



DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, NORTH ATLANTIC DIVISION
FORT HAMILTON MILITARY COMMUNITY
302 GENERAL LEE AVENUE
BROOKLYN, NY 11252-6700

CENAD-PD-P

18 March 2019

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, Norfolk District,
Fort Norfolk 803 Front Street, Norfolk, VA 23510-1011

SUBJECT: Request for Approval of the Miami-Dade Back Bay Coastal Storm Risk
Management Feasibility Study and Environmental Impact Statement Review Plan

1. Reference Memorandum, CENAO-EX, dated 6 February 2019, subject as above.
2. The Coastal Storm Risk Management Planning Center of Expertise of the North Atlantic Division (NAD) is the lead office to execute the referenced Review Plan. The Review Plan includes Independent External Peer Review.
3. The enclosed Review Plan is approved for execution and is subject to change as study circumstances require, consistent with study development under the Project Management Business Process. Subsequent revisions to this Review Plan or its execution require new written approval from the NAD Commander.
4. The point of contact is Mr. Larry Cocchieri, NAD Planning Program Manager at 347-370-4571 or Lawrence.J.Cocchieri@usace.army.mil.

Encl

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DN: cn=US, o=U.S. Government, ou=DoD,
ou=PKI, ou=USA,
cn=MILHORN.JEFFREY.LARRY.1149493928
Date: 2019.03.21 19:38:23 -0400

JEFFREY L. MILHORN
Major General, USA
Commanding



DEPARTMENT OF THE ARMY
US ARMY CORPS OF ENGINEERS
NORFOLK DISTRICT
FORT NORFOLK
803 FRONT STREET
NORFOLK VA 23510-1011

CENAO-EX


06 February 2019

MEMORANDUM FOR Planning Division (ATTN: CENAD-PP/Mr. Cocchieri), U.S. Army Engineer Division, North Atlantic, 302 General Lee Avenue, Brooklyn, New York 1252-6700

SUBJECT: Miami-Dade Back Bay Coastal Storm Risk Management Feasibility Study and Environmental Impact Statement – Submission of Review Plan

1. Enclosed for review and approval is the Review Plan for the subject study.
2. Please contact Niklas Hallberg, Planning Team Lead, or Richard Klein, Project Manager, if you have any questions or require additional information.

Encl


PATRICK V. KINSMAN, PE
Colonel, EN
Commanding

REVIEW PLAN

February 2019

Project Name: Miami-Dade Back Bay Coastal Storm Risk Management Feasibility Study and Environmental Impact Statement, Miami-Dade County, Florida

P2 Number: 476677

Decision Document Type: Feasibility Report

Project Type: Single-Purpose Coastal Storm Risk Management

District: Norfolk District

District Contact: Project Manager (757)201-7243;
Planning Technical Team Lead (757)201-7728

Major Subordinate Command (MSC): North Atlantic Division

MSC Contact: Senior Coastal Planner (347-370-4591)

Review Management Organization (RMO): Planning Center of Expertise for Coastal Storm Risk Management (PCX-CSRSM)

RMO Contact: PCX-CSRSM Director (347-370-4571)

Key Review Plan Dates

Date of RMO Endorsement of Review Plan: Pending

Date of MSC Approval of Review Plan: Pending

Date of Independent External Peer Review (IEPR) Exclusion Approval: N/A

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

Date of Last Review Plan Revision: Jan 31 2019

Date of Review Plan Web Posting: Pending

Date of Congressional Notifications: Pending

Milestone Schedule

	<u>Scheduled</u>	<u>Actual</u>	<u>Complete</u>
FCSA Signed:	10/09/2018	10/09/2018	Yes
Alternatives Milestone (AMM):	01/09/2019	01/09/2019	Yes
Tentatively Selected Plan (TSP):	Jan 2020		No
Release Draft Report to Public:	Mar 2020		No
Agency Decision Milestone (ADM):	Aug 2020		No
Final Report Transmittal:	May 2021		No
Senior Leaders Briefing:	July 2021		No
Chief's Report:	Sept 2021		No

Project Fact Sheet

February 2019

Project Name: Integrated Miami-Dade Back Bay Coastal Storm Risk Management Study

Location: The project is located in Miami-Dade County, Florida.

Authority: The study authority is Public Law 84-71, June 15, 1955 which authorizes an examination and survey of the coastal and tidal areas of the eastern and southern United States, with particular reference to areas where severe damages have occurred from hurricane winds and tides.

Notwithstanding Section 105(a) of the Water Resources Development Act of 1986 (33 U.S.C. 2215(a)), which specifies the cost-sharing requirements generally applicable to feasibility studies, Title IV, Division B of the Bipartisan Budget Act of 2018, Public Law 115-123, enacted February 9, 2018 (hereinafter “BBA 2018”), authorizes the Government to conduct the Study at full Federal expense to the extent that appropriations provided under the Investigations heading of the BBA 2018 are available and used for such purpose.

Sponsor: Miami-Dade County

Type of Study: Feasibility, Coastal Storm Risk Management

SMART Planning Status: The project is currently 3x3 complaint.

Project Area: The study area is Miami-Dade County which is located on the southeast coast of Florida. The county includes the City of Miami and has a population of approximately 2.8 million people, making it the most populous county in Florida and the seventh most populous in the United States. The average elevation of the county is 6 feet above sea level. Based on its low lying topography and dense population, the Miami-Dade County area is recognized for risks associated with sea level rise and coastal storms.

Problem Statement: There are four primary problems occurring in Miami-Dade County with relation to coastal flooding:

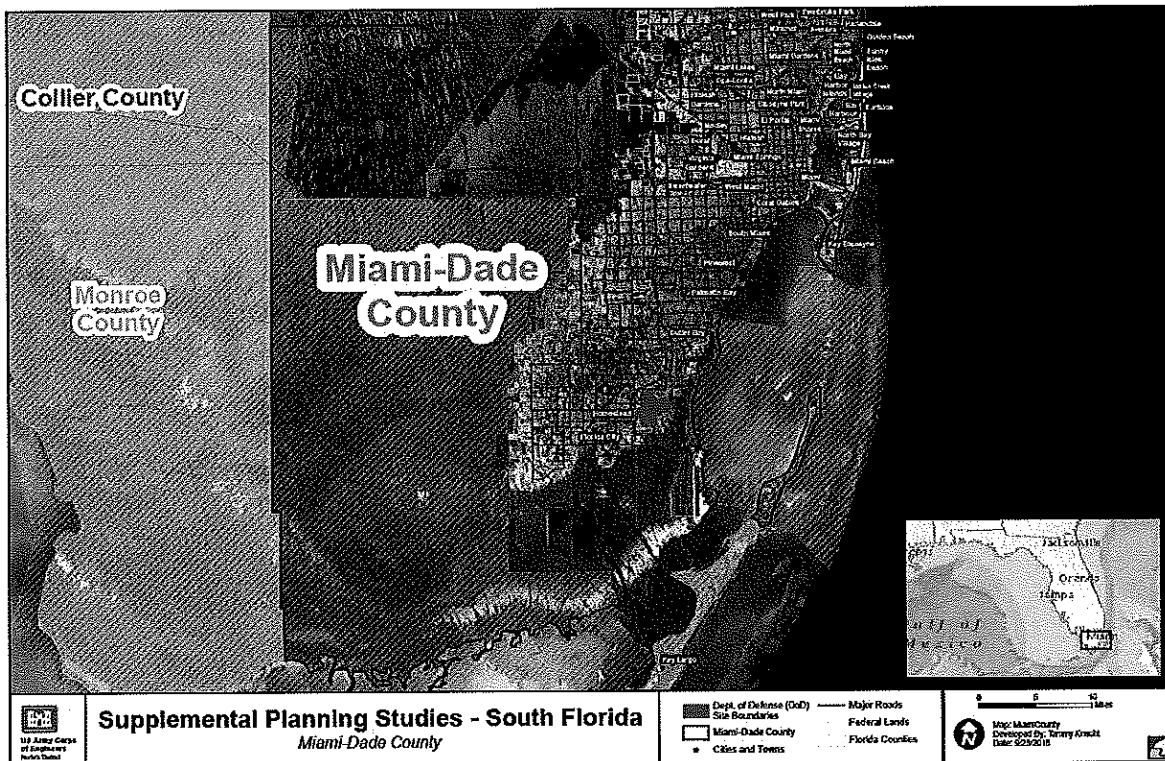
- The geographic location, low elevation, and high population of Miami-Dade County make it vulnerable to storm surge from hurricanes and tropical storms.
- Increasing high tides and king tides resulting from sea level rise result in recurrent flooding to roads and properties.
- Increasing groundwater elevations from sea level rise result in flood risks to inland areas.
- Increasing flooding from rain events due to the higher groundwater elevations and higher tailwater elevations from sea level rise threaten properties and infrastructure.

Federal Interest: Miami-Dade County is an important asset to the economic development of the United States because as both an economic hub to international business but also due to its large/dense coastal population. There is Federal interest in addressing high levels of risk and vulnerability to coastal storms which is expected to be compounded by the combined effects of sea level change and climate change. Analysis completed during the scoping phase indicates the

potential for a variety of structural and non-structural solutions to have marked effects on resiliency and be economically justified, environmentally acceptable, and consistent with USACE policy. This interest is also echoed across the region in the South Atlantic Coastal Study (SACS) and the 13 other CSRSM studies that are currently being conducted within the state of Florida.

Risk Identification: The study area will continue to be at risk of the effects of coastal storms in the future. In addition to damages to structures and critical infrastructure, there is a significant life safety component that should be considered due to the vulnerability of the population and study area to flooding impacts as well as potential vulnerability of evacuation routes. Study risks include the accurate projection of sea level rise over the period of analysis and the potential limited ability to use existing models to analyze conditions in the study area due to unique geologic and hydrodynamic conditions.

Figure 1: Project Area



1. FACTORS AFFECTING THE LEVELS OF REVIEW

- Is it likely that the study will be challenging?

This study will likely be challenging due to the large size of the study area, likely resulting in a large array of different project alternatives which are expected to vary across different areas of the county. A holistic/systems approach will be used to mesh various measures into one plan, but it is likely that this will be accomplished only after technical and political challenges are met.

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

The study area will continue to be at risk of the effects of coastal storms in the future. In addition to damages to structures and critical infrastructure, there is a significant life safety component that should be considered due to the vulnerability of the population and study area to flooding impacts as well as potential vulnerability of evacuation routes. Study risks include the accurate projection of sea level rise over the period of analysis and the potential limited ability to use existing models to analyze conditions in the study area due to unique geologic and hydrodynamic conditions. At this point in the study, none of these risks are expected to hinder the execution of the study, but will need to be managed throughout the duration.

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

Implementation of a coastal storm risk management project could potentially reduce flood related risks to human life/safety; however, the recommended project will be selected based on economic analysis in combination with other considerations such as whether the project is acceptable, engineeringly feasible, and complete. While the project is not likely to be justified by life safety alone, it is expected to involve significant life safety issues. Due to the study area conditions, non-performance of project economics may have an impact on life safety. Climate variability, including sea level rise, will also be a major factor in the analysis completed in this study.

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

There has not been a request for independent peer review by the Governor of Florida.

- Is it likely that the study/project will have significant public dispute as to the project's size, nature, or effects?

There may be some public dispute as to the project's size, nature, or effects due to the unique study area conditions, regional economic considerations, and local political opinions. There may also be public dispute due to the presence of 34 different municipalities within Miami Dade County.

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

There may be some public dispute as to the economic or environmental cost or benefit of the project due to the unique study area conditions, regional economic considerations, and local political opinions. Environmental considerations are likely to be a key component of the study that should be actively managed throughout the study. There are environmental considerations to adjacent corps projects that may impact this project; currently there are two other corps

projects close to this study area that may have ramifications on this study including Miami Harbor deepening and the Miami Beach project.

- Is the project/study likely to have significant interagency interest?
The project is anticipated to have environmental interagency interest. As such an EIS is anticipated to be developed to address such interests. A scoping meeting occurred on December 5, 2018.
- 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 anticipates using the new probabilistic life cycle analysis model, G2CRM, which is still undergoing the USACE model approval process. This model has not been widely used in USACE CSRSM studies yet. In addition, this study will likely include natural and nature based features (NNBF), and will analyze their economic justification based on their CSRSM benefit (vs. environmental restoration). USACE approved methods for quantifying NED benefits for NNBF features are still being developed. It is also expected that some project components or the selection of the recommended plan may be evaluated for justification under the other social effects (OSE) account. G2CRM has been approved for this study.
- Does the project design require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule?
Due to the unique conditions in the study area and the current expectation that the recommended plan will include NNBF, it is likely that the project design will require at least some elements of redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule.
- Is the estimated total cost of the project greater than \$200 million?
Considering the project costs of other CSRSM projects recently completed, it is likely that this project cost will exceed \$200 million.
- Will an Environmental Impact Statement (EIS) be prepared as part of the study?
Due to the significant unique environmental resources in the study area, an EIS will likely be completed as part of this study.
- Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources?
This project is not expected to have more than negligible adverse impacts on scarce or unique tribal or historic resources.
- Is the project expected to have substantial adverse impacts on fish and wildlife species and their habitat prior to the implementation of mitigation measures?
This project may have some adverse impacts on fish and wildlife species and/or their habitat prior to the implementation of mitigation, but at this early stage of the study, the extent of impacts are unknown.

- 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?

This project may have some adverse impacts on endangered or threatened species and/or their designated critical habitat prior to the implementation of mitigation, but at this early stage of the study, the extent of impacts are unknown.

2. REVIEW EXECUTION PLAN

This Review Plan (RP) section provides a general description of each type of review and identifies the reviews anticipated for this study/project.

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/approved USACE personnel. The ATR team lead will be from outside the home MSC. If significant life safety issues are involved in a study or project a safety assurance review should be conducted during ATR.

Independent External Peer Review (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. If required, Type I IEPR will be managed by an Outside Eligible Organization, external to USACE. Neither the public nor scientific or professional societies would be asked to nominate potential external peer reviewers.

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 Cost Engineering certification. The RMO is responsible for coordinating with the MCX for the reviews; these reviews typically occur as part of ATR.

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

Policy and Legal Review. All decision documents will be reviewed for compliance with USACE policy and law. 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/coordination comply with law and policy and warrant approval or further recommendation to higher authority by the home MSC Commander.

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: Miami-Dade County CSRM – Anticipated Reviews

Product(s) to undergo Review	Review Level	Start Date	End Date	Cost	Complete
Draft Feasibility Report and EIS	District Quality Control	Dec 2019	Jan 2020	\$50,200	No
Draft Feasibility Report and EIS	Agency Technical Review	March 2020	April 2020	\$59,620 ¹	No
Draft Feasibility Report and EIS	Type I IEPR	April 2020	June 2020	\$100,000	No
Draft Feasibility Report and EIS	Policy and Legal Review	March 2020	April 2020	N/A	No
Final Feasibility Report and EIS	District Quality Control	Dec 2020	Jan 2021	\$50,200	No
Final Feasibility Report and EIS	Agency Technical Review	Jan 2021	Feb 2021	\$59,620 ²	No
Final Feasibility Report and EIS	Policy and Legal Review	Feb 2021	March 2021	N/A	No

¹ Estimated cost for Draft and Final Report ATRs does not include the cost of ATR Team Lead participation in milestone meetings or other engagement/ coordination beyond that directly related with those ATRs. The estimated cost for ATR of the Draft Report is based upon the following assumptions:

- ATR Team Lead – 30 hours, \$130/hour
- ATR Team – 10 Technical Disciplines, 40 hours/discipline, average \$125/hour
- RMO – 40 hours, \$143/hour

² The estimated cost for ATR of the Final Report is based upon the following assumptions:

- ATR Team Lead – 30 hours, \$130/hour
- ATR Team – 10 Technical Disciplines, 40 hours/discipline, average \$125/hour
- RMO – 40 hours, \$143/hour

A. District Quality Control

The home district shall manage DQC and will appoint a DQC Lead to manage that review (see EC 1165-2-217, section 8.a.1). The DQC Lead will prepare a DQC Plan and provide it to the RMO and MSC prior to starting DQC reviews.

Table 2: Required DQC Expertise

DQC Team Disciplines	Expertise Required
DQC Lead	The DQC lead should be 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 (i.e., planning, economics, environmental resources, etc.).
Plan Formulation	The plan formulation reviewer should be a senior water resources planner with experience in coastal storm risk management studies and familiarity with the SMART Planning process.
Economics	The economics reviewer should be a senior economist with experience in coastal storm risk management (CSRM) studies and familiarity with Feasibility Report requirements and G2CRM. The economics DQC team member will be identified by the district.
Environmental Resources	The environmental reviewer should have expertise in evaluating the impacts associated with structural and non-structural storm surge measures as well as extensive knowledge of estuarine and coastal ecology. The reviewer should also be familiar with the environmental coordination and NEPA requirements for storm surge and ecological projects.
Cultural Resources	Cultural resources reviewer should have expertise in evaluating the impacts associated with flood risk management (or coastal storm risk management) projects with some knowledge of both terrestrial and underwater archaeology. The reviewer should also be familiar with the environmental coordination, NEPA, National Historic Preservation Act (NHPA) Section 106 requirements.
Hydraulics, Hydrology and Coastal (HH&C) Engineering	The reviewer should be an expert in the field of coastal hydrology and hydraulics and have a thorough understanding of coastal storm wave dynamics and have experience in CSRM studies/projects. The reviewer should also be familiar with computer modeling techniques that were used for calculating benefits on CSRM studies. A registered professional engineer is recommended with applicable modelling and design experience.
Geotechnical Engineering	The reviewer should be familiar with the geotechnical requirements of the structural measures and beach nourishment borrow sources.
Structural Engineering	The Structural Engineering reviewer should be familiar with the structural requirements of the structural measures.

Cost Engineering	The cost engineering reviewer should have experience evaluating cost requirements and experience with the MII, Abbreviated Risk Analysis, Cost and Schedule Risk Analysis (Crystal Ball).
Operations	The project design reviewer should have experience design, construction, and maintenance, including development of plans, surveying, mapping, and volumetric computations.
Real Estate	The real estate reviewer should have expertise in the real estate requirements of coastal storm risk management projects.

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 (Figure F). DrChecks software be used to document DQC review comments, responses, and issue resolution.

Documentation of completed DQC will be provided to the MSC, RMO, and ATR Team leader prior to initiating an ATR. The ATR team will assess the quality of the DQC performed and provide a summary of that assessment in the ATR report. 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

ATR will assess whether the analyses are technically correct and comply with USACE guidance and whether the documents explain the analyses and results in a clear manner. Further, the ATR will ensure proper and effective DQC has been performed and will ensure that the product is consistent with established criteria, guidance, procedures, and policy. The RMO will identify the ATR team members and manage the ATRs. Review team members will not be nominated by the home District/MSC.

Table 3: Required ATR Team Expertise

ATR Team Disciplines	Expertise Required
ATR Lead	The ATR lead will be 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 (e.g., plan formulation, economics, etc.).
Plan Formulation	The plan formulation reviewer should be a senior water resources planner with experience in coastal storm risk management studies and familiarity with the SMART Planning process.
Economics	The economics reviewer(s) should be a senior economist with experience in coastal storm risk management studies and familiarity with Feasibility Report study requirements and G2CRM. Typically, two economics reviewers are required, one to review the Economics Appendix and the other to review inputs/outputs of G2CRM modeling. The economics ATR team members will be identified by the Coastal PCX.
Environmental Resources	The environmental reviewer should have expertise in estimating the impacts associated with structural and non-structural storm surge measures as well as extensive knowledge of estuarine and coastal ecology. The reviewer should also be familiar with environmental coordination and NEPA requirements for storm surge and ecological projects.
Cultural Resources	The cultural resources reviewer should have expertise in evaluating the impacts associated with coastal storm risk management and/or flood risk management projects as well as extensive knowledge of terrestrial and some knowledge of underwater archaeology. The reviewer should also be familiar with environmental coordination, NEPA, and NHPA Section 106 requirements.
Hydraulics, Hydrology & Coastal (HH&C) Engineering	The reviewer should be an expert in the field of coastal hydrology and hydraulics and have a thorough understanding of coastal storm wave dynamics and have experience in CSRM studies/projects. The reviewer should also be familiar with computer modeling techniques that were used for calculating benefits on CSRM studies. A registered professional engineer is recommended with applicable modelling and design experience.
Geotechnical Engineering	The reviewer should be familiar with the geotechnical requirements of the structural measures and beach nourishment borrow sources.
Cost Engineering	The cost engineering reviewer should have experience evaluating cost requirements and experience with the MII, Abbreviated Risk Analysis, Cost and Schedule Risk Analysis (Crystal Ball).
Real Estate	The real estate reviewer should have expertise in the real estate requirements of coastal storm risk management projects.
Climate Preparedness and Resilience/Certified Climate Reviewer	A member of the Climate Preparedness and Resiliency CoP or a H&H Climate certified reviewer will participate on the ATR team.

Documentation of ATR. DrChecks will be used to document all ATR comments, responses, and issue resolution. Comments should be limited to those needed to ensure product adequacy. All members of the ATR team should use the four part comment structure (EC 1165-2-217, Section 9(k)(1)). 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. The comment(s) can then 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.

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. A Type I IEPR is mandatory if there is a significant threat to human life. This project will require an IEPR because critical infrastructure features including fire stations, airports, hospitals, etc. are at risk to the effects of coastal storms. Utilities including water, wastewater, electricity, phone, etc. are at risk to the effects of coastal storms and are essential for human health and safety.

When a decision document does not trigger a mandatory Type I IEPR, a risk informed recommendation is utilized. This process explicitly considers the consequences of non-performance on project economics, the environment, and social well-being (public safety and social justice), as well as indicated whether the product is likely to contain influential scientific information or be a highly influential scientific assessment; or involve any other issues that provide a rationale for determining the appropriate level of review. Furthermore, the recommendation must make a case that the study is so limited in scope or impact that it would not significantly benefit from IEPR. Section 5 of this RP highlights the limited scope and anticipated limited impacts associated with the study and project implementation. However, it is anticipated that Type I IEPR will be required due to the inclusion of an EIS.

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

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

Table 4: Required Type I IEPR Panel Expertise

IEPR Panel Member Disciplines	Expertise Required
Plan Formulation	The planner must have demonstrated experience serving as a water resources planner for CSRM projects and applying USACE plan formulation processes, procedures, and standards to CSRM projects.
Economics	The economist must have at least a bachelor's degree in economics. The reviewer must have demonstrated experience in performing economic evaluations for CSRM projects; in applying USACE procedures and standards for CSRM economic analyses; and in formulating and evaluating alternative plans for CSRM projects. Knowledge/experience with tools employed for economic analysis, risk analysis, and storm surge/sea level rise forecasts is required.
Environmental Resources	The reviewer must have demonstrated experience directly related to water resources environmental evaluation and NEPA compliance for CSRM projects. Additionally, the panel member should be an expert in compliance requirements of environmental laws, policies, and regulations, including the fish and wildlife coordination act and the endangered species act.
HH&C Engineer	The hydraulic engineering reviewer should be an expert in the field of hydraulics and have a thorough understanding of open channel dynamics and coastal hydraulics as well as have experience in CSRM studies/projects. The reviewer should also be familiar with computer modeling techniques that were used for prior studies. A registered professional engineer is recommended with applicable modelling and design experience.
Geotechnical Engineer	The geotechnical engineer must have demonstrated engineering experience or combined equivalent of education and experience in geo-civil design and geotechnical evaluation of CSRM projects. The panel member must be a registered professional engineer from academia, a public agency, or an A-E or consulting firm, with a MS degree or higher in geotechnical engineering. Candidate must have demonstrated experience related to USACE geotechnical practices for design and construction of structural storm surge and flood mitigation measures. The panel member should have experience in geotechnical risk analysis. Active participation in related professional engineering and scientific societies is encouraged.

Documentation of Type I IEPR. The Outside Eligible Organization (OEO) will submit a Final IEPR Report no later than 60 days after the end of the draft report public comment period. Upon RMO acceptance, the Regional Integration Team will post the Final IEPR Report on the USACE public website and the OEO will post the final panel comments in DrChecks. USACE shall consider all recommendations in the Final IEPR Report and prepare evaluator responses for all findings adopted or not adopted. Evaluator responses will become the basis of the Agency Response. The final decision document will include an appendix which contains the Final IEPR Report and Agency Response. Please consult EC 1165-2-217 for a detailed explanation of the Type I IEPR process, including public notification requirements.

(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. Type II IEPR, Safety Assurance Review, is managed outside of the USACE and is performed on design and construction activities for any project where potential hazards pose a significant threat to human life. For Type II IEPRs, a panel is convened to review the design and construction activities before construction begins and periodically thereafter until construction activities are completed. There are many uncertainties related to existing and potential hazards from storm surge. This report will most likely require a Type II IEPR because this project is a coastal storm risk project.

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 study area problems and take advantage of 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 assessment of input and output data is the responsibility of the users and is subject to DQC, ATR, and IEPR (if required). The following models may be used to develop the decision document.

Table 5: Planning Models

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Certification / Approval
Generation 2 Coastal Risk Model (G2CRM)	G2CRM is a Probabilistic Life Cycle Analysis (PLCA) model developed by ERDC that provides incorporation of quantified uncertainty in the driving forces, physical system, and system response. The model is designed for the evaluation of coastal storm risk management (CSRM) projects involving static protective measures. G2CRM is able to perform event-driven Monte Carlo simulation of environmental forcing (storms), estimate event-based damages, and protective system response, over the project life cycle.	One Time Use Approval
Gridded Surface Subsurface Hydrologic Analysis (GSSHA)	GSSHA is a multidimensional modeling technology that uniformly couples overland, surface, and subsurface flow for accurate watershed simulation. It is a physics-based, distributed, hydrologic, sediment and constituent fate and transport model that features two-dimensional overland flow and groundwater and one-dimensional stream flow and soil moisture, fully dynamic pipe networks for urban and	Certified

	agricultural drainage systems, wetland peat layer hydrodynamics and several in-stream weir and culvert models, lakes, detention basins, levees, rating and rule curve releases, boundary conditions for hurricane storm surge or levee breach inundation modeling, full coupling among groundwater, vadoze zone, streams, and overland flow, and full-Gr-coupled groundwater to surface-water interaction to model Hortonian and non-Hortonian basins. GSSHA can be used as an episodic or continuous model where soil surface moisture, groundwater levels, stream interactions, and constituent fate are continuously simulated. The fully coupled groundwater to surface-water interaction allows GSSHA to model basins in both arid and humid environments. The model simulates sediment and constituent fate and transport in shallow soils, overland flow planes, streams, and channels.	
Uniform Mitigation Assessment Method (UMAM)	An assessment method to determine the amount of mitigation needed to offset adverse impacts to wetlands and other surface waters and to award and deduct mitigation bank credits. UMAM provides a standardized procedure for assessing the ecological functions provided by wetlands and other surface waters, the amount that those functions are reduced by a proposed impact, and the amount of mitigation necessary to offset that loss. This standardized methodology is also used to determine the degree of improvement in ecological value of proposed mitigation bank activities. UMAM evaluates functions through consideration of an ecological community's current condition, hydrologic connection, uniqueness, location, fish and wildlife utilization, time lag and mitigation risk.	Not Yet Certified
Regional Economic System (RECONS)	A regional economic impact modeling tool that estimates jobs, income, sales, and value added associated with Corps Civil Works and ARRA spending, as well as stemming from effects of additional economic activities (for example, water transportations, tourism spending, etc) at more than 1,400 Corps project areas.	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 (if required). The following models may be used to develop the decision document.

Table 6: Engineering Models

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Approval Status
Surface-Water Modeling System (SMS), Version 12.3	The Surface Water Modeling System (SMS) is a comprehensive environment for one- and two-dimensional models dealing with surface water applications. Hydrodynamic models include CMS-Flow and ADCIRC. The hydrodynamic models cover a range of applications including river flow analysis, rural and urban flooding, estuary and inlet modeling, and modeling of large coastal domains. Additional functionalities include advection/diffusion (RMA4) and sediment transport (FESWMS). Wave models in SMS include CMS-Wave, STWAVE, BOUSS2D, and CGWAVE and include both spectral and wave transformational models. The Particle Tracking Model (PTM) tracks particles added to the water column to help evaluate sediment transport and environmental impacts. It also includes a shoreline change model GENCADE.	HH&C CoP Approved
HEC-HMS (Hydrologic Modeling System)	This system simulates the complete hydrologic processes of dendritic watersheds. It includes many traditional hydrologic analysis procedures such as event infiltration, unit hydrographs, and hydrologic routing. It includes procedures for continuous simulation including evapo-transpiration, snowmelt, and soil moisture accounting. Advanced capabilities are provided for gridded runoff simulation using the linear quasi-distributed runoff transform (ModClark). Supplemental analysis tools are provided for parameter estimation, depth-area analysis, flow forecasting, erosion and sediment transport, and nutrient water quality.	HH&C CoP Approved
HEC-RAS (River Analysis System)	This program provides the capability to perform one-dimensional steady and unsteady flow river hydraulics calculations. The program will be used for steady flow analysis to evaluate the future without and with-project conditions along the PC.	HH&C CoP Approved
Abbreviated Risk Analysis, Cost Schedule Risk Analysis	Cost risk analyses identify the amount of contingency that must be added to a project cost estimate and define the high risk drivers. The analyses will include a narrative identifying the risks or uncertainties. During the alternatives evaluation, the PDT will assist the cost engineer in defining confidence/risk levels associated with the project features within the abbreviated risk analysis. For the Class 3 estimate, an evaluation of risks will be performed using Crystal Ball Cost Schedule Risk	Civil Works Cost Engineering and Agency Technical Review MCX mandatory

	Analysis for construction costs over \$40 million or the Abbreviated Risk Analysis for projects under \$40 million.	
MII	MII is the second generation of the Micro-Computer Aided Cost Estimating System. It is a detailed cost estimating software application.	Cost Engineering Approved
Crystal Ball	This model will be used to account for risk and uncertainty of alternatives and the recommended plan	Enterprise
@Risk	This model will be used to account for risk and uncertainty of alternatives and the recommended plan	Enterprise
CEDEP	Corps-proprietary, Excel add-on for Cost Engineering; used to estimate costs of alternatives and the recommended plan	Enterprise
eProUCL Version 4.00.04	Statistical software used to estimate costs of alternatives and the TSP	Enterprise
MiniTab	Statistical software used to estimate costs of alternatives and the TSP	Enterprise
ArcGIS	Used to visually represent alternatives and the TSP	Enterprise

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).

1) Policy Review.

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

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

(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
Greggory Williams	CENAO-PMC	Project Manager	757-201-7616
Niklas Hallberg	CENAO-WRP-R	Planning Technical Team Lead	757-201-7728
Susan Conner	CENAO-WRP-R	Planning Chief	757-201-7390
Abbegail Preddy	CENAO-WRP-R	Plan Formulation	757-201-7693
Dave Schulte	CENAO-WRP-E	Environmental	757-201-7007
Carissa Agnese	CENAO-WRP-E	Environmental	757-201-7752
John Haynes	CENAO-WRP-E	Cultural Resources	757-201-7008
Robertas Simonavicius	CENAO-WRP-R	Economics	757-201-7704
Alicia Farrow	CENAO-ECE-H	Engineering Technical Team Lead/ Hydrology and Hydraulics	757-201-7869
Faraz Ahmed	CENAO-WRP-F	Flood Plain Management	757-201-7779
Miranda Ryan	CENAO-WR-OG	GIS	757-201-7825
Andy MacInnes	CEMVN-PD-PER	Planning Mentor	504-862-1062
Jane Bolton	CENAO-ECE-G	Geotechnical	757-201-7123
Drew Johnson	CENAO-ECE-S	Structural	757-201-7850
Beth Babineau	CENAO-RE	Real Estate	757-201-7736
Christy Alexander	CENAO-RMA	Resource Management	757-201-7325
Matt Donaldson	CENAO-OC	Office of Counsel	757-201-7867
Patrick Bloodgood	CENAO-PA	Public Affairs Officer	757-201-7881
Hank Gruber	CENAD-PD-P	NAD POC	347-370-4566
TBD		Resilience	
TBD		Climate Change	
Sherry Jean	CENAO-ECE-E	Cost Engineer	757-201-7823
TBD		Contracting	
TBD		Civil	

DISTRICT QUALITY CONTROL TEAM

Name	Office	Position	Phone Number
Rachel Haug	CENAO-WRP-R	DQC Lead	757-201-7589
TBD		Plan Formulation	
TBD		Economics	
TBD		Environmental Resources	
TBD		Cultural Resources	
TBD		Hydraulic Engineering	
TBD		Geotechnical Engineering	
TBD		Cost Engineering	
TBD		Operations	
TBD		Real Estate	

AGENCY TECHNICAL REVIEW TEAM			
Name	Office	Position	Phone Number
TBD		ATR Lead	
TBD		Plan Formulation	
TBD		Economics	
TBD		CPR CoP Certified ATR Reviewer	
TBD		Environmental Resources	
TBD		Cultural Resources	
TBD		Hydraulic Engineering	
TBD		Geotechnical Engineering	
TBD		Cost Engineering	
TBD		Operations	
TBD		Real Estate	

VERTICAL TEAM			
Name	Office	Position	Phone Number
Jason Allmon	CENAD-PD-C	Program Manager	347-370-4567
Joe Vietri	CENAD-PD-P	Supervisory Civil Engineer	347-370-4570
Ray Wimbrough	CECW-NAD	Deputy Chief NAD RIT	202-761-4056
Larry Cocchieri	CENAD-PD-X	Deputy Director	347-370-4571

POLICY REVIEW TEAM			
Name	Office	Position	Phone Number
Donald Cresitello	CENAD-PD-P	Senior Coastal Planner	347-370-4591
Lauren Diaz	CECW-PC	Biologist	202-761-4663
Naomi Fraenkel	CENAD	Economics and Review Manager	917-359-2819
Ralph Lamoglia	CENAD-RB-T	Civil Engineer	347-370-4599
Michael Grove	CENAD-PD-RE	Realty Specialist	346-370-4777
George Nieves	CENAD-PSD-O	Operations Program Manager	347-370-4556
Suzanne Kimble	CECC-NAD	Assistant Division Counsel	347-370-4527
Kate White	CECW-EC	Climate Preparedness and Resilience CoP	202-761-4163