UPPER GUADALUPE RIVER
FLOOD RISK MANAGEMENT PROJECT
San José, California

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

Appendix C5

DRAFT INTEGRATED
GENERAL REEVALUATION REPORT
& SUPPLEMENTAL ENVIRONMENTAL ASSESSMENT

November 2022

US Army Corps
of Engineers®
San Francisco District

Valley Water

APPENDIX C5

Upper Guadalupe River Project Clean Water Act Section 404(b)(1) Preliminary Evaluation

1 Introduction

This appendix evaluates compliance of the recommended plan, Combination Plan, with the Guidelines established under the Federal Pollution Control Act (Clean Water Act) Amendments of 1972 (Public Law 92-500), as amended by the Clean Water Act of 1977 (Public Law 95-217), legislation collectively referred to as the Clean Water Act. The Clean Water Act sets national goals and policies to eliminate the discharge of water pollutants into navigable waters. Any discharge of dredged or fill material into waters of the U.S. (WOTUS) by the U.S. Army Corps of Engineers (Corps) requires a written evaluation that demonstrates that a proposed action complies with the guidelines published at 40 CFR Part 230. These guidelines, referred to as the Section 404(b)(1) Guidelines or "Guidelines," are the substantive criteria used in evaluating discharges of dredged or fill material under Section 404 of the Clean Water Act.

Fundamental to the Guidelines is the precept that "dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated such a discharge would not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern."

The procedures for documenting compliance with the Guidelines include the following:

1. Examining practicable alternatives to the proposed discharge that might have fewer adverse environmental impacts, including not discharging into a water of the U.S. or discharging into an alternative aquatic site.
2. Evaluating the potential short- and long-term effects, including cumulative effects, of a proposed discharge of dredged or fill material on the physical, chemical, and biological components of the aquatic environment.
3. Identifying appropriate and practicable measures to mitigate the unavoidable adverse environmental impacts of the proposed discharge.
4. Making and documenting the Findings of Compliance required by §230.12 of the Guidelines.

This Clean Water Act, Section 404(b)(1) evaluation of compliance with the Guidelines is not intended to be a "stand alone" document; it relies heavily on information provided in the Integrated General Reevaluation Report and supplemental Environmental Assessment (GRR/EA) to which it is attached.

2 Project Description

2.1 Basic and Overall Project Purpose

As defined under 40 CFR Part 230, the basic project purpose comprises the fundamental, essential, or irreducible purpose of the action, and is used to determine whether the project is water dependent. The basic purpose of this project—flood risk management—is water dependent, since the project purpose cannot be fulfilled outside of riverine environment.

The Guadalupe River and its associated floodplains have a documented history of flooding dating back nearly 100 years, with consequences ranging in the millions of dollars in damages from more recent flooding evens in 1995 and 1998. The primary drivers of flooding on the Guadalupe River are capacity issues and pinch points. High velocities during flood events have incised the channel creating steep riverbanks that have constrained flows that historically spread out in a marshy floodplain. Flood event breakouts from the Guadalupe River, Canoas Creek, and Ross Creek result in deep flooding in environmental justice communities and shallow flooding in historically affluent communities.

The overall project purpose serves as the basis for the alternatives analysis and more specifically describes the goals for the action. The overall project purpose is to implement flood-risk management actions on the Guadalupe River in San Jose, California that improve life safety and provide ecosystem/environmental quality.

2.2 Project Location

The study area includes not only the geographic boundary of where an eventual project may be built, but the entire area which stands to benefit from, or be impacted by the project, such that full evaluation and comparison of alternatives can be performed.

The study area is located in Santa Clara County, in west central California, immediately south of the San Francisco Bay. The project area is in the southwestern portion of the City of San José, within the highly urbanized Santa Clara Valley. The Guadalupe River is the second largest stream in Santa Clara County. The river discharges into the San Francisco Bay approximately 20 miles north of its origin in the Santa Cruz Mountains. The Guadalupe River drains an area of approximately 170 square miles.

The study area includes roughly 5.5 miles of the Upper Guadalupe River main stem between the Southern Pacific Railroad Bridge and the Blossom Hill Road Bridge. Two tributaries, which frequently overtop their banks, Ross Creek and Canoas Creek, are also included within the study area.

2.3 Delineation of Waters of the U.S.

In accordance with the USACE risk-informed planning process, the team used the maximum amount of existing data. There were two Water of the U.S. types that were evaluated— perennial stream and riparian forest wetland. Both were delineated based on hydraulic modeling analysis. Existing perennial stream was delineated based on the inundation boundary for mean winter flow and existing riparian forest wetland came from a 50% annual exceedance probably flow inundation boundary. Using this flow exceedance can provide a reasonable approximation of the extent of riverine wetlands in some reiver systems (Gartner et al. 2016). These areas were overlaid with alternative grading footprints to determine project impacts to Waters of the U.S.

3 Alternatives Analysis

An evaluation of alternatives is required under the Section 404(b)(1) Guidelines for projects that include the discharge of dredged or fill material into Waters of the U.S.. Under the Guidelines, practicability of alternatives is taken into consideration and no alternative may be permitted if there is a less environmentally damaging practicable alternative (40 Code of Federal Regulations [CFR] 230.5(c)).

Section 230.10 of the Guidelines dictates that, except as provided under §404(b)(2),

> *"no discharge of dredged or fill material shall be permitted if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, so long as the alternative does not have significant adverse environmental considerations."*

While the NEPA process, through the supplemental EA, extensively examines alternatives and discloses all of their environmental impacts, the 404(b)(1) Analysis focuses on the impacts of alternatives to the aquatic ecosystem. The Guidelines require choosing for implementation the practicable alternative that has the least damage to the aquatic ecosystem, as long as that alternative has no significant adverse environmental impacts to other components of the environment, such as endangered species that occupy upland habitat.

A "practicable alternative" is defined as:

> *"available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes*."

The Guidelines also require that :

> *"where the activity associated with a discharge which is proposed for a special aquatic site does not require access or proximity to or siting within the special aquatic site in question to fulfill its basic purpose (i.e., is not "water dependent"), practicable alternatives that do not involve special aquatic sites are presumed to be available, unless clearly demonstrated otherwise."*

3.1 Alternative Screening Criteria

Alternative screening criteria were developed in evaluating alternatives as described below. This screening criteria also considers the Section 404(b)(1) practicability factors. An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes (40 CFR 230.10(a)(2)).

The focused array of alternatives, as described in the GRR, was evaluated by projecting and comparing the with project and without project conditions. Plan formulation focused on addressing the identified problems and meeting study objectives, including those responsive to national, state, and local concerns. Consideration of state and local objectives in concert with national objectives necessitates the inclusion and assessment of a broad range of benefits and impacts, both qualitative and quantitative. Alternative plans were assessed to determine if they have net benefits in total and by type. The set of plans judged to

have net benefits were candidates for further analysis and included in the final array. The action-alternatives carried into the final array were evaluated on the *Principles and Guidelines Criteria* of:

- **Efficiency** – The potential benefits/outcome of the measure are greater than what could be provided by another measure/plan of equal or greater cost.
- **Effectiveness** – Extent to which a measure or alternative alleviates problem areas and meets planning objectives.
- **Acceptability** – Viability and appropriateness of an alternative from the perspective of the general public and consistency with existing Federal laws, authorities, and public policies.
- **Completeness** – Extent to which an alternative provides and accounts for all features, investments, and/or other actions necessary to realize the planned effects, including any necessary actions by others.

Additionally, plans were assessed on the *Principles and Guidelines* four accounts:

- National Economic Development (NED)
- Regional Economic Development (RED)
- Environmental Quality (EQ)
- Other Social Effects (OSE)

3.2 Description of Alternatives

Five structural alternatives were moved forward into the final array of alternatives, including:

- Alternative 1—No Action Alternative
- Alternative 2—Modified Valley View Plan
- Alternative 3—Bypass Plan
- Alternative 7—Low Scope Plan
- Alternative 8—Combination of Engineering with Nature and Traditional FRM Plan

A high-level description of each of the final alternatives is provided below and they are described in more detail in Section 3.4.3.

3.2.1 Alternative 1—No Action Alternative.

The No Action Alternatives describes what would happen if no action is taken as part of this project. Used for comparison with action alternatives to assess the benefits and impacts of proposed plans.

3.2.2 Alternative 2—Modified Valley View Plan

The Modified Valley View Plan consists of a channel widening on the eastern bank of the Guadalupe River and bypasses, culvert, and bridge replacements, as well as floodwalls on the tributaries to increase channel capacity and reduce flood damages.

During the original Upper Guadalupe River Feasibility Study, this plan was identified as the NED Plan.

3.2.3 Alternative 3—Modified Bypass Plan

The Modified Bypass Plan is the largest structural alternative analyzed and uses channel widening on the eastern bank of the Guadalupe River, with even more bypass features that include four strategically placed alcoves to provide connectivity to the main channel. This plan would include gravel augmentation (rip rap) and fishponds, as well as culvert/bridge replacements throughout the system.

During the original Upper Guadalupe River Feasibility Study, this plan was identified as the Locally Preferred Plan (LPP) and eventually became the Authorized Project.

3.2.4 Alternative 7—Lower Scope Plan

The Lower Scope Plan is identical to the Combination Plan in Reaches 7 and 8, but has some differences on the tributaries. This alternative is focused on seeing if there is a lower cost plan that may be justified. It has fewer bridge and culvert replacements and focuses work in the reaches with breakouts, or at the most constricting pinch points. On Canoas creek, it proposes to have less floodwalls. On Ross Creek, it proposes to have more floodwall and fewer culvert expansions.

3.2.5 Alternative 8—Combination Plan

The Combination plan combines engineering with nature features, such as floodplain reconnection/restoration in the constricted portions of the mainstem of the Guadalupe River, with traditional flood risk management features, such as floodwalls on the tributaries where homes abut the creek. This alternative proposes bridge replacements and a large floodplain bench with other natural and nature-based features, including gravel augmentation and biotechnical bank stabilization in Reaches 7 and 8. The Combination Plan also includes gravel augmentation and alcoves, as well as bridge/culvert replacement at the most restricting pinch points in the system. It also proposes floodwalls and culvert expansions on Ross and Canoas Creek.

3.3 Least Environmentally Damaging Practicable Alternative (LEDPA) under the 404(b)(1) Guidelines

The Combination Plan is the least environmentally damaging practicable alternative (LEDPA). Although the No Action plan would result in no impacts to wetlands, the habitat conditions would continue to degrade and there would continue to be a high flood risk, therefore this alternative does not meet the overall project purpose. Table 1 below shows a comparison of impacts to jurisdictional waters and wetlands by alternative. Figure 1 below shows an example of the overlay used to calculate those numbers.

Table 1. Summary of permanent impacts to Water of the U.S. (acres). Temporary impacts are outside of the jurisdictional boundaries.

ATTRIBUTE	ALTERNATIVE			
	Valley View	Bypass	Lower Scope	Combination
Riparian Forest Wetland	5.21	5.44	2.49	2.14
Low-flow Channel	4.18	6.38	3.32	1.26
TOTAL	**9.39**	**11.82**	**5.81**	**3.40**

Based on the impacts table above, the Combination Plan is the LEDPA.

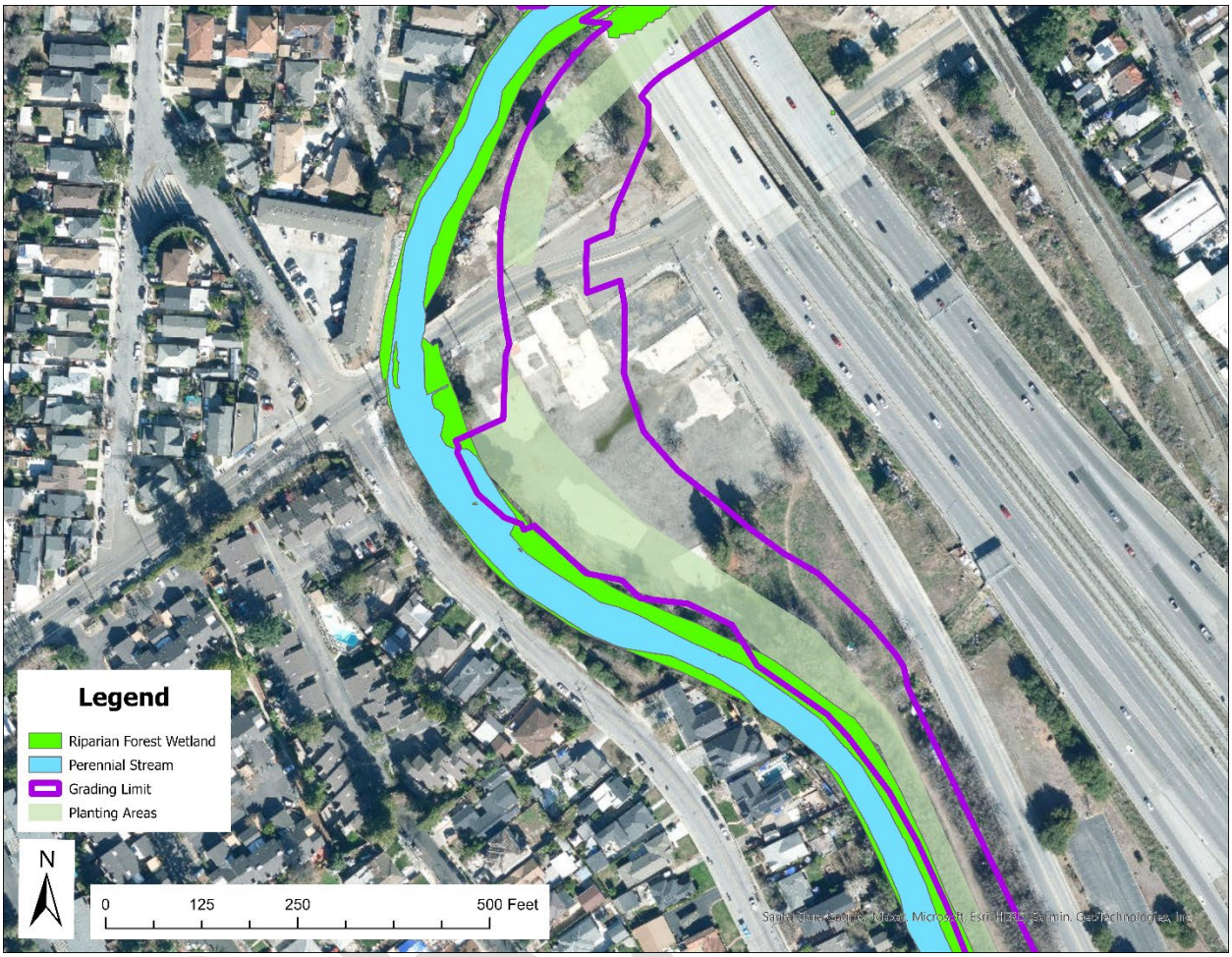

Figure 1. Example of grading footprint overlaid with jurisdictional wetlands and waters used for calculating numbers in table above, shown for Combination Plan in Reach 7.

4 Proposed Project and its Potential Effects

The Upper Guadalupe River Flood Risk Management Project General Reevaluation Study (Upper Guadalupe) recommended the Combination Plan as the Tentatively Selected Plan (TSP). The Combination Plan is the NED as well as the Comprehensive Benefits Plan and includes several natural or nature-based features (NNBFs) and Engineering With Nature (EWN) measures for flood risk management (FRM). See Section 5.3 of the GRR/EA for more detail about the Combination Plan.

The Combination Plan maximizes EQ benefits compared to other alternatives by providing a large increase of over 30 habitat units of riparian forest habitat in the form of a floodplain bench, compared with the without project condition; and an increase in both aquatic rearing habitat (0.93 acres), and spawning habitat (0.14 acres). The purpose of the floodplain bench is to increase the capacity of the channel, reducing hydraulic constrictions and flood damages. However, by designing it with habitat in mind, more benefits to the nation can be gained.

Table 2. Summary table of tentatively selected plan (TSP) features, Combination Plan.

Reach	Channel	Bridges/Culverts	Levees/Floodwalls	Bank Protection
7	50 to 150 ft wide floodplain bench on right bank of main channel Islands left in place to preserve existing riparian vegetation Gravel augmentation Floodplain revegetation Large woody debris structures in low flow channel	Retrofit/Replacement at Caltrain, Willow, and Alma St.	Floodwall at Elks Lodge if needed	450 ft of biotechnical bank stabilization on left bank Rip-rap if needed
8	Same as 7	Retrofit at abandoned Union Pacific railroad bridge with box culvert		Biotechnical bank stabilization or rip-rap if needed
Canoas Creek	Widening at culverts	New culverts at Almaden and Nightingale	Floodwalls on both banks (~1,500 ft)	
Ross Creek	Widening at culverts	New culverts at Almaden, Cherry, Jarvis, Kirk, Meridian	Intermittent floodwall on both banks	

4.1 Potential Impacts of Proposed Project

4.1.1 Potential Impacts on Physical and Chemical Characteristics of the Aquatic Ecosystem

The Combination Plan would result in moderate permanent changes to the substrate through grading, fill, and in-channel gravel augmentation, and would result in minor temporary impacts to suspended particulates/turbidity. Groundwater and the general watershed characteristics would be unaffected by project actions. Through the use of a large floodplain bench and biotechnical bank stabilization in Reaches 7 and 8, the plan will help reset natural physical and ecological processes, and shift the channel away from an incised, eroding system to a dynamic, more-functional river corridor. This will reduce long-term operations and maintenance costs, as well as provide additional habitat benefits, described in more detail in Section 4.5 below. See the Section 4.4.6 of the GRR/EA for more information on the project's effects on water resources.

Substrate

Gravel augmentation is incorporated along the existing channel in Reach 7 to provide spawning substrate for migratory fish and a coarse sediment infusion for downstream reaches. The project would generate temporary, short-term increases in sedimentation during construction activities. The project is expected to result in improved aquatic habitat conditions for wildlife and federally listed salmonids. Channel widening, the inclusion of floodplain benches, and the proposed gravel augmentation is expected to provide more topographic complexity and a return of the underlying channel dynamics and physical

processes that support healthy aquatic ecosystems and spawning and rearing for federally listed salmonids. See Sections 4.4.6 and 4.5.3 of the GRR/EA for more information.

Water Resources

The project would significantly reduce flood risk in the study area (Section 4.4.6). The project reduces 95% of the damages due to flooding, but some residual flooding still remains. Groundwater and the general watershed characteristics would be unaffected by project actions. Initially, there could be a temporary impact due to sediment inputs from the constructed banks in the winters immediately following construction as the site settles. However, with successful revegetation of the channel banks, and implementation of natural and nature-based features, the channel banks would become stabilized, and velocities would be slowed, resulting in a long-term reductions in sediment inputs from incision, lateral erosion, or bank failures. See the Section 4.4.6 of the GRR/EA for more information on the project's effects on water resources.

Current Patterns and Water Circulation

Through the use of a large floodplain bench and biotechnical bank stabilization in Reaches 7 and 8, the project shifts the channel away from an incised, eroding system to a dynamic, more-functional river corridor. With the project implemented, installed riparian vegetation should slow in-channel velocities in Reaches 7 and 8, but overall maximum velocities could be as high as 15 feet per second in a 1% AEP event, but this is well within the limits that both traditional erosion protection and biotechnical bank stabilization measures can stabilize for (Section 4.4.6).

Normal Water Fluctuations

The project proposes to remove two large, paved areas adjacent to the channel which should increase infiltration and reduce runoff to the channel resulting in minor improvements to the flashiness of the system.

Salinity Gradients

N/A

4.1.2 Potential Impacts on Biological Characteristics of the Aquatic Ecosystem

The Combination Plan would result in minor to moderate temporary impacts to the biological characteristics of the aquatic ecosystem of the Upper Guadalupe River. Potential impacts to biological resources are described in detail in Section 4.5.3 of the GRR. The Combination Plan would also result in permanent beneficial effects to the biological characteristics of the aquatic ecosystem of the Upper Guadalupe River, particularly by increasing the area of forested wetland and other riparian, and SRA habitats, by increasing habitat connectivity, and improving in-channel substrate conditions for salmonid species. The Combination Plan preserves several "islands" of mature riparian vegetation in both Reaches 7 and 8 and includes extensive planting (7.25 acres) both on the floodplain benches, and along the banks.

The Combination Plan includes large floodplain benches in Reaches 7 and 8 in lieu of a bypass channel or conventional channel widening, in addition to conversion of paved areas to riparian vegetation. The result is in a significant net increase in riparian habitat following project implementation. Overall, the amount of native riparian is expected to increase to significantly under the Combination Plan.

No impacts to freshwater marsh are anticipated. No substantial impacts are expected to total acreage of spawning and rearing habitat for federally listed salmonids. The quality of habitat for federally listed salmonids is expected to improve (Appendix C1). This is due in part to gravel augmentation incorporated along the existing channel to provide spawning substrate for migratory fish and an infusion of coarse sediment .

Channel widening and the inclusion of floodplain benches is also expected to provide more topographic complexity and a return of the underlying channel dynamics and physical processes that support healthy aquatic ecosystems.

Threatened And Endangered Species

A biological opinion was issued and subsequently supplemented by NMFS for the originally authorized project (Bypass Channel Plan). The opinion found that the project and its revisions were not likely to jeopardize continued existence of the threatened Central California coast steelhead. It also found that the project would result in take of listed species and therefore issued an Incidental Take Statement. Temporary impacts to stream temperatures during construction were one of the more significant impacts addressed in the opinions. The supplemental opinion shortened the construction period from 25 to 9 years, and also included several other project changes, as well as a design review requirement.

Fish, Crustaceans, Mollusks and Other Aquatic Organisms in the Food Web

No substantial impacts are expected to total acreage of spawning and rearing habitat for federally listed salmonids. The quality of habitat for federally listed salmonids is expected to improve (Appendix C1). Temporary impacts to fish and fish habitat are expected during construction due to dewatering or flow diversions. Initially, there could be a temporary impact due to sediment inputs from the constructed banks in the winters immediately following construction as the site settles.

Other Wildlife

The project should result in improved aquatic habitat conditions for wildlife and federally listed salmonids. Channel widening, the inclusion of floodplain benches, and the proposed gravel augmentation is expected to provide more topographic complexity and a return of the underlying channel dynamics and physical processes that support healthy aquatic ecosystems and spawning and rearing for federally listed salmonids. See appendix C1 for the projected increase to riparian habitat.

4.1.3 Potential Impacts on Special Aquatic Sites

Within the project footprint, there are no sanctuaries and refuges, mud flats, vegetated shallows, coral reefs. However, wetlands are present onsite and would be affected by the Combination Plan.

Wetlands

As characterized in section 3.3. However, the Combination plan has been determined to be the least impactful to wetlands.

Riffle and Pool Complexes

Riffle and pool complexes may be present but in such limited quantities and extent that any impacts to these sites would be negligible. For example, the Supplemental Biological Opinion (2005) describes habitat conditions as having marginal rearing habitat and lacking habitat complexity or low velocity refugia, as follows:

Habitat conditions within the project area are generally poor for steelhead rearing and spawning. Rearing habitat in the mainstem of the Guadalupe River is marginal during the summer months due to elevated water temperatures and the presence of warm-water predatory fish species. Existing overwintering habitat and outmigration conditions are also limited because the mainstem channel lacks habitat complexity and low velocity refugia during storm events.

4.1.4 Potential Effects on Human Use Characteristics

The Combination Plan is not expected to negatively affect municipal private water supplies, recreational and commercial fisheries, water-related recreation, or parks, but would temporarily affect aesthetics. Effects to the human environment are described in detail in section 4.6 - 4.15 of the GRR. It incorporates, with clarifying modifications, mitigation measures in the GRR EIS/EIR that would minimize these effects. The Combination Plan is expected to have beneficial effects on recreation through the implementation of publicly accessible trails and would have only minor or no effects on other human uses.

Municipal and Private Water Supplies

N/A

Recreational and Commercial Fisheries

N/A

Water-Related Recreation

See Section 4.6.3 of the GRR/EA.

Aesthetics

See Section 4.6.3 of the GRR/EA.

Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves

No adverse operational impacts on the City's parks would result from the project. There would be the potential of having an explanded trail system.

4.2 Potential Effects of Contaminants—Evaluation and Testing of Fill Material

Under the Combination Plan, there would be extensive excavation of a floodplain bench in Reaches 7 and 8, as well as other ground-disturbing activities that could expose the public to hazardous sites if they were located within the excavation footprint. Following a review of the sites identified in Figure 20 in the GRR/EA, there are no known hazardous sites located within the Combination Plan grading footprint, and thus the project would have no effect on these sites. There would be no increase in risk of public exposure to these sites as a result of the project. All soils removed from the excavation footprint will be placed in accordance with applicable regulations. See Section 4.12.3 of the GRR/EA for more information for the project's plans to place mercury-containing soils.

4.3 Actions To Minimize Adverse Effects

See Section 4.18 of the GRR/EA for a summary of the project measures that will be taken to avoid and minimize adverse effects.

5 Factual Determination (Section 230.11).

A review of appropriate information as it pertains to items identified above indicates that there is minimal potential for short or long term environmental effects of the proposed discharge as related to (a yes below indicates that effects are minimal or smaller):

	YES	NO
a. Physical substrate	[X]	
b. Water circulation, fluctuation and salinity	[X]	
c. Suspended particulates/turbidity	[X]	
d. Contaminant availability	[X]	
e. Aquatic ecosystem structure, function and organisms	[X]	
f. Proposed disposal site	[X]	
g. Cumulative effects on the aquatic ecosystem	[X]	
h. Secondary effects on the aquatic ecosystem	[X]	

6 Findings of Compliance or Non-Compliance with the Restrictions on Discharges

6.1 Adaptation of the Section 404(b)(1) Guidelines to this Evaluation

No significant adaptations of the guidelines were made relative to this evaluation.

6.2 Availability of a Practicable Alternative Less Damaging to the Environment

Alternatives to the Combination Plan are described and evaluated in Section 3.2, "Alternatives." Based on the evaluation in that section, there is no practicable alternative to the Combination Plan that would be less damaging to the environment.

6.3 Compliance with Applicable Water Quality and Toxic Effluent Standards

Construction of the Combination Plan would not cause or contribute to violation of any applicable State water quality standards, and would not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

6.4 Compliance with Endangered Species Act

The placement of fill materials by the Combination Plan would not jeopardize the continued existence of any species listed as threatened or endangered or result in the likelihood of destruction or adverse modification of any critical habitat as specified by the Endangered Species Act of 1973.

6.5 Compliance with Marine Protection, Research, and Sanctuaries Act

Compliance with the Marine Protection, Research, and Sanctuaries Act is not relevant to the Combination Plan because it is along a freshwater river with no potential to affect marine sanctuaries.

6.6 Extent of Degradation of Waters of the U.S.

Construction of the Combination Plan would not cause or contribute to significant degradation of waters of the U.S. Approximately 2.14 acres of wetlands and 1.26 acres of other waters of the U.S. would be impacted, but ultimately will result in a net increase of riparian forest.

Overall, the Combination Plan would have beneficial long-term effects on the aquatic ecosystem's diversity and productivity resulting from the increase in wetland area and associated increases in SRA habitat, other habitat values, and increases in habitat connectivity. Long-term effects to human uses would be minor and not significant.

6.7 Appropriate and Practicable Steps Taken to Minimize Potential Impacts to the Aquatic Ecosystem

Appropriate steps to minimize potential adverse effects of the discharge on aquatic systems would be implemented, as described in Section 4.18of the GRR/EA. Consequently, the Combination Plan is compliant with the requirements of the guidelines for the inclusion of appropriate and practicable measures to minimize adverse effects to the aquatic ecosystem.

7 References

Gartner, J.D., Lichvar, R., Mersel, M.K. and Lefebvre, L.E., 2016. Integrating hydrologic modeling, hydraulic modeling and field data for ordinary high water mark delineation. Cold Regions Research and Engineering Laboratory (US).