



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SOUTH ATLANTIC DIVISION
60 FORSYTH STREET SW, ROOM 10M15
ATLANTA, GA 30303-8801

CESAD-PDP (1105)

3 July 2024

MEMORANDUM FOR Commander, U.S. Army Corps of Engineers, Wilmington District,
69 Darlington Avenue, Wilmington, NC 28403-1343

SUBJECT: Approval of the Review Plan for the Brunswick County Beaches (Holden
Beach Portion), North Carolina General Reevaluation Report

1. References:

a. Wilmington District, CESAW-ZA memorandum (Brunswick County Beaches,
Holden Beach Portion, North Carolina, General Reevaluation Report – Request for
Approval of Review Plan), 18 June 2024.

b. Engineering Regulation (ER) 1165-2-217 (Civil Works Review Policy),
1 May 2021.

2. The Review Plan (RP) for the Brunswick County Beaches (Holden Beach Portion),
North Carolina General Reevaluation Report, submitted by the Wilmington District, via
reference 1.a. noted above has been reviewed by South Atlantic Division (SAD) and
National Coastal Storm Risk Management Planning Center of Expertise in accordance
with reference 1.b. The review plan includes the determination that Independent
External Peer Review (IEPR) is warranted.

3. I hereby approve this Review Plan. After removing team roster attachments,
Wilmington District shall post the enclosed review plan to their District website.
Subsequent revisions to this Review Plan or its execution due to significant changes in
the study, scope, or level of review will require new written approval from this office.

4. Point of contact for this action is [REDACTED], or
[REDACTED].

DANIEL H. HIBNER, PMP
Brigadier General, USA
Commanding

Review Plan
July 7, 2024

1. Project Summary

Project Name: Brunswick County Beaches, Holden Beach Portion, North Carolina

Location: Holden Beach, North Carolina

P2 Number: 481505

Decision and Environmental Compliance Document Type: General Re-evaluation Report, Environmental Impact Statement and Record of Decision

Congressional Authorization Required: No. The project was originally authorized under Section 203 of the Flood Control Act of 1966, Public Law 89-789.

Project Purpose(s): Coastal Storm Risk Management

The authorized purpose of this project is to manage risks to the Town of Holden Beach from erosion, flooding, storm surge, and wave attack caused by severe coastal storms. These risks are exacerbated by the onset of sea level rise and climate change.

Non-Federal Sponsor: Town of Holden Beach, NC

Points of Public Contact for Questions/Comments on Review Plan:

District: Wilmington District (SAW)

District Contact: Brennan Dooley, Project Manager 910-251-4916

Major Subordinate Command (MSC): South Atlantic Division (SAD)

MSC Contact: Ms. Karen Dove Odumosu, District Support Team, 404-562-5225

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

RMO Contact: Larry Cocchieri, Planning Program Manager, 347-370-4571

Key Review Plan Dates

Date of RMO Endorsement of Review Plan	12/21/2021
Date of MSC Approval of Review Plan	Pending
Date of IEPR Exclusion Approval	N/A
Has the Review Plan changed since RMO Endorsement?	Yes
Date of Last Review Plan Revision	1/24/2024
Date of Review Plan Web Posting	

Milestone Schedule and Other Dates

	Scheduled	Actual
FCSA Execution	8/27/2021	8/27/2021

Alternatives Milestone	1/13/2022	1/13/2022
Tentatively Selected Plan	3/2025	Pending
Release Draft Report to Public	6/2025	Pending
Agency Decision Milestone	10/2025	Pending
Final Report Transmittal	4/2026	Pending
State & Agency Briefing	5/2026	Pending
Chief's Report or Director's Report	7/2026	Pending

2. References

Engineer Regulation 1165-2-217 – Water Resources Policies and Authorities – Civil Works Review Policy, 1 May 2021.

Engineer Circular 1105-2-412 – Planning – Assuring Quality of Planning Models, 31 March 2011.

Planning Bulletin 2013-02, Subject: Assuring Quality of Planning Models (EC 1105-2-412), 31 March 2013.

Office of Management and Budget, Final Information Quality Bulletin for Peer Review, Federal Register Vol. 70, No. 10, January 14, 2005, pp 2664-267

Type I Independent External Peer Review: Standard Operating Procedure. Product of the Planning Centers of Expertise Guild, June 2019.

3. Review Execution Plan

The general plan for executing all required independent reviews is outlined in the following two tables.

Table 1 lists each study product to be reviewed. The table provides the schedules and costs for the anticipated reviews. Teams also determine whether a site visit will be needed to support each review. The decisions about site visits are documented in the table. As the review plan is updated the team will note each review that has been completed.

Table 2 identifies the specific expertise and role required for the members of each review team. The table identifies the technical disciplines and expertise required for members of review teams. In most cases the team members will be senior professionals in their respective fields. In general, the technical disciplines identified for a District Quality Control (DQC) team will be needed for an Agency Technical Review (ATR) team. Each ATR team member will be certified to conduct ATR by their community of practice. If Independent External Peer Review (IEPR) is warranted, panel membership will reflect disciplines representing the areas of expertise applicable to the review being conducted.

The table is set up to concisely identify common types of expertise that may be applicable to one or more of the reviews needed for a study.

Table 1: Schedule and Costs of Reviews

Product to undergo Review	Review Level	Site Visit	Start Date	End Date	Cost	Complete
G2CRM and Beach fx (FWOP)	Targeted ATR	No	July 2024	Aug 2024	\$10,000	
Draft General Re-evaluation Report and Environmental Impact Statement (GRR-EIS)	District Quality Control (DQC)	No	May 2025	June 2025	\$30,000	
	Agency Technical Review (ATR)	No	July 2025	Aug 2025	\$25,000	
	Policy and Legal Compliance (P&LC) Review	No	July 2025	Sept 2025	N/A	
	Type I Independent External Peer Review (IEPR)	No	June 2025	Oct 2025	\$200,000	
Final GRR-EIS	DQC	No	Jan 2026	Feb 2026	\$15,000	
	ATR	No	Feb 2026	Mar 2026	\$20,000	
	P&LC Review	No	Apr 2026	May 2026	N/A	
State and Agency (S&A) Review	Headquarters	No	June 2026	July 2026		

Table 2: Review Teams - Disciplines and Expertise

Discipline / Role	Expertise	DQC	ATR	IEPR
DQC Team Lead	A senior agency professional with extensive experience preparing integrated Civil Works feasibility reports and leading agency review teams. The lead may also serve as a reviewer for a specific discipline on the study (such as planning, economics, environmental resources, etc.).	Yes	No	No
ATR Team Lead	A senior planning agency professional that is certified by the Planning Community of Practice (PCOP) as a Plan Formulator. Individual must have extensive experience preparing integrated Civil Works feasibility reports and leading agency review teams in a virtual environment. The lead may also serve as a reviewer for a specific discipline on the study (such as planning, economics, environmental resources, etc.).	No	Yes	No
IEPR Manager	Water Resources Planner with the PCX-CSR. Must knowledge of current IEPR policy and contract management.	No	No	Yes
Plan Formulation	Knowledge of current agency policy and guidance associated with the formulation and selection of plans on CSR projects. Experience with the preparation of integrated Civil Works Feasibility reports, and documentation associated with risk management and study decisions. PCOP certification as a Plan Formulator is preferred.	Yes	Yes	Yes
Economics	Knowledge of current agency policy and guidance associated with the economic analysis of alternative plans and selection of the NED plan. Experience with models required for CSR studies (i.e. Beach FX, G2CRM, and RECONS), recreation, Comprehensive Benefits Analysis, and the preparation of Civil Works Feasibility reports. PCOP certification as an Economist is preferred.	Yes	Yes	Yes
Environmental Resources	Experience with the evaluation of impacts to environmental resources from CSR projects. Knowledge of compliance responsibilities associated these environmental laws, Executive Orders, and guidance including, but not limited to, the National Environmental Policy Act, the Endangered Species Act, and the Clean Water Act. Additional experience in the preparation of environmental documentation and integrated Civil Works feasibility reports is required. PCOP	Yes	Yes	Yes

Discipline / Role	Expertise	DQC	ATR	IEPR
	certification as an Environmental Specialist is preferred.			
Cultural Resources	Knowledge of compliance responsibilities associated with historic preservation laws, Executive Orders, and guidance including, but not limited to, the National Historic Preservation Act, Archaeological Resources Protections Act, and the Native American Graves Protection and Repatriation Act. Experience with the evaluation of effects to cultural resources from CSRMs projects. Additional experience in the preparation of cultural resource documentation per 36 CFR 800. 11 is required. PCOP certification as a Cultural Resource Specialist is preferred.	Yes	Yes	No
Coastal Engineer	Knowledge of coastal processes and the use of economic/engineering models - such as Beach FX, G2CRM and GenCade – to analyze and evaluate these processes. Experience in the development of engineering solutions through management measures and alternative plans, and the preparation of integrated Civil Works Feasibility reports. A minimum of 5 years of Coastal Engineering experience is preferred. CERCAP certification for the ATR is required.	Yes	Yes	Yes
Cost Engineering	Knowledge of current agency policy, guidance, and engineering associated with the cost and schedule of resources leading to the design and construction of CSRMs projects. Experience using cost estimation software and certification with the Cost Engineering Mandatory Center of Expertise is required.	Yes	Yes	Yes
Engineering Civil Design	Experience creating plans and drawings for the construction of CSRMs projects. Experience in the development of engineering solutions through management measures and alternative plans, and the preparation of integrated Civil Works Feasibility reports. A minimum of 5 years of civil design experience is preferred. CERCAP certification for the ATR is required.	Yes	Yes	No
Engineering Geotechnical	Knowledge of the physical, mechanical and chemical properties of soil, sand and rock in order to design hardened and soft structures for CSRMs projects. and earthworks. Experience in the development of engineering solutions through management measures and alternative	Yes	Yes	Yes

Discipline / Role	Expertise	DQC	ATR	IEPR
	plans, and the preparation of integrated Civil Works Feasibility reports. A minimum of 5 years of geotechnical experience is preferred. CERCAP certification for the ATR is required.			
Hydrology	Knowledge of the distribution and movement of water both on and below the Earth's surface, and the impact of human activity on water availability and conditions. Experience in the development of engineering solutions through management measures and alternative plans, and the preparation of integrated Civil Works Feasibility reports. A minimum of 5 years of hydrology experience is preferred. CERCAP certification for the ATR is required.	Yes	Yes	Yes
Real Estate	Knowledge of real estate transactions per Engineering Circular (EC) 405-2-12, Engineering Regulation (ER) 405-2-12, and Public Law 91-646 for CSRMs projects including acquisitions, disposals, donations, easements, leases, licenses, relocations, and rights-of-entry. Experience with the valuation of real property, the preparation of costs leading to project construction and the preparation of real estate plans. A minimum of 5 years of experience as a Real Estate specialist is required.	Yes	Yes	No
Climate Preparedness and Resilience	A member of the Climate Preparedness and Resiliency Community of Practice with knowledge of coastal processes, climate change, sea level rise, and related agency policy. Experience with Coastal Storm Risk Management Projects is required.	Yes	Yes	No

4. Documentation of Reviews

Documentation of DQC. Quality Control will be performed continuously. A specific certification of DQC completion will be prepared at the base conditions (existing and future), draft and final report stages. Documentation of DQC will follow the District Quality Manual and the MSC Quality Management Plan. DrChecks will be used for documentation of DQC comments. An example DQC Certification statement is provided in ER 1165-2-217, Appendix D. Documentation of completed DQC, to include the DQC checklist, will be provided to the MSC, RMO and the ATR Team leader. The ATR team will examine DQC records and comment in the ATR report on the adequacy of the DQC effort.

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. All members of the ATR team will use the four-part comment structure (see ER 1165-2-217, Section 5). If a concern cannot be resolved by the ATR team and PDT, it will be elevated to the vertical team to resolve using the issue resolution process in ER 1165-2-217, Section 5.9. Unresolved concerns will be closed in DrChecks by noting the concern has been elevated. ATR documentation will include an assessment by the ATR team of the effectiveness of DQC. The ATR Lead will prepare a Statement of Technical Review (see ER 1165-2-217, Section 5.11, and Appendix D), for the draft and final reports, certifying that review issues have been resolved or elevated. ATR will be certified when all concerns are resolved or referred to the vertical team and the ATR documentation is complete.

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

5. Supporting Information

Study Authority

The Brunswick County Beaches Coastal Storm Risk Management Project was authorized by Section 203 of the Flood Control Act of 1966 (Public Law (PL) 89-789) to provide for shore and hurricane wave protection through a dune and berm system that protects the communities of Yaupon and Long Beaches (later combined into the town of Oak Island), Holden Beach, Ocean Isle Beach, and Sunset Beach.

A feasibility study was completed in the same year recommending a dune and berm system consisting of a "...50-foot berm at an elevation of 15 feet MSL with a dune 25 feet wide at an elevation of 20 feet MSL..." and extending varying lengths for each beach. For Holden Beach, the recommended plan measured approximately 40,000 linear feet in length between the Shallotte and Lockwood Folly Inlets. However, a 1974 public referendum of Brunswick County residents rejected the recommended plan within the 1966 Feasibility Report and the project was never constructed.

Study or Project Area

The town of Holden Beach is located in Brunswick County, North Carolina, approximately 35 miles southeast of the city of Wilmington. The town occupies an 8-mile-long barrier island on the Atlantic Ocean and is bounded to the west by Shallotte Inlet, to the east by Lockwoods Folly Inlet, and the to the north by the Atlantic Intracoastal Waterway (A.I.W.W).

Most businesses and residents in the town are located along Ocean Boulevard and Holden Beach Road (a.k.a. North Carolina Highway 130) which crosses the A.I.W.W

and connects the island to the mainland. Man-made inlets along the A.I.W.W. characterize central portion of the island, while marsh and wetlands characterize the western portion.

Land use at Holden Beach generally consists of medium-density detached homes, multi-unit apartments, and condominiums. Newly-constructed and rebuilt structures on the island have elevated first floors in response to previous coastal storm events and local building codes, but several older structures are either at grade or a few feet above the ground surface. While a few habitable vacant lots exist on the island, it is assumed that they will be built upon within the period of analysis for this study, since the infrastructure (water, electric, sewer, etc.) already exists in these areas.



Figure 1: Study Area

Problem Statement

The town of Holden Beach is experiencing increased damages and risks from erosion, storm surge, wave attack and inundation caused by severe coastal storms, and worsened by the onset of sea level rise and climate change.

Study Objectives

Study objectives based upon the identified problems and opportunities include:

- Reduce damages to Holden Beach from storm-induced beach erosion, flooding, wave action, and surge (while considering effects of potential sea level change) over a 50-year period of analysis (2029-2078).
- Improve the quality of life for residents of Holden Beach and surrounding areas through better wages, increased employment, and business growth over a 50-year period of analysis (2029-2078).
- Improve beach and nearshore habitat for terrestrial and marine resources, including threatened and endangered species and migratory birds, over a 50-year period of analysis (2029-2078)
- Reduces the life, health, and safety risks for Holden Beach residents from storm-induced beach erosion, flooding, wave action, and surge (while considering effects of potential sea level change) over a 50-year period of analysis (2029-2078).
- Reduces coastal storm risks to community services and critical infrastructure - such as city government, police, fire, public works, and ocean rescue - during and after coastal storm events.
- Maximize access to the project for disadvantaged communities and socially vulnerable populations in Brunswick County over a 50-year period of analysis (2029-2078).

Future Without Project Conditions

If a federal project is not constructed at Holden Beach, then residents will continue to struggle with the risks associated with coastal storms, sea level rise, and climate change. Currently, Holden Beach experiences flooding in low-lying areas during King Tide events. By 2039, sea level rise will create flooding along the A.I.W.W. By 2079, most of the central portion of the island will experience significant flooding impacting unelevated structures and property. Beyond the project life and through the 100-year adaptation horizon (2129), flooding is expected to impact primary roadways.

Types of Measures/Alternatives Being Considered

This study will develop a comprehensive plan to address coastal storm risk management. Alternatives include measures such as berm and dune nourishment, groins, bulkheads, seawalls, rock revetment, nature-based solutions, structure raising and relocation. Below is the preliminary alternatives array:

- Alternative 1: No action plan
- Alternative 2: Berm and Dune Nourishment plan only (Coastal Side)
- Alternative 3: Nonstructural plan only (Whole Island) - no buy outs
- Alternative 4: Berm and dune nourishment with nonstructural measures and coastline plantings
- Alternative 5: Terminal groin and berm and dune nourishment with nonstructural measures and coastline plantings.
- Alternative 6: Groin field and berm and dune nourishment with nonstructural measures and coastline plantings

Table 3: Class 5 Range of Magnitude (ROM) Cost Estimate with 50% Contingency

Measure	Cost
Sand Nourishment (50 ft Berm, 24k ft. length)	\$314m
Detached Breakwaters (25 structures)	\$127.9m
Seawall (24k ft. length)	\$43.5m
Groin Field (44 structures)	\$65.5m
Terminal Groin (1068 ft. length)	\$10.4m
Rock Revetment (24k ft. length)	\$73.8m
Bulkhead (A.I.W.W.)	\$143.2m

The estimated cost of the above alternatives are unknown. A Class 5 Range of Magnitude (ROM) cost estimate with contingency was prepared for seven of the measures being considered on the study using recent contractor quotes and professional judgement.

6. Models to be Used in the Study

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 following planning/economic models will be used to develop and evaluate alternatives for the study:

Table 4: Planning/Economic Models.

Model Name and Version	Brief Model Description and How It Will Be Used in the Study	Certification / Approval
Beach –Fx (version 1.1.12) with SBEACH (CEDAS version 4.03)	A comprehensive innovative analytical framework for more accurately evaluating the physical performance and economic benefits and costs of a beach nourishment project. Beach-Fx will utilize SBEACH for model inputs.	Certified
Generation 2 Coastal Risk Model (G2CRM) version 0.4.564	A Monte Carlo life cycle analysis coastal model that allows the user to quantify the value of various flood risk management measures. The model takes coastal forcing and applies it to an asset inventory to calculate total damages for multiple life cycles.	Certified
Unit Day Value for Recreation	A method that estimates recreational benefits using expert or informed opinion and judgment and approximates the average willingness of users to pay Federal or Federally-assisted recreation resources.	It is approved and certified for use.
Economic Consequences Assessment Model (ECAM), version 2.0	A tool and methodology for measuring indirect economic effects, such as lost business revenues, changes to household incomes, and employment losses.	It is approved and certified for use.
Regional Economic Systems (RECONS), version 2.0	A regional economic impact modeling tool developed to provide accurate and defensible estimates of regional economic impacts associated with Federal expenditures. This modeling tool automates calculations and generates estimates of jobs and other economic measures such as income and sales associated with USACE spending on Civil Works programs and projects.	It is approved and certified for use.

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. For example, HH&C models need to comply with the requirements of HH&C CoP Enterprise Standard 08101.

These engineering models will be used to develop the decision document:

Table 5: Engineering Models.

Model Name and Version	Description	Approval Status
MII, version 4.4.4	Used to estimate costs of alternatives and TSP	Enterprise
Crystal Ball, version 11.1.2.4	Used to account for risk and uncertainty of alternatives and the TSP	Enterprise
CEDEP	Corps-proprietary, Excel add-on for Cost Engineering; used	CEDEP
GenCade model (GENESIS and Cascade combined model), version (CEDAS) 1.1 r8	Simulates the long-term platform evolution of the beach in response to imposed wave conditions, coastal structures, and other engineering activity (e.g., beach nourishment).	Enterprise
CMS-Flow and CMS-Wave, version 5.3.0	An integrated 2D numerical modeling system used for simulating waves, current, water level, sediment transport, and morphology change at coastal inlets and entrances.	Enterprise
SBEACH, version 4.03	A numerical simulation model for predicting beach, berm, and dune erosion due to storm waves and water levels.	Enterprise

All civil works planning studies must document compliance with CECW-P memo (28 July 2023), Model Coordination for Civil Works Planning Studies, to coordinate models and confirm assigned modelers possess the requisite knowledge and experience to complete modeling tasks. A questionnaire for each model is attached in Appendix G.

7. Factors Affecting Level and Scope of Review

All planning products are subject to the conduct and completion of District Quality Control. Most planning products are subject to Agency Technical Review and a smaller sub-set of products may be subject to Independent External Peer Review. Information in this section helps in the scoping of reviews through the considerations of various potential risks.

Objectives of the Reviews

According to ER 1165-2-217 (dated 1 May 2021): CIVIL WORKS REVIEW POLICY, the objectives of a review are to assess “. . . whether the analyses presented are technically

correct and comply with published USACE guidance, and whether the documentation explains the analyses and results in a reasonably clear manner for the public and decision makers.” Civil Works products will undergo an open, dynamic, and rigorous review process. Technical, scientific, engineering, and other information used to support recommendations in decision documents or form the basis of design must undergo review. Reviews of specifications, O&M requirements, or other assessments help ensure technical quality and practical application.

Assessing the Need for an Independent External Peer Review (IEPR)

The mandatory triggers for an IEPR must include at least one of the following:

- The estimated total cost of the project, including mitigation costs, is greater than \$200 million.
- The Governor of an affected State requests a peer review by independent experts.
- When the Chief of Engineers determines the project study is controversial due to significant public dispute over the size, nature, or effects of the project or the economic or environmental costs or benefits of the project.

The guidance also states that “. . .PDTs must make a recommendation based on a risk-informed assessment of whether or not conducting IEPR would substantially benefit or add value to the project study and provide the rationale for the recommendation. . . . This assessment and documentation should consider a variety of factors to indicate whether the covered subject matter (including data, use of models, assumptions, and other scientific and engineering information) has life safety concerns, is novel, is controversial, is precedent setting, has significant interagency interest, or has significant economic, environmental and social effects to the Nation.”

The following is an evaluation of these triggers and factors:

Mandatory IEPR Triggers

- Has the Chief of Engineers determined the project is controversial? **No**
- Has the Governor of an affected state requested an IEPR? **No**
- Is the cost of the project more than \$200 million? **Yes**

Discretionary IEPR

- Has the head of another Federal agency requested an IEPR? **No**

Potential IEPR Exclusion

- Is the project cost greater than \$200 million? **Yes**; and
- Does the project have an Environmental Impact Statement (EIS)? **Yes**

Assessing Other Risk Considerations

Will the study likely be challenging? If so, describe how?

It’s possible that year-round dredging windows will be included to some extent in the final alternatives array. Year-round dredging was successfully challenged in 2021 by the Southern Environmental Law Center on behalf of Cape Fear River Watch, the North

Carolina Wildlife Federation and Defenders of Wildlife, and could be the basis for a challenge for this project, if adopted. It is anticipated that the inclusion of year-round dredging for the project in the final alternatives array will be controversial and thus the study will be challenging. This would be an important consideration in the selection of a recommended plan.

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

The South Atlantic Coastal Study indicates a deficiency of proven, offshore sand borrow sources for Brunswick County, North Carolina and study area. In addition, a preliminary assessment of the Sea Level Rise anticipates flooding along the Atlantic Intercoastal Waterway within the 50-year project lifespan, impacting real property within the study area. Both represent “high risks” for implementation of a CSRM project at Holden Beach.

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

It is unclear at this point in the study whether a project at Holden Beach will result in a life safety risk for the residents and seasonal visitors. An examination of life safety risks for the project will be determined later in the study.

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? If so, how?

It is not anticipated that the study or project will recommend novel methods, involve innovative materials or techniques, complex challenges, or conclusions that will challenge prevailing practices.

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

It is not anticipated that the study or project will require redundancy, resiliency, and/or robustness, unique construction sequencing, or a reduced or overlapping design/construction schedule.

Is the project expected to have more than negligible adverse impacts on scarce or unique tribal, cultural, or historic resources? If so, what are the anticipated impacts?

It is unclear at this point in the study whether a project at Holden Beach will have an effect or adverse effect to historic properties (such as “scarce or unique tribal, cultural, or historic resources”) eligible for listing to the National Register of Historic Places. These “impacts” will be determined through consultation under Section 106 of the National Historic Preservation Act with state agencies, tribes and public, through a defined Area of Potential Effect, and a professional investigation and evaluate of the APE. Currently, the District is aware that abandoned shipwrecks eligible for listing to the National Register of Historic Places are recorded within the Lockwoods Folly Inlet, which could be a borrow

source of sand on the project. The District will develop alternatives to avoid or minimize effects to these and other cultural 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? If so, describe the impacts?

At this point in the study, it is unclear if a project at Holden Beach will have a “substantial adverse impact on fish and wildlife species and their habitat prior to the implementation of mitigation measures.” However, inclusion of year-round dredging could have an impact to aquatic and terrestrial species such as the Loggerhead Sea Turtles, Piping Plover, North Atlantic Right Whale, fisheries and benthos, and will require additional consultation per the South Atlantic Regional Biological Opinion (SARBO). In addition, Frying Pan Shoals, a large Habitat Area of Particular Concern (HAPC) under the Essential Fish Habitat regulations, is a potential offshore borrow source for the project and require additional consultation.

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? If so, what are the anticipated impacts?

At this point in the study, it is unclear if a project at Holden Beach will have a “negligible adverse impact on an endangered or threatened species or their designated critical habitat prior to the implementation of mitigation measures.” However, inclusion of year-round dredging could have an impact to aquatic and terrestrial species such as the Loggerhead Sea Turtles, Piping Plover, North Atlantic Right Whale, fisheries, and benthos, and will require additional consultation per the South Atlantic Regional Biological Opinion (SARBO). In addition, Frying Pan Shoals, a large Habitat Area of Particular Concern (HAPC) under the Essential Fish Habitat regulations, is a potential offshore borrow source for the project and require additional consultation.

Conclusions

The current estimated cost of the Holden Beach portion of the 1966 authorized plan exceeds \$200 million. The consideration of year -round dredging for the project will likely be controversial and require consultation to determine the impacts to aquatic and terrestrial species. Lastly, proposed sand borrow sources are being considered from nearby inlets where abandoned shipwrecks are located and within a HAPC of the Essential Fish Habitat known as Frying Pan Shoals. Such considerations require the preparation of an environmental impact statement (EIS) and Record of Decision (ROD) under the National Environmental Policy Act (NEPA). Based on these factors, an IEPR is required for the study.

8. Risk Informed Decisions on the Level and Scope of Review

Targeted ATR

A targeted ATR is scheduled for the FWOP condition model results of the Beach fix and G2CRM. The review will address the following charge/questions:

1. Are the FWOP conditions within the G2CRM appropriate? If not, how can they become appropriate or improved?
2. Are the inputs for the FWOP conditions of the G2CRM correct? If not, how can they be corrected or improved?
3. Are the outputs for the FWOP conditions of the G2CRM correct? If not, how can they be corrected or improved?
4. Were the outputs for the FWOP conditions of the G2CRM interpreted correctly and used appropriately for alternative plan development, evaluation, comparison, and selection? If not, how can the outputs be better used for these efforts?

IEPR Decision

As the estimated cost of the Holden Beach portion of the 1966 authorized plan exceeds \$200 million, and compliance under NEPA will require the preparation of an EIS and ROD, an IEPR is recommended for the study.

Safety Assurance Review

Safety Assurance Reviews (SAR) are managed outside of the USACE and are conducted on design and construction products for coastal storm risk management projects, or other projects where existing and potential hazards pose a significant threat to human life. In some cases, significant life safety considerations may be relevant to planning decisions. These cases may warrant the development of relevant charge questions for consideration during reviews such as ATR or IEPR. In addition, if the characteristics of the recommended plan warrant a Safety Assurance Review, a panel will be convened to review the design and construction activities on a regular schedule before construction begins and until construction activities are completed.

Decision on Safety Assurance Review

It is unclear at this point in the study if a constructed project will represent a life safety risk to the residents of Holden Beach. Therefore, the decision for a SAR will be made later in the study.

9. Policy and Legal Compliance Review

Policy and legal compliance review of draft and final planning decision documents is delegated to the MSC (see EP 1105-2-61).

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 Major Subordinate Command (MSC) Commander. These reviews are not further detailed in this section of the Review Plan

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 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.
- 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.

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.

10. Public Comment

This Review Plan will be posted on the District's website. Public comments on the scope of reviews, technical disciplines involved, schedules and other considerations may be

submitted to the District for consideration. If the comments result in a change to the Review Plan, an updated plan will be posted on the District's website.

11. Documents Distributed Outside the Government

For information distributed for review to non-governmental organizations, the following disclaimer shall be placed on documents:

“This information is distributed solely for the purpose of pre-dissemination review under applicable information quality guidelines. It has not been formally disseminated by USACE. It does not represent and should not be construed to represent any agency determination or policy.”

Appendix A - Brief Description of Each Type of Review

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 and accompanying components will undergo DQC. This internal review covers basic science and engineering work products. It fulfills the project quality requirements of the Project Management Plan. The DQC team will read all reports and appendices. The review must evaluate the correct application of methods, validity of assumptions, adequacy of basic data, correctness of calculations (error-free), completeness of documentation, and compliance with guidance and standards. Districts are required to check all computations and graphics by having the reviewer place a highlight (e.g., place a “red dot”) on each annotation and/or number indicating concurrence with the correctness of the information shown.

Agency Technical Review. ATR will be 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. The objectives of an ATR are to assess “. . . whether the analyses presented are technically correct and comply with published USACE guidance, and whether the documentation explains the analyses and results in a reasonably clear manner for the public and decision makers.”

Independent External Peer Review. IEPR is required for this decision document. 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. Certain criteria dictate mandatory performance of IEPR and other considerations may lead to a discretionary decision to perform IEPR. For this study, a risk-informed decision has been made that IEPR is appropriate. The information in Section 7 – Factors Affecting the Scope of Review – informed the decision to conduct IEPR.

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

Policy and Legal Compliance Review. 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.

Public Review. The District will post the Review Plan and approval memo on the District’s internet site. Public comment on the adequacy of the Review Plans will be accepted and considered. Additional public review will occur when the report and environmental compliance document(s) are released for public and agency comment.

Appendix B – Team Rosters

PROJECT DELIVERY TEAM			
Name	Office	Position	Phone Number
[REDACTED]	CESAW-PM-DG	Project Manager	[REDACTED]
[REDACTED]	CESAW-ECP-PS	Plan Formulation	[REDACTED]
[REDACTED]	CESAJ-PDD	Economist	[REDACTED]
[REDACTED]	CESAJ-PDD	Economist	[REDACTED]
[REDACTED]	CESAJ-PDD	Economist	[REDACTED]
[REDACTED]	CESAW-ECP-EC	Coastal Engineer	[REDACTED]
[REDACTED]	CESAW-ECP-EC	Coastal Engineer	[REDACTED]
[REDACTED]	CESAW-ECP-PE	Environmental	[REDACTED]
[REDACTED]	CESAW-ECP-EG	Geologist	[REDACTED]
[REDACTED]	CESAW-ECP-ET	Cost Engineer	[REDACTED]
[REDACTED]	CESAS-RE-A	Real Estate	[REDACTED]
[REDACTED]	CESAW-OC	Office of Counsel	[REDACTED]
[REDACTED]	CESAW-ECP-ED	Design Engineer	[REDACTED]
[REDACTED]	CESAW-CT	Contracting	[REDACTED]
[REDACTED]	CESAW-ECP-EG	Geotechnical Engineer	[REDACTED]
[REDACTED]	CESAW-ECP-PE	Cultural Resources	[REDACTED]

DISTRICT QUALITY CONTROL TEAM			
Name	Office	Position	Phone Number
[REDACTED]	CESAW-ECP-P	Planning Chief	[REDACTED]
[REDACTED]	CESAJ-PD-D	Economics	[REDACTED]
[REDACTED]	CESAW-ECP-EC	Coastal Engineer	[REDACTED]
[REDACTED]	CESAW-ECP-PE	Environmental	[REDACTED]
[REDACTED]	CESAS-RE-A	Real Estate	[REDACTED]
[REDACTED]	CESAW-ECP-ET	Civil Design	[REDACTED]
[REDACTED]	CESAW-ECP-ET	Cost Engineer	[REDACTED]
[REDACTED]	CESAW-ECP-EG	Chief, Geotech Branch	[REDACTED]
[REDACTED]	CESAW-PM-D	CW Prog & PM Branch	[REDACTED]

INDEPENDENT EXTERNAL PEER REVIEW TEAM			
Name	Office	Position	Phone Number
[REDACTED]	CENAB-PLP	Review Manager	[REDACTED]

AGENCY TECHNICAL REVIEW TEAM			
Name	Office	Position	Phone Number
[REDACTED]	CENAB-PL	ATR Lead	[REDACTED]
TBD	TBD	Planning – Coastal Specialist	TBD
TBD	TBD	Economics	TBD
TBD	TBD	Coastal Engineering	TBD
TBD	TBD	Environmental	TBD
TBD	TBD	Real Estate	TBD
TBD	TBD	Cost Engineering	TBD
TBD	TBD	Climate Preparedness and Resilience	TBD
TBD	TBD	Civil Design	TBD
TBD	TBD	Cultural Resources	TBD

POLICY AND LEGAL COMPLIANCE REVIEW TEAM			
Name	Office	Position	Phone Number
[REDACTED]	CECC-SAD	Office of Counsel	[REDACTED]
[REDACTED]	CESAD-PDO	Coastal Navigation	[REDACTED]
[REDACTED]	CESAD-PDR	Real Estate	[REDACTED]
[REDACTED]	CECC-SAD	Office of Counsel	[REDACTED]
[REDACTED]	CECW-EC	Climate Preparedness & Resilience	[REDACTED]
[REDACTED]	CECW-PB	Environmental	[REDACTED]
[REDACTED]	CECW-PC	Planning, Review Manager	[REDACTED]
[REDACTED]	CESAD-PDP	Economics	[REDACTED]
[REDACTED]	CESAD-RBT	Engineering	[REDACTED]

Appendix C – Checklist – District Quality Control

DQC Checklist	Response	Initials	Comments
General Issues			
1. Has a PDT Review been completed?			
2. Was the allotted time for DQC in the review plan adhered to?			
3. Has the DQC Team verified the information presented in the current study issue checklist (Pre-AMM, Pre-TSP, Final Report) is accurate?			
4. Is the identified problem well understood and are the risks and uncertainties properly characterized?			
5. Has an appropriate array of alternatives been considered that could solve the problem?			
6. Does the Tentatively Selected Plan (TSP) solve the problem needs and have implementation risks been appropriately considered?			
7. Are the proposed construction methods appropriate?			
8. Are the schedules and cost estimates reliable (comprehensive, well-documented, accurate, and credible)?			
9. What is the risk of potential cost and schedule growth?			
10. Are there lessons learned that need to be considered?			
11. Does the product comply with USACE criteria and policy requirements including environmental compliance requirements?			
12. Have life-safety risks been appropriately assessed?			
13. Are the methods used to develop analyses and conclusions clearly and fully presented to ensure transparency if applicable?			
Items for Verification			
14. Are the assumptions, methods, procedures, computations (including quantities), and materials used in the analyses consistent with the project purpose or decisions being made?			
15. Are the array of alternatives considered comprehensive?			
16. Are the methods used to develop analyses and conclusions clearly and fully presented?			
17. Are the data, level of data, assumptions, and safety risk based on deterministic criteria and RIDM information is appropriate?			

18. Are the results compared to project purpose in compliance with applicable laws and USACE policies reasonable?			
19. Correctness of calculations – before this is checked yes, the DQC reviewer must have highlighted (placed a red-dot) on each annotation, computation, and model input parameter indicating concurrence with the correctness of the information. By checking yes, the reviewer is assuming the same level of responsibility as the author.			
a. H&H			
b. Economics			
c. Environmental			
d. Climate Change			
e. Geotechnical			
f. GIS			
g. Civil			
h. Real Estate			
20. Correctness, accuracy, and clarity of graphic/plan presentation – before this is checked the DQC reviewer must have highlighted (placed a red-dot) critical graphic/plan elements (e.g., dimension/elevation, note, or reference) showing concurrence with the correctness of the information shown. By checking yes, the reviewer is assuming the same level of responsibility as the author.			
a. H&H			
b. Economics			
c. Environmental			
d. Climate Change			
e. Geotechnical			
f. GIS			
g. Civil			
h. Real Estate			

Concurrence

District Planning Chief _____ Date: _____

DQC Lead _____ Date: _____

Appendix D – Cost of Reviews – Backup Information

Appendix E – Sensitive Information

Appendix F – Review Plan Change Log

Revision Date	Description of Change	Page / Paragraph Number
12/2021	Draft Study Review Plan approved	
6/2024	Updated teams and schedule, inclusion of IEPR, and new review plan template	Whole plan

Appendix G – Model Coordination and Model User Questionnaires