

REVIEW PLAN (UPDATE)



San Francisco Waterfront Flood Resiliency Study
San Francisco, California
General Investigations Program
Integrated NEPA and Feasibility Report
P2# 402568



US Army
Corps of Engineers
® San Francisco District



15 March 2021

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1 PROJECT DETAILS

Project Name: San Francisco Waterfront Flood Resiliency Study (SFWFRS)

P2 Number: 402568

Decision Document Type: Integrated NEPA and Feasibility Study Report

Project Type: Coastal Storm Risk Management

District: San Francisco

District Contact: Project Manager (415·503·6731)

Major Subordinate Command (MSC): South Pacific Division

MSC Contact: (415·503·6556)

Review Management Organization (RMO): Coastal Storm Risk Management PCX

RMO Contact: Planning Program Manager (347·370·4571)

Key Review Plan Dates

Date of RMO Endorsement of Review Plan: 26 March 2019

Date of MSC Approval of Review Plan: 26 March 2019

Date of IEPR Exclusion Approval: Not Applicable

Has the Review Plan changed since PCX Endorsement? Yes

Date of Last Review Plan Revision: March 2021

Date of Review Plan Web Posting: March 2021

Date of Congressional Notifications: Not Applicable

Table 1 Milestone Schedule

	Scheduled	Actual	Complete
Feasibility Cost Share Agreement:	5 September 2018	5-Sep-18	Yes
Alternatives Milestone:	3 December 2018	3-Dec-18	Yes
Tentatively Selected Plan:	December 2021	TBD	No
Release Draft Report to Public:	January 2022	TBD	No
Agency Decision Milestone:	June 2022	TBD	No
Final Report Transmittal:	March 2023	TBD	No
Senior Leaders Briefing:	May 2023	TBD	No
Chief's Report or Director's Report:	August 2023	TBD	No

Project Name: San Francisco Waterfront Flood Resiliency Study (SFWFRS)

Location: San Francisco, California

Authority: Section 110 of Rivers and Harbors Act of 1950 and Section 142 WRDA 1976 as amended by Section 705 of WRDA 1986

Rivers and Harbors Act of 1950, SEC. 110.

The Secretary of the Army is hereby authorized and directed to cause preliminary examinations and surveys to be made at the following-named localities, the cost thereof to be paid from appropriations heretofore or hereafter made for such purposes : *Provided*, That no preliminary examination, survey, project, or estimate for new works other than those designated in this title or some prior Act or joint resolution shall be made: *Provided further*, That after the regular or formal reports made as required by law on any examination, survey, project, or work under way or proposed are submitted, no supplemental or additional report or estimate shall be made unless authorized by law: *Provided further*, That the Government shall not be deemed to have entered upon any project for the improvement of any waterway or harbor mentioned in this title until the project for the proposed work shall have been adopted by law: *Provided further*, That reports of surveys on beach erosion and shore protection shall include an estimate of the public interests involved, and such plan of improvement as is found justified, together with the equitable distribution of costs in each case: *And provided further*, That this section shall not be construed to interfere with the performance of any duties vested in the Federal Power Commission under existing law: ...San Francisco Bay, including San Pablo Bay, Suisun Bay, and other adjacent bays, and tributaries thereto, California.

Water Resources Development Act of 1976, Section 142:

SEC. 142. The Secretary of the Army, acting through the Chief of Engineers, is authorized and directed to investigate the flood and related problems to those lands lying below the plane of mean higher high water along the San Francisco Bay shoreline of San Mateo, Santa Clara, Alameda, Napa, Sonoma and Solano Counties to the confluence of the Sacramento and San Joaquin Rivers with a view toward determining the feasibility of and the Federal interest in providing protection against tidal and fluvial flooding. The investigation shall evaluate the effects of any proposed improvements on wildlife preservation, agriculture, municipal and urban interests in coordination with Federal, State, regional, and local agencies with particular reference to preservation of existing marshland in the San Francisco Bay region.

Water Resources Development Act of 1986, Section 705:

SEC. 705. SAN FRANCISCO BAY AREA FLOOD CONTROL STUDY.

Section 142 of the Water Resources Development Act of 1976 (Public Law 94-587) is amended by inserting immediately after "Napa," the following: "San Francisco, Marin..."

Sponsor: The City and County of San Francisco, acting through The Port of San Francisco

Type of Study: General Investigation Feasibility Study

SMART Planning Status: The District anticipates requesting an exemption to 3x3x3 on both schedule and budget. Primary drivers of the need for an exemption are:

- The need for extensive public and agency outreach and engagement prior to the TSP milestone
- The need for additional analysis required to understand, manage, and incorporate seismic risk
- Engineering complexities of the urban waterfront

The current schedule for the study has the TSP milestone being completed in December of 2021 and a Chiefs Report being signed in August 2023. The budget for the study is currently approved at \$6 million dollars, but may be higher due to a number of complex and compounding factors identified below in section 3.

Project Area: The entire San Francisco Bay shoreline is within the study authorization. The study area (Figure 1: right) is approximately 7.5 miles of the San Francisco waterfront between Aquatic Park (to the North) and Heron's Head Park (to the South). This area of the San Francisco waterfront is a complex mix of piers, structures, seawall, and open land. Most of the piers' bulkhead buildings, seawall, and waterfront structures along the Embarcadero were built before World War II, and many have historical distinction.



Figure 1: San Francisco Waterfront Flood Resiliency Study authorized area covers the entire San Francisco Bay shoreline, and the San Francisco Waterfront is shown between the white brackets (left); the study area is smaller and (red arc) covers between the red brackets (right).

Problem Statement: The San Francisco Waterfront is at risk of flooding from bay water, which could cause extensive damage to public infrastructure and private property, poses a risk to public safety and health, degradation of the natural environment, and could create adverse changes to the social and economic character of the waterfront community. This flooding risk is expected to increase over time due to the rising sea level in the bay, and be further exacerbated as the expected sea level rise accelerates as time advances. Specific problems include:

1. The risk to public infrastructure and private property
2. The risk to public safety and health

Federal Interest: The non-federal sponsor for this study is the Port of San Francisco. The Port is obligated by the Burton Act¹ (California law: Chapter 1333, Statutes of 1968 as amended) to promote maritime commerce, navigation, and fisheries, as well as to protect

¹ An act authorizing the transfer in trust to the City and County of San Francisco the interest of the state in and to, and the control and management of, the Harbor of San Francisco.

natural resources and develop recreational facilities for public use. Because those obligations are commensurate with USACE's mission,² it is in the Federal interest to participate in the study and partner in the implementation of potential solutions.

At this stage of the study, there is a high degree of uncertainty in project costs and benefits, and relative costs have been assigned to the initial alternatives. The initial values of project costs and benefits are expected to exceed \$1B.

Study Area Risks: Exceptionally high tides and large storms with frequent return periods cause flooding along the San Francisco waterfront (Figure 2). Many areas and structures are could be inundated from the 1% annual chance exceedance (ACE) event under existing conditions, and the frequency and magnitude of damage will increase as sea level rises. Flooding of that magnitude could result in the closure of the Embarcadero roadway and pedestrian promenade, as well as closure of the Ferry Building and temporary termination of ferry service. Generally, such flooding can have a significant negative impact on:

- Hydrologically independent areas with the lowest elevations
- Tourism and the financial heart of San Francisco
- Critical public infrastructure including local and regional transit (above ground and below ground)
- Three designated historic districts
- Dense residential, commercial, and industrial land



Figure 2: Overtopping of the seawall along the Embarcadero roadway and pedestrian promenade south of the Ferry Building

² To provide vital public engineering services in peace and war to strengthen our Nation's security, energize the economy, and reduce risks from disasters

Based on the current understanding of risk for the study area, three specific study risks have been identified:

- Public outreach and stakeholder engagement: Because of its location, potential size, short and long-term impacts, and the number of people, agencies, and businesses affected, determining the Tentatively Selected Plan will require a high level of public engagement and communication.
- Costs associated with high seismicity and fill: Sufficient understanding of seismic risk in the study area is necessary to inform the costs of alternatives that require seismic improvements.
- Regulatory and environmental compliance, particularly in relation to the in-water alternatives: Strict state and federal regulatory requirements for activities in San Francisco Bay could limit the scope of alternatives.

None of the identified risks are expected to pose a significant threat to human life or the environment.

Scope of Review.

Will the study likely be challenging? Determining a Tentatively Selected Plan will be challenging because the diversity of stakeholders will require much fine tuning of the preferred alternative. The consideration of seismic risk that introduces flood vulnerability to the study area poses an additional challenge to the PDT. These challenges will be mitigated by an extensive public involvement effort and a completion of a seismic analysis conducted separately by the Port. Construction should not be challenging because the potential alternatives rely on well-established practices.

Provide a preliminary assessment of where the project risks are likely to occur and assess the magnitude of those risks.

- *Public outreach and stakeholder engagement:* Because of its location, potential size, short and long-term impacts, and the number of people, agencies, and businesses affected, determining the Tentatively Selected Plan will require a high level of public engagement and communication. This factor should have a small effect on the level of review because there is widespread support for protecting the waterfront³.
- *Costs associated with high seismicity and fill:* Sufficient understanding of seismic risk in the study area is necessary to inform the costs of alternatives that require seismic improvements. This factor should have a small effect on the level of review because the Port and other City agencies are focused on a seismic retrofit of the area; these activities of the City will help the PDT understand the seismic risk, and depending on the progress of the City's efforts, may reduce seismic risk in the area.
- *Regulatory and environmental compliance, particularly in relation to the in-water alternatives:* Strict state and federal regulatory requirements for activities in San Francisco Bay could limit the scope of alternatives. This factor should have a small effect on the level of review because the most likely TSP will be land focused.

Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues? No. The study will not be justified by life safety as project benefits. The project will be justified based on net national economic benefits resulting from a reduction in expected future direct and indirect flood damages to buildings,

³ San Francisco Local Measure A authorizes the city to issue \$425M in bonds to address the waterfront, BART and Muni, historic piers, and roads from earthquakes, flooding and rising seas. The measure passed with 82.7% yes votes.

contents, and public infrastructure. The PDT also believes the potential risks to life safety from any recommended plan would be low (not significant). This is based on the following factors:

- Flood depths in the study area under all but the most extreme and distant future conditions (for example, 1% AEP event under the High SLC scenario, 40 years into the future) are anticipated to be three feet or less.
- Unlike other flooding sources (such as sudden levee breaches), coastal storm flooding in this area can be forecasted by local officials, and effective emergency measures can quickly and easily be put in place by local officials that would significantly reduce the number of people in the floodplain (and therefore reduce the population at risk) during flood events. These measures include sheltering-in-place, restricting access to sidewalks, streets, buildings, and public transportation in the study area during storms.
- There are numerous potential vehicular and pedestrian egress routes to nearby higher ground.
- The District Chief of Engineering and Technical Services has reviewed the information and analyses performed to date, and concurs that risks to life safety from coastal storms and flooding are not quantitatively significant in the Study.

Has the Governor of an affected state requested a peer review by independent experts? No.

Will the project/study likely involve significant public dispute as to the project's size, nature, or effects? No; the robust public involvement effort will reduce the chance for public dispute on project size, nature, and effects. In addition, city-wide support demonstrated through the recent passage of a roughly \$425 million bond measure (Measure A) to pay for seawall upgrades suggests nearly universal support for an effort to improve the waterfront to reduce the risk of flooding.

Is the project/study likely to involve significant public dispute as to the economic or environmental cost or benefit of the project? No due to robust public involvement effort.

Is the information in the decision document or anticipated project design likely to be based on novel methods, involve innovative materials or techniques, present complex challenges for interpretation, contain precedent-setting methods or models, or present conclusions that are likely to change prevailing practices? Yes. The San Francisco Waterfront presents several complex challenges, including highly variable subsurface conditions (potentially liquefiable, hydraulically placed fill over soft marine sediments), very high seismic hazard, and existing infrastructure within a highly urbanized environment. Lateral spreading is one of the most complex problems in geotechnical engineering. The analysis will include state

of the art techniques, as well as, more practical techniques that may be precedent-setting and lead to a change in the prevailing practices within USACE. Incorporating the seismic risk reduction into our economic analysis would be precedent setting within USACE.

Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule? Resiliency is important for sea level rise and seismic hazard.

Is the estimated total cost of the project greater than \$200 million? Yes.

Will an Environmental Impact Statement be prepared as part of the study? This has not yet been determined. The NEPA scoping process will be followed and a decision between an Environmental Assessment (EA) and an EIS will be made after it is determined that the study is likely to have one or more significant impacts to the environment. Because the project will occur in a highly urban area, it may create large impacts on traffic and visual resources (for example) and may affect socially vulnerable communities. These factors combined with scale of the large likely alternatives suggest that an EIS is likely.

Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources? No. Conversely, it will have positive impacts on cultural and historic resources.

Is the project expected to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures? No.

Is the project expected to have, before mitigation measures, more than a negligible adverse impact on an endangered or threatened species or their designated critical habitat? No.

4 REVIEW EXECUTION PLAN

This section describes each level of review to be conducted. Based upon the factors discussed in Section 3, this study will undergo the following types of reviews:

District Quality Control. All decision documents (including data, analyses, environmental compliance documents, etc.) undergo DQC. This internal review process covers basic science and engineering work products. It fulfills the project quality requirements of the Project Management Plan.

Agency Technical Review. ATR is performed by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. These teams will be comprised of certified USACE personnel. The ATR team lead will be from

outside the home MSC. If significant life safety issues are involved in a study or project, a safety assurance review should be conducted during ATR.

Independent External Peer Review. Type I IEPR may be required for decision documents under certain circumstances. This is the most independent level of review and is applied in cases that meet criteria where the risk and magnitude of the project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision is made as to whether Type I IEPR is appropriate.

Cost Engineering Review. All decision documents shall be coordinated with the Cost Engineering Mandatory Center of Expertise (MCX). The MCX will assist in determining the expertise needed on the ATR and IEPR teams. The MCX will provide the Cost Engineering certification. The RMO is responsible for coordinating with the MCX for the reviews. These reviews typically occur as part of ATR.

Model Review and Approval/Certification. EC 1105-2-412 mandates the use of certified or approved models for all planning work to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions.

Policy and Legal Review. All decision documents will be reviewed for compliance with law and policy. ER 1105-2-100, Appendix H provides guidance on policy and legal compliance reviews. These reviews culminate in determinations that report recommendations and the supporting analyses and coordination comply with law and policy, and warrant approval or further recommendation to higher authority by the home MSC Commander. These reviews are not further detailed in this section of the Review Plan.

Table 2 provides the schedules and preliminary costs for reviews. The study scope has recently gone through an independent technical review (ITR), and the preliminary costs in this table may be updated following the ITR and potential success of the 3 x 3 x 3 exemption request.

The specific expertise required for the teams are identified in later subsections covering each review. These subsections also identify requirements, special reporting provisions, and sources of more information.

Public Review. The Draft Integrated Report will be reviewed by the public per the policy set forth in the Principles and Requirements for Federal Investments in Water Resources and in parallel with the public involvement process required by the National Environmental Policy Act (NEPA). The PDT will consider all comments provided and incorporate any recommendations, as appropriate, into the Final Integrated Report.

Table 2: Schedule and Costs for Review

Product(s) to undergo Review	Review Level	Start Date (M/ Y)	End Date (M/ Y)	Cost	Complete
Planning Model Review	PCX Approval	04/01/19	04/15/19	n/a	No
Draft FWOP Conditions Economics Appendix and H&H Appendix	District Quality Control	08/2020	9/2020	\$15,000	No
Draft Environmental Existing Conditions	District Quality Control	8/2020	9/2020		No
Coastal Inputs to G2CRM	Agency Technical Review	09/2020	10/2020	\$30,000	No
Econ Assumptions to G2CRM	Agency Technical Review	09/2020	10/2020	\$30,000	No
Draft Economics Appendix	District Quality Control	5/20221	6/2021	\$15,000	No
Draft Engineering Appendix	District Quality Control	5/20221	6/2021	\$15,000	No
Draft Real Estate Plan	District Quality Control	5/20221	6/2021	\$15,000	No
Draft Supporting NEPA Documents	District Quality Control	5/20221	6/2021	\$20,000	No
Draft Integrated Report	District Quality Control	7/2021	8/2021	\$30,000	No
Draft Integrated Report	Agency Technical Review	03/2022	05//2022	\$70,000	No
Draft Integrated Report	Type I IEPR	03/2022	05//2022	\$150,000	No
Draft Integrated Report	Policy and Legal Review	01/2022	05//2022	n/a	No
Draft Integrated Report	Public Review	03/2022	05//2022	tbd	No
Final Integrated Report	District Quality Control	11/2022	01/2022	\$20,000	No
Final Integrated Report	Agency Technical Review	01/2023	04/2023	\$50,000	No
Final Integrated Report	Policy and Legal Review	01/2023	04/2023	n/a	No

4.1 DISTRICT QUALITY CONTROL

The home district shall manage DQC and will appoint a DQC Lead (San Francisco District Plan Formulation Section Chief) to manage the local review (see EC 1165-2-217, section 8.a.1). The DQC Lead will prepare a DQC Plan and provide it to the RMO and MSC prior to starting DQC reviews. Table 3 identifies the required expertise for the DQC team. Prior to DQC, the full PDT will review the feasibility report for accuracy and completeness.

Potential work in-kind products provided by the nonfederal sponsor will be submitted to the PDT and internally/peer-reviewed for applicability to study. If applicable, it then will be reviewed in accordance with DQC and Corps Policy compliance.

Table 3: Required DQC Expertise

DQC Disciplines	Expertise Required
Planning	The reviewer should have recent experience in reviewing plan formulation processes for coastal storm risk management studies and be able to draw on “lessons learned” in advising the PDT of best practices.
Economics	The economics reviewer should have extensive experience in the economic analysis for Civil Works projects, including coastal storm experience. It is preferable for the economics reviewer to have familiarity with G2CRM.
Flood Risk Management (Coastal)	The flood risk management reviewer should be familiar with the latest guidance form the National Flood Risk Management Program and the communication of flood risk to the affected communities.
Environmental Resources	The reviewer should have a solid background in the coastal and estuarine systems to be found in the Western United States, and understand the factors that may affect native species of plants and animals, coastal public access, air quality, and other environmental resources.
Cultural / Historic Resources	The reviewer should have extensive USACE experience regarding cultural and historic resources on public lands. They need to be familiar with Department of Defense as well as USACE policies and procedures as they pertain to USACE studies and projects.
Coastal Engineering	The reviewer should have experience in coastal engineering, including structural and non-structural solutions. The reviewer should also be well versed in the life safety risks associated with flood risk-management projects. The reviewer should have extensive experience with sea level change analysis and USACE vertical datums compliance.
Geotechnical Engineering	The reviewer should have recent experience in the USACE design requirements. This person should also have experience in investigating existing subsurface conditions and materials; determining their physical/mechanical and chemical properties that are relevant to the project considered, assessing risks posed by site conditions; designing earthworks and structure foundations; and monitoring site conditions, earthwork and foundation construction. To the extent available, the reviewer should have experience with seismic considerations.
Civil Engineering	The reviewer should have recent experience in the design of and plans and specifications for various coastal storm risk management features such as sea walls and slope protection.
Cost Engineering	The reviewer should have experience preparing cost estimates for coastal storm risk management projects and the application of scientific principles and techniques to cost engineering.
Real Estate	The reviewer should have experience preparing Real Estate Plans for General Investigation Studies.

Documentation of DQC. Quality Control should be performed continuously throughout the study. A specific certification of DQC completion is required at the draft and final report stages. Documentation of DQC should follow the District Quality Manual and the MSC Quality Management Plan. An example DQC Certification statement is provided in EC 1165-2-217, on page 19 (see Figure F).

Documentation of completed DQC should be provided to the MSC, RMO, and ATR Team leader prior to initiating an ATR. The ATR team will examine DQC records and comment in the ATR report on the adequacy of the DQC effort. Missing or inadequate DQC documentation can result in delays to the start of other reviews (see EC 1165-2-217, section 9).

4.2 AGENCY TECHNICAL REVIEW

The ATR will assess whether the analyses are technically correct and comply with guidance, and that reports explain the analyses and results in a clear manner. An RMO manages ATR. The review is conducted by an ATR Team whose members are certified to perform reviews. Lists of certified reviewers are maintained by the various technical Communities of Practice (see EC 1165-2-217, section 9(h) (1)). Table 4 identifies the disciplines and required expertise for this ATR Team. Note, some reviewers can cover more than one discipline for their ATR review, such as coastal engineering and climate preparedness, risk analysis and economics, or other possible combinations. If deemed justified, the Project Manager will request the appropriate ATR specialist to conduct ATR on a section of the report before submittal of the final report (e.g., Economics).

Table 4: Required ATR Team Expertise

ATR DISCIPLINES	EXPERTISE REQUIRED
ATR Lead	The ATR lead should be a senior professional with extensive experience in preparing Civil Works decision documents and conducting ATR. The lead should also have the necessary skills and experience to guide a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (e.g., planning, economics, environmental resources).
Planning	The Planning reviewer should be a senior water resources planner with experience in coastal storm risk management, familiarity with the “Planning Guidance Notebook” (ER-1105-100), the Water Resources Council’s Principals and Guidelines, and SMART Planning guidance.
Economics	The Economics reviewer should be a senior economist with experience in flood damage analysis, preferably in using G2CRM or other coastal models; recreation analysis; use of RECONS model to address regional economic development associated with a project; discussion of other social effects (OSE) associated with flood risk, as well as OSE benefits from reduction in coastal storm risk; economic justification of projects in accordance with current USACE policy for coastal storm damages.

Environmental Resources	The Environmental Resources reviewer should have experience in the integration of environmental evaluation and compliance requirements pursuant to the “Procedures for Implementing the National Environmental Policy Act (NEPA)” (ER 200-2-2), national environmental statutes, applicable executive orders, and other Federal planning requirements into the planning of Civil Works projects. Experience with ESA, fishery resources, mitigation, and coastal habitat is required.
Cultural Resources	The Cultural Resources reviewer should be an archaeologist familiar with records searches, cultural resource survey methodology, area of potential effects, Section 106 of the National Historic Preservation Act, and State and Federal laws/executive orders pertaining to American Indian Tribes.
Climate Preparedness and Resilience	A member of the Climate Preparedness and Resilience CoP will participate on the ATR team.
Coastal Engineering	The ATR team member will be a subject matter expert in the field of coastal engineering and coastal geomorphology and have a thorough understanding of both the nature of coastal storm risk in this area and coastal structures such as seawalls. They should have experience in coastal modeling and sea level change analysis, as well as expertise in USACE vertical datums compliance.
Geotechnical Engineering	The reviewer should be a geotechnical engineer familiar with sampling and laboratory testing, embankment stability and seepage analyses, planning analysis, sea walls, fragility curves, and a number of other closely associated technical subjects. It is recommended that this reviewer have experience with seismic considerations.
Civil Engineering	The reviewer should be a structural engineer with experience in sea walls, revetments, groins, and other coastal structures.
Cost Engineering	The reviewer should be a cost estimating specialist competent in cost estimating for construction using MCACES/MII; working knowledge of construction; capable of making professional determinations based on experience.
Real Estate	The real estate specialist should be familiar with real estate valuation, gross appraisal, utility relocations, takings, and partial takings as needed for implementation of Civil Works projects.
Risk Analysis	The risk analysis reviewer will be experienced with performing and presenting risk analyses in accordance with ER 1105-2-101 and other related guidance, including familiarity with how information from the various disciplines involved in the analysis interact and affect the results. The reviewer should also be familiar with failure tree statistical analysis and flood risk transfer.

Documentation of ATR. DrChecks will be used to document all ATR comments, responses, and resolutions. Comments should be limited to those needed to ensure product adequacy. If a concern cannot be resolved by the ATR team and PDT, it will be elevated to the vertical team for resolution using the EC 1165-2-217 issue resolution process. Concerns can be closed in DrChecks by noting the concern has been elevated for resolution. The ATR Lead will prepare a Statement of Technical Review (see EC 1165-2-217, Section 9), for the draft and final reports, certifying that review issues have been resolved or elevated. ATR may be certified when all concerns are resolved or referred to the vertical team and the ATR documentation is complete.

4.3 INDEPENDENT EXTERNAL PEER REVIEW

4.3.1 Type I IEPR

Type I IEPR is managed outside of the USACE and conducted on studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study.

Decision on Type I IEPR. Type I IEPR will be performed on this study due to the presence of a number of factors that affect the level of review (and identified in EC 1165-2-217). Some of these factors include, but are not limited to: the estimated total cost of the project is greater than \$200 million (triggering a mandatory Type I IEPR); there is a high level of complexity considering seismic threats, sea level rise, the resilience required in design of this nature, and the a burdensome local regulatory context; and, there is potential controversy (though not necessarily public dispute) in the analysis and outcomes due to the large number of stakeholders and other interests in the study area over what should be prioritized and protected.

Products to Undergo Type I IEPR. The full draft report will undergo Type I IEPR.

Required Type I IEPR Panel Expertise. Panels will consist of independent, recognized experts from outside of the USACE in disciplines representing a balance of areas of expertise suitable for the review being conducted. Table 5 lists the required panel of expertise.

Table 5: Required Type I IEPR Panel Expertise

IEPR Disciplines	EXPERTISE REQUIRED
Planning	The Planning reviewer should be a senior water resources planner with experience in coastal storm risk management, familiarity with the "Planning Guidance Notebook" (ER-1105-100), the Water Resources Council's Principals and Guidelines, and SMART Planning guidance.
Economics	The Economics reviewer should be a senior economist with experience in flood damage analysis using G2CRM; recreation analysis; use of RECONS model to address regional economic development associated with a project; discussion of other social effects (OSE) associated with coastal flood risk, and well as OSE benefits from reduction in coastal flood risk; economic justification of projects in accordance with current USACE policy for coastal storm damages.

Environmental Resources	The Environmental Resources reviewer should have experience in the integration of environmental evaluation and compliance requirements pursuant to the “Procedures for Implementing the National Environmental Policy Act (NEPA)” (ER 200-2-2), national environmental statutes, applicable executive orders, and other Federal planning requirements, into the planning of Civil Works projects. Experience with ESA, fishery resources, mitigation, and coastal habitat is required.
Coastal Engineering	Team member will be a subject matter expert in the field of coastal engineering and coastal geomorphology and have a thorough understanding of both the nature of coastal storm risk in this area and coastal structures such as seawalls. They should also have experience in coastal modeling, sea level change analysis, and expertise in USACE vertical datums compliance.
Civil Engineering	The reviewer should be a structural engineer with experience in sea walls, revetments, groins, and other coastal structures.
Geotechnical Engineering.	The reviewer should have experience in seismic hazard analysis and seismic considerations in construction of coastal risk management infrastructure. This skillset could also be included in the Civil Engineering expertise above.

Documentation of Type I IEPR. The Outside Eligible Organization (OEO), will submit a final Review Report no later than 60 days after the end of the draft report public comment period. USACE shall consider all recommendations in the Review Report and prepare a written response for all recommendations. The final decision document will summarize the Review Report and USACE response and will be posted on the internet.

4.3.2 Type II IEPR.

The second kind of IEPR is Type II IEPR. These Safety Assurance Reviews are managed by the RMC and are conducted on design and construction for hurricane, storm, and flood-risk-management projects or other projects where existing and potential hazards pose a significant threat to human life. A Type II IEPR Panel will be convened to review the design and construction activities before construction begins, and until construction activities are completed, and periodically thereafter on a regular schedule.

Decision on Type II IEPR. Type II IEPR is not needed during the study; a decision will be made at a later date on if it is needed during design or construction.

4.4 MODEL CERTIFICATION OR APPROVAL

EC 1105-2-412 mandates the use of certified or approved models for all planning activities to ensure the models are technically and theoretically sound, compliant with USACE policy, computationally accurate, and based on reasonable assumptions. Planning models are any models and analytical tools used to define water resources management problems and

opportunities, to formulate potential alternatives to address the problems and take advantage of the opportunities, to evaluate potential effects of alternatives and to support decision-making. The use of a certified/approved planning model does not constitute technical review of a planning product. The selection and application of the model and the input and output data are the responsibility of the users and are subject to DQC, ATR, and IEPR.

Table 6 lists the proposed planning models for the study. G2CRM uses economic and coastal hydraulic inputs to produce USACE policy-compliant economic and other social effects (loss of life) outputs. G2CRM certification is forthcoming from the Coastal Storm Risk Management Planning Center of Expertise; the study has received approval for one-time use of the model. G2CRM will not capture the economic losses from transportation delays and disruption; for this analysis, the PDT is working with the Vertical Team to develop appropriate spreadsheet models. The PDT may use RECONS to provide estimates of regional economic impacts; this model was recertified in September 2019. The PDT consulted with the office of Climate Preparedness and Resilience Community of Practice, in June of 2020 and proceeded with a targeted ATR on the economics and coastal engineering analysis to define a policy-compliant path forward. This additional analysis was needed to inform the Future Without Project conditions (FWOP) and subsequently to determine a Federal Interest.

Table 6: Planning Models

Model Name and Version	Model Description and How It Will Be Used in the Study	Cert/Approval
G2CRM	Model generates a wide variety of outputs useful for estimating damages and costs, characterizing risk, and reporting detailed model behavior in the without-project condition and under various plan alternatives representing the with-project condition.	Approved for one time use, but not yet certified.
TBD (Spreadsheet)	Spreadsheet models will be used to support analysis of losses associated with transportation costs and delays. Will work with ATR/Vertical team to develop an approved model/approach.	TBD-currently working with vertical team
RECONS	Regional Economic System (RECONS) is a USACE-certified regional economic modeling tool. It is designed to provide estimates of regional economic impacts and contributions associated with Corps projects, programs, and infrastructure. Regional economic impacts and contributions are measured as economic output, jobs, income, and value added.	Model was recertified in September 2019.

EC 1105-2-412 does not cover engineering models used in planning. The responsible use of well-known and proven USACE developed and commercial engineering software will continue. The professional practice of documenting the application of the software and modeling results will be followed. The USACE Scientific and Engineering Technology Initiative has identified many engineering models as preferred or acceptable for use in

studies. These models should be used when appropriate. The selection and application of the model and the input and output data is still the responsibility of the users and is subject to DQC, ATR, and IEPR.

4.5 POLICY AND LEGAL REVIEW

Policy and legal compliance reviews for draft and final planning decision documents are delegated to the MSC at this time (see Director's Policy Memorandum 2018-05, paragraph 9). The project is undergoing a 3 x 3 x 3 exemption request; if granted, the policy and legal compliance review will be managed by HQUSACE.

4.5.1 Policy Review

The policy review team is identified through the collaboration of the MSC Chief of Planning and Policy and the HQUSACE Chief of the Office of Water Project Review. The team is identified in Attachment 1 of this Review Plan. The makeup of the Policy Review team will be drawn from Headquarters (HQUSACE), the MSC, the Planning Centers of Expertise, and other review resources as needed.

- The Policy Review Team will be invited to participate in key meetings during the development of decision documents as well as SMART Planning Milestone meetings. These engagements may include In-Progress Reviews, Issue Resolution Conferences or other vertical team meetings plus the milestone events.
- The input from the Policy Review team should be documented in a Memorandum for the Record (MFR) produced for each engagement with the team. The MFR should be distributed to all meeting participants.
- In addition, teams may choose to capture some of the policy review input in a risk register, if appropriate. These items should be highlighted at future meetings until the issues are resolved. Any key decisions on how to address risk or other considerations should be documented in an MFR.

4.5.2 Legal Review

Representatives from the Office of Counsel will be assigned to participate in reviews. Members may participate from the District, MSC, and HQUSACE. The MSC Chief of Planning and Policy will coordinate membership and participation with the office chiefs.

- In some cases, legal review input may be captured in the MFR for the particular meeting or milestone. In other cases, a separate legal memorandum may be used to document the input from the Office of Counsel.

- Each participating Office of Counsel will determine how to document legal review input.

4.6 PUBLIC REVIEW

This section describes how and when there will be opportunities for the public to review and comment on the decision document (the Draft Integrated Report, and when significant and relevant public comments will be provided to the reviewers before they conduct their review.

Preliminary public scoping for the study is scheduled to occur in Summer of 2020, with a series of scoping meetings to provide information on the study to the public. Comments and recommendations from the public will be sought in writing and will be considered as part of plan formulation and selection of the tentatively selected plan.

The Draft Integrated Report will be released to provide the public an opportunity to comment on the draft environmental analysis and tentatively selected plan. Currently, public review is tentatively scheduled to occur beginning in January 2022. Following the public review period, the PDT will review and respond to the public comments, and incorporate any changes, as appropriate, for incorporation into the Final Integrated Report

5 OPTIONAL - FUTURE REVIEWS

6 ATTACHMENT 1: TEAM ROSTERS

PROJECT DELIVERY TEAM

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TBD	Environmental Resources	
TBD	Cultural Resources	
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TBD	Civil Engineer	
TBD	Cost Engineer	
TBD	Real Estate	
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Type I IEPR Placeholder

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TBD	Economics	
TBD	Environmental Resources	
TBD	Coastal Engineering	
TBD	Geotechnical Engineering	
TBD	Civil Engineering	

Type II IEPR (Safety Assurance Review) Placeholder

NAME	DISCIPLINE	EMAIL
TBD	IEPR Lead	
TBD	Planning	
TBD	Economics	
TBD	Environmental Resources	
TBD	Coastal Engineering	
TBD	Geotechnical Engineering	
TBD	Civil Engineering	