REVIEW PLAN

Pawcatuck River, Rhode Island
Coastal Storm Risk Management Feasibility Report

New England District

MSC Approval Date: *14 August 2014*
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US Army Corps
of Engineers ®

REVIEW PLAN

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TABLE OF CONTENTS

1. PURPOSE AND REQUIREMENTS

a. Purpose. This Review Plan defines the scope and level of peer review for the Pawcatuck River, Rhode Island Coastal Storm Risk Management (CSRM) Feasibility Report.

b. References.

(1) Engineering Circular (EC) 1165-2-214, Civil Works Review, 15 Dec 12
(2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 11
(3) Engineering Regulation (ER) 1110-1-12, Quality Management, 30 Sep 06
(4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 07
(5) Project Management Plan for the Pawcatuck River, Rhode Island Flood Risk Management Feasibility Study and National Environmental Policy Act (NEPA) Compliance Report
(6) New England District Quality Management Plan(s)

c. Requirements. This review plan was developed in accordance with EC 1165-2-214, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R). The EC outlines four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. In addition to these levels of review, decision documents are subject to cost engineering review and certification (per EC 1165-2-214) and planning model certification/approval (per EC 1105-2-412).

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for decision documents is typically either a Planning Center of Expertise (PCX) or the Risk Management Center (RMC), depending on the primary purpose of the decision document. The RMO for the peer review effort described in this Review Plan is the Hurricane and Storm Risk Management Planning Center of Expertise.

The RMO will coordinate with the Civil Works Cost Engineering and Agency Technical Review Mandatory Center of Expertise (MCX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies. The District will coordinate with the Ecosystem Restoration Center of Expertise should a worthy ecosystem restoration be identified during the study.

3. STUDY INFORMATION

a. Decision Document. This study is authorized in a resolution approved by the Committee on Public Works of the United States Senate, dated September 12, 1969 (also known as the Southeastern New England (SENE) resolution). This resolution by the Committee on Public Works of the United States Senate gives the Army Corps of Engineers the authority to investigate solutions for "flood control, navigation, and related purposes in Southeastern New England …" Authorization and funding is also provided under investigations heading, Chapter 4, Title X, Division A of the Disaster Relief Appropriations Act of 2013, Public Law 113-2 (127 Stat. 23) enacted January 29, 2013

(hereinafter "DRAA 13"). The Secretary of the Army is authorized, at full Federal expense using funds provided in DRAA 13, to complete ongoing flood and storm damage reduction studies in areas that were impacted by Hurricane Sandy in the North Atlantic Division of the United States Army Corps of Engineers, which includes the Pawcatuck River CSRM Feasibility Study. The District will prepare the Pawcatuck River CSRM Feasibility Study and NEPA Compliance decision document for review by the North Atlantic Division (NAD) and approval at Corps Headquarters in Washington by the Chief of Engineers for transmittal to Congress. It is expected that the Environmental Assessment (EA) will result in the signing of a Finding of No Significant Impact (FONSI) at the District level.

b. Study/Project Description. In 2013 the USACE New England District conducted a focus area analysis or "reconnaissance-like" investigation as part of the North Atlantic Coastal Comprehensive Study under the authority of P.L. 113-2. That investigation concluded that there is a Federal interest in continuing with a feasibility study. The study area is located entirely in Washington County, Rhode Island (Figure 1) and includes portions of the towns of Westerly, Charlestown, South Kingstown and Narragansett. The coastal area is about 24 miles in length.

The arrival of Hurricane Sandy on October 29, 2012 was preceded by Coastal Flood Warnings and mandatory evacuations for coastal towns, low lying areas and mobile homes. The storm surge destroyed houses and businesses, damaged pilings and deck supports, blew out walls on lower levels, and moved significant amounts of sand and debris into homes, businesses, streets, and adjacent coastal ponds. Propane gas tanks were dislodged from houses, septic systems were damaged and underground septic tanks were exposed, creating potential hazardous material exposure. The National Guard was called out to restrict entry to the community of Misquamicut (located in the town of Westerly) due to the devastation. More than $39.4 million in support from four federal disaster relief programs was used to assist Rhode Island recover from Hurricane Sandy's effects.

The feasibility study will evaluate alternatives and recommend a plan to reduce the economic and life risk for areas affected by coastal storm damage in the Pawcatuck River watershed. Alternatives considered will include no action, and structural and non-structural measures. The planning objectives for the feasibility study are to

- Developing projects that are resilient in light of future climate change and sea level rise.

- Protecting and restoring natural ecosystems and the environment while encouraging sustainable economic development;

- Avoiding adverse impacts to natural ecosystems wherever possible and fully mitigating any unavoidable impacts; and

- Avoiding the inappropriate use of flood plains, flood-prone areas and other ecologically valuable areas.

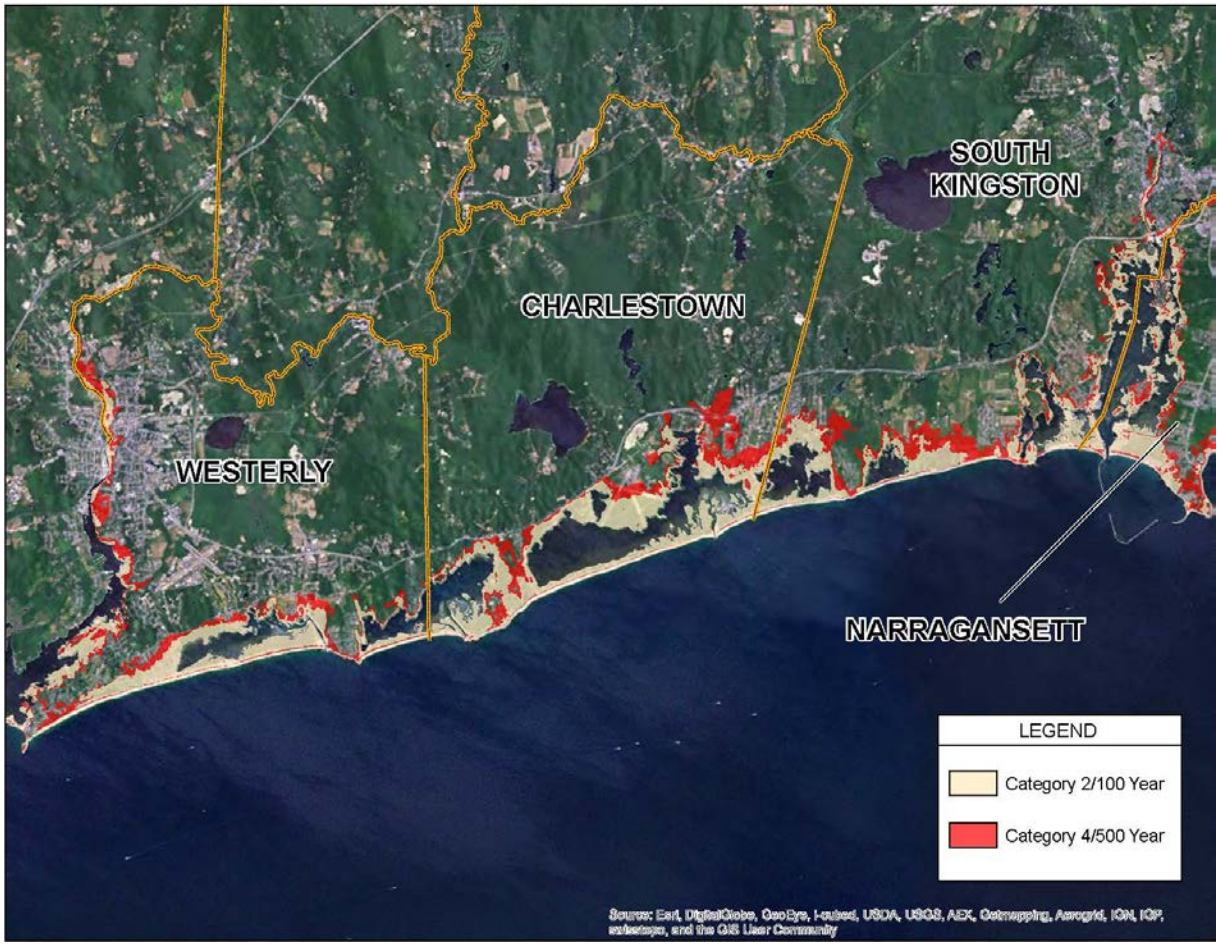

Figure 1. Pawcatuck River Coastal Watershed with Hurricane Storm Surge Mapping Overlain

c. Factors Affecting the Scope and Level of Review.
The complexity, challenges, and risks associated with the Pawcatuck River CSRM Feasibility Study will depend on the size of the affected area eligible for Federal participation and the probable alternatives formulated. We anticipate that an IEPR of our Decision Document is necessary at this point in the project. The Project Delivery Team (PDT) and Vertical Team (VT) will evaluate risks associated with each alternative throughout the project. The PDT and VT will make a decision on whether an IEPR is required during the Alternatives Milestone and again during Tentatively Selected Plan Milestones. We assume a Type I IEPR is required at this stage and is included in the project schedule and budget.

Challenges associated with this CSRM study include defining the scope and extent of the study. The coastline is 24 miles long and storm damage impacts are broad, but impacts severe enough to warrant Federal participation may be limited. The PDT will need to accurately define the study area and appropriate alternatives for Federal participation. An accurate assessment of the economics of potential damages will be challenging. There are many secondary impacts when infrastructure is impacted due to a storm event and can be difficult to quantify. There is also the potential for various stakeholders (e.g. fishing and recreational interests, environmental resource agencies, etc..) to oppose structural measures if recommended including the use of offshore sand sources.

The project will not be justified by life safety. The project is also unlikely to involve significant threat to human life, but our study will evaluate this risk throughout the process. The National Oceanic and Atmospheric Administration's (NOAA) National Weather Service (NWS) office in Taunton, Massachusetts provides daily coastal storm forecasts and warnings to local communities and businesses. Project stakeholders are aware of the NWS systems and use warnings to prepare for an event. During an extreme coastal event it is anticipated that employees at businesses and residents evacuate quickly and safely to higher ground. Residents are less likely to evacuate, but flooding conditions are generally limited to the immediate coast line. Residents experience a temporary inconvenience of restricted road travel and power outages.

Hurricane Sandy made landfall on the evening of the October 29, 2012 as a "post-tropical cyclone" near Atlantic City, NJ with winds of 90 mph. Sandy caused extensive flooding, beach erosion and coastal damage along the shorelines from Delaware north to Rhode Island. The surge height from Sandy in southern New England increased from east to west, with the maximum surge occurring in western Long Island Sound. The maximum measured surge in southern New England occurred at the Bridgeport, CT NOAA station and was 9.63 feet with a return period of 275 years. The New London, CT NOAA tide station (closest to the study area) recorded a surge of 6.5 feet, and a surge return period of 64 years. For New London, the maximum water level return period (surge combined with tide) was 73 years with an elevation of 6.08 feet-NAVD88. Despite the severity of the storm no deaths were reported in the study area.

There has been no request from the Governor of Rhode Island for a study peer review by independent experts. Based on public outreach meetings conducted to date, the feasibility study is not likely to involve significant public dispute as to the size, nature, or effects of the project. CSRM alternatives will be developed in full consideration of the comments provided to the PDT from project stakeholders. The affected towns and the State of Rhode Island are represented on the PDT and local and State officials are very supportive of the study.

The information presented in the decision document will not be based on novel methods or involve the use of innovative materials or techniques. The overall study has limited risks and will most likely be a very traditional CSRM projects. The study is considering both structural and non-structural measures including relocation, beach fill projects, elevating structures or utilities, flood proofing, and small protective floodwalls or revetments. The PDT does not believe the study will present complex challenges for interpretation or require the need for precedent-setting methods or models. Only accepted planning and engineering models will be used for this study. Based on the traditional nature of this study, conclusions presented in the decision document are unlikely to change prevailing practices.

At this early stage, it is unknown to what degree the project design will require redundancy, resiliency, and/or robustness. However, these qualities will be built into the range of CSRM alternatives considered as part of the study.

The factors affecting the scope and level of review will be reassessed and the review plan will be updated at least three times; when the without-project conditions are identified; when the array of alternatives to be considered are identified; and when the preferred alternative is identified. These updates are especially important to validate the initial assessment that the project will not pose a significant threat to human life.

d. In-Kind Contributions. Products and analyses provided by non-Federal sponsors as in-kind services are subject to DQC, ATR, and IEPR. We do not anticipate the non-Federal sponsor providing any in-kind products or analyses at this time.

4. DISTRICT QUALITY CONTROL (DQC)

All decision documents (including supporting data, analyses, environmental compliance documents, etc.) shall undergo DQC. DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The home district shall manage DQC. Documentation of DQC activities is required and should be in accordance with the Quality Manual of the District and the home MSC.

a. Documentation of DQC. Documentation of the technical and policy review of a specific product will be sufficient to allow both planning management and QC reviewers to feel confident that a comprehensive review was conducted in accordance with principles and guidelines established. It is expected that all in-progress review actions, review team meetings, and other significant technical review related actions will be documented in the form of a written memorandum prepared by the review leader. This memorandum will be provided to the ATR team to inform them that the internal DQC review has been completed by the New England District. The decision document will follow standard New England District quality control procedures. The results of this review, including any significant concerns, will be provided to the ATR team for their consideration.

5. AGENCY TECHNICAL REVIEW (ATR)

ATR is mandatory for all decision documents (including supporting data, analyses, environmental compliance documents, etc.). The objective of ATR is to ensure consistency with established criteria, guidance, procedures, and policy. The ATR will assess whether the analyses presented are technically correct and comply with published USACE guidance, and that the document explains the analyses and results in a reasonably clear manner for the public and decision makers. ATR is managed within USACE by the designated RMO and is conducted by a qualified team from outside the home district that is not involved in the day-to-day production of the project/product. ATR teams will be comprised of senior USACE personnel and may be supplemented by outside experts as appropriate. The ATR team lead will be from outside the home MSC.

a. Products to Undergo ATR. Specific products to undergo ATR include the Draft and Final Report (including NEPA and supporting documentation). Documents prepared prior to the draft report will be made available to the ATR team upon request (e.g. Alternative Milestone and Tentatively Selected Plan Milestone documentation). Targeted ATR of key products that drive the alternative analyses/TSP decision is a fundamental component of SMART Planning. For a CSRM study, H&H and Economics are often critical.

b. Required ATR Team Expertise.

ATR Team Members/Disciplines	Expertise Required
ATR/ Planning Lead	The ATR lead should be a senior water resources planner with extensive experience in preparing CSRM Civil Works decision documents and conducting ATRs. The lead should also have the necessary skills and experience to lead a virtual team through the

	ATR process. The ATR lead may also serve as a reviewer for the plan formulation or other component of the study.
Economics	The team member for the economics portion of the ATR review will have knowledge of damage evaluation for CSRM studies, stage damage curve assessments, structure evaluation, stage damage curve assessments HEC's Expected Annual Flood Damage methodology, HEC-FDA and Beach-Fx.
Environmental Resources	The team member for the environmental section should be an expert in the NEPA process, reviewing EAs, Fish & Wildlife Impacts, Coastal Zone Management and the Section 7 of Endangered Species Act, Sections 401 and 404 of the Clean Water Act, the Clean Air Act, the U.S. Fish and Wildlife Coordination Act, and Section 106 of the National Historic Preservation Act. The reviewer should also be familiar with cultural resources.
Hydrology & Hydraulic Engineering	The H&H engineering reviewer will be an expert in the field of hydrology and hydraulics and have a thorough understanding of coastal processes, beach fill projects, coastal structures, non-structural solutions involving relocation and elevating structures, Beach-Fx modeling as well as other coastal models (e.g. CWS, ST-Wave, AD-CIRC, etc.)
Civil/Gen Engineering	The person performing the review for the civil engineering portions of this study should have a good understanding of typical USACE FRM structural project designs such as beach berms, revetments, floodwalls and integrated pump systems. The reviewer should also be familiar with dredging and the mechanical and electrical pump feasibility-level design fundamentals.
Geotechnical Engineer	The geotechnical reviewer should be a geotechnical engineer familiar with geologic principles, static and dynamic slope stability evaluation, evaluation of the seepage through earthen embankments and under seepage through the foundation of the structures, floodwalls, closure structures and other pertinent features, and in settlement evaluation of the structure. The reviewer should also have knowledge of boring logs, soil sampling techniques and testing methods for both geotechnical and environmental testing.
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.
Cost Engineering	The team member reviewing the cost engineering section of the report should have familiarity with cost estimates that have been developed in accordance with the guidance contained in ER 1110-2- 1302, Civil Works Cost Engineering using the MII (MCACES Second Generation) cost estimating system. Cost estimates will be prepared for all items that are required for project

	construction for both Federal and non-Federal costs, including mitigation, operation and maintenance. The Cost Engineering review will be coordinated with the Cost Engineering Center of expertise at the Walla Walla District.
Real Estate	The real estate reviewer should be an expert in coastal real estate acquisition, appraisals, temporary work area easements and real estate mapping.

c. Documentation of ATR. DrChecks review software will be used to document all ATR comments, responses and associated resolutions accomplished throughout the review process. Comments should be limited to those that are required to ensure adequacy of the product. The four key parts of a quality review comment will normally include:

(1) The review concern – identify the product's information deficiency or incorrect application of policy, guidance, or procedures;
(2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not be properly followed;
(3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan selection, recommended plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and
(4) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

In some situations, especially addressing incomplete or unclear information, comments may seek clarification in order to then assess whether further specific concerns may exist.

The ATR documentation in DrChecks will include the text of each ATR concern, the PDT response, a brief summary of the pertinent points in any discussion, including any VT coordination (includes the district, RMO, MSC, and HQUSACE), and the agreed upon resolution. If an ATR concern cannot be satisfactorily resolved between the ATR team and the PDT, it will be elevated to the vertical team for further resolution in accordance with the policy issue resolution process described in either ER 1110-1-12 or ER 1105-2-100, Appendix H, as appropriate. Unresolved concerns can be closed in DrChecks with a notation that the concern has been elevated to the vertical team for resolution.

At the conclusion of each ATR effort, the ATR team will prepare a Review Report summarizing the review. Review Reports will be considered an integral part of the ATR documentation and shall:

- Identify the document(s) reviewed and the purpose of the review;
- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions;
- Identify and summarize each unresolved issue (if any); and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

d. Certification of ATR. ATR is certified when all ATR concerns are either resolved or referred to the VT for resolution and the ATR documentation is complete. For draft and final products, the ATR Lead will prepare a Completion of ATR Statement documenting that the ATR has been completed and issues raised by the ATR team have been resolved (or elevated to the vertical team). Subsequently, the District will prepare (with ATR Lead assistance upon request) a Certification of ATR statement that certifies all concerns resulting from the ATR of the project have been fully resolved. Sample statement of Completion and Certification of Agency Technical Review are included in Attachment 2.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

IEPR may be required for decision documents under certain circumstances. IEPR is the most independent level of review, and is applied in cases that meet certain criteria where the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision, as described in EC 1165-2-214, is made to determine if IEPR is appropriate for this project and is described below. IEPR panels will consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. There are two types of IEPR:

(1) Type I IEPR. Type I IEPR reviews are managed outside the USACE and are conducted on project 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. Type I IEPR will cover the entire decision document or action and will address all underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-214.

(2) Type II IEPR. Type II IEPR, or Safety Assurance Review (SAR), are managed outside the USACE and are conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. Type II IEPR panels will conduct reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.

a. Decision on IEPR. This study does not trigger any of the other mandatory triggers for Type I IEPR including:

- Total Project Costs – the Focus Area analysis estimated the CSRM alternative for the Misquamicut Beach area to be $26 million, still below the $200 million threshold;
- The State Governor has not requested a review;

- The Chief of Engineers or the Director of Civil Works (DCW) have not determined that the project study is controversial in size, nature, effects, economics, environmental, costs or estimated benefits;
- The head of a Federal or state agency has not determined that the project is likely to have a significant adverse impact on environmental, cultural, or other resources after implementation of planned mitigation;
- The information reviewed and generated during the study is not based on novel methods, doesn't present complex challenges for interpretation, does not contain precedent-setting method or models and is not likely to present conclusions that are likely to change prevailing practices.

A project study may be excluded from Type I IEPR in cases where none of the above mandatory triggers are met and:

- The project does not include an EIS,
- The DCW or the Chief determines that the project is not controversial and has no more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources or substantial adverse impacts on fish and wildlife species and endangered or threatened species under the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.) or the critical habitat.

The study will result in an integrated feasibility report and Environmental Assessment (EA), and a Finding of No Significant Impact (FONSI). The study and its recommendations will have no adverse effects on the tribal, cultural or historic areas or any adverse effects on Endangered Species based information gathered during the feasibility study.

Based on the guidance published in EC 1165-2-214 and the fact that the types of projects that will be recommended (e.g. beach fills, small flood walls, and elevating homes) the District does not believe life safety is a significant issue and a Type 1 IEPR will be required. The District, working with the CSRM CX will develop an exclusion request.

b. Products to Undergo Type I IEPR. The Draft Integrated Coastal Storm Risk Management Feasibility and Environmental Assessment feasibility report, including supporting documentation will not undergo IEPR. All products will be reviewed by the PDT and undergo DQC and ATR. This includes products that are produced by the non-Federal sponsors as in-kind services, though the PDT does not anticipate the sponsor producing any in-kind services at this time.

c. Required Type I IEPR Panel Expertise. If at some point it was determined that IEPR was required, it will be conducted by a minimum of three IEPR team members. Disciplines that are anticipated to undergo IEPR are coastal hydraulics and engineering, geotechnical engineering, civil design, economics, and environmental impacts.

IEPR Panel Members/Disciplines	Expertise Required
Plan Formulation	The Plan Formulation reviewer should be a senior water resources planner with experience in CSRM and environmental mitigation methods.

Economics	The Economics reviewer will be responsible for reviewing the required economic analyses, project benefits, anticipated future costs, and residual damages for the project alternatives. The Economics reviewer should have extensive experience in economics analysis for CSRM feasibility studies and utilization of approved economic models (Beach-Fx, HEC-FDA and IWR-Plan).
Environmental/Biologist/NEPA	The Environmental reviewer will be responsible for assessing environmental impacts, and ensuring the proper NEPA and cultural resource compliance activities were completed. This includes verifying any NER calculations, mitigation plan review, and completion of the Fish and Wildlife Service Coordination Act requirements.
Coastal Hydraulics & Engineering	The coastal hydraulics and engineering reviewer will be an expert in the field of coastal processes and modeling and have a thorough understanding of computer modeling techniques that will be used such as Beach-Fx and HEC-FDA.
Geotechnical Engineering	The geotechnical reviewer will ensure that the project designs meet Corps standards, that the quantities estimated and assumptions are reasonable.

d. Documentation of Type I IEPR. The IEPR panel will be selected and managed by an Outside Eligible Organization (OEO) per EC 1165-2-214, Appendix D. Panel comments will be compiled by the OEO and should address the adequacy and acceptability of the economic, engineering, and environmental methods, models, and analyses used. IEPR comments should generally include the same four key parts as described for ATR comments described above. The OEO will prepare a final Review Report that will accompany the publication of the final decision document and shall:

- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions; and
- Include a verbatim copy of each reviewer's comments (either with or without specific attributions), or represent the views of the group as a whole, including any disparate and dissenting views.

The final Review Report will be submitted by the OEO no later than 60 days following the close of the public comment period for the draft decision document. USACE shall consider all recommendations contained in the Review Report and prepare a written response for all recommendations adopted or not adopted. The final decision document will summarize the Review Report and USACE response. The Review Report and USACE response will be made available to the public, including through electronic means on the internet.

Reviews of the interim products will be documented in interim Review Reports using the same format as presented above for the final Review Report. The interim Review Reports will be incorporated into the final Review Report.

e. Type II IEPR/Safety Assurance Review (SAR). The Pawcatuck River CSRM design and construction activities may be required to undergo Type II IEPR. EC 1165-2-214 requires that a Type IIEPR/SAR be performed on projects that involve a significant threat to human life and public safety. The PDT and VT will assess the need for a Type II will be determined at that stage of the process.

7. POLICY AND LEGAL COMPLIANCE REVIEW

All decision documents will be reviewed throughout the study process for their compliance with law and policy. Guidance for policy and legal compliance reviews is addressed in Appendix H, ER 1105-2-100. These reviews culminate in determinations that the recommendations in the reports 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. DQC and ATR augment and complement the policy review processes by addressing compliance with pertinent published Army policies, particularly policies on analytical methods and the presentation of findings in decision documents.

8. COST ENGINEERING AND ATR MANDATORY CENTER OF EXPERTISE (MCX) REVIEW AND CERTIFICATION

All decision documents shall be coordinated with the Cost Engineering and ATR MCX, located in the Walla Walla District. The MCX will assist in determining the expertise needed on the ATR team and Type I IEPR team (if required) and in the development of the review charge(s). The MCX will also provide the Cost Engineering certification. The RMO is responsible for coordination with the Cost Engineering MCX.

9. MODEL CERTIFICATION AND 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, for the purposes of the EC, are defined as any models and analytical tools that planners use 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 the planning product. 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 (if required).

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 and the professional practice of documenting the application of the software and modeling results will be followed. As part of the USACE Scientific and Engineering Technology (SET) Initiative, many engineering models have been identified as preferred or acceptable for use on Corps studies and these models should be used whenever 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 (if required).

a. Planning Models. HEC-FDA and BEACH-Fx are the only planning models identified at this point that may used on this study. HEC-FDA is used to perform an integrated hydrologic engineering and economic analysis during the formulation and evaluation of flood risk management plans. BEACH-Fx is a certified prototype shore protection engineering-economic software tool. The model consists

of a Monte-Carlo simulation that evaluates reach erosion, physical storm impacts, and damages that occur from a storm passing a shore. Both are USACE-approved planning models.

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Certification / Approval Status
HEC-FDA 1.4 (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 flood risk management plans using risk-based analysis methods. The program will be used to evaluate and compare the future without- and with-project plans along the Pawcatuck River to aid in the selection of a recommended plan to manage flood risk.	Certified
BEACH-Fx 1.1.6	The Corps Engineer Research and Development Center (ERDC), Coastal and Hydraulics Laboratory developed this life-cycle simulation model to strengthen the linkages between engineering analyses (project performance and evolution) and planning functions (alternative analysis and economic justification) with respect to coastal storm risk management projects. Beach-F*x* provides a comprehensive analytical framework for evaluating the physical performance and economic benefits and costs of shore protection projects, particularly beach nourishment along sandy shores.	Certified

b. Engineering Models. The following engineering models are anticipated to be used in the development of the decision document:

Model Name and Version	Brief Description of the Model and How It Will Be Applied in the Study	Approval Status
MII (Second Generation MCACES software)	The MII cost engineering program will be utilized to develop construction costs of study alternatives. MII provides an integrated cost estimating system (software and databases) that meets the U.S. Army Corps of Engineers (USACE) requirements for preparing cost estimates.	Approved
CEDEP (Corps of Engineers Dredge Estimating Program)	CEDEP will be used to estimate the cost of beach-fill alternatives that require off-shore sources of sand that will be excavated using dredging equipment.	Approved

10. REVIEW SCHEDULES AND COSTS

a. ATR Schedule and Cost. The individual cost estimates below are rough estimates for establishing an overall estimated ATR budget. The actual distribution of costs across disciplines will depend on the specific products produced and specific review issues that arise, and will be developed by the ATR Lead in collaboration with the PDT.

Draft Report ATR Schedule (estimated budget $60K):

1- Draft Report submitted to ATR team	April 19, 2016
2- Deadline for comments from ATR team into Dr. Checks	June 2, 2016
3- Deadline for comments to be evaluated by PDT members	June 17, 2016
4- Deadline for ATR back-checking	June 24, 2016

ATR Lead/Planning	$17,000
Hydrology and Hydraulics (and Risk)	$10,000
Civil	$4,000
Cost	$8,000
Environmental	$4,000
Economist	$4,000
Real Estate	$4,000
Geotechnical	$4,000
Review of Final Report (if significant changes occur after Draft)	$5,000
TOTAL	**$60,000**

b. Type I IEPR Schedule and Cost (PMP budget of $125k, if necessary).

1- Draft Report submitted to Peer Review team	April 19, 2016
2- Deadline for comments from Peer Review team into Dr. Checks	June 2, 2016
3- Deadline for comments to be evaluated by PDT members	June 17, 2016
4- Deadline for Peer Review back-checking	June 24, 2016

c. Model Certification/Approval Schedule and Cost. All of the models anticipated to be used for this feasibility study are already certified or approved for use.

11. PUBLIC PARTICIPATION

Public participation and comment will be received concurrently with the State and Agency review upon the issuance of the Public Notice signifying the release of the Draft Feasibility Report and Integrated Environmental Assessment (EA). Significant and relevant public comments will be provided to reviewers prior to the initiation of the review period. The final decision document and associated review reports will be made available to the public via the project's web page.

12. REVIEW PLAN APPROVAL AND UPDATES

The North Atlantic Division Commander is responsible for approving this Review Plan. The Commander's approval reflects VT input (involving district, MSC, RMO, and HQUSACE members) as to the appropriate scope and level of review for the decision document. Like the PMP, the Review Plan is a living document and may change as the study progresses. The home district is responsible for keeping the Review Plan up to date. Minor changes to the review plan since the last MSC Commander approval, if necessary, are documented in Attachment 3. Significant changes to the Review Plan (such as changes to the scope and/or level of review) should be re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, should be posted on the Home District's webpage. The latest Review Plan should also be provided to the RMO and home MSC.

13. REVIEW PLAN POINTS OF CONTACT

Public questions and/or comments on this review plan can be directed to the following points of contact:

- Home District; Project Manager, (978) 318-8520
- Major Subordinate Command; Chief of Planning, (347) 370-4570
- Planning Center of Expertise; CSRM-PCX Program Manager (347) 370-4570

ATTACHMENT 1: TEAM ROSTERS

Vertical Team POCs

	Title	Name	Phone
HQ	CECW-NAD-RIT Program Manager	Ray Wimbrough	202-761-4056
	Plan Formulation	Andrea Walker / Gary Hardesty	202-761-0316 / 202-203-9372
	Economics	Doug Gorecki	202-761-5450
	Environmental	Jeff Trulick / Jeanette Gallihugh	202-761-1380 / 202-761-0209
	Real Estate	Michael Haskins	202-761-0441
NAD			
	NAD Sandy Program Manager	Hibba Haber	347-370-4779
	District Support Team (DST)	Paul Sabalis	347-370-4589
	NAD MSC POC	Naomi Fraenkel	917-790-8615
PCX			
	CSRM Planning Center of Expertise POC	Joseph Vietri	347-370-4570
	CSRM PCX Regional Manager	Larry Cocchieri	347-370-4571

Home District Project Development Team Roster

Title	Name	Org	Phone
Planning – PM	Chris Hatfield	E6L0620	978-318-8520
Environmental Resources	Judy Johnson Richard Loyd	E6L0710	978-318-8138 978-318-8048
Economics	Denise Kammerer-cody	E6L0720	978-318-8105
Cultural Resources	Kate Atwood	E6L0720	978-318-8537
Coastal Hydraulics	John Winkelman Mark Gravens	E6L0510 U430520	978-318-8615 601-634-3809
Civil Design	Mark Godfrey	E6L0310	978-318-8689
Geotechnical	Dara Gay	E6L0540	978-318-8787
Geology/Chemistry	Paul Young	E6L0430	978-318-8597
Cost Engineering	Jeff Gaeta	E6L0301	978-318-8438
Structural Engineering	Thuyen Nguyen	E6L0350	978-318-8466
Mechanical Engineering	Angela Frisino	E6L0350	978-318-8085
Electrical Engineering	Jeanine Cline	E6L0350	978-318-8143
Real Estate	Jeffrey Teller	E6N0100	978-318-8030
Counsel	Ryan Killman	E6E0000	978-318-8292

ATR Project Development Team Roster

Title	Name	Phone
ATR Lead	Pam Castens/SAW	910-251-4671
Plan Formulation	Elden Gatwood/SAW	910-251-4505
Environmental Resources	Mike Malsom/SAM	251-690-2023
Economics	Brian Maestri/MVD	504-862-1915
Hydrology/Hydraulic Engineering	Kevin Conner/SAW	910-251-4867
Civil /Gen Engineering	Joe Long/SAM	251-694-4085
Geotechnical	Larry Nobles/SAM	251-694-4028
Cost Engineering	Mike Ferguson/Jim Neubauer/NWW	509-683-3018/ 509-527-7332
Real Estate	Michael Rohde/LRC	312-846-5576
Risk	Joe Lamb/SPL	213-452-3819

ATTACHMENT 2: SAMPLE STATEMENT OF TECHNICAL REVIEW FOR DECSION DOCUMENTS

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for the *<type of product>* for *<project name and location>*. The ATR was conducted as defined in the project's Review Plan to comply with the requirements of EC 1165-2-214. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, alternatives evaluated, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrChecks[sm].

SIGNATURE _____ Date _____
Name
ATR Team Leader
Office Symbol/Company

SIGNATURE _____ Date _____
Name
Project Manager
Office Symbol

SIGNATURE _____ Date _____
Name
Architect Engineer Project Manager[1]
Company, location

SIGNATURE _____ Date _____
Name
Review Management Office Representative
Office Symbol

CERTIFICATION OF AGENCY TECHNICAL REVIEW

Significant concerns and the explanation of the resolution are as follows: *Describe the major technical concerns and their resolution.*

As noted above, all concerns resulting from the ATR of the project have been fully resolved.

SIGNATURE _____ Date _____
Name
Chief, Engineering Division
Office Symbol

SIGNATURE _____ Date _____
Name
Chief, Planning Division
Office Symbol

[1] Only needed if some portion of the ATR was contracted

ATTACHMENT 3: REVIEW PLAN REVISIONS

Revision Date	Description of Change	Page / Paragraph Number

ATTACHMENT 4: ACRONYMS AND ABBREVIATIONS

Term	Definition	Term	Definition
AFB	Alternative Formulation Briefing	NED	National Economic Development
ASA(CW)	Assistant Secretary of the Army for Civil Works	NER	National Ecosystem Restoration
ATR	Agency Technical Review	NEPA	National Environmental Policy Act
CSRM	Coastal Storm Risk Management	O&M	Operation and maintenance
DPR	Detailed Project Report	OMB	Office and Management and Budget
DQC	District Quality Control/Quality Assurance	OMRR&R	Operation, Maintenance, Repair, Replacement and Rehabilitation
EA	Environmental Assessment	OEO	Outside Eligible Organization
EC	Engineer Circular	OSE	Other Social Effects
EIS	Environmental Impact Statement	PCX	Planning Center of Expertise
EO	Executive Order	PDT	Project Delivery Team
ER	Ecosystem Restoration	PAC	Post Authorization Change
FDR	Flood Damage Reduction	PMP	Project Management Plan
FEMA	Federal Emergency Management Agency	PL	Public Law
FRM	Flood Risk Management	QMP	Quality Management Plan
FSM	Feasibility Scoping Meeting	QA	Quality Assurance
GRR	General Reevaluation Report	QC	Quality Control
Home District/MSC	The District or MSC responsible for the preparation of the decision document	RED	Regional Economic Development
HQUSACE	Headquarters, U.S. Army Corps of Engineers	RMC	Risk Management Center
IEPR	Independent External Peer Review	RMO	Review Management Organization
ITR	Independent Technical Review	RTS	Regional Technical Specialist
LRR	Limited Reevaluation Report	SAR	Safety Assurance Review
MCX	Mandatory Center of Expertise	USACE	U.S. Army Corps of Engineers
MSC	Major Subordinate Command	WRDA	Water Resources Development Act