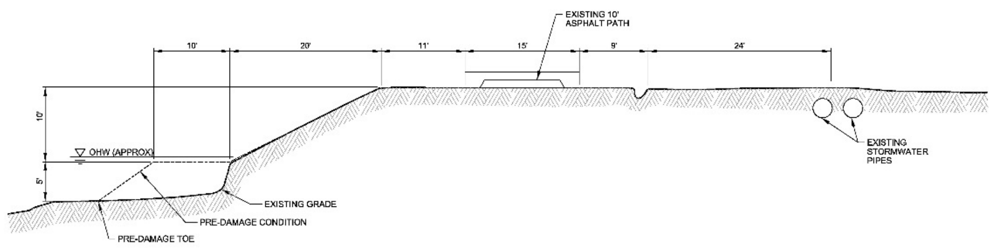
Plot Date: $DATE$ $TIME$ File Path: I:\AECDesigns\FY20_P2-489176_WWTP\Con_Docs\CAD_Sheets\Civil\FY20_P2-489176_WWTP-CS-101 - PROPOSED SITE PLAN.dgn



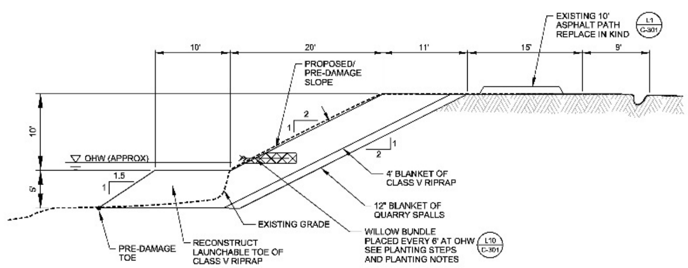
L1 EXISTING PAVEMENT CROSS SECTION (TYP.)
NTS



L10 WILLOW BUNDLE CROSS SECTION
NTS



G1 EXISTING CONDITIONS CROSS SECTION
NTS



A1 PROPOSED CROSS SECTION
NTS

GENERAL NOTES:

1. PROJECT SITE EXTENDS FOR 300 LINEAL FEET INCLUDING TRANSITIONS FROM NATIONAL LEVEE DATABASE (NLD) FROM STATION 10+00 TO STATION 13+00. ACTUAL STATION OF CROSS SECTIONS WILL VARY DEPENDING ON FIELD CONDITIONS.
2. USACE SHALL BE RESPONSIBLE FOR LOCATING UNDERGROUND AND OVERHEAD UTILITIES AS APPLICABLE PRIOR TO COMMENCING WORK.
3. QUARRY SPALLS SHALL CONFORM TO GRADATIONS IN TABLE 1 ON C-301 AND SHALL CONSIST OF CLEAN, ANGULAR, SCREENED AND CRUSHED ROCK.
4. CLASS V RIPRAP SHALL CONFORM TO THE GRADATIONS IN TABLE 2 ON C-301. STONE SHALL BE HARD, SOUND, AND DURABLE MATERIAL, FREE FROM SEAMS, CRACKS AND OTHER DEFECTS TENDING TO LEAD TO PREMATURE WEATHERING.
5. SOIL FROM EXISTING LEVEE EMBANKMENT TO BE REUSED ALONG THE EMBANKMENT. ADDITIONAL EMBANKMENT SOIL SHALL CONFORM TO THE GRADATIONS IN TABLE 3 ON C-301.
6. TOPSOIL PLANTING MATRIX SHALL CONSIST OF A 75/25 MIXTURE O SOIL AND ORGANIC COMPOST. ENGINEERED TOPSOIL SHALL CONFORM TO GRADATION IN TABLE 3 ON C-301 AND SHALL BE FREE OF ROOTS, CHEMICALS GARBAGE AND DEBRIS.
7. WHERE HISTORICAL RIVERWARD TOE EXCEEDS THE EXTENT OF THE LEVEE REPAIR, EFFORT SHOULD BE MADE FOR EXISTING MATERIAL TO REMAIN INTACT SUCH THAT SAFE CONSTRUCTION PRACTICES AND STABLE SLOPES ARE STILL MAINTAINED.
8. LIMIT CONSTRUCTION ACTIVIES TO WORK AREAS SHOWN.
9. TREES AND OTHER WOODY SHRUBS REMOVED AS A RESULT OF THE REPAIR SHALL BE PLACED AT ABOUT 1' ABOVE OHW LINE FOR ALL SITES. DO NOT PLACE VEGETATION ON WILLOW BUNDLES.
10. OHW TO BE VERIFIED IN THE FIELD BY USACE.
11. ALL DIMENSIONS ARE APPROXIMATE AND MUST BE VERIFIED BY THE CONTRACTOR IN THE FIELD.
12. HYDROSEED MIXTURE SHALL CONTAIN THE FOLLOWING SPECIES OF EQUAL PARTS PLUS MULCH: SANDBERG BLUEGRASS (POA SANBERGII), BLUEBUNCH WHEATGRASS (AGROPYRON SPICATUM), THICKSPIKA WHEATGRASS (AGROPYRON DASYTACHYUM), STREAMBANK WHEATGRASS (AGROPYRON RIPARIUM), AND LADAK ALFALFA. SUITABLE SUBSTITUTES MAY BE USED AFTER REVIEW AND APPROVAL BY PROJECT BIOLOGIST.

REPAIR STEPS

1. EXCAVATE SLOUGHED MATERIAL FROM TOE OF SLOPE. REMOVE EXISTING RIPRAP AND RETAIN AS PRACTICABLE.
2. RECONSTRUCT LAUNCHABLE TOE TO PRE DAMAGE CONDITION USING CLASS V RIPRAP.
3. INSTALL WILLOW/DOGWOOD BUNDLES ACCORDING TO PLANTING STEPS.
4. RECONSTRUCT THE 4' BLANKET AND 1' SPALL LAYER TO THE TOP OF SLOPE.
5. TRANSITION UPSTREAM AND DOWNSTREAM ENDS OF REPAIR TO SMOOTHLY TIE INTO EXISTING SLOPE AND EXISTING ELEVATION.
6. RESTORE CROWN WITH CSBC CREST. MATCH ADJACENT EXISTING.
7. HYDROSEED EXPOSED GROUND WITH REQUIRED LOCAL NATIVE MIX.

PLANTING STEPS

1. AFTER SLOPE ARMOR IS PLACED TO THE PRE-EXISTING VEGETATION LINE (ORDINARY HIGH WATER), CREATE TOPSOIL UNITS WITH WILLOW/DOGWOOD BUNDLES SPACED 6 FEET ON CENTER ALONG THE ENTIRE LENGTH OF THE LEVEE.
2. FOR EACH TOPSOIL UNIT, FIRST PLACE TOPSOIL 6 INCHES THICK, 2 FEET WIDE, AND 3 FEET DEEP ALIGNED HORIZONTALLY.
3. PLACE WILLOW/DOGWOOD BUNDLE HORIZONTALLY IN THE CENTER OF THE TOPSOIL UNIT SO THAT APPROXIMATELY 80% WILL BE EMBEDDED.
4. PLACE TOPSOIL 6 INCHES THICK, 2 FEET WIDE, AND 3 FEET DEEP ON TOP OF THE WILLOW BUNDLE. THEN CONTINUE ROCK PLACEMENT UP THE SLOPE.
5. INSTALL SOIL UNIT WITH WILLOW/DOGWOOD BUNDLES EVERY 6 FEET ALONG THE LENGTH OF THE LEVEE. THERE WILL BE 17 BUNDLE UNITS PER 100 FEET OF LEVEE LENGTH.
6. WATER BUNDLES AFTER PLANTING.

PLANTING NOTES

1. TOPSOIL SPECIFICATIONS ARE IN TABLE 3 BELOW.
2. WILLOW/DOGWOODSTAKES SHALL BE CUT TO 4 FEET IN LENGTH WITH AN ANGLE CUT (45 DEGREES) AT THE BASAL END OF 0.5" TO 1.5" IN DIAMETER AND PERPENDICULAR CUT JUST ABOVE A NODE (BUD) AT THE TOP.
3. WILLOW/DOGWOOD BUNDLES SHALL CONSIST OF SIX 4 FOOT LONG WILLOW/DOGWOOD STAKES PLANTED IN A TOPSOIL MATRIX CONSISTING OF TOPSOIL 12 INCHES IN DIAMETER 2 FEET WIDE, AND 3 FEET DEEP. THE SOIL AND WILLOW/DOGWOOD UNIT SHALL BE SPACED 6 FEET ON CENTER.
4. SUBSTITUTES FOR WILLOWS AND DOGWOOD MAY BE USED AFTER REVIEW AND APPROVAL BY THE PROJECT BIOLOGIST.

TABLE 1: QUARRY SPALL GRADATION

SIEVE SIZE	PRECENT PASSING
6"	100
4"	0

TABLE 2: CLASS V RIPRAP GRADATIONS (ASSUMED SG = 2.60)

DISTRIBUTION	CLASS V	
	SIZE (IN)*	WEIGHT (LB)*
100% SMALLER THAN	34	3000
50% SMALLER THAN	21	750
10% SMALLER THAN	13	188
Cu	2.2	

* A DEVIATION OF +/- 4% IS ALLOWED FOR SIZE AND +/- 10% FOR WEIGHT

TABLE 3: ENGINEERED TOPSOIL GRADATION

SIEVE SIZE	PRECENT PASSING BY WEIGHT
1/2"	100
NO. 4	75-100
NO. 10	40-75
NO. 16	25-55
NO. 40	25-50
NO. 200	10-20

TABLE 4: MATERIAL QUANTITIES

SITE	LENGTH (FT)	CLASS V RIPRAP (CY)	CLASS V RIPRAP W/ 10% BULKING CY)	QUARRY SPALLS (CY)	QUARRY SPALLS W/ 10% BULKING (CY)	TOPSOIL (CY)
TOTAL	300	2000	2200	378	420	20

US Army Corps of Engineers ®

DESIGNED BY: J. SKRINDE
ISSUE DATE: 02 OCT 2020

U.S. ARMY CORPS OF ENGINEERS
SEATTLE DISTRICT
4735 EAST MARGINAL WAY SOUTH
SEATTLE, WASHINGTON 98134

YAKIMA WASTE WATER TREATMENT PLANT LEVEE REHAB 2020
YAKIMA, WA

CROSS SECTIONS

SHEET ID
WWTP
C-301

APPENDIX C – PHOTOS

Photos C1 to C8 – Yakima Right Bank Federal (RB) Levee
Photos C9 to C12 – Yakima Wastewater Treatment Plant (WWTP) Levee

Photo C1. Riverbank failure area at Yakima RB Levee Site 1 (Station 121+00) looking downstream.

Photo C2. Slope failure surface caused by erosion at levee toe, Yakima RB Levee Site 1 (Station 121+00).

Photo C3. Remnant riprap at waterline above scoured toe, Yakima RB Levee Site 1 (Station 121+00).

Photo C4. Damaged Yakima RB Levee at Site 1 (Station 121+00) from upstream end, looking downstream.

Photo C5. Damaged section of Yakima RB Levee Site 2, looking upstream (Station 138+00).

Photo C6. Riverside slope and scour at the toe at Yakima RB Levee Site 2, looking upstream (Station 138+00).

Photo C7. Scour and loss of riprap at levee toe at Yakima RB Levee Site 2, looking downstream (Station 138+00).

Photo C8. Yakima RB Levee turns landward at Site 2 on upstream end of damage looking downstream (Station 138+00).

Photo C9. Photo of damaged Yakima WWTP Levee area looking downstream (Station 13+00).

Photo C10. Damage along the Yakima WWTP Levee toe looking downstream (Station 13+00).

Photo C11. Scour of riprap at Yakima WWTP Levee toe looking downstream (approx. Station 13+00).

Photo C12. Downstream end of Yakima WWTP Levee damage area looking upstream (approx. Station 10+00).

APPENDIX D – WATER QUALITY MONITORING PLAN

WATER QUALITY MONITORING PLAN

Monitoring will occur during in-water sediment-generating activities. Each new type of sediment generating activity will be monitored.

Sediment-generating activities triggering monitoring efforts:

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

Monitoring Frequency/Duration:

- Point of compliance monitoring will occur once per hour for the first three hours after the start of each new sediment-generating activity and then once every 3 hours, if no exceedance is noted, until the end of the workday.
- Background samples will be taken on the same frequency as the compliance samples.
- If, after a minimum of one full day, the monitoring results verify that turbidity levels from a certain sediment-generating activity are remaining consistently below the stated water quality standards, physical monitoring may be reduced or stopped for that activity. Physical monitoring will be resumed during new sediment-generating activities or if precipitation events or any other changes will result in higher or lower project-related turbidity.
- Visual monitoring will be done continuously for all work below the ordinary high-water mark.
- Maximum turbidity levels will meet WAC 173-201A-200. 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.

Contingency Sampling

If sample results confirm that water quality is out of compliance with water quality standards, the Project will modify or stop the activity causing the problem and commence the contingency sampling requirements until standards are met for two consecutive sample periods.

Parameter	Contingency Sampling Location	Contingency Frequency	WQ Standard
Turbidity	Point of Compliance	Hourly	When background < 50 NTU: not to exceed 5 NTU over background When background > 50 NTU: Not to exceed 10 percent over background
Oil/Grease	Throughout project area	Continuous-Visual	No Sheen

Once compliance with water quality standards is achieved, the project shall return to its standard sampling schedule.

Non-Compliance

If either visual or physical monitoring indicates that water quality standards have been exceeded, the required reporting will be initiated.

Sampling locations are:

- Background – 100 feet upstream of the project site.
- Point of Compliance site – 300 feet downstream of the project site.

Sampling Procedures:

Water samples will be collected and analyzed for the appropriate parameters, per the Monitoring Schedule above, following the equipment and sampling guidelines below:

Turbidity will be monitored using a Hach turbidimeter.

A portable turbidity meter will be used in the field. A representative sample should accurately reflect the true condition of the water source from which the sample was taken. The following protocol will be used to ensure a representative sample is analyzed:

- Use a clean container to obtain a grab sample from the source;
- Collect sample with care to avoid disturbance of sediments and collecting surface contaminants;
- Gently but thoroughly mix the sample before pouring it into the small vial used to read the sample in the turbidimeter; and
- Without allowing the sample to settle, take turbidity reading according to turbidimeter manufacturer's instructions.
- Several measurements can be taken, with the average used as the data for comparison.

A calibration check of the turbidimeter using secondary standards will be carried out regularly (at least once per week). The instrument will be recalibrated using primary standards at least once every three months, or more when a calibration check indicates there is a problem. The manufacturer's calibration procedures will be followed.

Oil and Grease is a continuous visual monitoring for a visible sheen on the water's surface.

Reporting

All water quality monitoring results (visual and physical) will be recorded on the monitoring form attached (enclosed).

All sample results will be submitted to the Ecology Federal Permit Manager/Coordinator per the frequency specified in the 401 (if applicable).

If sample results or visual monitoring indicate an exceedance of water quality standards, notification shall be made within 24 hours to Ecology's Federal Permit Manager/Coordinator.

Encl. Sample Monitor Results Reporting Form

Date:	Weather:	In-water work start time:

Time of day	**Construction activity**	**Background Sample** (NTU) Please note location	**Point of compliance Sample** (NTU) Please note location	**Change** (NTU)	**Description of visible plume** (length downstream, width as % of channel)
Example: 0800	*Rock Placement at Site 1*	*20.2 (BKG Sno)*	*21.1 (POC1)*	*+0.9*	*visible plume 50 ft in length, < 10% of channel in width*

Notes:

APPENDIX E – PUBLIC COMMENTS

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 155
Seattle, WA 98101-3188

REGIONAL
ADMINISTRATOR'S
DIVISION

December 4, 2021

Zachary Wilson
U.S. Army Corps of Engineers
Planning, Environmental, and Cultural Resources Branch
P.O. Box 3755
Seattle, Washington 98124

Dear Mr. Wilson:

The U.S. Environmental Protection Agency has reviewed the U.S. Army Corps of Engineers' Draft Environmental Assessment and Draft Finding of No Significant Impact Notice of Availability and Clean Water Act Public Notice. EPA conducted the review in accordance with our responsibilities under the National Environmental Policy Act, the Council of Environmental Quality regulations (40 CFR §§ 1500-1508), and Section 309 of the Clean Air Act (EPA Project Number 21-0063-USACE).

The U.S Army Corps of Engineers (Corps) proposes emergency in-kind levee repairs at the Yakima Right Bank Federal Levee and Yakima Wastewater Treatment Plant Levee in Yakima, Yakima County, Washington. Repairs will address damage caused by flooding in early February 2020 on the Yakima River. The Yakima Right Bank Federal Levee and Yakima Wastewater Treatment Plant Levee no longer provide the designed level of protection against flooding. The Corps has scheduled construction to start in January 2022 with work planned in a single construction period over the course of six weeks.

EPA's review of the analyses in the Draft Environmental Assessment finds communities with environmental justice concerns may occur within the project impact area. EPA's attached detailed comments provide recommendations for your consideration, which emphasize the use of EJSCREEN to describe potential environmental justice concerns for each repair site.

EPA appreciates the opportunity to provide comments during this period and looks forward to continued coordination with the Corps on this project. If you would like to discuss these comments, please contact David Magdangal at (206) 553-4044 or magdangal.david@epa.gov, or me at (206) 553-1774 or at chu.rebecca@epa.gov.

Sincerely,

Rebecca Chu Digitally signed by Rebecca Chu Date: 2021.12.03 09:56:29 -08'00'

Rebecca Chu
Manager, Environmental Review Branch

Enclosure: Detailed Comments

U.S. EPA Detailed Comments on the Draft Environmental Assessment for the Yakima Right Bank Federal Levee and Yakima Wastewater Treatment Plant Levee Repair
December 2021

Environmental Justice

Assessing EJSCREEN information is a useful first step in understanding or highlighting locations that may be candidates for further review or outreach.[1] EPA considers a project to be in an area of potential environmental justice (EJ) concern when an EJSCREEN analysis for the impacted area shows one or more of the eleven EJ Indexes at or above the 80th percentile in the nation and/or state. At a minimum, EPA recommends an EJSCREEN analysis consider EJSCREEN information for the block group(s) which contains the proposed action(s) and a one-mile radius around those areas.

It is important to consider all impacted areas by the proposed action(s). Areas of impact can be a single block group or span across several block groups and communities. When assessing large geographic areas, consider the individual block groups within the project area in addition to an area wide assessment. Important caveats and uncertainties apply to this screening-level information, so it is essential to understand the limitations on appropriate interpretations and applications of these indicators.[2] As the screening tool does not provide data on every environmental impact and demographic factor that may be relevant to a particular location and/or proposed project, consider additional information in an EJ analysis to supplement EJSCREEN outputs.[3]

Further review or outreach may be necessary for the Yakima River Bank (RB) repair sites and the Yakima Waste Water Treatment Plant (WWTP) Levee site. Yakima RB Levee 1, Yakima RB Levee 2, and the Yakima WWTP Levee repair sites are in an area of potential EJ concern. An EJSCREEN analysis for these sites shows all eleven EJ Indexes at or above the 80th percentile in the nation and state. To address these concerns, EPA recommends:

- Applying the "Environmental Justice Interagency Working Group Promising Practices for EJ Methodologies in NEPA Reviews" report, or the Promising Practices Report, to this project.[4] The Promising Practices Report is a compilation of methodologies gleaned from current agency practices concerning the interface of EJ considerations through NEPA processes.
- Characterizing Yakima RB Site 1, Yakima RB Site 2, and the Yakima WWTP Levee repair site with specific information or data related to EJ concerns.[5]
- Describing potential EJ concerns for all EJ Indexes at or above the 80th percentile in the state and/or nation.

---

[1] https://ejscreen.epa.gov/mapper/
[2] https://www.epa.gov/ejscreen/technical-documentation-ejscreen
[3] https://fortress.wa.gov/doh/wtn/WTNIBL/; https://www.epa.gov/healthresearch/health-impact-assessment-hia-resource-and-tool-compilation; https://www.lep.gov/maps/lma2015/Final; https://www.airnow.gov/; https://www.atsdr.cdc.gov/placeandhealth/svi/index.html; https://nihhis.cpo.noaa.gov/vulnerability-mapping; https://www.cpc.ncep.noaa.gov/products/predictions/threats/extremesTool.php; https://www.fema.gov/emergency-managers/practitioners/resilience-analysis-and-planning-tool; https://epa.maps.arcgis.com/home/webmap/viewer.html?webmap=137d4e512249480c980e00807562da10;
[4] https://www.epa.gov/sites/default/files/2016-08/documents/nepa_promising_practices_document_2016.pdf
[5] For more information about potential EJ concerns, refer to the July 21, 2021 Memorandum for the Heads of Departments and Agencies Interim Implementation Guidance for the Justice40 Initiative. https://www.whitehouse.gov/wp-content/uploads/2021/07/M-21-28.pdf

- Describing block groups which contains the proposed action and at a minimum, a one-mile radius around those areas.
- Describing individual block groups within the project area in addition to an area wide assessment.
- Supplementing data with county level reports and local knowledge. This may include:
    - Washington State's Environmental Health Disparities tool[6]
    - The Health Impact Assessment (HIA) Resource and Tool Compilation[7]
    - Limited English Proficiency Mapping[8]
    - Air Quality Data[9]
    - Center for Disease Control and Agency for Toxic Substances and Disease Registry's Social Vulnerability Index[10]
    - Extreme Heat Vulnerability Mapping Tool[11]
    - Global Probabilistic Extremes Forecast Tool[12]
    - Resilience Analysis and Planning Tool[13]
    - Smart Location Mapping[14]
    - Ground truthing through meaningful engagement with residents, community leaders, and organizations.

[6] https://fortress.wa.gov/doh/wtn/WTNIBL/
[7] https://www.epa.gov/healthresearch/health-impact-assessment-hia-resource-and-tool-compilation
[8] https://www.lep.gov/maps/lma2015/Final
[9] https://www.airnow.gov/
[10] https://www.atsdr.cdc.gov/placeandhealth/svi/index.html
[11] https://nihhis.cpo.noaa.gov/vulnerability-mapping
[12] https://www.cpc.ncep.noaa.gov/products/predictions/threats/extremesTool.php
[13] https://www.fema.gov/emergency-managers/practitioners/resilience-analysis-and-planning-tool
[14] https://epa.maps.arcgis.com/home/webmap/viewer.html?webmap=137d4e512249480c980e00807562da10

Response: As recommended, the Corps used the EJScreen tool in its environmental justice (EJ) assessment but used a five-mile radius around the project area. The EA has been updated to state that all eleven EJ Indexes are at or above the 80th percentile in the nation and state. However, due to the nature of the project, it is not expected to cause long-term increases to any index. See section 7.11 of the EA for additional details. Due to the scale and scope of the proposed action under PL 84-99 the Corps is conducting an EA and not an EIS. As such, the level of analysis is commensurate with the type of impacts of the proposed federal action, which is the repair of the flood control structure; not the existence of the flood control structure itself or the siting of facilities that would cause long-term impacts, such as increases to EJ Indexes.

State of Washington
Department of Fish and Wildlife

Mailing Address: 600 Capitol Way N, Olympia WA 98501-1091, (360) 902-2200, TDD (360) 902-2207
Main Office Location: Natural Resources Building, 1111 Washington Street SE, Olympia WA

December 04, 2021

US Army Corps of Engineers
Seattle District
Attn: Environmental and Cultural
Resources Section
P.O. Box 3755
Seattle, WA 98124-3755

SUBJECT: NEPA/ PMP-21-05, Draft Environmental Assessment and Draft Finding of No Significant Impact; WDFW Comments on Proposed Repairs to the Yakima Right Bank Levees along the City of Yakima, Washington, Yakima River, WRIA 37.0001

Dear Mr. Wilson:

The Washington Department of Fish and Wildlife (WDFW) reviewed the above-referenced National Environmental Policy Act (NEPA) document dated November 19, 2021, and we offer the following comments and information. Other comments may be offered as the project progresses.

See Response 1

The WDFW commented during prior environmental reviews of repetitive losses to the Federal levee system adjacent to the City of Yakima. We are concerned for the ever-increasing requirements to afford 100-year flood recurrence protections by the levees, and the reverberating effects to upstream, adjacent, and downstream habitats that they cause. Setbacks of the subject levees might be a suitable compromise to the current conditions, and we support that approach here. Yet, the close adjacency of urban infrastructure increases the challenge to accomplish it at the maintenance-project level.

See Response 2

The levee structures and the activities perpetuating their service-lives have long-term, adverse effects to Middle Columbia Steelhead (Steelhead) and Yakima Bull Trout. Additionally, the repairs and "rehabilitation" do not address causes of the levee failures, which is toe scour caused by simplifying channel form, reducing edge roughness, and increasing hydraulic velocity and energy.

See Response 3

A substantial portion of the subject levees appears to be expected to remain in the current orientation for many more decades. We do not support that condition. An approach that incorporates much more robust, complex and rough, engineered structures composing the

State of Washington
Department of Fish and Wildlife

Mailing Address: 600 Capitol Way N, Olympia WA 98501-1091, (360) 902-2200, TDD (360) 902-2207
Main Office Location: Natural Resources Building, 1111 Washington Street SE, Olympia WA

See Response 3

face and toe of these levees would help to arrest the mechanisms of toe scour. By increasing hydraulic resistance of levees, and especially at the toes; sacrificial, launchable-toes might no longer be necessary; which could allow larger, less-erodible, and more persistent boulders to be within sensible budgets. Ballasted log and rootwad structures provide very-effective resistance to toe erosion. These more-consolidated and hydraulically-rough surfaces would also reduce the repetitive rehabilitations and reduce the substantial flood risks to life and infrastructure posed by levee failures. "Repair-in-kind" restorations that fail at heightened frequencies should not be repeated. Rather, techniques to increase roughness and consolidate levee structure, such as bioengineering, should be implemented, rather than to have more and more medium-sized riprap be eroded and consumed by a large river. Rip-rap boulders that wash away, which the river is not competent to move as bedload, will necessarily cause unintended changes to streambed conditions downstream of the more-constrained levee segments.

Much of the area between the levees near the City of Yakima exhibit channel aggradation. Yet, the channel immediately adjacent to these levees, particularly along outside bends, express degradation. That situation causes increased desiccation of the aggraded areas during lower flows, which often hampers regeneration of riparian vegetation, as well as reducing functional edge and off-channel fish habitat. Off-channel habitat is a documented limiting-factor to efforts of salmon recovery in this reach. Perpetuating these levees as-built sustains the chronic deficiencies enforced on normative, habitat forming processes.

See Response 4

Levees also severely impact the functions of stream-adjacent vegetation that is normally present. Vegetation grows only fair to poor on levee surfaces because they are resistant to rooting and tend to be overly drained. That outcome is made worse by the active removal of levee vegetation, which is no longer required for PL 84-99 certification, but it is still practiced by many local governments. Near-stream vegetation provides cover for fish and a food source in the form of insects. The potential recruitment of woody debris that is lost to the river and lack of channel roughness further degrade leveed streams.

See Response 5

The elimination of connected, functioning floodplain areas, stream complexity and sinuosity, and normative riparian corridors seems to sustain permanent 'takes' of Steelhead and Bull Trout, because juvenile and refuge fish habitats are demonstrably reduced. The WDFW envisions that the entirety of Yakima-area dikes would be moved 200-to-600 feet landward to substantially reduce adverse impacts.

Yakima County has worked with many entities, including the Corps, to mitigate flood risks associated with the larger levee system- including those that are not part of the PL 84-99 program. Those collective efforts already provide positive benefits to restoring fish

State of Washington
Department of Fish and Wildlife

Mailing Address: 600 Capitol Way N, Olympia WA 98501-1091, (360) 902-2200, TDD (360) 902-2207
Main Office Location: Natural Resources Building, 1111 Washington Street SE, Olympia WA

and wildlife habitat. Further, the Yakima Basin Integrated Plan (YBIP) is advancing comprehensive improvements to stream flow, temperature, fish passage, riparian vegetation, the recruitment of wood and structural habitat in the Yakima drainage basin.

See Response 6

The YBIP is a consortium of the Yakama Nation, irrigation districts, environmental organizations, and federal, state, county, and city governments. Its goals are to protect, mitigate, and enhance fish and wildlife habitat; provide increased operational flexibility to manage instream flows to meet ecological objectives; and improve the reliability of the water supply for irrigation, municipal supply and domestic uses. The potential and already-realized benefits from cumulatively very-large expenditures from these and other programs, which are aimed toward improving fish habitat throughout the Yakima Basin, will be impaired by the Corps' preferred alternative of levee rehabilitation (versus setback or design improvement). We adamantly support levee setbacks, with appropriately sized and engineered features, as the comprehensive action for the Corps to take.

See Response 7

<u>Aspects of the proposed action, which could be improved over those presented, include:</u>

- Any loose LWM created or encountered will remain whole.
- More variable and larger classes of riprap are used at the toe of the levees to create greater roughness, irregularity, and velocity breaks.
- Further enhance the resistance to toe scour of the stream bed and reduce other mechanisms of levee-toe failure.

See Response 8

I am concerned of the work sequencing being appropriate. Prior to widespread knowledge that adult Steelhead predominantly "wintered" in the Zillah-Granger reach of the Yakima River, it was known amongst sport fishermen that it is a good bet in latter-January of catching an adult Steelhead at the confluence of Naches and Yakima rivers. In around 1993, WDFW successfully collected steelhead broodstock at this location for research. Given that the depth conditions at repair sites 2 & WWTP may be comparable and of the local knowledge of Steelhead occurrence there, I'm skeptical that their presence in the active project area is actually "unlikely". The migrating fish could easily be holding near those sites as they do at the Naches River confluence. To avoid impacts and minimize possible effects at sites 2 & WWTP, those project portions should be completed prior to mid-January.

State of Washington
Department of Fish and Wildlife

Mailing Address: 600 Capitol Way N, Olympia WA 98501-1091, (360) 902-2200, TDD (360) 902-2207
Main Office Location: Natural Resources Building, 1111 Washington Street SE, Olympia WA

See Response 9

The proposed action in NEPA perpetuates adverse impacts to fish and wildlife and inadequately addresses continued environmental harm from levees. Levee repairs should provide improved measures to address the mechanisms of failure. Flood protection structures should only engage flowing water at above bank full discharges.

Thank you for the opportunity to provide these comments. If you have any questions, please contact me at (509) 457-9310.

Sincerely,

Eric Bartrand
Area Habitat Biologist

EB:eb

Response 1: The authority provided by the PL 84-99 program is limited to restoration of the pre-flood level of protection for life and property using the least cost alternative that restores the level of protection while fulfilling all legal, technical, and environmental requirements. Setback levees would provide benefits that maintaining the existing structure does not. However, implementing such an alternative is dependent on the damaged site, existing conditions, and the agreement of the non-federal sponsor to assume responsibilities including funding the incremental cost (i.e., within the framework of our authority). For federal projects, such as the Yakima RB Levee, the Corps has no authority to deviate from the Congressionally-authorized design in the course of conducting a repair under the PL 84-99 program. The focus of the emergency levee rehabilitation program is to repair levee damages from discrete flood events. If only a small portion of a levee system has been damaged, then only a small portion will be repaired and a setback option for the entire segment would be beyond the scope of the project.

The Corps has completed setbacks under the PL 84-99 program. For example, the Corps setback parts of the non-federal Naches Segment 7 and McCormick Levees on the Naches River, returning approximately 4.5 acres back to the floodplain.

Setbacks or improvements can be evaluated through other Corps programs, each of which require the sharing of implementation and operation/maintenance responsibilities, including sharing cost, with a non-federal partner. If a non-federal sponsor, including the Washington Department of Fish and Wildlife, is interested in a setback or levee improvements the Corps has

a variety of programs with authorities to pursue, including aquatic habitat ecosystem restoration (Continuing Authorities Program [CAP] Section 206), restoration of degraded ecosystems through the modification of existing Corps' projects (CAP Section 1135), or construction or improvement of flood control works (CAP Section 205). This is not an exhaustive list and other programs are available. Please call our office at 1(855) 828-7015, email NWSCivilWorks@usace.army.mil or visit us online at:

http://www.nws.usace.army.mil/Missions/Civil-Works/Programs-and-Projects/.

An example project includes the Yakima River Gap to Gap Ecosystem Restoration Project in this reach of the Yakima River. This project involves setting back levees, among other actions, that will provide a wide range of environmental benefits.

Response 2: Repairs are designed under current Corps engineering standards and within the authority of the PL 84-99 program, which authorizes rehabilitation to the level of protection exhibited by the flood control work prior to the damaging event. For a federal project, such as Yakima RB Levee, the legislative authorization extends to maintenance to the initial design. The Corps lacks authority to decline to maintain in perpetuity, and to decline to maintain to the design that was legislatively authorized. The proposed repairs are designed to withstand anticipated scour velocities and depths so repairs are less likely to be a recurring event in the future.

Response 3: Incorporating ballasted wood at the levee toe and rootwads is not recommended due to the repair sites small size, separation, and location in relation to incoming flows. Changes to the current alignment (e.g., setback) are not recommended due to the small footprint of each repair site. Alignment changes also need agreement from the local non-federal sponsor (Yakima WWTP Levee) or congressional approval to change a federal project (Yakima RB Levee). The hydraulic resistance and roughness of the levee at each repair site will increase to a small degree because repairs would increase the riprap size from Class III, which corresponds to a median diameter of 15 inches and a maximum rock diameter of 20 inches, to Class V armor at the three repair sites. Class V armor has a median size of 21 inches and a maximum rock diameter of 34 inches. This increase will reduce the chance for repetitive rehabilitations at the repair sites by making the levee more resilient to river flows.

Response 4: The proposed repair sites contain little to no vegetation. What is present would be removed to complete repairs. Mitigation includes willow bundles and off-site mitigation. Although vegetation removal "is no longer required for PL 84-99 certification," maintenance of Corps standards with respect to the presence of some types of vegetation remains a recommendation with each inspection, and any repairs undertaken to federal or non-federal levees must still conform to Corps engineering standards including those applicable to vegetation. Vegetation does produce negative effects on levee performance and their resiliency against scour and other failure pathways. Localized scour, slope stability, and windthrow are a few examples. Thick brush can also mask signs of distress such as cracking, seepage and slope stability issues that can lead to catastrophic failure.

Response 5: The Yakima RB and WWTP Levees are likely to remain in their current alignment in the foreseeable future. Roads, railroads, bridges, trails, business, and utilities are located immediately near the levees. Substantial resources and support is necessary to setback the entirety of the Yakima City levee system, more than is available to repair the three small sites on the Yakima RB and WWTP Levees. The consequences to listed species or designated critical habitat from ongoing activities or existing facilities that are not within the agency's

discretion to modify, such as the continued presence of the Yakima City levee system, are part of the environmental baseline (50 CFR § 402) and are not considered a source of incidental take from the proposed action. Aforementioned CAP projects, like the Yakima River Gap to Gap Ecosystem Restoration Project, may be appropriate for such undertaking. Local governments, agencies, and tribes seeking assistance may request the Corps to investigate potential water resource issues that may fit a particular authority. These authorities may also authorize the Corps to modify a federal project, such as the Yakima RB Levee.

Response 6: See previous responses to related comments regarding levee setbacks and limitations to the PL 84-99 program. The CAP program may be more appropriate for implementing projects that meet the goal of the Yakima Basin Integrated Plan (YBIP). It should be emphasized that the emergency repair will not be designed to significantly change the pre-flood condition and therefore will not impair any of the YBIP goals.

Response 7:

- The repair sites do not include trees or snags. LWM may be present along the riverward slope or toe during repairs. If LWM is present, it would be placed back along the completed levee or into the river so that it remains within the active floodplain. The Corps will avoid cutting the LWM unless reducing its size is necessary for transport.
- The rock sizes proposed for the repair include a gradation of sizes that is not unisize and determined through hydraulic analysis. The smaller rocks will be mixed with the larger, with the larger focused along the toe where there is greater scour risk
- Scour depths have been calculated for the design hydraulics in the channel. The potential scour depth at the toe has been accounted for in the design.

Response 8: The Corps is coordinating with the National Marine Fisheries Service (NMFS) on the proposed repair, including determining the in-water work window. The NMFS has provided information on the presence of steelhead and the Corps updated steelhead presence from “unlikely” to “likely” in the Final EA. In-water construction will start in mid-January and will be completed within the established work window.

Response 9: Repair has focused on reducing the likelihood of toe and bank scour with an emphasis on toe scour. The existing levee failed from toe scour, causing the repair to focus on addressing this issue. The height of the levee will not change with this repair.

APPENDIX F – NATIONWIDE PERMIT 3 FUNCTIONAL ANALOGY MEMO AND LETTER OF VERIFICATION

Yakima Right Bank Federal Levee and Yakima Wastewater Treatment Plant Levee Repairs
Yakima, Washington
Determination of functional analogy to Nationwide Permit 3

Introduction

The purpose of this document is to record the U.S. Army Corps of Engineers' (Corps) determination of compliance with Section 404 of the Clean Water Act (CWA) by functional analogy to Nationwide Permit (NWP) 3 for repairs to the Yakima Right Bank Federal (RB) Levee and Yakima Wastewater Treatment Plant (WWTP) Levee. The Corps concludes that repairs to the Yakima RB and WWTP Levees are functionally analogous to activities authorized under NWP 3. The Corps also concludes that the project satisfies the conditions associated with this NWP and qualifies for Washington State Department of Ecology (Ecology) certification for Section 401 of the CWA. Details for construction of the project are included below and in the attachments.

Background

In the first week of February 2020, an atmospheric river event brought abundant amounts of rain, warmer temperatures, and higher snow levels to Washington. Subsequent heavy rainfall and rapid snowmelt caused flooding across Washington, with some places exceeding record values. While the Yakima River was spared the more extreme flooding, a smaller discrete event occurred on February 2, 2021, with a peak flow of 10,500 cubic feet per second (cfs) and a stage height of 43.68 feet (gage height) above Ahtanum Creek at Union Gap, Washington (USGS Gage 12500450). A second peak occurred on February 8 with a peak flow of 19,900 cfs and a stage height of 46.51 feet (USGS Gage 12500450). Based on a flow analysis at the Union Gap gage, this event corresponded to a 69 percent annual exceedance probability (AEP) or approximately a 1.5-year flood event.

Approximately 300 linear feet (LF) of the Yakima RB Levee was damaged at two separate locations: Site 1 (200 LF; Station 120+00 to Station 122+00) and Site 2 (100 LF; Station 138+00 to Station 139+00) (Appendix A, Figure 1). The event caused toe scour and loss of toe rock at each site. At Site 2, slope armor was also scoured along with embankment material from within the levee prism. In an undamaged state, the Yakima RB Levee reduces flood risk to public infrastructure and residential, commercial, and park properties by preventing overtopping up to a 100-year flood (1 percent AEP). In the damaged state, the Yakima RB Levee provides a 2-year flood (50 percent AEP) level of protection. If this levee were to be overtopped or breached, approximately 3,600 structures could be flooded.

Approximately 300 LF of the Yakima WWTP Levee was damaged at a single location between Stations 10+00 and 13+00 (Appendix A, Figure 2). The event scoured riprap from the levee's riverward toe and slope. The levee provides protection against flooding to the WWTP, which serves nearly all of the homes, industries, and businesses in Yakima. In an undamaged state, the Yakima WWTP Levee provides flood risk reduction by preventing overtopping up to a 20-year flood (5 percent AEP). In the damaged state, the levee provides a 2-year flood (50 percent AEP) level of protection.

The purpose of the project is to repair the Yakima RB Levee to the 100-year level of protection and the Yakima WWTP Levee to the 20-year level of flood protection. Repairs will restore adequate and reliable flood protection to the same level provided by the levees prior to the damaging February 2020 flood event. If the levees were to fail, there would be an increased risk to human safety, improved property, and public infrastructure. See Appendix A for maps and photos of the damaged levees.

Proposed Repair

The Corps proposes to repair the Yakima RB and the Yakima WWTP Levees to their pre-damage level of protection. Each site will be repaired as shown in the cross sections in Appendix B. The levees will be rebuilt within the horizontal and vertical profiles as they were designed and as they existed when first built. The repairs will increase the riprap size from Class III, which corresponds to a median diameter of 15 inches and a maximum rock diameter of 20 inches, to Class V armor at the three repair sites. Class V armor has a median diameter of 21 inches and a maximum rock diameter of 34 inches. Repair activities for all sites are summarized below.

Work will require removing streamside shrubs and trees from the levee within the construction project footprint, primarily at Yakima RB Levee Site 1. Material excavated from the levee may be repurposed in the repair, provided it meets the general requirements for suitable levee embankment fill. No fill material will be added beyond the existing levee footprint. Construction is planned to start in January 2022. From start to completion, repair of the levees is expected to take 6 weeks, and any in-water work for the repairs will occur within the approved in-water work window, which is from October 15 to February 15.

Equipment used in the repair will include hydraulic excavator, dump truck, grader, vibratory compactor, water truck, and bulldozer. Construction vehicles will access the project area from existing levee roads and paths. Excavated materials will be staged within the levee footprint and at designated staging areas landward of the levee. Work is planned to occur in a single construction period of approximately 6 weeks. Best management practices (BMPs) will be employed to minimize project impacts (Appendix C).

The proposed levee repairs will be within the existing footprint of currently serviceable structures with minor deviation in rock size based on hydraulic analysis under the current Seattle District rock-sizing guidelines. The design is based on updated hydrology information from the hydraulic model of the Gap to Gap reach of the Yakima River, which was updated in 2015 to a 2D HEC-RAS hydraulic model. Hydraulic analysis was used to estimate the minimum size rock recommended during a 100-year flow event for the levee repairs. The analysis found that the minimum acceptable riprap class is Class V, with a recommended blanket thickness of 48 inches on the levee slope. All riverward repairs will occur within the pre-damage levee footprint, i.e., the levee will not encroach farther into the river.

Yakima RB Levee Repairs

The Corps proposes to repair the Yakima RB Levee Site 1 in-kind to restore its pre-damage level of protection. The repaired levee will remain within the pre-damage footprint. Riprap will be placed at the original as-built slope, which varies between 2 horizontal to 1 vertical (2H:1V) and 3H:1V. The launchable toe below the bench will have a 2H:1V slope. Sloughed material will be excavated from the scoured toe and the slope re-graded. A launchable toe will be reconstructed within the existing footprint using Class V riprap. The damaged slope will be armored with a 48-inch-thick blanket of Class V riprap backed by a 12-inch layer of quarry spalls. The upstream and downstream ends will be smoothly transitioned into the existing slopes. Total construction length is approximately 200 LF at Site 1, including any necessary transitions. Repairs to Yakima RB Levee Site 2 will be similar; however, the waterward edge of the toe will be set back approximately two feet from the pre-damage location. As a consequence of pulling the toe landward, the slope of the Yakima RB Levee Site 2 will be altered from approximately 2.5H:1V to 2H:1V. Total construction length will be approximately 100 LF at Site 2, including any necessary transitions.

Yakima WWTP Levee Repairs

The Corps proposes to repair the Yakima WWTP Levee in-kind to restore its pre-damage level of protection. The repaired levee will remain within the pre-damage footprint. Sloughed material will be excavated from the scoured toe and the slope re-graded. The slope and launchable toe will be reconstructed within the existing footprint to their pre-damage slopes of 2H:1V and 1.5H:1V, respectively. The launchable toe will be reconstructed using Class V riprap. The damaged slope will be armored with a 48-inch-thick blanket of Class V riprap backed by a 12-inch layer of quarry spalls. The upstream and downstream ends will be smoothly transitioned into the existing slopes. Total construction length will be approximately 300 LF, including any necessary transitions.

Mitigation

Shoreline habitat in Yakima along the Yakima River is degraded due to the presence of levees along most of its length. As part of the repair, the Corps is proposing the following measures to mitigate habitat impacts from the work.

- On-site: At all repair sites, coyote willow (*Salix exigua*) and red-osier dogwood (*Cornus stolonifera*) bundles will be incorporated into the levee slope at 6-foot intervals along a line matching the lowest vegetation line, approximately at the ordinary high-water mark (OHWM). See sheet C-301 in Appendix B.1 and B.2 for the willow bundle cross section. Substitutes for coyote willow and red-osier dogwood may be used after review and approval by the project biologist. Possible substitutes are arroyo willow (*S. lasiolepsis*), dusky willow (*S. melanopsis*), Scouler's willow (*S. scouleriana*), or stakes collected from nearby stands of native willows.

- Off-site: Repair work along 200 LF at the Yakima RB Levee Site 1 will remove a 15-foot-wide swath of black locust (*Robinia pseudoacacia*) saplings, which provides overhanging vegetation to the Yakima River. The total area impacted is 0.07 acres. To offset the loss of overhanging cover and localized shade, vegetation projected to yield 0.20 acres of foliage cover at full maturity will be planted at an off-site location upstream of the repair. Off-site plantings include 50 black cottonwood (*Populus balsamifera*) containers and 400 coyote willow or red-osier dogwood stakes. No off-site mitigation is proposed for the Yakima RB Levee Site 2 and the Yakima WWTP Levee because they are sparsely vegetated. See L-101, L-102, and L-501 in Appendix B.1 for the planting details.

Monitoring and adaptive management, including replacement and maintenance, after the first year will be conducted by the Corps. If after the first year less than 80 percent of the plantings survive, all the dead plantings will be replaced. In preparation for any required adaptive management re-plantings, the Corps will evaluate why the plantings failed and plan the best path forward for successful replacement. The Corps will engage with the non-federal sponsor to assist in identifying the problem and alternative planting practices for successful re-planting. These may include planting different species, changing the planting location, or adding pest control or exclusion devices. If replacement occurs, the plantings will be monitored for an additional year by the Corps. The Corps will report the success of the mitigation plantings to the resource agencies with which it coordinated for the repair. The plantings will be evaluated in September of each year before leaf drop.

The following information will be provided in a post-construction report to the National Marine Fisheries Service and U.S. Fish and Wildlife Service by December 1, 2022, and constitutes the maintenance, monitoring and adaptive management plan:

1. Project identification:
    i. Project name: Yakima Right Bank Federal Project and Yakima Wastewater Treatment Plant Levee PL 84-99 Repair
    ii. Corps contact person
2. Construction details
    i. Starting and ending dates for work completed for construction
    ii. Total area (sq ft) of in-water construction footprints
    iii. Total area (sq ft) of riparian disturbance (i.e., waterward face of the levee)
    iv. Results of turbidity monitoring
    v. A description of any elements of the project that were constructed in a manner different from that depicted in the BA, associated addendums, and communications.
    vi. Percent survival of installed bundles at the end of the first growing season and, if survival is less than 80%, remedial measures planned or undertaken to replace dead plants.
    vii. Plant survival, based on how many of the total plants installed survive, at the off-site mitigation area at the end of the first growing season and, if survival is less than 80%, remedial measures planned or undertaken to replace dead plants.
3. If re-planting is required due to survival of less than 80%, the Corps will submit an additional monitoring report of the survival status of all plantings following one growing season after re-planting.

The Corps' Analysis of the Applicability of NWP 3 for the Proposed Repairs

The Corps concludes that repairs to the Yakima RB and WWTP Levees are functionally analogous to NWP 3 and that Ecology's Section 401 certification with conditions applies to this work. Under the Corps Regulatory Program, NWP 3 "Maintenance" applies to the repair, rehabilitation, or replacement of any previously authorized, currently serviceable structure or fill, or of any currently serviceable structure or fill authorized by 33 CFR 330.3, provided that the structure or fill is not to be put to uses differing from those uses specified or contemplated for it in the original permit or the most recently authorized modification. Minor deviations in the structure's configuration or filled area, including those due to changes in materials, construction techniques, requirements of other regulatory agencies, or current construction codes or safety standards that are necessary to make the repair, rehabilitation, or replacement are authorized. This NWP also authorizes the removal of previously authorized structures or fills. Any stream channel modification is limited to the minimum necessary for the repair, rehabilitation, or replacement of the structure or fill; such modifications, including the removal of material from the stream channel, must be immediately adjacent to the project. This NWP authorizes the removal of accumulated sediment and debris within, and in the immediate vicinity of, the structure or fill. This NWP also authorizes the repair, rehabilitation, or replacement of those structures or fills destroyed or damaged by storms, floods, fire or other discrete events, provided the repair, rehabilitation, or replacement is commenced, or is under contract to commence, within two years of the date of their destruction or damage. In cases of catastrophic events, such as hurricanes or tornadoes, this two-year limit may be waived by the district engineer, provided the permittee can demonstrate funding, contract, or other similar delays.

The proposed levee repairs will be within the existing footprint of currently serviceable structures with minor deviation in rock size based on hydraulic analysis under the current Seattle District rock-sizing guidelines used to estimate the minimum size rock recommended for the levee repairs during a 100-year flow event. The analysis found that the minimum acceptable riprap class is Class V, with a recommended blanket thickness of 48-inches on the levee slope.

Though NWP 3 does not directly apply to Corps Civil Works activities, the Corps has concluded that the proposed repairs to the Yakima RB and WWTP Levees are functionally analogous to repairs authorized under NWP 3.

The Corps' Analysis of NWP 3 State-Specific Regional Certification Conditions

General State Section 401 certification under NWP 3 has been established, subject to conditions. Individual 401 review is required if one of the following is true:

1. The project or activities are below the OHWM with new work being proposed outside the original footprint.

2. The proposed project or activity increases the original footprint of the structure by more than $1/10^{th}$ acre in wetlands.

3. The project or activity includes adding a new structure, such as a weir, flap gate/tide gate, or culvert to the site.

None of these conditions applies to the Yakima RB and WWTP Levee repairs. The purpose of the project is to reduce flood risk. The project consists of repairing existing serviceable structures and maintaining the use (i.e., flood control) of those structures. The proposed repairs include a minor deviation in riprap size below the OHWM. The increase in rock size is the result of analysis using an updated hydraulic model. Under the old classification system, the Corps classified the pre-existing riprap below the OHWM as Class III. The new repair will use Class V riprap from the current Seattle District rock-sizing guidelines, which is approximately 6 inches wider in median diameter and 14 inches wider in maximum diameter than Class III under the old gradation system. Otherwise, all work below the OHWM is within each levee's original footprint. Based on the three conditions listed above, an individual 401 certification is not required.

NWP 3 does require a preconstruction notification. This memo serves as that notification. The Corps will also solicit public input on the project with a Notice of Preparation.

The Corps' Analysis of State General Section 401 Water Quality Certification Conditions

For any NWP authorization involving Section 404 activities to be valid in Washington State, permittees must comply with all applicable State General Section 401 Water Quality Certification conditions. The following are the eight general conditions, and how repairs to the Yakima RB and WWTP Levees meet each condition.

1. *For In-Water Construction Activities. Ecology Section 401 review is required for projects or activities authorized under NWPs that will cause, or may be likely to cause or contribute to, an exceedance of a State water quality standard (Chapter 173-291A WAC) or sediment standard (Chapter 173-204 WAC).*

Temporary increases in turbidity may result from construction activities of the proposed repair. To reduce the temporary increases in turbidity and potential related effects on juvenile salmonids, all in-water construction work will take place during the established fish window (October 15 to February 15). The design and implementation of construction will incorporate BMPs such as turbidity monitoring during construction to ensure any temporary increases are compliant with State Water Quality standards

(Appendix C). No exceedances are anticipated; however, should construction efforts increase turbidity above the state standards, work would be halted and modified such that standards can be met.

2. *Projects or Activities Discharging to Impaired Waters. Ecology Section 401 review is required for projects or activities authorized under NWPs if the project or activity will occur in a 303(d) listed segment of a waterbody or upstream of a listed segment and may result in further exceedances of the specific listed parameter.*

The Yakima River segment adjacent to the Yakima WWTP Levee repair site and another segment downstream approximately 3,500 feet from the Yakima RB Levee repair site are on Ecology's 303(d) list for pH. The Naches River, where it meets the Yakima River upstream of the repair sites, is on Ecology's 303(d) list for pH and temperature. No significant changes in nutrient inputs that could change pH or decrease dissolve oxygen are anticipated as part of the project. No changes to contamination in the water will occur because only clean fill material will be used in the repairs. The repairs will affect vegetation, but most of the repair areas provide minimal shading or other temperature-moderating effects in these channel reaches. Native tree and shrub plantings will mitigate for minimal effects on temperature of the vegetation removal in project areas. Willow and red-osier bundles will be incorporated into the levee repair at each site. Additionally, off-site plantings will be installed in a 0.20-acre area to offset impacts to 0.07 acres of black locust saplings that will be removed at the Yakima RB Levee Site 1. Off-site plantings will consist of 50 black cottonwood containers and 400 willow or red-osier stakes. Therefore, no significant changes to pH and temperature that would impact 303(d) listings in the area are expected as a result of the proposed repairs.

3. *Application. For projects or activities that will require Ecology Section 401 review, applicants must provide Ecology with a Joint Aquatic Resources Permit Application (JARPA) along with the documentation provided to the Corps, as described in National General Condition 32, Pre-Construction Notification, including, when applicable:*

    a. *A description of the project, including site plans, project purpose, direct and indirect adverse environmental effects the project would cause, best management practices (BMPs), and any other Department of the Army or federal agency permits used or intended to be used to authorize any part of the proposed project or any related activity.*

    b. *Drawings indicating the OHWM, delineation of special aquatic sites and other waters of the state. Wetland delineations must be prepared in accordance with the current method required by the Corps and shall include Ecology's Wetland Rating form. Wetland rating forms are subject to review and verification by Ecology staff. Guidance for determining the OHWM is available on Ecology's website.*

    c. *A statement describing how the mitigation requirement will be satisfied. A conceptual or detailed mitigation or restoration plan may be submitted. See State General Condition 5 for details on mitigation requirements.*

    d. *Other applicable requirements of Corps Nationwide Permit General Condition 32, Corps Regional Conditions, or notification conditions of the applicable NWP.*

    e. *Within 180 calendar days from receipt of applicable documents noted above and a copy of the final authorization letter from the Corps providing coverage for a proposed project or activity under the NWP Program Ecology will provide the applicant notice of whether an individual Section 401 will be required for the project. If Ecology fails to act within a year after receipt of both of these documents, Section 401 is presumed waived.*

The proposed action is functionally analogous to NWP 3 and meets State conditions for the WQC and does not require an individual 401 certification review. Project description details are included in this memo and in the appendices.

4. *Aquatic resources requiring special protection. Certain aquatic resources are unique, difficult-to-replace components of the aquatic environment in Washington State. Activities that would affect these resources must be avoided to the greatest extent possible. Compensating for adverse impacts to high value aquatic resources is typically difficult, prohibitively expensive, and may not be possible in some landscape settings. Ecology Section 401 review is required for activities in or affecting the following aquatic resources (and not prohibited by Seattle District Regional Condition):*

    a. *Wetlands with special characteristics (as defined in the Washington State Wetland Rating Systems for western and eastern Washington, Ecology Publications #14-06-029 and #14-06-030): estuarine wetlands, wetlands of high conservation value, bogs, old-growth and mature forested wetlands, wetlands in coastal lagoons, interdunal wetlands, vernal pools, alkali wetlands.*

    b. *Fens, aspen-dominated wetlands, camas prairie wetlands.*

    c. *Marine water with eelgrass (Zostera marina) beds (except for NWP 48).*

    d. *Category 1 wetlands.*

    e. *Category II wetlands with a habitat score ≥ 8 points.*

    This State General Condition does not apply to the following Nationwide Permits:

    NWP 20 – Response Operations for Oil and Hazardous Substances

    NWP 32 – Completed Enforcement Actions

The proposed project will not have any impacts on aquatic resources requiring special protection. No wetlands in these categories are present within the construction footprint, and the project is not considered analogous to NWP 20 or NWP 32.

5. *Mitigation. Applicants are required to show that they have followed the mitigation sequence and have first avoided and minimized impacts to aquatic resources wherever practicable. For projects requiring Ecology Section 401 review with unavoidable impacts to aquatics resources, adequate compensatory mitigation must be provided.*

    a. *Wetland mitigation plans submitted for Ecology review and approval shall be based on the most current guidance provided in Wetland Mitigation in Washington State, Parts 1 and 2 (available on Ecology's website) and shall, at minimum, include the following:*

        i. *A description of the measures taken to avoid and minimize impacts to wetlands and other waters of the U.S.*

        ii. *The nature of the proposed impacts (i.e., acreage of wetlands and functions lost or degraded).*

        iii. *The rationale for the mitigation site that was selected.*

        iv. *The goals and objectives of the compensatory mitigation project.*

v. *How the mitigation project will be accomplished, including construction sequencing, best management practices to protect water quality, proposed performance standards for measuring success and the proposed buffer widths.*

vi. *How it will be maintained and monitored to assess progress towards goals and objectives. Monitoring will generally be required for a minimum of five years. For forested and scrub-shrub wetlands, 10 years of monitoring will often be necessary.*

vii. *How the compensatory mitigation site will be legally protected for the long term.*

Refer to Wetland Mitigation in Washington State – Part 2: Developing Mitigation Plans (Ecology Publication #06-06-011b) and Selecting Wetland Mitigation Sites Using a Watershed Approach (Ecology Publications #09-06-032 (Western Washington) and #10-06-007 (Eastern Washington)) for guidance on selecting suitable mitigation sites and developing mitigation plans.

Ecology encourages the use of alternative mitigation approaches, including credit/debit methodology, advance mitigation, and other programmatic approach such as mitigation banks and in-lieu fee programs. If you are interested in proposing use of an alternative mitigation approach, consult with the appropriate Ecology regional staff person. Information on alternative mitigation approaches is available on Ecology's website.

b. *Mitigation for other aquatic resource impacts will be determined on a case-by-case basis*

Impacts to aquatic resources will be avoided and minimized in several ways. Any in-water work for the repairs will occur within the approved in-water work window, which is from October 15 to February 15. Construction vehicles will access the project area from existing levee roads and paths. Excavated materials will be staged within the levee footprint and at designated staging areas landward of the levee. Work is planned to occur in a single construction period of approximately 6 weeks. Best management practices (BMPs) will be employed to minimize project impacts (Appendix C).

Most unavoidable impacts will include temporary and minor increases in turbidity, noise, and human presence. The longest lasting impact will be to streamside vegetation, which will be removed. The removal of vegetation could cause minor impacts to overhanging cover, shade, and insect and detrital inputs to the river. Yakima RB Levee Site 1 is vegetated with approximately 0.07 acre of black locust saplings that will be removed during repairs. There are also scattered patches of golden currant (*Ribes aureum*), rugosa rose (*Rosa rugosa*), and clematis (*Clematis sp.*). There is one maple sapling (*Acer sp.*) and one elm sapling (*Ulmus sp.)*, but no mature trees or native vegetation. The landward side of the levee at Site 1 is dominated by non-native grasses and shrubs. Yakima RB Levee Site 2 is vegetated with only a few coyote willows along the water line and some scattered rugosa rose and black locust shrubs. The landward side of the levee at Site 2 is dominated by black locust shrubs and grass. The Yakima WWTP Levee repair is devoid of vegetation along the riverward side of the levee. The landward side is vegetated with grasses.

Compensatory mitigation for vegetation impacts has been incorporated into the repair. The Corps will install willow bundles into the levee slope at 6-foot intervals along the OHWM to establish native riparian vegetation and will use a native mixture to hydroseed all disturbed soils. The Corps will complete off-site mitigation in 0.20 acre on vegetated gravel bars in the Yakima River approximately 1,200 feet upstream of the Yakima RB Levee Site 2 repair. These gravel bars are located within the floodplain and are not subject to levee operation and maintenance trimming or cutting. The plantings will be able to mature and provide habitat, shade, organic matter to detrital food webs, sediment trapping, and other ecosystem services. Off-site plantings consist of 50 cottonwood containers and 400 coyote willow or red-osier dogwood stakes. See design plans for more details (Appendix B). Mitigation may change after further

coordination with the non-federal sponsor and other resource agencies. If environmental features are proposed by agencies during NEPA coordination, these features will be fully considered.

Monitoring and adaptive management, including replacement and maintenance, after the first year will be conducted. If after the first year less than 80 percent of the plantings survive, all the dead plantings will be replaced. If replacement occurs, the plantings will be monitored for an additional year.

Until vegetation matures, the new rock will absorb sunlight and may increase water temperatures in portions of the adjacent channels. The amount the rock warms the water is expected to be minor and difficult to measure relative to the overall volume of water in the river. On-site bundles and off-site plantings will provide shade and may moderate water temperatures as they grow. No significant changes to water quality are expected.

6. *Temporary Fills. Ecology Section 401 review is required for any project or activity with temporary fill in wetlands or other waters of the state for more than 90 days, unless the applicant has received written approval from Ecology.*

The proposed project does not include the placement of any temporary fill in wetlands or other waters of the State for more than 90 days.

7. *Stormwater Pollution Prevention. All projects that involve land disturbance or impervious surfaces must implement stormwater pollution prevention or control measures to avoid discharge of pollutants in stormwater runoff to waters of the state.*

    a. *For land disturbances during construction, the applicant must obtain and implement permits (e.g., Construction Stormwater General Permit) where required and follow Ecology's current stormwater manual.*

    b. *Following construction, prevention or treatment of on-going stormwater runoff from impervious surfaces shall be provided.*

Repairs to the Yakima RB and WWTP Levees will not cause an increase in stormwater runoff into waters of the state. Stormwater coming from the repair sites will be managed according to the criteria from Ecology's 2019 Stormwater Management Manual for Eastern Washington.

8. *State Section 401 Review for Preconstruction Notification (PCN) not receiving 45-day response from the Seattle District. In the event Seattle District Corps does not issue a NWP authorization letter within 45 days of receipt of a complete PCN, the applicant must contact Ecology for Section 401 review prior to commencing work.*

The purpose of the PCN is to notify the District Engineer of a project and allow his or her evaluation of the proposed project. The Seattle District Engineer will review the project in its entirety prior to construction through review of project documentation and coordination with staff.

The Corps' Conclusion

The Corps concludes that the proposed repairs to the Yakima RB and WWTP Levees are functionally analogous to work authorized under NWP 3 pursuant to Section 404 of the CWA. The Corps has analyzed the repairs pursuant to the general conditions established by the State associated with authorization under NWP 3 and has concluded that the proposed work satisfies those conditions.

Based on review of the NWP 3 State Specific Regional Certification Conditions, this project is covered by the certification approved for this NWP and an individual Section 401 Water Quality Certification is not required.

APPENDIX A – Project Location and Photos

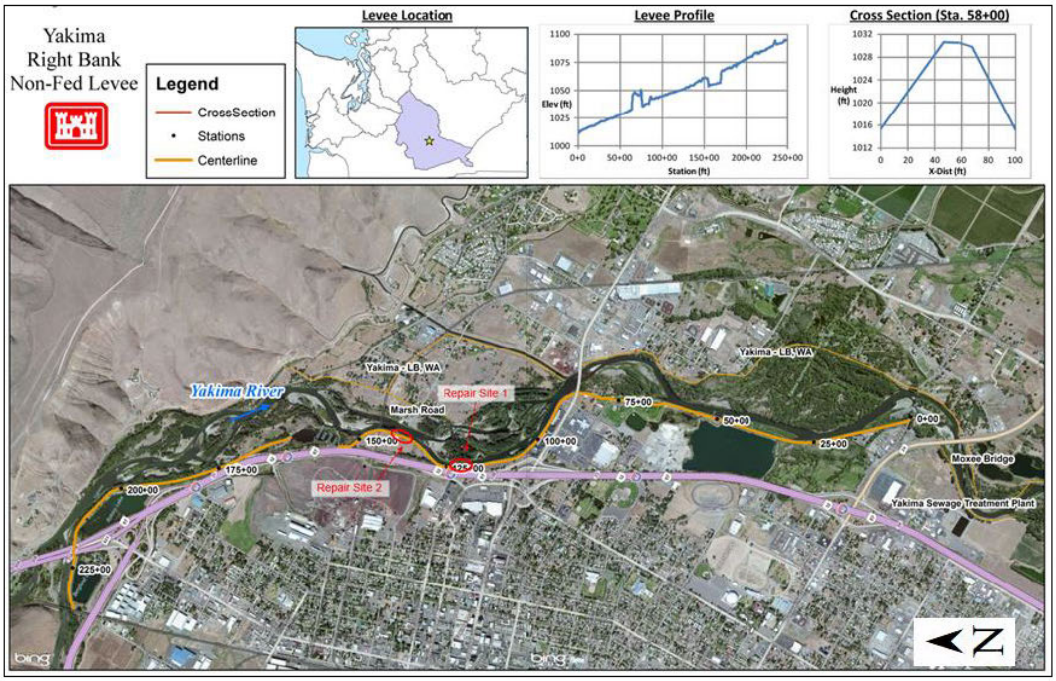


Figure 1. Yakima Right Bank Federal (RB) Levee damage locations.

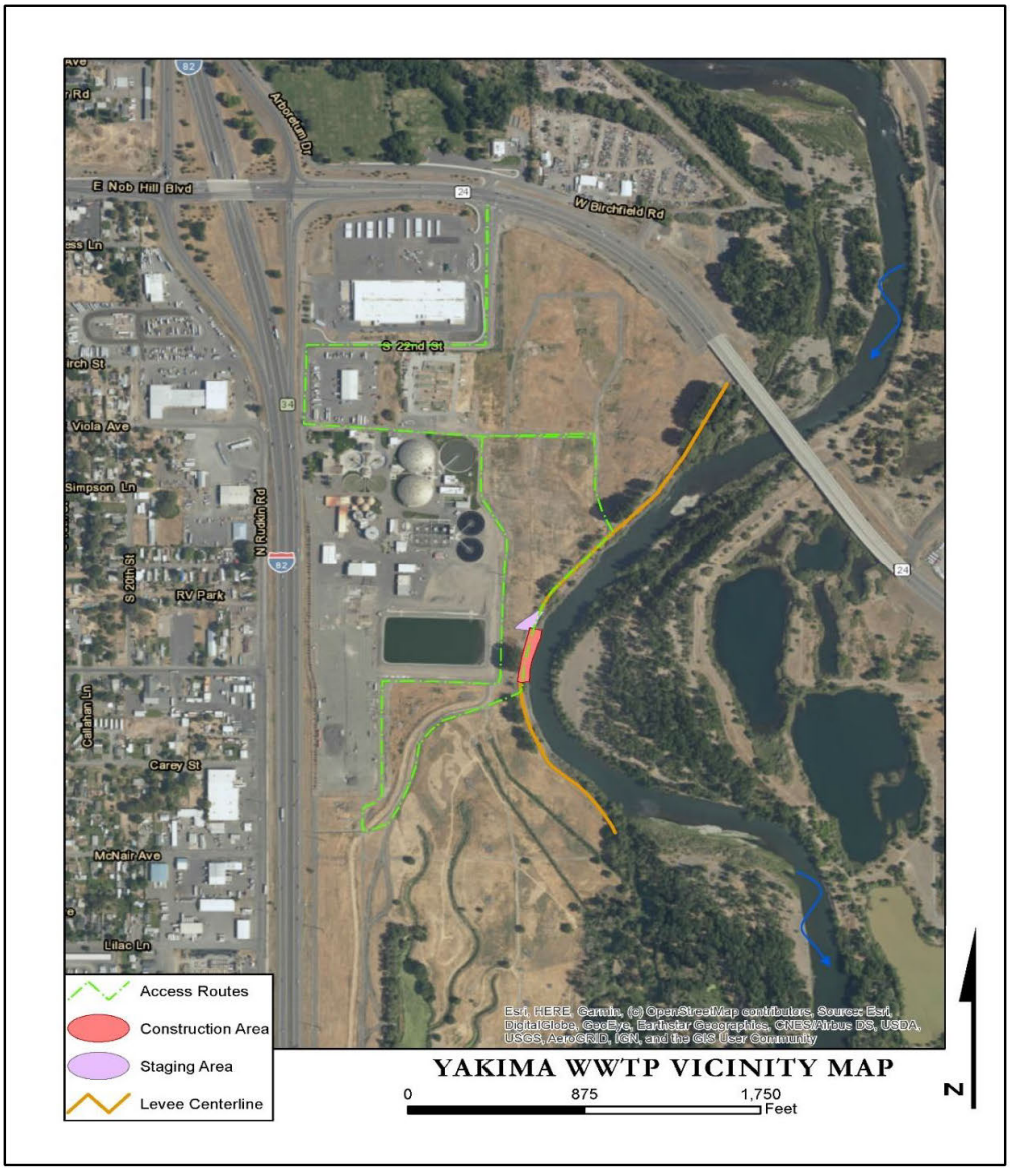


Figure 2. Yakima Wastewater Treatment Plant (WWTP) Levee damage location.

Figure 3. Damaged Yakima RB Levee Site 1 looking downstream.

Figure 4. Damaged Yakima RB Levee Site 2 looking upstream.

Figure 5. Yakima WWTP Levee looking downstream at the damaged section.

APPENDIX B – Design Plans

APPENDIX C – Best Management Practices and Water Quality Sampling Plan

Appendix B and C of the Nationwide Permit 3 Functional Analogy Memo have been removed to reduce page count.

- For the project's design plans see Appendix A and B of the Environmental Assessment.
- For the project's Best Management Practices see section 2.7 of the Environmental Assessment.
- For the project's Water Quality Sampling Plan see Appendix D of the Environmental Assessment.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
1250 West Alder Street • Union Gap, Washington 98903-0009 • (509) 575-2490

September 27, 2021

Laura Boerner, Chief, Planning, Environmental, and Cultural Resource Branch
Department of the Army
U.S. Army Corps of Engineers, Seattle District
4735 East Marginal Way South Building 1202
Seattle, WA 98134

RE: U.S. Army Corps of Engineers Yakima Right Bank Federal Levee and Yakima Wastewater Treatment Plant Levee Repairs, Yakima River, Yakima County, Washington

Dear Laura Boerner:

The Department of Ecology (Ecology) has received the U.S. Army Corps of Engineers' (Corps) memorandum dated September 17, 2021, providing a functional analogy to Nationwide Permit (NWP) #3 for the above project.

Upon review of functional analogy, Ecology has determined that the project meets the requirements of the Nationwide permits and Washington State 401 Water Quality Certification conditions for NWP #3. Therefore, an Individual 401 certification will not be required for this project and the Corps may proceed with the project.

Any changes to your project that would impact water quality should be submitted in writing to Ecology before work begins for additional review.

This letter does not exempt you from other requirements of federal, state, and local agencies.

Please contact me if you have any questions regarding this letter at (509) 575-2616 or e-mail lori.white@ecy.wa.gov.

Sincerely,

Lori White
Wetland/Shoreland/Federal Permit Specialist
Shorelands and Environmental Assistance Program

ec: David Moore, Corps of Engineers
Eric Bartrand, Dept. of Fish and Wildlife
Joanne Gardiner, Corps of Engineers
Zachary Wilson, Corps of Engineers
ecyrefedpermits@ecy.wa.gov

APPENDIX G – CULTURAL RESOURCE CORRESPONDENCE

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

March 3, 2021

Ms. Laura A. Boerner
Environmental Resources Section
Corps of Engineers – Seattle District
PO Box 3755
Seattle, Washington 98124-3755

Re: Yakima Right Bank Federal Levee Rehabilitation 2020 Project
Log No.: 2021-02-00907-COE-S

Dear Ms. Boerner:

Thank you for contacting our department. We have reviewed the materials you provided for the Area of Potential Effect (APE) for the proposed Yakima Right Bank Federal Levee Rehabilitation 2020 Project, Yakima, Yakima County, Washington

We concur with your determination of the Area of Potential Effect (APE) as described and presented in your figures and text.

We look forward to further consultations as you consult with the concerned tribal governments, provide the results of the professional cultural resources review, and render your determination of effect.

We would also appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in compliance with the Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations 36CFR800.4. Should additional information become available, our assessment may be revised. Thank you for the opportunity to comment.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(360) 890-2615
email: *rob.whitlam@dahp.wa.gov*

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

March 3, 2021

Ms. Laura A. Boerner
Environmental Resources Section
Corps of Engineers – Seattle District
PO Box 3755
Seattle, Washington 98124-3755

Re: Yakima Wastewater Treatment Plant Left Bank Non-Federal Levee Rehabilitation 2020 Project
Log No.: 2021-02-00908-COE-S

Dear Ms. Boerner:

Thank you for contacting our department. We have reviewed the materials you provided for the Area of Potential Effect (APE) for the proposed Yakima Wastewater Treatment Plant Left Bank Non-Federal Levee Rehabilitation 2020 Project, Yakima, Yakima County, Washington

We concur with your determination of the Area of Potential Effect (APE) as described and presented in your figures and text.

We look forward to further consultations as you consult with the concerned tribal governments, provide the results of the professional cultural resources review, and render your determination of effect.

We would also appreciate receiving any correspondence or comments from concerned tribes or other parties that you receive as you consult under the requirements of 36CFR800.4(a)(4).

These comments are based on the information available at the time of this review and on behalf of the State Historic Preservation Officer in compliance with the Section 106 of the National Historic Preservation Act, as amended, and its implementing regulations 36CFR800.4. Should additional information become available, our assessment may be revised. Thank you for the opportunity to comment.

Sincerely,

Robert G. Whitlam, Ph.D.
State Archaeologist
(360) 890-2615
email: *rob.whitlam@dahp.wa.gov*

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

April 13, 2021

Laura Boerner, Chief
Planning, Environmental and Cultural
Resources Branch
US Army Corps of Engineers - Seattle District

In future correspondence please refer to:
Project Tracking Code: 2021-02-00907
Property: Yakima Right Bank Federal Levee Rehabilitation 2020 Yakima County, Washington
Re: NO Adverse Effect

Dear Laura Boerner:

Thank you for contacting the State Historic Preservation Officer (SHPO) and Department of Archaeology and Historic Preservation (DAHP) regarding the above referenced proposal. This action has been reviewed on behalf of the SHPO under provisions of Section 106 of the National Historic Preservation Act of 1966 (as amended) and 36 CFR Part 800. Our review is based upon documentation contained in your communication.

First, we agree with the Area of Potential Effect (APE) as mapped in the survey report. We also concur that the current project as proposed will have "NO ADVERSE EFFECT" on historic properties within the APE that are listed in, or determined eligible for listing in, the National Register of Historic Places. As a result of our concurrence, further contact with DAHP on this proposal is not necessary. However, if new information about affected resources becomes available and/or the project scope of work changes significantly, please resume consultation as our assessment may be revised. Also, if any archaeological resources are uncovered during construction, please halt work immediately in the area of discovery and contact the appropriate Native American Tribes and DAHP for further consultation.

Thank you for the opportunity to review and comment. Please ensure that the DAHP Project Number (a.k.a. Project Tracking Code) is shared with any hired cultural resource consultants and is attached to any communications or submitted reports. If you have any questions, please feel free to contact me.

Sincerely,

Holly Borth
Project Compliance Reviewer
(360) 890-0174
holly.borth@dahp.wa.gov

Allyson Brooks Ph.D., Director
State Historic Preservation Officer

April 13, 2021

Laura Boerner, Chief Planning,
Environmental and Cultural Resources Branch
US Army Corps of Engineers - Seattle District

In future correspondence please refer to:
Project Tracking Code: 2021-02-00908
Property: Yakima Wastewater Treatment Plant Non Federal Levee Rehabilitation 2020, Yakima County, Washington
Re: NO Adverse Effect

Dear Laura Boerner:

Thank you for contacting the State Historic Preservation Officer (SHPO) and Department of Archaeology and Historic Preservation (DAHP) regarding the above referenced proposal. This action has been reviewed on behalf of the SHPO under provisions of Section 106 of the National Historic Preservation Act of 1966 (as amended) and 36 CFR Part 800. Our review is based upon documentation contained in your communication.

First, we agree with the Area of Potential Effect (APE) as mapped in the survey report. We also concur that the current project as proposed will have "NO ADVERSE EFFECT" on historic properties within the APE that are listed in, or determined eligible for listing in, the National Register of Historic Places. As a result of our concurrence, further contact with DAHP on this proposal is not necessary. However, if new information about affected resources becomes available and/or the project scope of work changes significantly, please resume consultation as our assessment may be revised. Also, if any archaeological resources are uncovered during construction, please halt work immediately in the area of discovery and contact the appropriate Native American Tribes and DAHP for further consultation.

Thank you for the opportunity to review and comment. Please ensure that the DAHP Project Number (a.k.a. Project Tracking Code) is shared with any hired cultural resource consultants and is attached to any communications or submitted reports. If you have any questions, please feel free to contact me.

Sincerely,

Holly Borth
Project Compliance Reviewer
(360) 890-0174
holly.borth@dahp.wa.gov

APPENDIX H – CLEAN WATER ACT SECTION 401 ANALYSIS

Clean Water Act Section 404 (b)(1) Analysis

Yakima Right Bank Federal Levee and Yakima Wastewater Treatment Plant Levee Repair
Rehabilitation of Flood Control Works
Yakima, Yakima County, Washington

Substantive Compliance for
Clean Water Act Section 404(b)(1) Evaluation

1. **Introduction.** The purpose of this document is to record the U.S. Army Corps of Engineers (Corps) compliance evaluation of the repair of the Yakima Right Bank Federal (RB) Levee and Yakima Wastewater Treatment Plant (WWTP) Levee on the Yakima River in Yakima, Washington, pursuant to the Section 404 of the Clean Water Act (CWA), the Rivers and Harbors Act, and the General Regulatory Policies of the Corps. Specifically, this document addresses substantive compliance issues, including where CWA 404(b)(1) Guidelines require an evaluation of impacts for work involving discharge of fill material into the waters of the U.S. [40 CFR § 230.12(a)]; and the Corps General Regulatory Policies [33 CFR § 320.4(a)], which is used as a reference, that provides measures for evaluating permit applications for activities undertaken in navigable waters.

   This document summarizes relevant information from the project's Environmental Assessment (EA) that was prepared pursuant to the National Environmental Policy Act (NEPA) of 1969 (42 U.S.C. § 4321 et seq.). Attachment A provides the Corps' specific analysis of compliance with the CWA 404(b)(1) and the Public Interest factors (33 CFR § 320.4(a), used as a reference) requirements.

2. **Project Description**. Construction of the Yakima RB Levee was authorized by the 1938 Flood Control Act, P.L. 75-761 (incorporating H.R. Doc. No. 75-579). Initial construction was completed in 1948, with additional work being accomplished in 1949 to repair flood-damaged sections. The levee provides a 100-year flood (1 percent annual exceedance probability [AEP]) level of protection to 19,261 people, 4,413 buildings, and $2.81 billion worth of property. The levee was constructed with a 2 horizontal to 1 vertical (2H:1V) or 3H:1V side-slope with a launchable toe. The levee is armored with Class III riprap. The levee is approximately 25,300 linear feet (LF) long and ties into a railroad embankment at its upstream end and into W. Birchfield Road at its downstream end. Appendix A of the EA contains design plans, including sheets C-301 and C-302 that show the projected as-built section, as best estimated from field conditions, overlaying the proposed repair design.

   The Yakima WWTP Levee was originally constructed by local interests prior to 1958. The city of Yakima owns the levee and is responsible for its operation and maintenance. The levee provides a 20-year flood (5 percent AEP) level of protection to the 40 people, 4 buildings, and $1.4 million worth of property. Most of the protection is to the city of Yakima WWTP, which serves nearly all of the homes, industries, and businesses in Yakima. The levee was rehabilitated by the city of Yakima in 1965 after acquiring the property. The levee is armored with Class III riprap with side slopes of 2H:1V. The levee is approximately 3,000 LF long and ties into the bridge abutment of State Route 24 at its upstream end and into high ground at its downstream end. Appendix B of the EA contains design plans, including sheets sheet C-301 that show the 2009 as-built section, overlaying the proposed repair design.

   In the first week of February 2020, an atmospheric river event brought abundant amounts of rain, warmer temperatures, and higher snow levels to Washington. Subsequent heavy rainfall

and rapid snowmelt caused flooding across Washington, with some places exceeding record values. While the Yakima River was spared the more extreme flooding, a smaller discrete event occurred on February 2, 2021, with a peak flow of 10,500 cubic feet per second (cfs) and a stage height of 43.68 feet (gage height) above Ahtanum Creek at Union Gap, WA (USGS Gage 12500450). A second peak occurred on February 8 with a peak flow of 19,900 cfs and a stage height of 46.51 feet (USGS Gage 12500450). Based on a flow analysis at the Union Gap gage, this event corresponded to a 69 percent AEP or approximately a 1.5-year flood event.

Approximately 300 LF of the Yakima RB Levee was damaged at two separate locations: Site 1 (200 LF; Station 120+00 to Station 122+00) and Site 2 (100 LF; Station 138+00 to Station 139+00). The event caused toe scour and loss of toe rock at each site. At Site 2 slope armor was also scoured, along with embankment material from within the levee prism. In an undamaged state, the Yakima RB Levee provides a 100-year level of protection against flooding to public infrastructure and residential, commercial, and park properties. In the damaged state, the Yakima RB Levee provides a 50 percent AEP level of protection. If this levee was to be overtopped or breached, approximately 3,600 structures could be flooded.

Approximately 300 LF of the Yakima WWTP Levee was damaged at a single location between Stations 10+00 and 13+00. The event scoured riprap from the levee's riverward toe and slope. The levee provides protection against flooding to the WWTP which serves nearly all of the homes, industries, and businesses in Yakima. In its undamaged state, the Yakima WWTP Levee provides flood risk reduction against overtopping up to the 20-year flood level of protection. In the damaged state, the levee provides protection for 50 percent AEP events.

The Corps proposes to repair the Yakima RB and the Yakima WWTP Levees to their pre-damage level of protection. The levees would be rebuilt within the horizontal and vertical profiles as they were designed and as they existed when first built. The repairs would increase the riprap size from Class III, which corresponds to a median diameter of 15 inches and a maximum rock diameter of 20 inches, to Class V armor at the three repair sites. Class V armor has a median diameter of 21 inches and a maximum rock diameter of 34 inches. Repair activities for all sites are summarized below.

Work would require removing streamside shrubs and trees from the levee within the construction project footprint, primarily at Yakima RB Levee Site 1. Material excavated from the levee may be repurposed in the repair, provided it meets the general requirements for suitable levee embankment fill. No fill material would be added beyond the existing levee footprint. Construction is planned to start in January 2022. From start to completion, repair of the levees is expected to take 6 weeks, and any in-water work for the repairs would occur within the approved in-water work window, which is from October 15 to February 15.

Compensatory mitigation for vegetation impacts has been incorporated into the repair. The Corps would install willow bundles into the levee slope at 6-foot intervals along the ordinary high-water mark (OHWM) to establish native riparian vegetation and would use a native mixture to hydroseed all disturbed soils. The Corps would complete off-site mitigation in 0.20 acre on vegetated gravel bars in the Yakima River. These gravel bars are located within the floodplain and are not subject to levee operation and maintenance trimming or cutting. Off-site plantings consist of 50 cottonwood containers and 400 coyote willow or red-osier dogwood stakes.

The proposed levee repairs would be within the existing footprint of currently serviceable structures with minor deviation in rock size based on hydraulic analysis under the current Seattle District rock-sizing guidelines. The design is based on updated hydrology information

from the hydraulic model of the Gap to Gap reach of the Yakima River, which was updated in 2015 to a 2D HEC-RAS hydraulic model. Hydraulic analysis was used to estimate the minimum size rock recommended for the levee repairs. The analysis found that the minimum acceptable riprap class is Class V, with a recommended blanket thickness of 48 inches on the levee slope. All riverward repairs would occur within the pre-damage levee footprint, i.e., the levee would not encroach farther into the river.

Yakima RB Levee Repairs

The Corps proposes to repair the Yakima RB Levee Site 1 in-kind to restore its pre-damage level of protection. The repaired levee would remain within the pre-damage footprint. Riprap would be placed at the original as-built slope, which varies between 2 horizontal to 1 vertical (2H:1V) and 3H:1V. The launchable toe below the bench would have a 2H:1V slope. Sloughed material would be excavated from the scoured toe and the slope re-graded. A launchable toe would be reconstructed within the existing footprint using Class V riprap. The damaged slope would be armored with a 48-inch-thick blanket of Class V riprap backed by a 12-inch layer of quarry spalls. The upstream and downstream ends would be smoothly transitioned into the existing slopes. Total construction length is approximately 200 LF at Site 1, including any necessary transitions. Repairs to Yakima RB Levee Site 2 would be similar; however, the waterward edge of the toe would be set back approximately two feet from the pre-damage location. As a consequence of pulling the toe landward, the slope of the Yakima RB Levee Site 2 would be altered from approximately 2.5H:1V to 2H:1V. Total construction length would be approximately 100 LF at Site 2, including any necessary transitions.

Yakima RB Levee Repairs

The Corps proposes to repair the Yakima WWTP Levee in-kind to restore its pre-damage level of protection. The repaired levee would remain within the pre-damage footprint. Sloughed material would be excavated from the scoured toe and the slope re-graded. The slope and launchable toe would be reconstructed within the existing footprint to their pre-damage slopes of 2H:1V and 1.5H:1V, respectively. The launchable toe would be reconstructed using Class V riprap. The damaged slope would be armored with a 48-inch-thick blanket of Class V riprap backed by a 12-inch layer of quarry spalls. The upstream and downstream ends would be smoothly transitioned into the existing slopes. Total construction length would be approximately 300 LF, including any necessary transitions.

3. **Project Purpose and Need**. The purpose of the project is to repair the Yakima RB Levee to the 100-year level of protection and the Yakima WWTP Levee to the 20-year level of flood protection, to protect lives and property from subsequent flooding. The repairs are needed because the levees were damaged by the February 2020 flood event described above and no longer provides the designed level of protection against flooding. Repairs would restore adequate and reliable flood protection to the same level provided by the levees prior to the damaging flood event.. If the levees were to fail, there would be an increased risk to human safety, improved property, and public infrastructure. Per PL 84-99, the Corps is authorized to repair damaged flood control works to the pre-flood level of protection.

4. **Availability of Environmentally Acceptable Practicable Alternatives to Meet the Project Purpose.** The alternatives evaluated for this project were as follows:

    a. Alternative 1 – No Action. Under the No Action Alternative, the Yakima RB and WWTP Levees would remain in their damaged condition. This alternative would not meet the project purpose because the levee would likely be further damaged in future flood events and could fail, which would endanger protected homes, businesses, and public

infrastructure. During any flood event that threatens the integrity of the levee system, the Corps or other federal and non-federal agencies may act under emergency authorities to preserve the levee system and, to the extent possible, maintain protection of life and property behind the levee. Any response to damages during a flood event would be temporary, less certain of success, potentially more expensive, and could be less protective of environmental and cultural resources. A response would also take time to activate and execute, so there is risk that it would not prevent levee failure, such as overtopping or breaching.

The No Action Alternative is not recommended because it would risk failure of the levee system and would present unacceptable risk to life and property. It does not meet the project purpose and need, nor is it acceptable to the non-federal sponsors. While the No Action Alternative is not recommended, it is carried forward for further evaluation to serve as a base condition for evaluation of other alternatives.

b. Alternative 2 – Nonstructural Alternative. This alternative consists of floodplain management strategies that are offered by other federal and state programs and generally involve changes in land use. Such strategies would include zoning, easements, flood-warning procedures, floodplain evacuation, and flood insurance. Nonstructural strategies involve acquiring, relocating, elevating, and flood- proofing existing structures. The cost and timeframe for implementing this alternative make it impractical. The participation of the non-federal sponsors would be required to implement a nonstructural alternative, and Yakima County and the city of Yakima have not agreed to meet their various obligations as described above in executing a nonstructural alternative. Therefore, this alternative is not carried forward for detailed consideration.

c. Alternative 3 – Levee Setback Alternative. This alternative would shift the alignment of the levee embankment landward to avoid or minimize direct contact with the river and provide additional space for water conveyance. Typically, the setback would involve construction of a new earthen embankment structure and abandonment of the existing levee located on the riverbank. In this instance, a setback levee may be more costly than other alternatives due to the need for more embankment material and real estate requirements. This approach could also encroach on existing structures, privately-owned land, and public infrastructure. Implementing this alternative would also require participation of the non-federal sponsor, and Yakima County and the city of Yakima have not agreed to meet their obligations, including land acquisition and additional cost-share funding, to execute a setback alternative. Therefore, this alternative is not carried forward for detailed consideration.

d. Alternative 4 – Repair In-Kind. This alternative repairs the levee by returning it to the pre-flood condition with minor change to the character, scope, or size of the levee. This alternative largely maintains the levee at the repair locations as it existed prior to the flood damage. The design uses updated engineering techniques including slightly larger rock size, increasing it from Class III to Class V, which is approximately 6 inches wider in median diameter and 14 inches wider in maximum diameter than Class III under the old gradation.

Findings: The Corps rejected Alternative 1 because it would not meet the project purpose and need because it would not fulfill the Corps' authorization to restore the pre-existing level of protection, and due to the high likelihood of damage to protected infrastructure, businesses,

industry and homes during future flood events. The Corps rejected Alternative 2 because the Corps does not have authority to pursue a nonstructural alternative in the absence of participation by the non-federal interest. Alternative 3 was rejected because the Corps does not have authority to pursue a setback alternative in the absence of participation by the non-federal interest. Alternative 4 would restore the levee in place within the existing real estate easement. Alternative 4, the Repair In-Kind Alternative, was selected as the preferred alternative. Although the larger rock size constitutes fill in Waters of the United States and would require mitigation, it meets the project purpose and need and is authorized.

5. Significant Degradation, either Individually or Cumulatively, of the Aquatic Environment

a. *Effects on Physical, Chemical, or Biological Characteristics of the Aquatic Ecosystem*. Impacts to aquatic resources from the proposed repairs may include possible injury or displacement of aquatic species as a result of placing riprap into the water along the slope of the damaged levee. Projected impacts to aquatic resources from the proposed permanent repair action, the Repair In-Kind (Alternative 4), include possible displacement or injury due to excavation and placement of riprap along the slope of the levees, temporary degraded water quality associated with excavation, and potential impacts to aquatic organisms.

Given the location of proposed repairs, in-water work window, presence of species, and relatively slow speed of excavation; it is reasonably certain that the risk of injury to aquatic species from the proposed excavation activities is low but not insignificant. Short-term, localized project-related increases in turbidity levels would likely occur as a result of in-water toe or bank excavation, rock placement for toe rock, and rock placement for bank construction during the proposed repair. Short-term increases in turbidity around the action areas resulting from work below the OHWM would be temporary and are not expected to result in long-term adverse effects to aquatic species, or significant net change in function of the in-stream habitat.

Disturbance from vibration from the proposed action is possible during construction, stemming from delivery and dumping of rock on land as it is staged for construction, and as a result of excavation and placement of rock along the riverward face of the levee. Vibrational disturbance during the proposed construction would be minimized by working from the top of the bank and placing rock individually or in small bucket loads (no end-dumping into the river). Following these construction techniques, it is reasonably certain that impacts to aquatic species resulting from equipment use or rock placement during construction would be minimal, but not entirely insignificant or discountable for injury or long-term adverse behavioral effects.

Fish moving past the in-water work locations at the time of construction may be temporarily delayed at the construction site due to noise. If construction does interfere with fish movement past the repairs, breaks in the work during the day or overnight would allow fish to continue past, minimizing any effect. The degree to which aquatic species use the specific project locations for spawning is unknown. The area affected would be limited to the portion of the channel adjacent to the levee and the proposed actions would likely have no long-term effect on the movement or spawning of fish species.

Under this alternative construction activities would clear vegetation from within the repair footprints at the Yakima RB Levee repair sites, including an estimated maximum of 0.07

acre of aerial coverage of black locust saplings and scattered shrubs, herbs, and saplings. Riparian vegetation is important for recruitment of large woody material (LWM) in the river, shading, cover, food, complexity of shoreline, nutrient input, and as perching and nesting habitat for birds. To mitigate for the vegetation removal the repair includes on-site and off-site mitigation, as described in section 6 below. There would be a temporary loss in habitat until the vegetation establishes. As the mitigation plantings grow, they would regain ecological functions, providing food and substrate for insects and contributing organic material to the river, including LWM. Shading and other functions along the levee, however, could be limited by maintenance trimming and clearing to protect levee integrity and allow inspection through the non-federal sponsor's maintenance regimen. Offsite mitigation would not be subject to these maintenance requirements and would provide greater benefits because of this.

b. *Effects on Recreational, Aesthetic, Historical, and Economic Values*. The Yakima Greenway Trail runs along the paved surface of the levee top at all repair sites. To ensure public safety during construction, access to the project site would be prohibited, temporarily interrupting pedestrian use. *After repairs are completed the path would be returned to pre-existing conditions and access restored.* The levee repair would not affect recreational boating or fishing from a boat in the river.

   Prior to the damaging event, the Yakima RB Levee provided a 100-year flood (1 percent annual exceedance probability [AEP]) level of protection to 19,261 people, 4,413 buildings, and $2.81 billion worth of property. Prior to the damaging event, the Yakima WWTP Levee provided a 20-year flood (5 percent AEP) level of protection to the 40 people, 4 buildings, and $1.4 million worth of property. Most of the protection is to the city of Yakima WWTP, which serves nearly all of the homes, industries, and businesses in Yakima. The proposed action would restore both levees to their pre-damage level of protection and is not expected to change existing land uses.

   The Yakima RB and WWTP Levees are more than 50 years old making the structures eligible for review under the National Historic Preservation Act (NHPA). The Corps' evaluation focused on just two small sections of a much larger feature. A literature review and a records search found no previous surveys for cultural resources in the repair footprint. However, it did indicate seven previously recorded historic period archaeological sites within one mile of the Yakima RB Levee repair sites and 3 sites within one mile of the Yakima WWTP Levee repair site. No archaeological sites are recorded within the repair footprints at either levee. A cultural resource survey was completed by Ages Castronuevo, Corps archaeologist on October 22, 2020. The project footprint at each levee repair site is highly disturbed by modern development of the adjacent roadways, the Yakima Greenway, and the levee. The off-site mitigation site is a gravel/sand bar that is heavily influenced by the river and so has a low potential for archaeological materials retain context. Consultation with the Washington State Department of Archeology and Historic Preservation (DAHP) and the Confederated Tribes and Bands of the Yakama Indian Nation has been completed. Based on the literature review and a records search, cultural resource survey, and coordination with DAHP and the Confederated Tribes and Bands of the Yakama Indian Nation, the Corps determined that the proposed repairs would have no effect to historic properties.

Findings. This work is not exempt from Section 404 of the CWA. 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 CWA. This alternative would

have no adverse impact on cultural resources, as there are no cultural resources within the project footprint. There would also be no change to recreational opportunities at the site. The Corps has determined that the proposed work would have beneficial economic impacts and no significant adverse impacts to aquatic ecosystem functions, recreational, and aesthetic values.

6. Appropriate and Practicable Measures to Minimize Potential Harm to the Aquatic Ecosystem

a. *Impact Avoidance and Minimization Measures*. The proposed repairs would employ typical Conservation Measures and best management practices (BMPs) to avoid and minimize adverse effects. These measures would be written into the Construction Management Plan (CMP). A Corps employee would act as Construction Manager for the effort and would ensure that these measures would be employed per the CMP. Conservation Measures and BMPs include:

<u>Conservation Measures</u>

- Willow, red-osier dogwood, and cottonwood planting, maintenance, monitoring, and adaptive management on site.
- Additional off-site planting of willow, red-osier dogwood, and cottonwood to compensate for loss of vegetation cleared due to construction at the Yakima RB Site 1.
- Follow-up post-construction review of conservation measures. The repair site would be examined after the repair is completed. If conservation measures and repairs are different from described here or what is depicted in the plans, they would be recorded and described.

<u>Best Management Practices</u>

BMPs would be employed to minimize project impacts. Some are integrated into the repair, while others are guides to operation and care of equipment. Note, some of these have been mentioned above.

- In-water work would be limited to the in-water work window (October 15 to February 15) and minimized to the extent possible.
- Water quality monitoring for turbidity would be performed for a minimum of one day at the start of each new sediment-generating activity. See Water Quality Monitoring Plan for sampling protocols (Appendix D of the EA). In the event that Washington State Water Quality Turbidity standards (WAC 173-201A) are exceeded, or a visual plume is detected, work would be halted until the situation can be assessed and corrected.
- Temporary erosion control measures would be installed for all phases of work to be conducted. As construction advances, installation of silt fencing would occur during the full length of disturbed area of the project site. Additional erosion control measures would be used as needed to manage the discharge or accumulation of sediment into the river, adjacent swales, catch basins, storm drains and off-site. Accumulations of sediment in adjacent swales or storm drains would be monitored daily and cleared to ensure continued service throughout construction.
- Vegetation removal would be limited to the repair sites.
- Should any LWM be generated or found on site during repairs, it shall be salvaged and placed along the completed toe of the repaired levee where it can continue to provide habitat function. This includes any tree trunks and large shrubs. The woody debris may be placed after a section of levee is completed or after the entire repair. Depending on the water height, the material may be placed above or below the willow/dogwood stakes.

- Noxious weeds would be disposed of separately from other organic materials at an approved off-site location.
- Equipment that would be used near or in the water would be cleaned prior to construction.
- Drive trains would not work in the water. Only the excavator bucket with thumb attachment would extend into the water.
- Fueling would occur on the back side of the levee 100 feet away from the waterline, and biodegradable hydraulic fluids would be used as appropriate in any portion of the equipment that would work in the water.
- Construction equipment would be regularly checked for vehicle-fluid drips or leaks.
- At least one fuel spill kit with absorbent pads would be onsite at all times.
- Material placed into the water would be placed individually or in small bucket loads. No end dumping of rock into the water or on the levee slope would occur.
- 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 placed rock would act as a localized flow deflector and help manage flows in the installation areas.
- All work construction activities would occur during daylight hours to minimize noise impacts to the surrounding community.
- After construction is complete, the disturbed areas not covered in armor, asphalt, or other rock would be reseeded using a native grass seed mix including a mulch base. All disturbed soils (e.g., staging areas and access) above the OHWM not covered by riprap would be topped with topsoil and hydroseeded.
- All trash and unauthorized fill would be removed from the project and staging area, including concrete blocks or pieces, bricks, asphalt, metal, treated wood, glass, floating debris, and paper, and dispose of properly after work is completed.

Compensatory Mitigation

Riparian vegetation is important for recruitment of LWM in the river, shading, cover, food, complexity of shoreline, nutrient input, and as perching and nesting habitat for birds. Shoreline habitat in Yakima along the Yakima River is degraded due to the presence of levees along most of its length but vegetation is still present and provides an ecological benefit. As part of the repair, the Corps is proposed the following measures to mitigate habitat impacts from the work.

- On-site: Coyote willow and red-osier dogwood bundles would be incorporated into the levee repairs at 6-foot intervals along a line matching the lowest vegetation line, approximately at the OHWM. See C-301 in Appendix A and B of the EA for the willow bundle cross section. Substitutes for coyote willow and red-osier dogwood may be used after review and approval by the project biologist. Possible substitutes are arroyo willow (*S. lasiolepsis*), dusky willow (*S. melanopsis*), Scouler's willow (*S. scouleriana*), or stakes collected from nearby stands of native willows unavailable, Sitka (*S. sitchensis*) or Hooker's willow (*S. hookeriana*) cuttings (in that order of preference) would be used as a replacement.
- Off-site: A 15-foot-wide swath of black locust (*Robinia pseudoacacia*) saplings, which provides overhanging vegetation to the Yakima River, would be removed during repair work along 200 LF at the Yakima RB Levee Site 1. The total area impacted is estimated at a maximum of 0.07 acre of aerial coverage. To offset for the loss of overhanging vegetation cover and localized shade, vegetation projected to yield 0.20 acre of foliage cover at full maturity would be planted at an off-site location upstream of the repair in the floodplain upstream of the repair with native tree and shrub species. Off-site plantings include 50 black cottonwood (*Populus balsamifera*) containers and 400 coyote willow or

red-osier dogwood stakes. No off-site mitigation is proposed in compensation for the repair work on the Yakima RB Levee Site 2 and the Yakima WWTP Levee because they are bare or sparsely vegetated with a few shrubs. See sheets L-101, L-102, and L-501 in Appendix A of the EA for the planting details. No off-site mitigation is proposed for the Yakima RB Levee Site 2 and the Yakima WWTP Levee because they are sparsely vegetated.

Monitoring and adaptive management of on-site and off-site plantings, including replacement and maintenance, after the first year would be conducted by the Corps. If after the first year less than 80 percent of the plantings survive, all the dead plantings would be replaced. Each site would be evaluated separately. In preparation for any required adaptive management re-plantings, the Corps would evaluate why the plantings failed and plan the best path forward for successful replacement. The Corps would engage with the non-federal sponsor to assist in identifying the problem and alternative planting practices for successful re-planting. These may include planting different species, changing the planting location, or adding pest control or exclusion devices. If replacement occurs, the plantings would be monitored for an additional year by the Corps. The Corps would report the success of the mitigation plantings to the resource agencies with which it coordinated for the repair. The plantings would be evaluated in September of each applicable year before leaf drop.

Findings. The Corps has determined that all appropriate and practicable measures have been taken to minimize potential harm to the environment and appropriate mitigation is proposed to compensate for unavoidable impacts. There are no practicably available fill alternatives that would be less costly and still be consistent with engineering and environmental requirements, while meeting the project need.

7. Other Factors in the Public Interest

a. Fish and Wildlife. The Corps has analyzed potential effects to Endangered Species Act (ESA) listed species and prepared a BA that was submitted to the USFWS on June 14, 2021, and to NMFS on August 13, 2021. Consultation is ongoing. The Corps has reached an agency determination (Table 1) that the project would have the following effects on ESA-listed species:

Table 1. Species and effect determinations of the Yakima RB and WWTP facility These determinations were included in a BA sent to the USFWS and NMFS.

Species	Species Effects Determination	Critical Habitat Effects Determination
Middle Columbia River Steelhead	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Coastal/Puget Sound Bull Trout	May Affect, Not Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Yellow-billed Cuckoo	May Affect, Not Likely to Adversely Affect	No Effect

b. *Water Quality*. The Corps has concluded that this project would not violate Washington State Water Quality Standards. Limited in-water work would be completed and BMPs would limit turbidity impacts and concerns for spills or leaks from construction equipment. Water quality monitoring would ensure compliance with state standards. The proposed repairs include a minor deviation in the levee design which constitutes fill into the Waters of the U.S. This would be mitigated by the proposed mitigation.

c. *Historical and Cultural Resources*. As required under Section 106 of the NHPA, the Corps coordinated with DAHP and the Confederated Tribes and Bands of the Yakama Indian Nation. To date the Corps has received no comment from the Tribe. The Corps submitted its determination and findings letter on April 6, 2021 to DAHP that the proposed undertaking would have no adverse effect. DAHP concurred with the Corps determination that the undertaking would have no adverse effect in a letter dated April 13, 2021.

d. *Environmental Benefits*. The project purpose is to restore the level of protection of the Yakima RB and WWTP Levees. While the project purpose is not to create environmental benefits, the off-site plantings would be placed outside of the repair footprint in the floodplain where they would not be trimmed or cut during operation and maintenance of the levees.

Findings. The Corps has determined that this project is within the public interest based on review of the public interest factors.

8. Conclusion. Based on the analyses presented in the EA, as well as the following 404(b)(1) Evaluation, the Corps finds that this project complies with the substantive elements of Section 404 of the CWA.

Attachment A

Clean Water Act 404(b)(1) Evaluation [40 CFR § 230]

404(b)(1) Evaluation [40 CFR § 230]

Potential Impacts on Physical and Chemical Characteristics [Subpart C]:

1. **Substrate [230.20]**

The crown of the Yakima Right Bank Federal (RB) Levee topped with either gravel or asphalt pavement. The test pits dug in 1946 identified the foundation soils as loamy sand, sand and gravel with cobbles, and small boulders up to 10 inches with some soils with clay. The test pits were not dug more than 7 feet deep. Historical reports indicate that levee materials are coarse grained, and some silty soils may have been used for construction of some segments in the levee.

The crown of the Yakima Wastewater Treatment Plant (WWTP) Levee is topped with either gravel or asphalt pavement. Foundation soils are alluvial deposits of historic river channels – specifically quaternary loess identified as glacial outburst flood alluvial deposits. Six Subsurface explorations and monitoring wells were installed for the city of Yakima and the WWTP for a restoration project in 1992. Four additional explorations and monitoring wells were completed in 2012. The boring depths were between 15 feet and 20 feet. The foundation is identified primarily as silty sand underlain by well graded sand and gravels with cobbles up to 4 inches in diameter. The levee embankment material is composed of homogeneous compacted Silty Sandy Gravel Fill.

Substrate conditions would resemble existing conditions after repairs are completed.

2. **Suspended particulates/turbidity [230.21]**

Minimal turbidity is expected during construction. Best management practices (BMPs) for sediment control would be used throughout construction to minimize any potential turbidity issues. Turbidity monitoring would ensure compliance with state standards.

3. **Water [230.22]**

The work is not expected to add any nutrients to the water that could affect the clarity, color, odor, or aesthetic value of the water, or that could reduce the suitability of the Yakima River for aquatic organisms or recreation. There would be a time lag before plantings fully restore the pre-flood riparian function at this site.

4. **Current patterns and water circulation [230.23]**

The Corps expects minimal disruption of current patterns and water circulation during or after construction. A Hydraulic Engineer assisted with the design of the repairs at each site to determine rock size and design details to restore flood protection and minimize disturbance. Only a small fraction of the overall levee system is being repaired and matching the existing conditions upstream and downstream of each damaged location is essential. Any large change to the geometry of the levee section would create irregularities in the project as a whole and this would produce negative effects on the level of service being provided. The repaired slope would be similar to the adjacent slopes so there would be no measurable change in the flow and/or erosional forces of the water. No change to current patterns or water circulation is expected after completion.

5. Normal water fluctuations [230.24].

The levee repair work would have no effect on normal water fluctuations.

6. Salinity gradients [230.25]

The Yakima River is an entirely freshwater river system, and the proposed repair would not introduce saline materials; therefore, the levee repair work with have no effect to salinity gradients.

Potential Impacts on Biological Characteristics of the Aquatic Ecosystem [Subpart D]:

1. Threatened and endangered species [230.30]

The Corps has analyzed potential effects to Endangered Species Act (ESA) listed species and prepared a Biological Assessment (BA) that was submitted to the U.S. Fish and Wildlife Service (USFWS) on June 14, 2021, and to the National Marine Fisheries Service (NMFS) on August 13, 2021. Table 1 outlines the Corps' effects determination for each species and its critical habitat consulted on. Consultation is ongoing.

Table 1. The Corps' Effects Determinations for each species consulted on with the USFWS and NMFS.

Species	Species Effects Determination	Critical Habitat Effects Determination
Middle Columbia River Steelhead	May Affect, Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Coastal/Puget Sound Bull Trout	May Affect, Not Likely to Adversely Affect	May Affect, Likely to Adversely Affect
Yellow-billed Cuckoo	May Affect, Not Likely to Adversely Affect	No Effect

2. Fish, crustaceans, mollusks, and other aquatic organisms in the food web [230.31]

Fish crustaceans, mollusks, and other aquatic organisms may be temporarily impacted by small turbidity increases and increased noise. Similar habitat exists upstream and downstream, and any impacted areas would be expected to be recolonized quickly by surrounding aquatic organisms.

3. Other wildlife [230.32]

Birds and other wildlife may be temporarily displaced during construction due to noise, construction vehicles, and riprap placement. Similar habitat exists nearby for their use. Loss of vegetation would temporarily reduce available habitat function at the project sites. However, the mitigation would compensate for this loss.

Potential Impacts on Special Aquatic Sites [Subpart E]:

1. Sanctuaries and refuges [230.40]

The proposed and completed actions would have no effect on sanctuaries and refuges as none are in or adjacent to the project vicinity.

2. Wetlands [230.41]

No wetlands are located within the repair areas. Access roads and staging areas would not be located in jurisdictional wetlands.

3. **Mud flats [230.42]**

No mud flats are in the project vicinity and therefore would not affected.

4. **Vegetated shallows [230.43]**

No vegetated shallows are present at the project site; therefore, the proposed action would have no effect on vegetated shallows.

5. **Coral reefs [230.44]**

Not applicable.

6. **Riffle and pool complexes [230.45]**

No riffle and pool complexes are present at the project site; therefore, the proposed and completed action would have no effect on riffle and pool complexes.

Potential Effects on Human Use Characteristics [Subpart F]:

1. **Municipal and private water supplies [230.50]**

The proposed action would have no effect on municipal or private water supplies.

2. **Recreational and commercial fisheries [230.51]**

During construction, access to the levees would be restricted due to required safety measures; however, fishing access on the rest of the river is not affected by the repair. The proposed and completed action would have no effect on recreational and/or commercial fisheries.

3. **Water-related recreation [230.53]**

As construction would be only at the river's edge, the repairs to the levee would have no impacts to boating in the Yakima River.

4. **Aesthetics [230.53]**

During construction, there would be minor disturbance form heavy equipment noise and exhaust. After construction, the shoreline would look different because the riprap bank would be repaired. The repair sites would look less natural initially, but plantings would be done to compensate for these impacts. It is expected that foliage would begin to develop relatively quickly, and the repairs would blend in more with the surroundings.

5. **Parks, national and historic monuments, national seashores, wilderness areas, research sites and similar preserves [230.54]**

The Yakima RB and WWTP Levees are not located in or immediately adjacent to parks, national and historic monuments, national seashores, wilderness areas, research sites, and or similar preserves.

Evaluation and Testing [Subpart G]:

1. **General evaluation of dredged or fill material [230.60]**

Bank stabilization material would consist of quarry spalls and Class V riprap. All imported material would be free from contamination and obtained for a permitted local quarry.

1. **Chemical, biological, and physical evaluation and testing [230.61]**

No soil sampling is required as no contamination is known or expected. Turbidity monitoring would be completed during in-water work to ensure compliance with state water quality standards during construction.

Actions to Minimize Adverse Effects [Subpart H]:

1. **Actions concerning the location of the discharge [230.70]**

Since the Corps is not selecting a disposal site, but rather repairing a flood control structure, the actions that would be taken are necessary for the location.

2. **Actions concerning the material to be discharged [230.71]**

Bank stabilization material would be required to meet Corps standards for placement of riprap. Material would be imported from an approved, clean source.

3. **Actions controlling the material after discharge [230.72]**

Following placement of the materials for the armoring and repair, no further dispersion is expected, therefore no measures to control placement of these materials are considered necessary.

4. **Actions affecting the method of dispersion [230.73]**

The riprap placed below the water line would be placed individually or in small, controlled bucket loads. The excavator would work from the crown of the levee or the riverward bank. Dump trucks would deliver material and dump it onto levee crown or in the staging area away from the water's edge. No end dumping into the river would occur. Turbidity impacts are expected to be minor and temporary.

5. **Actions related to technology [230.74]**

The technology used in the proposed project is considered acceptable for this scope of work. No other specific actions to minimize effects related to technology are needed.

6. **Actions affecting plant and animal populations [230.75]**

The Corps has coordinated construction activities with state and federal resource agencies, as well as interested tribes, to minimize impacts to fishery and wildlife resources. There would be temporary disturbance to wildlife in the project vicinity due to noise from operation of machinery. Timing of construction avoids and minimizes impacts to sensitive species.

7. **Actions affecting human use [230.76]**

The Corps has taken all appropriate and practicable steps to assure minimal impacts to human use, safety and general appreciation of the area. Traffic would not need to be detoured around the area during construction. Signs and flaggers would be used as needed to minimize impacts and improve safety. Construction would occur during daylight hours to minimize noise impacts to nearby houses. Repair of the flood control structure is not expected to diminish water quality.

8. **Other actions [230.77]**

BMPs would be used in the proposed construction to ensure that no unnecessary damage to the environment occurs.

Application by Analogy of the General Policies for the Evaluation of the Public Interest [33 CFR § 320.4, used as a reference]

1. **Public Interest Review [320.4(a)]**

The Corps finds this repair to the two flood control structures to be in compliance with the 404(b)(1) guidelines and in the public interest.

2. Effects on wetlands [320.4(b)]

No wetlands are located within the repair sites.

3. Fish and wildlife [320.4(c)]

The Corps has consulted and continues to consult with state and federal resource agencies, tribes and other interested members of the public on this action. Mitigation is proposed to compensate for the vegetation removal.

4. Water quality [320.4(d)]

This work is not exempt from Section 404 of the CWA. 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 CWA, as well as the obligation to seek water quality certification under Section 401. The proposed repair action would require work in the active channel with some work below the elevation of ordinary high-water mark (OHWM). Construction could be expected to cause minor, temporary, localized increases in turbidity. BMPs, restrictions on fueling, and prevention of fluid leaks from construction equipment would be employed that would minimize discharge of pollutants into the river. The proposed repair includes a minor deviation in the levee design which constitutes fill into the Waters of the U.S. The Corps has analyzed the repairs pursuant to the general conditions established by the State associated with authorization under NWP 3 and has concluded that the proposed work satisfies those conditions. Based on review of the NWP 3 State Specific Regional Certification Conditions, this project is covered by the certification approved for this NWP and an individual Section 401 Water Quality Certification is not required

5. Historic, cultural, scenic, and recreational values [320.4(e)]

Consultation with the Washington State Department of Archeology and Historic Preservation (DAHP) and the Confederated Tribes and Bands of the Yakama Indian Nation has been completed. Based on the literature review and a records search, cultural resource survey, and coordination with DAHP and the contacted Tribes, the Corps determined that the proposed repairs would have no adverse effect to historic properties. DAHP concurred with Corps determination of no adverse effect to historic properties on April 13, 2021.

6. Effects on limits of the Territorial Sea [320.4(f)]

Not applicable.

7. Consideration of property ownership [320.4(g)]

Access for construction equipment and materials would be via public rights-of-way and real estate rights of entry provided by Yakima County and the city of Yakima, the non-federal sponsors for the repairs. No change in property ownership would occur.

8. Activities affecting coastal zones [320.4(h)]

Not applicable.

9. Activities in marine sanctuaries [320.4(i)]

Not applicable.

10. Other federal, state, or local requirements [320.4(j)]

The Corps has initiated formal consultation with the NMFS and USFWS on the findings of the BA for the proposed repair. Consultation with USFWS and NMFS is ongoing.

11. Safety of impoundment structures [320.4(k)]
Not applicable.

12. Floodplain Management [320.4(l)]
The project is in compliance. The Corps considered alternatives to reduce hazards and risks associated with floods and to minimize the impact of floods on human safety, health and welfare, and restoring and preserving the natural and beneficial values of the base floodplain. The project maintains the status quo of the level of flood protection.

13. Water supply and conservation [320.4(m)]
Not applicable.

14. Energy conservation and development [320.4(n)]
Not applicable.

15. Navigation [320.4(o)]
This project would not impede current navigability within the Yakima River.

16. Environmental benefits [320.4(p)]
The District Engineer has weighed the beneficial and detrimental environmental aspects of the project. No net detriments are expected.

17. Economics [320.4(q)]
Economic studies were undertaken which included studies enumerating and evaluating damages related to the existing economic development protected by the levees, sensitivity evaluations and optimization scenarios evaluating the benefits and costs of alternative project scopes. The outcome of these evaluations combined with engineering, environmental, and local sponsor considerations have led to the selection of the recommended plan. Repairing each levee was found to be economically justified based on a comparison of the annualized benefits (damages prevented by restoring the levee) and the annualized cost of repairs.

18. Mitigation [320.4(r)]
Compensatory mitigation for vegetation impacts has been incorporated into the repair. The Corps would install willow bundles into the levee slope at 6-foot intervals along the OHWM to establish native riparian vegetation and would use a native mixture to hydroseed all disturbed soils. The Corps would complete off-site mitigation in 0.20 acre on vegetated gravel bars in the Yakima River. These gravel bars are located within the floodplain and are not subject to levee operation and maintenance trimming or cutting. Off-site mitigation consists of planting 50 cottonwood containers and 400 coyote willow or red-osier dogwood stakes.