



DEPARTMENT OF THE ARMY
PACIFIC OCEAN DIVISION, U.S. ARMY CORPS OF ENGINEERS
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CEPOD-PDC (1105)

27 January 2021

MEMORANDUM FOR Commander, Honolulu Engineer District (CEPOH-PPC/Benjamin Reder), Building 230, Fort Shafter, HI 95858-5440

SUBJECT: Approval of the Review Plan for the Tafuna Flood Risk Management Feasibility Study

1. References:

- a. Engineering Circular 1165-2-217, Review Policy for Civil Works, 20 Feb 18.
 - b. HQUSACE, CECW-CE memorandum, (Interim Guidance on Streamlining Independent External Peer Review (IEPR) for Improved Civil Works Product Delivery), 5 Apr 19.
 - c. Review Plan for the Tafuna Flood Risk Management Feasibility Study, Alaska District, U.S. Army Corps of Engineers, Nov 20. (Encl)
2. In accordance with References 1.a. and 1.b., this memorandum constitutes approval of the Review Plan for the Tafuna Flood Risk Management Feasibility Study, Honolulu District, U.S. Army Corps of Engineers, which does not include a Type I Independent External Peer Review.
3. The approved Review Plan is subject to change as circumstances require, consistent with project development under the Project Management Business Process. Subsequent significant revisions to this Review Plan or its execution require my written approval.
4. POC is Mr. Russell Iwamura, Team Leader for Planning and Policy, Civil Works Integration Division, at 808-835-4625 or email Russell.K.Iwamura@usace.army.mil.

Encl

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REVIEW PLAN

November 2020

Project Name: Tafuna Flood Risk Management Study, American Samoa

P2 Number: 487233

Decision Document Type: Feasibility Report & Environmental Assessment

Project Type: Single-Purpose Flood Risk Management

District: Honolulu District (POH)

District Contact: Project Manager/Lead Planner, (808) 835-4203

Major Subordinate Command (MSC): Pacific Ocean Division (POD)

MSC Contact: Planning Chief, (808) 835-4625

Review Management Organization (RMO): Flood Risk Management Planning Center of Expertise (FRM-PCX)

RMO Contact: NWD/POD Regional Manager, (206) 764-5522

Key Review Plan Dates

Date of RMO Endorsement of Review Plan: 24 Aug 20

Date of MSC Approval of Review Plan: 27 Jan 20

Date of IEPR Exclusion Approval: N/A

Has the Review Plan changed since PCX Endorsement? N/A

Date of Last Review Plan Revision: None

Date of Review Plan Web Posting: Pending

Date of Congressional Notifications: Pending

Milestone Schedule

	<u>Scheduled</u>	<u>Actual</u>	<u>Complete</u>
<u>FCSA Execution:</u>	May 20	29 May 20	Yes
<u>Alternatives Milestone:</u>	Aug 20	26 August 20	Yes
<u>Tentatively Selected Plan:</u>	Aug 21	(enter date)	No
<u>Release Draft Report to Public:</u>	Oct 21	(enter date)	No
<u>Agency Decision Milestone:</u>	Feb 22	(enter date)	No

<u>Final Report Transmittal:</u>	Dec 22	(enter date)	No
<u>Briefing of HQUSACE PL Chief:</u>	Feb 23	(enter date)	No
<u>Chief's Report:</u>	May 23	(enter date)	No

Project Fact Sheet
September 2020

Project Name: Tafuna Flood Risk Management Study, American Samoa.

Location: Tafuna, Tutuila, American Samoa.

Authority: Section 444 of the Water Resources Development Act of 1996 (Public Law 104-303) (as amended by Section 207 of the Water Resources Development Act of 1999 (Public Law 106-53)) and Additional Supplemental Appropriations for Disaster Relief Act of 2019 (Public Law 116-20).

Sponsor: American Samoa Government.

Type of Study: Flood Risk Management Feasibility Study.

SMART Planning Status: This study is anticipated to be 3x3x3 compliant.

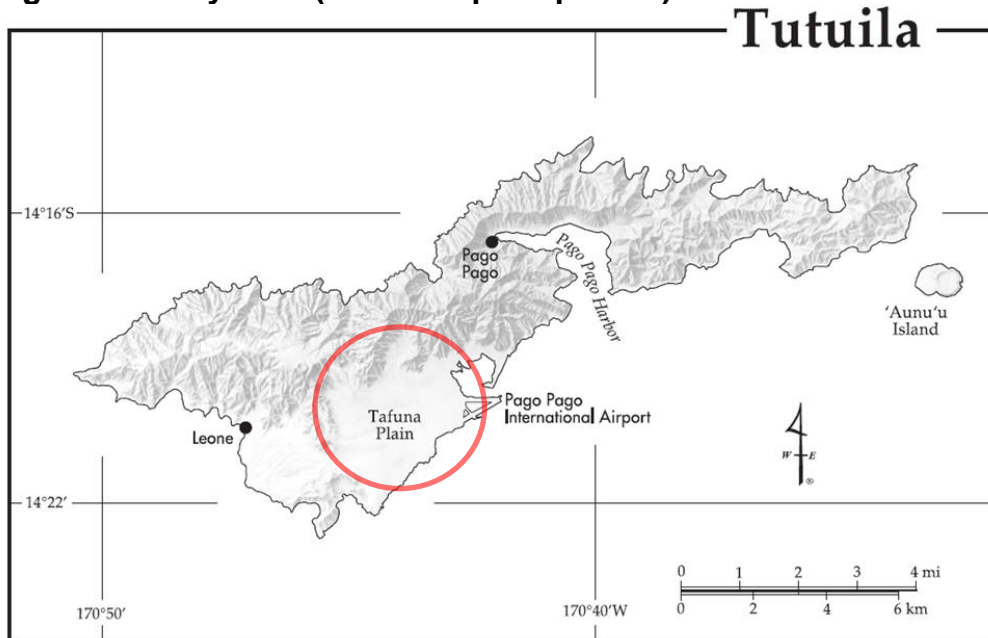
Project Area: American Samoa is an unincorporated territory of the United States located in the mid-South Pacific Ocean, a part of the Samoan Islands archipelago in Polynesia (see Figure 1). American Samoa consists of five main islands (Tutuila, Aunu'u, Ofu, Olosega, and Tau) and two coral atolls (Swains Island and Rose Atoll). Tutuila is the largest and most populous island, with a 58 square mile land area and approximately 56,000 residents, respectively.

Figure 1. Study Area.



The study area (red circle in Figure 1 and Figure 2) is located on the main island of Tutuila on the Tafuna plain. The drainages of the Tafuna plain are mostly contained within Tualauta County, the largest and also the most populated county in American Samoa. These drainages include those which drain from higher elevations areas into the Leaveave Stream system, as well as other minor basins on the Tafuna Plain. The central portion of the Tafuna Plain, located within its lower alluvial portion, is an area of focus for many government agencies due to the increasing rate of development in the area and the potential for aggravated flood problems.

Figure 2. Study Area (elevation perspective)

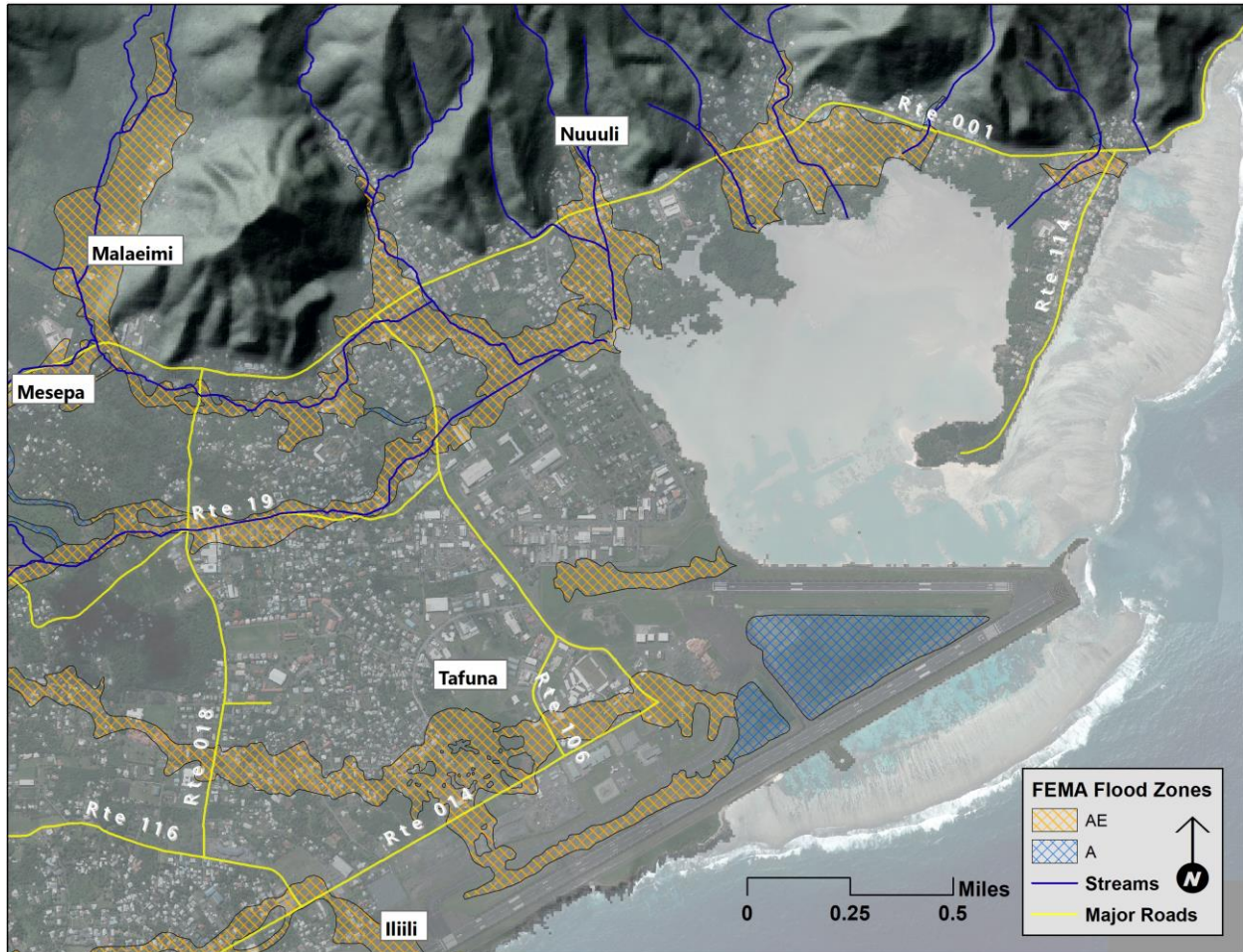


Problem Statement: Intense rainfall and the lack of well-defined stream channels contribute to the flooding experienced in the Tafuna study area. A greater potential for flooding exists in the village areas where the streams are incapable of supporting small flood events such as a 10% annual exceedance probability (10-year) flow. Flooding is intensified due to small channel sizes obstructed by thick vegetation, flat areas, constrictions from bridges and culverts, and encroaching development onto the flood plain areas.

Federal Interest: The Tafuna study area is a relatively heavily populated area of the island. In addition, property within the Tafuna floodplain, which include residential and non-residential structures (e.g., commercial and government buildings), streets and other types of essential facilities (e.g., wells), may be susceptible to frequent flooding. Potential costs for flood risk management solutions range from \$8-15 million (2020 price level, discussions with American Samoa Government). The geographic scope of the study will be limited to areas where flow velocities are greater than 800 cfs at the 10% Annual Exceedance Probability (AEP) per ER-1165-2-21.

It is also relevant to note, per Engineer Regulation (ER) 1165-2-21, exceptions to the 800 cfs limit can be made where the 1% AEP discharge exceeds 1800 cfs and the reason why 10% AEP discharge is less than 800 cfs is attributable to a hydrologic disparity. An exception of this nature will require HQUSACE approval. At this point in the project, the geographic scope is a conservative estimate of areas that meet the 800 cfs requirement, and will be further refined with updated Hydrologic and Hydraulic (H&H) models.

Figure 3. Tafuna Plain Flood Zones, Roads and Streams



The feasibility study will identify flood hazards and potential flood risk management measures for critical areas within the Tafuna plain area. The study will formulate potential alternative plans that provide flood risk management benefits and document the results in a decision document which will serve as the basis for project construction authorization. The alternative plans will be evaluated for engineering adequacy, economic feasibility, environmental acceptability, and project non-federal sponsor support. An analysis of the alternative plans that address flood risk management needs will be conducted to identify the National Economic Development (NED) Plan, which is the plan that maximizes net benefits (benefits of the project minus the costs of the project).

Risk Identification: In accordance with Engineering and Construction Bulletin (ECB) 2019-15 and Planning Bulletin (PB) 2019-04, life safety must be assessed during the study. Based on early iterations of the planning process, potential risks to life safety have not been identified, and no deaths associated with flooding problems within the Tafuna floodplain have been recorded. Completion of updated H&H modeling will help confirm whether life safety issues exist, and confirm the Federal Interest in flood risk management alternatives in the study area. Updated H&H modeling and associated economic analysis will evaluate factors that influence life loss including the depth and velocity of flooding, infrastructure performance, socio-economic characteristics of the population, warning systems, evacuation plans, emergency response, and other preparedness measures. Some of this information is available from past reports but will be verified and updated during the planning process.

Real estate valuation and potential non-federal sponsor Land, Easement, Right-of-way, Relocation, and Disposal (LERRD) actions are potential project challenges due to American Samoa's land tenure structure. As an unincorporated territory of the United States, American Samoa supports a mixture of communal, freehold, and individual land ownership. Under the communal land system, the descendant group ('âiga) are the "owners" of the land. Rights to land use come with membership in the descendant group. Membership in the kin group is dependent on two factors: genealogy and service. A matai, the elected head of the descendant group, administers the land and ensures it is used in the best interests of the 'âiga. In comparison, freehold land was granted by the International Claims Commission in Apia before the United States took possession of Samoa (located to the east of American Samoa). Freehold land may be freely sold or transferred. Approximately fourteen percent of land in American Samoa was awarded to foreigners as freehold land. Roughly 1,794 acres are now individually owned, which represents nearly one-quarter of land registered in American Samoa. Individually held land is concentrated in the Tafuna Plain, one of the territory's few regions of level terrain.

Environmental coordination and compliance activities will be managed by early coordination and communication with resource agencies. Environmental compliance risks are expected to decrease as alternatives are refined and footprints are confirmed.

In addition, there is a high study risk associated with the availability and cost of materials given the remote location of the study area. This risk will not impact technical evaluation for the study, but will likely result in a higher cost estimate and associated contingency and logistical challenges.

1. FACTORS AFFECTING THE LEVELS OF REVIEW

Scope of Review.

- Will the study likely be challenging? No. The study consists of evaluation of a range of flood risk management alternatives commonly implemented in the region. Accordingly, the study does not have any significant technical, institutional, or social challenges. The Corps has conducted technical evaluations in American Samoa for several decades and has experience implementing alternatives in the region under different Civil Works mechanisms or authorities. Social challenges are primarily related to the logistical challenges of conducting a study in a remote region, but the PDT has established strong working relationships with the sponsor, agencies, and stakeholders.

Although the study area is relatively small, there are multiple sources of flooding. The PDT will need to evaluate the potential comingling of floodplains from different sources of flooding. If there are multiple sources of flooding affecting the same area, then this could introduce additional analytical challenges. One challenge could be ensuring that economic damages/benefits are estimated accurately and not over/understated and also ensuring that risk (probability and consequence) is properly characterized, both under without- and with-project conditions.

- Provide a preliminary assessment of where the project risks are likely to occur and assess the magnitude of those risks. In general, project risks are expected to be low and will be further evaluated upon review of updated 2D H&H modeling. If updated H&H modeling indicates a significant flooding problem does exist, there are a number of smaller-scale, standard flood risk management alternatives including levees, floodwalls, concrete channel lining, placement of riprap, and vegetation management that could be evaluated for implementation. These traditional flood risk management measures would not pose significant challenges during technical evaluation or decision making. As described above, life safety risk will also be assessed during the study in accordance with ECB 2019-15 and PB 2019-04.

Real estate risks will be dependent on the alternative selected and the amount of flexibility of the location of the alternative selected. However, the real estate-related risk is high and will require extensive coordination and mitigation with local constituents if the study evaluates a flood risk reduction alternative or measure with a footprint that extends beyond publicly-owned land or right-of-way. The project team will coordinate with local partners in assessing the acceptability of a particular feature or alternative if private or communal lands may be impacted.

Environmental coordination and compliance activities will be managed by early coordination and communication with resource agencies. Environmental compliance risks are expected to decrease as alternatives are refined and footprints are confirmed. In addition, there is a high study risk associated with the availability and cost of locally-sourced materials given the remote location of the study area. This risk will not impact

technical evaluation for the study but will likely result in a higher cost estimate and associated contingency.

- Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues? Based on a qualitative review of existing information, life safety risk appears to be low. However, review of updated H&H modeling will help confirm whether life safety issues exist, and whether the project is likely to be justified by life safety. Finally, the study may introduce incremental risk with the implementation of new levees. If alternatives introduce incremental risk, the study team will address the Tolerable Risk Guidelines per ECB 2019-15 and PB 2019-04.

- Has the Governor of an affected state requested a peer review by independent experts? No. The Governor of American Samoa has not requested a peer review by independent experts.

- Will the project likely involve significant public dispute as to the project's size, nature, or effects? No. Based on prior public involvement activities, there is significant interest in constructing flood risk management features in the Tafuna plain area. The only potential area of controversy could be linked to the real estate issue.

- Is the project/study likely to involve significant public dispute as to the economic or environmental cost or benefit of the project? No. In general, the public is supportive of the project and there is not significant public dispute as to the economic or environmental cost or benefit of the project.

- 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? No. Project design will be based on similar flood risk management projects in the region.

- Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule? No. Project alternatives include standard flood risk management features implemented across the region. The project design is not anticipated to require redundancy, resiliency, or robustness, unique construction sequencing, or an overlapping design/construction schedule.

- Is the estimated total cost of the project greater than \$200 million? No. Alternatives being evaluated for the projects are small-scale and are expected to cost well under \$200 million. The project area is relatively small (3 sq. miles in area) and alternative footprints are anticipated to be somewhat confined. Implementation of typical structural flood risk management features will likely result in plan costs greater than \$10 million.

- Will an Environmental Impact Statement be prepared as part of the study? No.

It is currently anticipated that an Environmental Impact Statement (EIS) will not be required, and an Environmental Assessment (EA) with a Finding of No Significant Impact (FONSI) will be produced. The proposed federal action is not considered to be one that will significantly affect the quality of the human environment. Because the study area is mostly developed and contains no critical habitat, the likelihood that sensitive fish and wildlife species/habitat will be adversely impacted is low. In addition, alternatives are likely to be smaller in scale and footprint, and may consider non-structural measures, further reducing the likelihood of significant adverse impacts. The incorporation of best management practices (BMPs) when developing alternatives, where appropriate, will further reduce the the likelihood that significant adverse impacts will result from the proposed federal action. However, if potentially significant impacts are identified during the preparation of the EA, an EIS will be prepared as part of the study.

- Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources? No. The project is not expected to have more than negligible adverse impacts to tribal, cultural, or historic resources. A Programmatic Agreement will be developed in coordination with the American Samoa Historic Preservation Office, which will establish the process for consultation, review, and compliance with Section 106 of the National Historic Preservation Act (NHPA).

- 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. The project is not expected to have substantial adverse impacts on fish and wildlife species. As described above, the study area is mostly developed and alternatives are likely to be smaller in scale and footprint, reducing the likelihood of significant adverse impacts on fish and wildlife species.

- 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. Most locations within the study area are developed and there is no federally designated critical habitat within the immediate vicinity of the proposed project area (FWS 01EPIF00-2020-SL-0253); therefore, the project is not expected to have more than a negligible adverse impact on endangered or threatened species. Based on review of existing information, the Nu'uuli Pala Lagoon Special Management Area (SMA), the largest remaining mangrove wetland on Tutuila, receives surface runoff from a large portion of the Tafuna Plain, including the village of Nu'uuli, parts of Tafuna, Faleniu, Malaeimi, and Mesepa, among other areas. The lagoon may provide habitat for the federally listed green sea turtle (laumei ena'ena) and hawksbill sea turtle (laumei uga). However, as as described above, alternatives are likely to be smaller in scale and footprint, reducing the likelihood of significant adverse impacts on these species or the lagoon itself. Although the need for comprehensive biological field surveys is not anticipated. Based upon information available at this time, we anticipate informal consultation with NMFS under ESA Section 7 may be needed, but formal consultation under ESA Section 7 is not expected. Compliance with the Endangered Species Act

(ESA) and the Marine Mammal Protection Act (MMPA) will be ensured and completed during the feasibility phase.

2. REVIEW EXECUTION PLAN

This section describes each level of review to be conducted. Based upon the factors discussed in Section 1, this study will undergo the following types of reviews:

District Quality Control (DQC). 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). 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 POD. 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 (IEPR). 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. Engineer Circular (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 POD Commander. These reviews are not further detailed in this section of the Review Plan.

Table 1 provides the schedules and costs for reviews. 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.

Table 1: Levels of Review

Product(s) to undergo Review	Review Level	Start Date	End Date	Cost	Complete
Technical Approach (Critical Assumptions, Methods and Models for H&H, Economics) ¹	District Quality Control	November 2020	January 2021	\$5,000	Yes
	Agency Technical Review (Targeted)			\$8,000	
Future Without-Project Condition: H&H and Economics ²	District Quality Control	February 2021	February 2021	\$10,000	No
Future Without-Project Condition: H&H and Economics ³	Agency Technical Review (Targeted)	February 2021	March 2021	\$10,000	No

¹ Targeted ATR of the technical approach to the modeling effort to confirm scope, and study, methods, and model assumptions for future without project and future with project conditions are appropriate. This would be completed shortly after the Alternatives Milestone Meeting and prior to the targeted DQC and ATR of H&H and Economic future without-project conditions. DQC may be completed concurrent with this ATR effort. ATR disciplines include H&H and Economics.

² Targeted DQC of H&H and Economic future without project conditions would be completed prior to targeted ATR effort. Targeted DQC focuses on a review of economic inputs (H&H, structure inventory, etc.) to HEC-FDA, a review of the HEC-FDA models, and a review of the results (expected annual damages and project performance) coming out of the HEC-FDA models. DQC disciplines include H&H and Economics.

³ Targeted ATR focuses on a review of H&H methods, models, and outputs, prior to or concurrent with review of economic inputs (H&H, structure inventory, etc.) to HEC-FDA, the HEC-FDA model, and future without project condition results (expected annual damages and project performance). ATR disciplines include hydrology and hydraulics, climate change, and economics. Other disciplines may include planning and/or geotechnical, if needed.

Product(s) to undergo Review	Review Level	Start Date	End Date	Cost	Complete
Draft Feasibility Report and EA	District Quality Control	Sept 21	Sept 21	\$40,000	No
Draft Feasibility Report and EA	Agency Technical Review	Oct 21	Dec 21	\$50,000	No
Draft Feasibility Report and EA	Policy and Legal Review	Oct 21	Dec 21	n/a	No
Final Feasibility Report and EA	District Quality Control	Sep 22	Oct 22	\$35,000	No
Final Feasibility Report and EA	Agency Technical Review	Oct 22	Nov 22	\$40,000	No
Final Feasibility Report and EA	Policy and Legal Review	Dec 22	Feb 23	n/a	No

a. DISTRICT QUALITY CONTROL

The home district shall manage DQC and will appoint a DQC Lead to manage the local review (see EC 1165-2-217, section 8.a.1). The DQC Lead should prepare a DQC Plan and provide it to the RMO and POD prior to starting DQC reviews. Table 2 identifies the required expertise for the DQC team.

Table 2: Required DQC Expertise

DQC Team Disciplines	Expertise Required
DQC Lead	A senior professional with extensive experience preparing Civil Works decision documents and conducting DQC. The lead may also serve as a reviewer for a specific discipline (such as planning, economics, environmental resources, etc).
Planning	A senior water resources planner with experience in formulation, evaluation, and selection of alternatives for flood risk management studies.
Economics	The Economics reviewer should have experience in evaluating flood risk management projects including economic analyses required to support alternatives evaluation and plan selection. Knowledge of HEC-FDA model also required.
Environmental and Cultural Resources	The Environmental and Cultural Resources reviewer should have knowledge of Pacific Island biology, archaeology, and experience on coastal projects. Knowledge of Federal regulations, National Environmental Policy Act (NEPA), and NHPA/Sec. 106 is also required.
Hydrologic and Hydraulic Engineering	The reviewer should be a senior hydrologic/hydraulic engineer with analysis and review experience of hydrologic/hydraulic models (e.g. HEC-HMS, and HEC-RAS 1D/2D) and its application in tropical environments. The reviewer should have knowledge and familiarity of appropriate hydrologic/hydraulic model parameters used to estimate flood frequency, flow and stages.
Cost Engineering	The Cost Engineering reviewer should have experience using Micro-Computer Aided Cost Estimating System (MCASES) and experience developing cost estimates for coastal storm risk management projects.
Civil Engineering	The Civil Engineering reviewer should have experience designing flood risk management projects including typical structural and non-structural features, and have knowledge of feasibility study requirements for flood risk management engineering.
Geotechnical Engineering	The Geotechnical Engineering reviewer should have experience designing flood risk management projects including typical structural and non-structural features. The reviewer should also have experience with risk assessments including the estimation and portrayal of risk.

Real Estate	The Real Estate reviewer should have experience developing Real Estate Plans supported by appropriate analyses for flood risk management projects, in addition to familiarity with non-standard estates that may be needed due to the communal land ownership.
Office of Counsel	An OC reviewer will conduct a legal sufficiency review.

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 POD, the 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).

b. AGENCY TECHNICAL REVIEW

The ATR will assess whether the analyses are technically correct and comply with guidance, and that documents 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 3 identifies the disciplines and required expertise for this ATR Team.

Table 3: Required ATR Team Expertise

ATR Team Disciplines	Expertise Required
ATR Lead	A senior professional with extensive experience preparing Civil Works decision documents and conducting ATR. The lead should have the skills to manage a virtual team through an ATR. The lead may serve as a reviewer for a specific discipline (such as planning).
Planning	A senior water resources planner with experience in formulation, evaluation, and selection of alternatives for flood risk management studies.
Economics	The Economics reviewer(s) must be certified for review of flood risk management projects and have experience in analyzing study areas subject to multiple sources of flooding. Two economics reviewers may be required, one for reviewing the analysis related to the National Economic Development (NED) account and another for reviewing the the life safety assessment (Other Social Effects account). Knowledge of HEC-FDA model also required.

Environmental Resources	<p>The Environmental Resources reviewer should have knowledge of Pacific Island biology and experience on coastal projects. Knowledge of Federal regulations and NEPA is also required.</p> <p>The Environmental Resources reviewer may be combined with the Cultural Resources reviewer.</p>
Cultural Resources	<p>The Cultural Resources Reviewer should be a senior archaeologist with experience on NHPA/Section 106 compliance for flood risk management studies.</p> <p>The Cultural Resources reviewer may be combined with the Environmental Resources reviewer.</p>
Hydrologic Engineering	<p>The Hydrologic Engineering reviewer should have experience designing flood risk management projects including typical structural and non-structural features, tropical storms, and knowledge of requirements for flood risk management engineering. Knowledge of HEC-RAS unsteady-state modeling, flood frequency analysis, and HEC-HMS hydrologic modeling is also required.</p> <p>The Hydrologic Engineering reviewer may be combined with the Hydraulic Engineering reviewer.</p>
Hydraulic Engineering	<p>The Hydraulic Engineering reviewer should have experience designing flood risk management projects including typical structural and non-structural features, and have knowledge of feasibility study requirements for flood risk management engineering. Knowledge of HEC-RAS unsteady-state and HEC-HMS hydrologic modeling is also required. They should also be experienced in interior drainage design, channel stability, bridge scour, managed overtopping, and analyzing study areas subject to multiple sources of flooding.</p> <p>The Hydrologic Engineering reviewer may be combined with the Hydraulic Engineering reviewer.</p>
Real Estate	<p>The Real Estate reviewer will have experience in development of SMART Planning Real Estate Plans and will have experience in verification of considerations of utility relocations, staging, and dredged material disposal along with non-standard estates associated with communal land ownership.</p>
Civil Engineering	<p>The Civil Engineering reviewer should have experience designing flood risk management projects including typical structural and non-structural features, and have knowledge of feasibility study requirements for flood risk management engineering.</p>
Geotechnical Engineering	<p>The Geotechnical Engineering reviewer should have experience designing flood risk management projects including typical structural and non-structural features. The reviewer should also have experience with risk assessments including the estimation and portrayal of risk.</p>

Flood Risk Analysis	<p>The flood risk analysis reviewer should be a subject matter expert in multi-discipline flood risk analysis to ensure consistent and appropriate identification, analysis, and written communication of risk and uncertainty per ER 1105-2-101 and life safety per PB 2019-04 and ECB 2019-15 if needed.</p> <p>The reviewer may be combined with the Economics, Geotechnical, and/or H&H disciplines if all qualifications are met.</p>
Climate Preparedness and Resilience CoP Reviewer	This reviewer should be certified by the Climate Preparedness and Resilience COP to address sea-level rise and climate resilience considerations. This review may also cover other disciplines.
Cost Engineering	The Cost Engineering reviewer will be identified by the Cost MCX and will have experience using MCACES and experience developing cost estimates for flood risk management projects.

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.

c. INDEPENDENT EXTERNAL PEER REVIEW

(i) Type I IEPR.

Decision on Type I IEPR. Based on a risk-informed decision process referencing CECW-CE Memorandum dated 05 April 2019 (Subject: Interim Guidance on Streamlining Independent External Peer Review for Improved Civil Works Project Delivery), the project does not meet any of the three mandatory triggers for Type I IEPR outlined in the CECW-CE Memorandum: the estimated project cost is well under \$200 million; the Governor of American Samoa has not requested peer review; and the Chief of Engineers has not determined the project is controversial due to significant public dispute over the size, nature, or effects of the project or environmental costs or benefits of the project. Given the considerations relating to the scope of review in paragraph 1 above, an IEPR would not add value to this study and is not required. For purposes of NEPA compliance, an Environmental Assessment has been prepared and a Finding of No Significant Impact (FONSI) is anticipated. If potentially significant impacts are identified in the future, an environmental impact statement will be prepared.

(ii) Type II IEPR.

The second kind of IEPR is Type II IEPR. These Safety Assurance Reviews are managed outside of the USACE 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. A decision regarding whether or not to conduct Type II IEPR will be made at a later date.

d. 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 is the responsibility of the users and is subject to DQC, ATR, and IEPR.

Table 4: Planning Models. The following models may be used to develop the decision document:

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Certification / Approval
HEC-FDA v1.4.2 (Flood Damage Analysis)	The Hydrologic Engineering Center’s Flood Damage Reduction Analysis (HEC-FDA) program provides the capability for integrated hydrologic engineering and economic analysis for formulating and evaluating FRM plans using risk-based analysis methods. The program will be used to evaluate and compare the future without-project and future with-project economic consequences in the study area.	Certified
HEC-LifeSim v1.0	HEC-LifeSim simulates the entire warning and evacuation process for estimating potential life loss resulting from a flood event. During an evacuation, individuals are interacting with the roads, other vehicles, and the incoming flood. Following the warning and evacuation process simulation, HEC-LifeSim calculates lethality for exposed individuals and direct flood damages. By tracking individuals and their movements, HEC-LifeSim helps to identify where people are most at risk of losing their lives, on	Certified

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Certification / Approval
	roads or in structures, and pinpoints the locations of greatest potential life loss risk.	
RECONS v2.0	The Civil Works Regional Economic System (RECONS) Program is a regional economic impact modeling tool that was developed to provide accurate and defensible estimates of regional economic impacts associated with USACE spending. It can be utilized to track progress and justify continued operation, maintenance and construction work performed by the Corps. If an Regional Economic Development assessment is required for this study, RECONS will be used.	Certified

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.

Table 5: Engineering Models. These models may be used to develop the decision document:

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Approval Status
Microcomputer Aided Cost Engineering System (MCACES) 2 nd Generation (MII)	The MCACES MII construction cost estimating software, developed by Building Systems Design, Inc., is a tool used by cost engineers to develop and prepare all USACE Civil Works cost estimates. Using the features in this system, cost estimates are prepared uniformly allowing cost engineering throughout USACE to function as one virtual cost engineering team.	Cost Engineering MCX Required Model / Enterprise Model
HEC-RAS 5.0.7 (River Analysis System)	The Hydrologic Engineering Center's River Analysis System (HEC-RAS) program provides the capability to perform one-dimensional steady and unsteady flow river hydraulics calculations. The program will be used for unsteady flow analysis to evaluate the future without- and with-project conditions in the study area.	HH&C CoP Preferred Model
HEC-HMS 4.3	Hydrologic model that simulates rainfall-runoff response of a watershed and computes streamflow hydrographs. Will be used to create hydrographs for use in the hydraulic model.	HH&C CoP Preferred Model

e. POLICY AND LEGAL REVIEW

Policy and legal compliance reviews for draft and final planning decision documents are delegated to the MSC (see Director's Policy Memorandum 2018-05, paragraph 9).

(i) 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.

(ii) 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.

