REVIEW PLAN

August 2021

Project Name: Ala Wai Canal General Reevaluation Report
P2 Number: 498213

Decision Document Type: General Reevaluation Report

Project Type: Flood Risk Management

District: Pittsburgh District
District Contact: Chief, Plan Formulation and Economics Section, [redacted]

Major Subordinate Command (MSC): Great Lakes and Ohio River Division
MSC Contact: District Support Program Manager, [redacted]

Review Management Organization (RMO): FRM-PCX
RMO Contact: Deputy Director, [redacted]

Key Review Plan Dates

Date of RMO Endorsement of Review Plan: Pending
Date of MSC Approval of Review Plan: Pending
Date of IEPR Exclusion Approval: Pending
Has the Review Plan changed since PCX Endorsement? No
Date of Last Review Plan Revision: N/A
Date of Review Plan Web Posting: N/A
Date of Congressional Notifications: N/A

Milestone Schedule

	Scheduled	Actual	Complete
Alternatives Milestone:	31-Aug-2021	31-Aug-2021	Yes
Tentatively Selected Plan:	1-Sep-2022		No
Agency Decision Milestone:	23-Jan-2023		No
Final Report Transmittal:	15-Mar-2023		No
Chief's Report:	29-Jun-2023		No

Project Fact Sheet
August 2021

Project Name: Ala Wai Canal General Reevaluation Report

Location: Honolulu, HI

Authority: Section 209 of the Flood Control Act of 1962 (Public Law 87-874) and Section 216 of the Flood Control Act of 1970, as amended.

Sponsor: City and County of Honolulu (CCH)

Type of Study: General Reevaluation Report

SMART Planning Status: This study is 3x3x3 compliant.

Project Area: The Ala Wai Watershed is located on the southeastern side of the island of O'ahu, Hawai'i. The watershed encompasses 19 square miles (12,064 acres) and extends from the ridge of the Ko'olau Mountains to the nearshore waters of Māmala Bay (Figure 1). It includes the Makiki, Mānoa, and Pālolo streams, which flow to the Ala Wai Canal, a 2 mile long, man-made waterway constructed during the 1920s to drain extensive coastal wetlands. The construction and subsequent draining allowed the development of the Waikīkī District.

Problem Statement: A high level of flood risk exists within the Ala Wai Watershed. Extensive urban development throughout the watershed, coupled with the basin's unique topography and hydrology (i.e., steep mountainous terrain and propensity for intense rainfall events within the headwaters) and aging and undersized infrastructure result in elevated flood risk for a large proportion of the population both along the Ala Wai Canal and within the Makiki, Mānoa, and Pālolo valleys. It is estimated that the Ala Wai Canal has the capacity to contain about a 20% annual exceedance probability (AEP) flood event.

Overtopping of the Canal has previously flooded Waikīkī multiple times, including November 1965 and December 1967 storms and during the passage of Hurricane Iniki in 1992. Upstream areas are also at risk of flooding, as demonstrated by several recent events, including the October 2004 storm that flooded the Mānoa Valley and the March 2006 storm that flooded Makiki. The October 2004 event was estimated to have a 4% AEP and caused more than $85M in damages.

Federal Interest: Justification for the Federal Investment in a project is based on the significance of the problem and the benefits of possible solutions. Flooding has occurred within the Ala Wai Watershed on multiple occasions, resulting in recorded property damages and health and safety risks.

The Ala Wai Watershed contains approximately 200,000 residents and is the most densely populated watershed in Hawai'i. The upper portion of the watershed is zoned as a Conservation District, which is intended to protect natural and cultural resources, including the island's aquifer. The middle and lower watershed is heavily urbanized, supporting a high density of single-family residences, condominia, hotels and businesses, as well as public and private schools, and the University of Hawai'i at Mānoa (UH), the largest university in the state. Within this urban footprint, the population density is one of the highest in the nation. In addition to the variety of residential, commercial, and institutional development, the watershed also includes the Waikīkī District, a prime tourist destination that attracts more than 79,000 visitors per day. Waikīkī is the most important economic driver for the state, accounting for approximately 7% of the gross state product and 7% of all civilian jobs in the state.

Funding for this project was included in the 2018 Bipartisan Budget Act. The FCSA was signed 30 June 2021.

Risk Identification: The major study risk on this project is development of alternatives that have broad community support. The divided nature of the problem with rainfall concentrated at the top of the basin and impacts clustered near the coast mean that community priorities may not be consistent across the study area. Identification of implementable alternatives that significantly reduce flood risk will require an integrated approach due to the lack of single feature measures applicable in the basin. Population density and high real estate values make any substantial land acquisition requirement difficult.

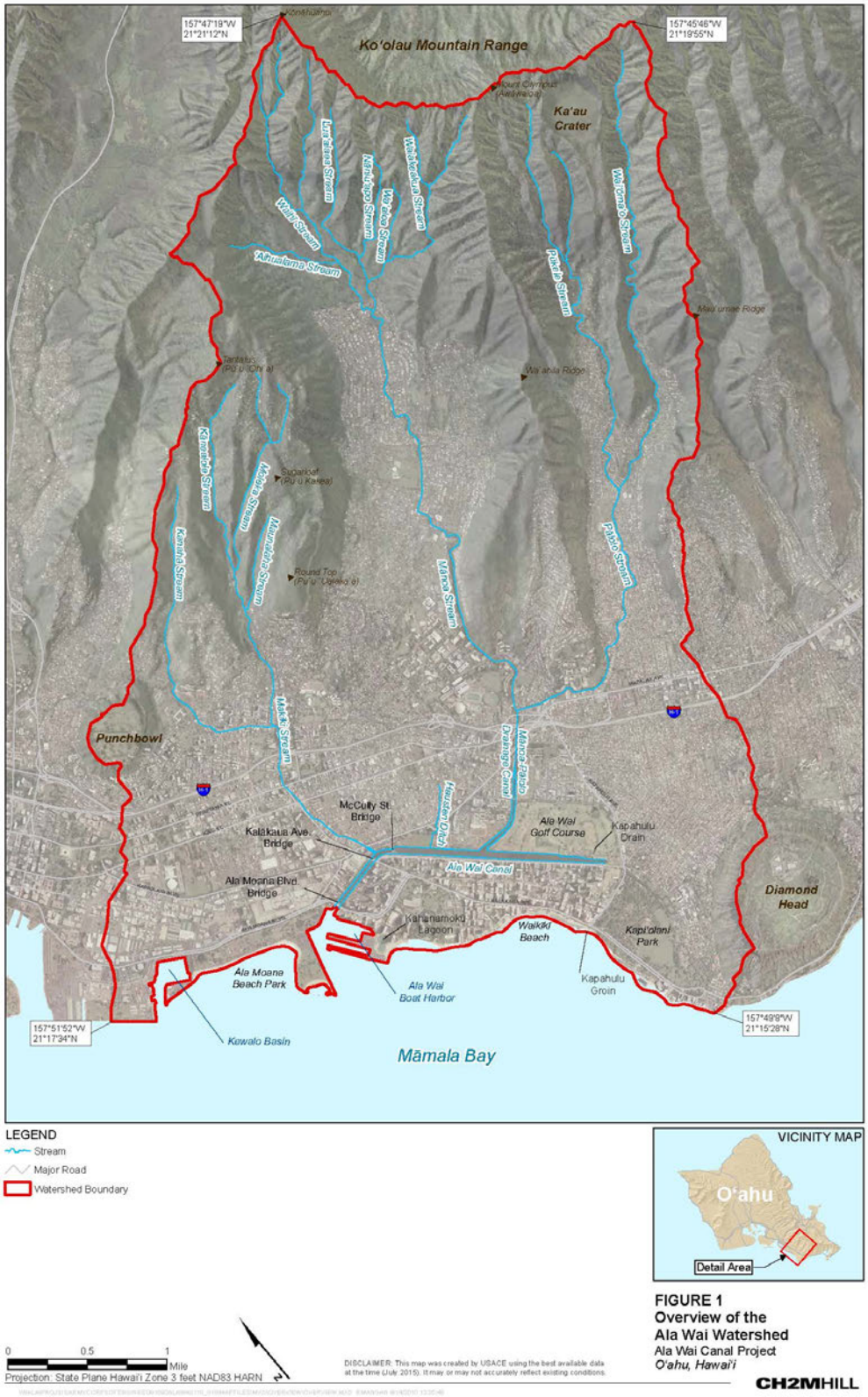

Fig. 1. Location of the Ala Wai Watershed, Hawai'i

1. FACTORS AFFECTING THE LEVELS OF REVIEW

Scope of Review.

- Will the study likely be challenging?

  From a technical standpoint, the PDT does not anticipate challenges outside the normal activities required for a flood risk management project. However, the study will be challenging due to the highly urbanized nature of the watershed. The watershed is relatively small, with approximately 8 miles of stream from headwater to ocean outlet. Very high annual precipitation amounts (ranging from 120-160 in.) and frequency of intense rainfall events in the upstream reaches lead to flash flooding in the lower reaches. Both water volumes and timings will need to be considered to determine the most effective management measures.

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

  The study area covers 19 sq. miles of highly urbanized residential, public, and commercial areas (see Figure 1). The upstream portions of the study area are extremely steep with an elevation loss of 2300 ft over 4 miles. The upper portion of the basin receives annual rainfall of 120-160 in. During the 1% AEP event combined flows from the three streams entering the Ala Wai Canal exceed 21,000 cfs.

  The flood characterization in the basin can be divided into three distinct areas: steep upstream areas in the Mānoa, Pālolo and Makīkī valleys with fast moving water (velocities capable of moving vehicles and large debris) and localized overland flooding; widespread shallow (average depths less than 3 feet) and low-velocity overland backwater flooding in the McCully-Moiliili neighborhood as the terrain flattens and downstream conveyance capacity is exceeded; and overtopping of the Ala Wai canal walls with low-velocity and relatively shallow (average depths less than 3 feet) flood waters impacting areas of Waikīkī and the southern portions of McCully-Moiliili.

  The study area is highly urbanized with limited greenspace in the lower drainage area (see Figure 1). The Ala Wai Basin is the primary economic driver for the state, Waikīkī. Damage areas in the basin are widespread in downstream areas with the 1% AEP event impacting approximately 11% of the total basin area. This level of event would impact an average of 79,000 residents and visitors in Waikīkī in addition to 54,000 residents across the rest of the basin. Modelling updated for the 2020 Validation Study indicates that a 1% AEP event would impact 3,200+ structures resulting in estimated damages of $720 million, excluding business income loss from impacts to tourism in Waikīkī.

  Real estate values are extremely high making alternatives that require substantial land acquisition challenging to justify or implement. Due to real estate constraints and the

volume of water within the basin, likely alternatives will include multiple features spread throughout the basin to achieve an acceptable level of cumulative protection.

- Is the project likely to be justified by life safety or is the study or project likely to involve significant life safety issues?

  The primary flood events in the basin have been due to large seasonal rainstorms which may not always be forecasted with much advance notice. In many instances these large storm events are highly localized, resulting in flooding in one basin and limited impacts in adjacent areas. Based on available data, the Ala Wai basin has not experienced or recorded a 1% AEP event. The Ala Wai Canal has the capacity to contain a 20% AEP event. Overtopping of the Canal has previously flooded Waikīkī multiple times, including November 1965 and December 1967 storms and during the passage of Hurricane Iniki in 1992.

  The basin has a population of 200,000 making it the most densely populated in the State of Hawai'i. The upper portion (approximately 40% of the watershed) is zoned as a Conservation District, intended to protect natural and cultural resources, including the island's aquifer. The remaining 11 sq miles of the middle and lower watershed is heavily urbanized, supporting a high density of single-family residences, condominium, hotels and businesses as well as public and private schools, including UH, the largest university in the state. Within the 11 sq miles of developed watershed the basin supports one of the highest population densities in the nation with 12.36 people per acre.

  Within the study area, rain typically falls in the mountainous areas of the upper watershed, often with little precipitation in the lower elevations. This phenomenon is caused by increased humidity as air cools while it moves up the face of the mountainside. Storms can be intense in volume (inches of rain per hour) but are typically limited in duration. The short length of the Ala Wai watershed means that timing of the peak flow from the mountains to the bay is approximately 30 minutes. Flash flooding during these events can result in conditions that implicate life safety considerations.

  There have been no recorded flooding-related fatalities in the basin, and inundation depths for most impacted areas are less than 3 feet. Upstream reaches of the watershed experience high velocity flows that have moved cars and pose considerable risk during the storm event. The McCully-Moiliili area, which experiences the most widespread flooding also sees some flowing water during peak flows followed by pooled water for a longer duration until the inlets and Ala Wai Canal can drain the interior areas. Outside of the McCully-Moiliili area, multiple transportation routes remain intact including multiple evacuation routes from Waikīkī. The localized nature of previous flood events on O'ahu indicate that evacuation is possible even with limited warning with most residents needing to move less than 1 mile to evacuate the floodplain. The limited duration of events also indicates that vertical evacuation in

the lower reaches would be possible to reduce life safety risks. The watershed currently includes a flood warning system with multiple real-time rain and stream gauges sponsored by the City and County of Honolulu, which assist in reducing life risk throughout the basin.

Previous USACE studies have considered detention basins and floodwalls as potentially viable measures to alleviate flood risk within the basin. However, these measures were not economically justified. The study will assess additional measures with fewer life safety implications, including channel diversions and modifications and pump stations, as well as the full suite of nonstructural measures. Therefore, there is no current indication that the recommended plan will include measures with significant life safety concerns. If it becomes likely that a measure with significant life safety concerns will be recommended, the need for additional levels of review will be revisited at that point.

The study will further evaluate the life safety risk associated with flood impacts and seek opportunities to mitigate. Life safety is a consideration for the basin; however, it is not anticipated at this time that life safety will be used to justify a recommended plan.

- Has the Governor of an affected state requested a peer review by independent experts?

  The Governor of Hawai'i has not requested a peer review by independent experts.

- Will it likely involve significant public dispute as to the project's size, nature, or effects?

  The PDT anticipates and is planning for significant public involvement and engagement throughout the study process. Previous study efforts have encountered substantial stakeholder engagement from groups representing a variety of interests. It is unlikely that any recommended federal action will be met with universal support across stakeholder groups; however, previous efforts have helped inform areas of controversy to be considered in the development and screening of alternatives. Although the PDT will be prepared for potentially negative feedback during the frequent public involvement activities, it does not anticipate significant public dispute over the project's size, nature, or effects.

- Is the project/study likely to involve significant public dispute as to the economic or environmental cost or benefit of the project?

  The PDT anticipates significant public involvement throughout the study process. Previous study efforts have encountered substantial stakeholder engagement from groups representing a variety of interests. The original feasibility study resulted in a federal recommendation and associated environmental impact statement, which was subsequently litigated by local environmental groups.

The original plan incorporated extensive structural measures that would have impacted environmental and cultural resources. In follow-on efforts, including engineering documentation and validation reports, revised modeling indicated that the structural measures serving as the basis of litigation would not have provided the originally estimated level of protection. As a result, it is unlikely that these measures will be part of a recommended plan under the current study effort.

It is unlikely that any recommended federal action will meet with universal support across stakeholder groups, previous efforts have helped inform areas of significant controversy to be considered in the development and screening of alternatives. The project will seek to minimize negative environmental impacts and is expected to protect important drivers of the local economy.

- 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?

  This study is not based on using novel methods, does not present complex challenges for interpretation, does not contain precedent-setting methods or models, and does not present conclusions that alter the originally authorized study.

- Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule?

  This will not require any unique redundancy, resiliency, robustness, or construction actions outside those normally necessary for flood risk management projects.

- Is the estimated total cost of the project greater than $200 million?

  The estimated project cost will likely be greater than $200 million. The original recommendation in the 2018 Ala Wai Chief's Report was authorized for $345 million. Cost drivers of the recommended plan may include high real estate values, high cost of materials and labor in Hawai'i and number of features under consideration. The project is unlikely to recommend a single, large structural component in excess of $200 million as a comprehensive plan.

- Will an Environmental Impact Statement be prepared as part of the study?

  At this time, we do not anticipate the need for an Environmental Impact Statement. The PDT is evaluating multiple NEPA compliance strategies, including supplementing the existing 2018 EIS and ROD.

- Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources?

There is an abundance of cultural resources within the watershed; however, the study will work to avoid impacts in the upper watershed focusing on measures that can be implemented in the developed, previously disturbed portions of the study area. No unique tribal, cultural, or historic resources are expected to be impacted as a result of the recommended Federal action.

- Is the project expected to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures?

  This project is not expected to have any adverse impacts on fish or wildlife species or their habitat whether or not they are listed as endangered or threatened under the Endangered Species Act of 1973.

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. All decision documents (including data, analyses, environmental compliance documents, etc.) undergo DQC. This internal review process covers basic science and engineering work products. It fulfils 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.

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 team. 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.

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 1 provides the schedules and costs for reviews. Given the compressed schedule between the Agency Decision Milestone and submittal of the final report, the report

provided for concurrent review following the tentatively selected plan milestone will essentially be a final product and should be reviewed as such. A targeted DQC and ATR of critical products, including the hydrologic/hydraulic and economic models will be conducted prior to the TSP milestone. The timing and extent of these reviews will be determined once the study team has a chance to characterize the status of the current products and remaining analytical requirements. Targeted DQC and ATR will ensure that any technical flaws are discovered early in the study process and will be conducted as early as possible following completion of the technical products.

Table 1 includes a tentative IEPR of the draft report. An IEPR exclusion has been requested; however, the decision to exclude IEPR will be revisited, particularly if it is determined that the recommendation will be controversial, or if the measures included in the recommended plan warrant IEPR due to life safety concerns or requirement of an EIS. A final decision will be made regarding whether an IEPR is warranted by the end of May 2022. This will ensure that ample time is provided to award a contract prior to the start of review.

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
Draft Feasibility Report and EA	District Quality Control	9/15/22	9/29/22	$15,000	No
Draft Feasibility Report and EA	Agency Technical Review	10/31/22	12/12/22	$60,000	No
Draft Feasibility Report and EA	Policy and Legal Review	10/31/22	12/12/22	n/a	No
Draft Feasibility Report and EA	TENTATIVE Interagency External Peer Review	10/31/22	12/12/22	$100,000	No
Final Feasibility Report and EA	District Quality Control	1/25/23	2/7/23	$10,000	No
Final Feasibility Report and EA	Agency Technical Review	2/8/23	2/28/23	$30,000	No
Final Feasibility Report and EA	Legal Sufficiency Review	3/1/23	3/14/23	n/a	No
Final Feasibility Report and EA	Policy and Legal Review	4/3/23	5/1/23	n/a	No

Note: Review timeframes include the time for review and PDT response.

a. DISTRICT QUALITY CONTROL

The home district shall manage DQC and will appoint a DQC Lead to manage the local review (see ER 1165-2-217). The DQC Lead should prepare a DQC Plan and provide it to the RMO and MSC 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 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.).
Plan Formulation	A senior water resources planner with experience in flood risk management planning. Experience integrating uncertainties in analyses (H&H, geotechnical, cost engineering, and economics) into plan comparison and selection is required.
Economics	A senior economist with thorough knowledge of the various economic analyses utilized in feasibility study (life safety, transportation, flood damage). Has capability and experience to estimate and communicate likely variance in the outcomes of models, analyses, and designs. Is familiar with HEC-FDA. Based on the initial array of alternatives, familiarity with LifeSim may be needed should certain alternatives move forward for consideration.
Environmental & Cultural Resources	A senior environmental specialist with experience in Cultural Resources, the National Environmental Policy Act and all applicable laws and Executive Orders.
Hydrologic & Hydraulic Engineering	A senior engineer with experience in the field of hydraulics and hydrology. They should have a thorough understanding of the application of structural and non-structural flood risk management solutions, and computer modeling techniques. Has capability and experience to estimate and communicate likely variance in the outcomes of models, analyses, and designs. Is familiar with climate preparedness and resiliency policy and requirements for feasibility reports.
Structural Engineering	A senior engineer with knowledge of stability analyses and design of structural flood risk reduction and protection solutions.
Geotechnical Engineering	A senior geotechnical engineer with a thorough knowledge and experience in geotechnical considerations related to flood risk management projects (e.g., slope stability). Has capability and experience to estimate and communicate

	likely variance in the outcomes of models, analyses, and designs.
Cost Engineering	A senior engineer and expert in the field of cost engineering. They must have a thorough knowledge of and experience in costing structural and non-structural flood risk management solutions. Has capability and experience to estimate and communicate likely variance in the outcomes of models, analyses, and designs.
Civil Design/ Engineering	A senior engineer and expert in the field of civil engineering. They must have a thorough knowledge of and experience with civil design products (e.g., site selection, project development, real estate, and relocations) related to flood risk reduction and protection solutions.
Real Estate	A senior real estate specialist with experience preparing Real Estate Plans and in acquisition of LERRD's. The realty specialist(s) should have experience in residential and utility/facility relocation (Public Law 91-646).

Documentation of DQC. Quality Control should be performed continuously throughout the study. A specific certification of DQC completion is required. Documentation of DQC should follow the District Quality Manual and the MSC Quality Management Plan. An example DQC Certification statement is provided in ER 1165-2-217.

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 ER 1165-2-217).

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 ER 1165-2-217). Table 3 identifies the disciplines and required expertise for this ATR Team. The ATR team will be assigned once the review plan has been approved by the MSC and endorsed by the RMO.

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.
Plan Formulation	The plan formulation lead will have experience preparing and reviewing Civil Works decision documents, developing

	plan formulation strategies and integrating technical analyses into the SMART planning framework.
Economics	The economist will be a senior economist and have a thorough knowledge of the various economic analyses utilized in a flood risk management feasibility study (life safety, transportation, flood damage). Has capability and experience to estimate and communicate likely variance in the outcomes of models, analyses, and designs. Is familiar with HEC-FDA. Based on the initial array of alternatives, familiarity with LifeSim may be needed should certain alternatives move forward for consideration. The PDT will communicate that need with the ATR lead prior to the TSP milestone to ensure the identified reviewer has that capacity.
Environmental & Cultural Resources	A senior environmental specialist with experience in Cultural Resources, the National Environmental Policy Act and all applicable laws and Executive Orders.
Hydrologic & Hydraulic Engineering	A senior engineer with expertise in the field of hydraulics and hydrology. They should have a thorough understanding of the application of structural and non-structural flood risk management solutions, and computer modeling techniques. Has capability and experience to estimate and communicate likely variance in the outcomes of models, analyses, and designs.
Structural Engineering	A senior engineer and expert in the field of structural engineering. They must have a thorough knowledge of stability analyses and design of structural flood risk reduction and protection solutions.
Civil Design/Engineering	A senior engineer and expert in the field of civil engineering. They must have a thorough knowledge of and experience with civil design products (e.g., site selection, project development, real estate, and relocations) related to flood risk reduction and protection solutions.
Geotechnical Engineering	A senior geotechnical engineer with a thorough knowledge and experience in geotechnical considerations related to flood risk management projects (e.g., slope stability). Has capability and experience to estimate and communicate likely variance in the outcomes of models, analyses, and designs.
Cost Engineering	Cost MCX staff or Cost MCX Pre-Certified Professional as assigned by the Walla Walla Cost Engineering Mandatory Center of Expertise with experience in preparing cost estimates. Has capability and experience to estimate and communicate likely variance in the outcomes of models, analyses, and designs.

Real Estate	A senior real estate specialist with preparation of Real Estate Plans and experience in acquisition of LERRD's. The realty specialist(s) should have experience in residential and utility/facility relocation (Public Law 91-646).
Climate Preparedness and Resilience CoP Reviewer	A member of the Climate Preparedness and Resiliency Community of Practice (CoP) with experience in climate change impacts to inland flood risk management projects.
Flood Risk Analysis Reviewer	Subject matter expert in multi-discipline flood risk analysis to ensure consistent and appropriate identification, analysis, and written communication of risk and uncertainty.

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 ER 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 ER 1165-2-217) 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 (see ER 1165-2-217 for example ATR Completion/Certification Sheet).

c. INDEPENDENT EXTERNAL PEER REVIEW

(i) 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. An exclusion is being requested to not conduct a Type I IEPR. There are three mandatory triggers which, if any are met, require an IEPR. These triggers include: 1- the determination that the project/study is controversial; 2- a request by the Governor for an IEPR; and 3- project costs greater than $200M. None of these mandatory triggers is currently met as described below:

- The project is not considered to be controversial. This project is not anticipated to have negative economic, environmental, or social effects to the nation. For these reasons the project should not be considered controversial. There is a high level of public engagement in this and previous USACE efforts within the watershed. A communications plan and robust public involvement strategy are being developed with the local sponsor to maximize community input, set expectations, and promote public support for the recommended plan.

- There has been no request to conduct an IEPR by the Governor of Hawai'i.
- The estimated total cost of the project will likely exceed $200M. It is unlikely that the team will recommend a single, large structural solution to the flood risk problems within the basin. It is more likely that a recommended action will be composed of multiple smaller elements that provide cumulative benefits to the basin.

I addition to not currently meeting any of the 3 mandatory triggers, the following specific conditions justify the request for an IEPR exclusion:

- At this time, the project is not anticipated to require an environmental impact statemen (EIS).
- No significant adverse impacts to cultural or historic resources or to any fish or wildlife species or their habitats, whether or not they are listed as endangered or threatened under the Endangered Species Act of 1973, are anticipated.

In addition to meeting the mandatory conditions for IEPR exclusions, the following points of justification support the risk-informed decision to request an IEPR exclusion:

- This study is not based on novel methods, does not present complex challenges for interpretation, does not contain precedent-setting methods or models, and does not present conclusions that alter the originally authorized study. The challenge associated with this study will be identifying the highest risk areas where a justifiable federal action exists, not in the application of complex solutions.

- The PDT does not believe the level of life safety risk warrants independent external peer review at this time. While the nature of the flooding can be rapid, the inundation depths in the developed portions of the basin are generally relatively shallow (I.e., less than three feet). The existing flood warning system within the watershed further reduces life safety risk by providing additional time to prepare and/or evacuate. Consequently, there have been no known deaths within the watershed due to flooding. The nature of flooding along with existing flood warning systems make justification of projects based solely on life safety considerations highly unlikely. Furthermore, there is no current indication that the recommended plan will include measures with significant life safety concerns.

- The flood risk management measures under consideration prior to the Alternatives Milestone are relatively routine, within the core competencies of the agency, and have minimal life safety risk. Previous USACE studies within this watershed have considered large-scale detention basins and floodwalls as potentially viable measures to alleviate flood risk within the basin. However, these measures were not economically justified. The study will assess additional measures with fewer life safety implications, including channel diversions and modifications and pump stations, as well as the full suite of nonstructural measures. Therefore, the risk of loss of life related to initially identified management measures is low. As such, the outcomes of this study would not significantly benefit from an independent external peer review.

As previously mentioned, the decision to exclude IEPR will be revisited throughout the study process, particularly if it is determined that the recommendation will be controversial, or if the measures included in the recommended plan warrant IEPR due to life safety concerns or requirement of an EIS.

(i) Type II IEPR Safety Assurance Review (SAR).

The second kind of IEPR is a Safety Assurance Review or SAR. 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 SAR 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 SAR. Because design is initiated in the decision document phase, the SAR for decision documents is incorporated into the Type I IEPR. For the reasons discussed in Scope of Review and in the Decision on Type I IEPR, significant life safety concerns that warrant a SAR are not anticipated, and it is not anticipated that a Type II IEPR will be needed during the Preconstruction Engineering and Design phase. This decision was confirmed by the LRN Chief of Engineering and Construction and is presented in Attachment 2. This decision may be revisited following selection of the TSP.

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 5: 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 1.4.2	The program integrates hydrologic engineering and economic analysis to formulate and evaluate plans using risk-based analysis methods. It will be used to	Certified

	evaluate/compare plans to aid in selecting a recommended plan.	
HEC-LifeSim 2.0	The program is designed to simulate the entire warning and evacuation process for estimating potential life loss estimates resulting from catastrophic floods. It will be used to estimate life loss at different flow rates and incorporating surge flow.	Certification is anticipated in FY21 or early FY22.
RECONS 2.0	RECONS is a regional economic impact modeling tools that estimates jobs, income, sales, and value added associated with Federal spending and associated changes in economic activities. The model will be used to estimate the regional economic effects of project implementation.	Certified
SOVI-X	This software performs a social vulnerability analysis, which provides a comparative metric that quantifies an areas relative social vulnerability to hazard exposure.	Approved

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 6: 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**
HEC-RAS v.5.0.7 (River Analysis System)	The software performs 1-D steady and unsteady flow river hydraulics calculations and has capability for 2-D (and combined 1-D/2-D) unsteady flow calculations. It will be used for unsteady flow analysis to evaluate the future without-project and future with-project conditions.	HH&C CoP Preferred Model
HEC-HMS v.4.3 (Hydrologic Modeling System)	This software is designed to simulate the complete hydrologic processes of a dendritic watershed system. It will be used to develop inflow frequency and inflow hydrographs for a 1-D/2-D unsteady state calculation. It could also be used to develop better	HH&C CoP Preferred Model

	estimates of various storm events (e.g., 50- and 100-year storms).	
HEC-WAT 1.0 (Watershed Analysis Tool)	The HEC-WAT framework is based on the Flood Risk Analysis compute option, which supports the analysis of complex riverine systems while implementing flood risk and uncertainty and systems analysis requirements. The HEC-WAT software also allows a user to perform plan comparisons or system performance analyses while incorporating risk analysis methods.	HH&C CoP Preferred Model
HEC-SSP (Statistical Software Package)	This software allows users to perform statistical analyses of hydrologic data. The current version of HEC-SSP can perform flood flow frequency analysis based on Bulletin 17B and Bulletin 17C.	HH&C CoP Preferred Model

e. POLICY AND LEGAL REVIEW

Policy and legal compliance reviews for 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.

ATTACHMENT 1: TEAM ROSTERS

PROJECT DELIVERY TEAM			
Name	Office	Position	Phone Number
[redacted]	[redacted]	[redacted]	[redacted]

DISTRICT QUALITY CONTROL TEAM			
[redacted]	[redacted]	[redacted]	[redacted]

Note: Given the regional nature of the PDT, DQC team members will also likely be regional. The study management team will work with the PDT, district leadership, and the MSC, as needed, to identify appropriate DQC reviewers.

AGENCY TECHNICAL REVIEW TEAM

Name	Office	Position	Phone Number
[redacted]	[redacted]	[redacted]	[redacted]

Note: The RMO is working to identify specific ATR team members. The review plan will be updated with the names and contact information for the ATR review team once they are identified. Multiple areas of expertise will be represented by individual reviewers to the extent possible. Despite the decreased number of reviewers on the ATR team, all 11 areas of expertise will be represented.

VERTICAL TEAM			
Name	Office	Position	Phone Number
[redacted]	[redacted]	[redacted]	[redacted]

POLICY REVIEW TEAM			
Name	Office	Position	Phone Number
[redacted]	[redacted]	[redacted]	[redacted]

ATTACHMENT 2: SAR Decision

From: [redacted]
To: [redacted]
Cc: [redacted]
Subject: Ala Wai GRR SAR Waiver
Date: Tuesday, August 3, 2021 5:06:43 PM

[redacted],

The USACE Great Lakes and Ohio River Division is executing the Ala Wai General Reevaluation Report (GRR) study for Honolulu District. I am writing this email to document my decision that a Safety Assurance Review (SAR) be waived for the study.

A SAR is normally conducted on design and construction activities for any project where potential hazards pose a significant threat to human life and public safety. The Ala Wai GRR does not currently meet criteria requiring this type of review due to the preliminary and conceptual nature of measures under consideration. Furthermore, there is no current indication that a SAR will be necessary during the pre-construction engineering and design (PED) phase. Previous USACE studies have determined that measures with potentially significant life safety concerns (i.e., detention basins and floodwalls) will likely not be economically justified. Consequently, it is likely that measures without significant life safety implications will be included in a recommended plan.

Upon completion of the GRR study, and transition to the PED phase, I will reevaluate the need for a SAR based on an assessment of the recommended plan.

Please let me know if you have any questions or need further clarification.

Thank you,

[redacted]