



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

CENAD-RBT

30 May 2019

MEMORANDUM FOR Commander, New York District, (CENAN-EN-M/Mr. Sulayman)
26 Federal Plaza, New York, NY 10278

SUBJECT: Review Plan Approval for the Atlantic Coast of New Jersey, Sandy Hook to Barnegat Inlet Beach Erosion Control Project, Sections I and II: Sea Bright to Manasquan Reaches Implementation Documents

1. References:

a. Memorandum, CENAN-DE, 24 April 2019, subject: Review Plan for the Atlantic Coast of New Jersey Sandy Hook to Barnegat Inlet Beach Erosion Control Project Sections I and II: Sea Bright to Manasquan Reaches..

b. EC 1165-2-217, Water Resources Policies and Authorities - Review Policy for Civil Works, 28 February 2018.

2. The enclosed Review Plan for the Atlantic Coast of New Jersey, Sandy Hook to Barnegat Inlet Beach Erosion Control Project, Sections I and II: Sea Bright to Manasquan Reaches Implementation Documents was prepared in accordance with Reference 1b.

3. North Atlantic Division Business Technical Division is the Review Management Organization for the Agency Technical Review. The Review Plan does not include Type II Independent External Peer Review (Safety Assurance Review) because the project does not include design or construction activities that involve potential hazards which pose a significant threat to human life.

4. I hereby approve the Review Plan, which is subject to change as circumstances require, consistent with study development under the Project Management Business Process. Subsequent revision to the 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.


5. In accordance with Reference 1b, Paragraph 7g, post this approved Review Plan on your district website for public review and comment. NAD will post on the Division website.

CENAD-RBT

SUBJECT: Review Plan Approval for the Atlantic Coast of New Jersey, Sandy Hook to Barnegat Inlet Beach Erosion Control Project, Sections I and II: Sea Bright to Manasquan Reaches Implementation Documents

6. The point of contact in the Business Technical Division is Mr. Ralph LaMoglia, PE, 347-370-4599 or ralph.a.lamoglia@usace.army.mil.

Encl
Review Plan


JEFFREY L. MILHORN
Major General, USA
Commanding

CF: (w/ encl)
CENAN-EN-M (J. Sulayman)

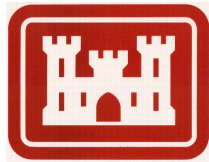
Review Plan

For Atlantic Coast of New Jersey

Sandy Hook to Barnegat Inlet Beach Erosion Control Project

Section I&II: Sea Bright to Manasquan Reaches

Implementation Documents



**US ARMY CORPS
OF ENGINEERS
NEW YORK DISTRICT**

MSC Approval Date: 30 May 2019

Last Revision Date: 20 February 2019

Table of Contents

1.	PURPOSE AND REQUIREMENTS	1
2.	REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION	1
3.	PROJECT INFORMATION	2
4.	DISTRICT QUALITY CONTROL (DQC)	2
5.	AGENCY TECHNICAL REVIEW (ATR).....	3
6.	INDEPENDENT EXTERNAL PEER REVIEW (IEPR)	4
7.	POLICY AND LEGAL COMPLIANCE REVIEW	6
8.	COST ENGINEERING DIRECTORATE OF EXPERTISE (DX) REVIEW AND CERTIFICATION	6
9.	MODEL CERTIFICATION AND APPROVAL.....	6
10.	REVIEW SCHEDULES AND COSTS.....	6
11.	PUBLIC PARTICIPATION	6
12.	REVIEW PLAN APPROVAL AND UPDATES.....	6
13.	REVIEW PLAN POINTS OF CONTACT.....	7
	ATTACHMENT 1: TEAM ROSTERS	8
	ATTACHMENT 2: STATEMENT OF AGENCY TECHNICAL REVIEW	10
	ATTACHMENT 3: ACRONYMS AND ABBREVIATIONS	12
	ATTACHMENT 4: MFR ON RISK INFORMED ASSESSMENT OF SIGNIFICANT THREAT TO HUMAN LIFE BY CENAN, ENGINEERING DIVISION	13

1. PURPOSE AND REQUIREMENTS

a. Purpose.

This Review Plan defines the scope and level of review for the implementation documents for the renourishment of Sea Bright to Manasquan reaches of the Sandy Hook to Barnegat Inlet Beach Erosion Control Project. Implementation documents include plans and Specifications (P&S), Design Documentation Report (DDR), and cost estimate.

b. References

- (1) Engineering Circular (EC) 1165-2-217, Review Policy for Civil Works, 20 Feb 18
- (2) EC 1105-2-412, Assuring Quality of Planning Models, 31 Mar 11
- (3) Engineering Regulation (ER) 1110-1-12, Quality Management, 20 Sep 06
- (4) ER 1105-2-100, Planning Guidance Notebook, Appendix H, Policy Compliance Review and Approval of Decision Documents, Amendment #1, 20 Nov 07
- (5) ER 415-1-11, Biddability, Constructability, Operability, Environmental and Sustainability (BCOES) Reviews, 1 Jan 13

c. Requirements.

This review plan was developed in accordance with EC 1165-2-217, which establishes an accountable, comprehensive, life-cycle review strategy for Civil Works products by providing a seamless process for review of all Civil Works projects from initial planning through design, construction, and operation, maintenance, repair, replacement and rehabilitation (OMRR&R). The EC outlines four general levels of review: District Quality Control/Quality Assurance (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Compliance Review. In addition to these levels of review, decision documents are subject to cost engineering review and certification (per EC 1165-2-217) and planning model certification/approval (per EC 1102-2-412).

2. REVIEW MANAGEMENT ORGANIZATION (RMO) COORDINATION

a. The RMO is responsible for managing the overall peer review effort described in this Review Plan. The RMO for implementation documents is the Major Subordinate Command (MSC), while for a decision document is the appropriate Planning Center of Expertise (per EC 1165-2-209). Therefore the RMO for the peer review of the P&S, DDR, and cost estimate described in this Review Plan is the North Atlantic Division.

b. The RMO will coordinate with the Civil Works Cost Engineering and Agency Technical Review Mandatory Center of Expertise (MCX) to ensure the appropriate expertise is included on the review teams to assess the adequacy of cost estimates, construction schedules and contingencies.

3. PROJECT INFORMATION

a. Implementation Documents.

This Review Plan has been prepared for the Design Documentation Report (DDR), plans and specifications (P&S), and cost estimate for the renourishment of the Sea Bright to Manasquan reaches of the Sandy Hook to Barnegat Inlet Beach Erosion Control Project. The purpose of these documents is to provide a record of final design. Approval of these implementation documents is at the District Command level.

b. Project Description.

The Federally authorized Sandy Hook to Barnegat Inlet Beach Erosion Control Project is located on the Atlantic Coast of New Jersey, covering 51 miles of coastline between Sandy Hook peninsula and Barnegat Inlet. The Project report recommending Federal action was submitted to Congress in 1956 and authorized by the River and Harbor Act of July 3, 1958, in accordance with House Document No. 332, 85th Congress, second session. Further modifications associated with the non-Federal sponsor cost share and public access requirements were made by Section 854 of the Water Resources Development Act (WRDA) of 1986, (P.L. 99-662).

The project area is comprised of three sections and is further sub-divided by construction contracts. Section I, the northerly extent of the project, extends 12 miles from just north of the Route 36 Bridge in Sea Bright, southward to Loch Arbour at the outlet of Deal Lake. Section II, the middle extent of the project, reaches for 9 miles from Asbury Park south to the Manasquan Inlet. The FY19 renourishment Project plan is for fill only, including advanced nourishment along the length of the design berm, and feeder beaches. The recommended plan provides for reduction of storm damages from coastal erosion and flooding through storm protective berm and beachfill. The State of New Jersey, acting through the Department of Environmental Protection, is the non-Federal sponsor for this project.

4. DISTRICT QUALITY CONTROL (DQC)

All implementation documents will undergo DQC. DQC is an internal review process of basic science and engineering work products focused on fulfilling the project quality requirements defined in the Project Management Plan (PMP). The home district (NAN) will manage the DQC.

a. Documentation of DQC and BCOES Reviews.

DQC and BCOES will be documented through the use of DrCheckssm and a DQC report, which will be signed by all reviewers.

b. Products to Undergo DQC and BCOES.

All applicable documents will undergo DQC and BCOES reviews.

c. Required DQC Expertise.

DQC and BCOES will be performed by staff in the Home District that are not involved in the development of implementation documents. Additional Quality Control will be performed by the Project Delivery Team during the course of completing the design.

5. AGENCY TECHNICAL REVIEW (ATR)

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

a. Products to Undergo ATR.

The products that will undergo ATR include the DDR and Plans and Specifications.

b. Required ATR Team Expertise.

ATR Team Members/Disciplines	Expertise Required
ATR Lead	The ATR lead should be a senior professional with extensive experience in preparing Civil Works implementation documents and conducting ATR. The lead should also have the necessary skills and experience to lead a virtual team through the ATR process. The ATR lead may also serve as a reviewer for a specific discipline (such as civil engineering).
Coastal Engineering/ Civil Engineering	Team member will be a licensed expert in the field of coastal engineering, specifically in beachfill design including renourishment.

c. Documentation of ATR.

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

- (1) The review concern – identify the product’s information deficiency or incorrect application of policy, guidance, or procedures;
- (2) The basis for the concern – cite the appropriate law, policy, guidance, or procedure that has not be properly followed;

- (3) The significance of the concern – indicate the importance of the concern with regard to its potential impact on the plan components, efficiency (cost), effectiveness (function/outputs), implementation responsibilities, safety, Federal interest, or public acceptability; and
- (4) The probable specific action needed to resolve the concern – identify the action(s) that the reporting officers must take to resolve the concern.

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

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

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

- Identify the document(s) reviewed and the purpose of the review;
- Disclose the names of the reviewers, their organizational affiliations, and include a short paragraph on both the credentials and relevant experiences of each reviewer;
- Include the charge to the reviewers;
- Describe the nature of their review and their findings and conclusions;
- Identify and summarize each unresolved issue (if any); and
- Include a copy of each ATR comment, the PDT response, a brief summary of the pertinent points in the follow on discussion, including any vertical coordination, and the agreed upon resolution.

ATR will be certified when all ATR concerns are either resolved or referred to the vertical team for resolution and the ATR documentation is complete. The ATR Lead will prepare a Statement of Technical Review certifying that the issues raised by the ATR team have been resolved (or elevated to the vertical team). A Statement of Technical Review should be completed for the implementation documents. A sample Statement of Technical Review is included in Attachment 2.

6. INDEPENDENT EXTERNAL PEER REVIEW (IEPR)

An IEPR may be required for implementation documents under certain circumstances. IEPR is the most independent level of review, and is applied in cases that meet certain criteria where

the risk and magnitude of the proposed project are such that a critical examination by a qualified team outside of USACE is warranted. A risk-informed decision, as described in EC 1165-2-217, is made as to whether an IEPR is appropriate. IEPR panels will consist of independent, recognized experts from outside of the USACE in the appropriate disciplines, representing a balance of areas of expertise suitable for the review being conducted. There are two types of IEPR:

- **Type I IEPR.** Type I IEPRs are managed outside the USACE and are conducted on project studies. Type I IEPR panels assess the adequacy and acceptability of the economic and environmental assumptions and projections, project evaluation data, economic analysis, environmental analyses, engineering analyses, formulation of alternative plans, methods for integrating risk and uncertainty, models used in the evaluation of environmental impacts of proposed projects, and biological opinions of the project study. Type I IEPR will cover the entire decision document or action and will address all underlying engineering, economics, and environmental work, not just one aspect of the study. For decision documents where a Type II IEPR (Safety Assurance Review) is anticipated during project implementation, safety assurance shall also be addressed during the Type I IEPR per EC 1165-2-217.
- **Type II IEPR.** Type II IEPRs, or Safety Assurance Reviews (SAR), are managed outside the USACE and are conducted on design and construction activities for hurricane, storm, and flood risk management projects or other projects where existing and potential hazards pose a significant threat to human life. Type II IEPR panels will conduct reviews of the design and construction activities prior to initiation of physical construction and, until construction activities are completed, periodically thereafter on a regular schedule. The reviews shall consider the adequacy, appropriateness, and acceptability of the design and construction activities in assuring public health safety and welfare.

a. Decision on IEPR.

Type I IEPR is not applicable as per EC 1165-2-217, Civil Works Review Policy, since the Sea Bright to Manasquan renourishment project is in the Preconstruction, Engineering, and Design Phase.

Type II Independent External Peer Review, Safety Assurance Review, is required by EC 1165-2-217 for hurricane and storm risk management and flood risk management projects, as well as other projects where potential hazards pose a significant threat to human life. Based on a risk informed decision, Attachment 4, there is no significant risk to human life.

b. Products to Undergo IEPR. Not applicable.

c. Required IEPR Panel Expertise. Not applicable.

d. **Documentation of IEPR.** Not applicable.

7. POLICY AND LEGAL COMPLIANCE REVIEW

All implementation documents will be reviewed for their compliance with law and policy. DQC and ATR facilitate the policy review processes by addressing compliance with pertinent published Army policies, particularly policies on analytical methods and the presentation of results in implementation documents.

8. COST ENGINEERING DIRECTORATE OF EXPERTISE (DX) REVIEW AND CERTIFICATION

The District, through the RMO, will coordinate with the Cost Engineering DX located in Walla Walla District to determine what level of review is necessary and to identify the appropriate reviewer. The DX will provide the Cost Engineering certification.

9. MODEL CERTIFICATION AND APPROVAL

Not applicable since the Sea Bright to Manasquan project is in the Preconstruction, Engineering and Design Phase and this relates to the use of certified or approved models for planning activities.

10. REVIEW SCHEDULES AND COSTS

a. ATR Schedule and Cost.

The schedule and costs budgeted for ATR reviews are as follows:

90% Plans & Specifications, May-June 2019 (\$20,000) (approximate start date May 21, 2019)

b. IEPR Schedule and Cost. Not applicable.

c. Model Certification/Approval Schedule and Cost. Not applicable.

11. PUBLIC PARTICIPATION

There will be no public meetings prior to the start of the construction contract.

12. REVIEW PLAN APPROVAL AND UPDATES

The North Atlantic Division Commander, or his representative, is responsible for approving this Review Plan. The Commander's approval reflects vertical team input (involving district, PCX (RMO), MSC (RMO), and HQUSACE members) as to the appropriate scope and level of review for the implementation documents. Like the PMP, the Review Plan is a living document and may change as the engineering and design progresses. The home district is responsible for keeping the Review Plan up to date. Significant changes to the Review Plan (such as changes to

the scope and/or level of review) should be re-approved by the MSC Commander following the process used for initially approving the plan. The latest version of the Review Plan, along with the Commanders' approval memorandum, will be posted on the Home District's webpage. The latest Review Plan should also be provided to the PCX (RMO).

13. REVIEW PLAN POINTS OF CONTACT

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

- Ralph LaMoglia, P.E., NAD, RMO Lead, 347-370-4599
- Jason Shea, NAN, PPMD Project Manager, 917-790-8727
- Jamal Sulayman, NAN, EN Technical Manager, 917-790-8299

ATTACHMENT 1: TEAM ROSTERS

PDT

Name	Role	Phone Number	E-mail Address
Jason Shea	Project Manager	x-8727	Jason.A.Shea@usace.army.mil
Jamal Sulayman	EN Technical Manager	x-8299	Jamal.A.Sulayman@usace.army.mil
Karen Baumert	Planning Lead	x-8608	Karen.L.Baumert@usace.army.mil
Kate Alcoba	Environmental	x-8216	Catherine.J.Alcoba@usace.army.mil
Suzana Rice	Coastal Engineer	x-8374	Suzana.S.Rice@usace.army.mil
Mukesh Kumar	Cost Engineering	x-8421	Mukesh.Kumar@usace.army.mil
Ellen Simon	Counsel	x-8158	Ellen.B.Simon@usace.army.mil

DQC Team

Name	Role	Phone Number	E-mail Address
Arun Heer	Coastal Engineering	x-8263	Arun.K.Heer@usace.army.mil
Kevin Whorton	Civil Engineering	x-8065	Kevin.a.whorton@usace.army.mil
Mukesh Kumar	Cost Engineering	x-8421	Mukesh.Kumar@usace.army.mil
Ellen Simon	Counsel	x-8158	Ellen.B.Simon@usace.army.mil

ATR Team*

Name	Role	Review District
TBD		

*All resumes will be reviewed and approved by the MSC prior to initiating any ATR.

Vertical Team

Name	Role	Phone Number	E-mail Address
Paul Tumminello	NAN PPMD Civil Works Chief	917-790-8220	Paul.Tumminello@usace.army.mil
Peter Wepler	NAN-PL, Environmental Analysis Branch Chief	917-790-8634	Peter.M.Wepler@usace.army.mil
Andre Chauncey	NAN-EN, Civil Resources Branch Chief	917-790-8353	Andre.T.Chauncey@usace.army.mil
Encer Shaffer	NAN-EN, Design Branch Chief	917-790-8360	Encer.R.Shaffer@usace.army.mil
Mukesh Kumar	NAN-EN, Cost Engineering Branch Chief	917-790-8421	Mukesh.Kumar@usace.army.mil
Steven Weinberg	NAN-EN, Engineering Management, Civil Works Section Chief	917-790-8391	Steven.R.Weinburg@usace.army.mil

ATTACHMENT 2: STATEMENT OF AGENCY TECHNICAL REVIEW

COMPLETION OF AGENCY TECHNICAL REVIEW

The Agency Technical Review (ATR) has been completed for Contract 1: DDR, Plans and Specs, and Cost Estimate for the Long Beach Island, NY project. The ATR was conducted as defined in the project's approved Review Plan to comply with the requirements of EC 1165-2-217. During the ATR, compliance with established policy principles and procedures, utilizing justified and valid assumptions, was verified. This included review of: assumptions, methods, procedures, and material used in analyses, the appropriateness of data used and level obtained, and reasonableness of the results, including whether the product meets the customer's needs consistent with law and existing US Army Corps of Engineers policy. The ATR also assessed the District Quality Control (DQC) documentation and made the determination that the DQC activities employed appear to be appropriate and effective. All comments resulting from the ATR have been resolved and the comments have been closed in DrChecks.

Signature & Date

TBD
ATR Team Leader
District

Signature & Date

Jason Shea
Project Manager
CENAN-PP-C

CERTIFICATION OF AGENCY TECHNICAL REVIEW

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

Signature & Date

Michael Rovi, P.E.
Chief, Engineering Division
CENAN-EN

Signature & Date

Alan Huntley, P.E., PMP
Chief, Business Technical Division
CENAD-RBT

ATTACHMENT 3: ACRONYMS AND ABBREVIATIONS

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

**ATTACHMENT 4: MFR ON RISK INFORMED ASSESSMENT OF SIGNIFICANT THREAT TO HUMAN LIFE BY
CENAN, ENGINEERING DIVISION**

MEMORANDUM For Record

SUBJECT: Sandy Hook to Barnegat Inlet Beach Erosion Control Project - Risk Informed Assessment of Significant Threat to Human Life

1. Project Information. The Federally authorized Sandy Hook to Barnegat Inlet Beach Erosion Control Project is located on the Atlantic Coast of New Jersey, covering 51 miles of coastline between Sandy Hook peninsula and Barnegat Inlet (Section I and II Sea Bright to Manasquan Inlet). The Project report recommending Federal action was submitted to Congress in 1956 and authorized by the River and Harbor Act of July 3, 1958, in accordance with House Document No. 332, 85th Congress, second session. Further modifications associated with the non-Federal sponsor cost share and public access requirements were made by Section 854 of the Water Resources Development Act (WRDA) of 1986, (P.L. 99-662). A Review Plan is being prepared for the implementation documents for Section I and II of this project.

2. Project Description.

The project area is comprised of three sections and is further sub-divided by construction contracts. Section I, the northerly extent of the project, extends 12 miles from just north of the Route 36 Bridge in Sea Bright, southward to Loch Arbour at the outlet of Deal Lake. Section II, the middle extent of the project, reaches for 9 miles from Asbury Park south to the Manasquan Inlet. The FY19 renourishment Project plan is for beachfill only, including advanced nourishment along the length of the design berm, and feeder beaches. The recommended plan provides for reduction of storm damages from coastal erosion and flooding through storm protective berm and beachfill. The State of New Jersey, acting through the Department of Environmental Protection, is the non-Federal sponsor for this project.

3. Risk Informed Assessment. In accordance with (EC) 1165-2-217, Review Policy for Civil Works, 20 Feb 18, a risk informed assessment was made as to whether there is a significant threat to human life from the shore protection project component (Table 1). The key factors considered are:

- a. The Sandy Hook to Barnegat Inlet, Sea Bright to Manasquan reaches, shore protection project components provide reduction in storm damage by reducing erosion-induced property damage and shoreline storm erosion.

- b. The Sandy Hook to Barnegat Inlet, Sea Bright to Manasquan reaches shore protection project does not protect critical public facilities. Failure of the project would most likely be from gradual degradation of beach and erosion from a significant coastal storm event. The State of NJ has the resources to monitor the project if there is degradation that reduces the features of the project berm width and height. The Corps and the State have capabilities to maintain the project features over the life of the project.
- c. Furthermore, traditional and proven design features and traditional and proven construction materials and methodologies will be used. All elements in construction, that may pose a risk are identified and methodologies are in place to reduce the human life safety risk to low.

4. Determination. Based on a risk informed assessment which considered life safety factors, I have determined that there is not a significant threat to human life associated with the Sandy Hook to Barnegat Inlet Beach Erosion Control Project, Sea Bright to Manasquan reaches. Accordingly, it is recommended that a Type II IEPR, Safety Assurance Review, is not warranted for the shore protection component.

Encl
Table Risk Assessment

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MICHAEL ROVI, P.E.
C, Engineering Division

**Sea Bright to Manasquan Reach
Risk Informed Assessment**

1. References.

a.) EC 1165-2-217 – Review Policy for Civil Works

2. Risk Assessment Matrix. In accordance with EC 1165-2-217 (exp. 31 March 2020) Review Policy for Civil Works, the Water Resources Development Act (WRDA) of 2007, Section 2035 requires a Safety Assurance Review (SAR) of “the design and construction activities for hurricane and storm damage reduction and flood damage reduction projects”.

A risk informed assessment (ref. Civil Works Review Policy, Appendix E, Paragraph 2) was made to determine whether there is a significant threat to human life from construction of Sea Bright to Manasquan Reach. The renourishment Project plan is for fill only, including advanced nourishment along the length of the design berm, and feeder beaches. The recommended plan provides for reduction of storm damages from coastal erosion and flooding through storm protective berm and beachfill. The risk assessment is presented in Table 1 below.

Table 1: Risk Assessment for Significant Threat to Life Safety, Sandy Hook to Barnegat Inlet Beach Erosion Control Project, Sea Bright to Manasquan Reach

No.	Risk Factor (Significant Threat to Life Safety)	Phase I Magnitude (H/M/L)	Basis of Concern	Risk Assessment for Construction
1	Land Use adjacent to the project	--	Sea Bright, Monmouth Beach, Long Branch, Elberon, Deal, Allenhurst, Loch Arbour, Asbury Pk., Ocean Grove, Bradley Beach, Avon-by-the-Sea, Belmar, Spring Lake, Sea Girt, and Manasquan are suburban communities located in Monmouth County, NJ.	Land use adjacent to the project is primarily residential buildings plus park/recreational. Risk Assessment details are provided in 1a-c below.
1a	Population Density	Low	Sea Bright's population is 1,389; Monmouth Beach population is 3,236; Long Branch's population is 30,762; Elberon, Deal, Allenhurst, and Loch Arbour are suburban areas that are largely second home communities. Deal's population is 733; Allenhurst's population is 489; and Loch Arbour's population is 183. These numbers are increased in the summer. Asbury Park's population is 15,767; Ocean Grove's population is 4,256; Bradley Beach's population is 4,225; Avon-by-the-Sea's population is 1,794; Belmar's population is 5,682; Spring Lake's population is 2,962; Sea Girt's population is 1,774; Manasquan's population is 5,903.	Population is a mix of dense populations and a suburban population density that is seasonal. Many people could be affected by flooding, wave attack or project failure. However, construction or failure of the beachfill will not increase the risk of flooding or wave attack over that of existing conditions. The beachfill will provide increased protection against erosion, and the beachfill does not create a risk of sudden catastrophic failure.
1b	Critical Facilities Affected (e.g. schools, hospitals, assisted living/nursing homes, evacuation routes)	Low	There are no critical facilities affected within the project area. Ocean Avenue provides primary north-south evacuation route from the project area and is the only state level evacuation route landward of the project area. Each street end provides westerly egress from the project area.	Multiple evacuation routes are in place, and Monmouth County has a record of successful past evacuations. Construction or failure of project elements will not alter the risk of flooding or wave attack over that of existing conditions.

1c	Number or types of structures in floodplain	Low	The project area encompasses primarily residential uses, and commercial developments concentrated in Sea Bright and Long Branch.	Flood levels would be unaffected by construction or nonperformance of the project. The beachfill will provide increased protection against erosion.
2	Inundation of protected side due to project failure	Low	Following completion of the line of protection, the project will be subject to risk due to catastrophic failure of any portion of the berm.	Completion of the berm component alone does not have a risk of inundation due to sudden catastrophic failure.
3	Shoreline Storm Erosion	Low	Coastal storms often result in significant shore erosion over short time periods which can undermine structures.	Construction of the shore protection component will increase berm width, height and volume, which will lessen the risk of storm erosion because of increased berm width.
4	Wave Attack	Low	Overtopping of the beachfill by waves during high water level events can result in damage to structures from direct wave impact.	Construction of the shore protection component will increase berm width, height and volume, which will lessen the risk of damage due to wave attack.
5	Use of unique or non-traditional design methods	Low	Unique or non-traditional design methods may be poorly understood or inadequately designed and may be more subject to failure than proven design methods.	Engineering for the new beachfill employed accepted methods in accordance with USACE design manual and guidance. No innovative or precedent setting methods or models were used.
6	Use of unique or non-traditional design features	Low	Unique or non-traditional design features may be poorly understood or inadequately designed and may be more subject to failure than proven design features.	Design of the beachfill is within prevailing practice and USACE guidance.
7	Use of unique or non-traditional construction materials or methods	Low	Unique or non-traditional construction materials or methods may be poorly understood or executed inadequately resulting in a project feature that may be more subject to failure than those built with proven materials and methods.	All materials and construction techniques used for the shore protection component are in common practice.
8	Does the project have unique construction	Low	Unique or accelerated construction sequencing may lead to poor quality work, leading to greater possibility of future project failure.	Sufficient time is available for completion of construction. There are no unique construction

	sequencing or a reduced or overlapping design/ construction schedule?			sequence requirements for this project.
9	Inherent risk with construction methods	Low	The offshore borrow site for beach fill is known to contain munitions and explosives of concern (MEC). MEC may be taken up into the dredge and possibly be placed on the beach within the sand fill.	Methods have been developed to eliminate the danger of picking up MEC from the borrow site into the dredge, and/or pumping MEC onto the project site. The controls consist of screens placed on the drag head and on the pump-out to prevent uptake of MEC and/or placement of MEC on the beach. This technology has been used successfully since the mid-1990s in the designated borrow site, and is fully incorporated into the project specifications and costs. Remaining risk would result from failure of the screens (which are monitored by inspectors), or presence of MEC smaller than the screening opening size.
10	Does the project design require:			
10a	Redundancy	Low	Failure of one critical project element would result in sudden, catastrophic damage. Duplication of critical components of the protective system is required to increase the reliability of the system.	Construction of the shorefront protection components reduce the risk of erosion relative to the existing condition. Nonperformance of the project protection segments would result in erosion less than or equal to those present under existing conditions.
10b	Resiliency	Low	Erodible structures are reduced in volume over time, providing less protective capacity.	Resiliency is included by the maintenance, regular beach renourishment, and post-storm emergency berm rehabilitation.
10c	Robustness	Low	Natural events can occur that are greater than the optimized project design, and may lead to project failure.	The berm design considered storm events up to a 100-year return interval, and long-term erosion derived from the sediment budget which reflects sea-level rise over the period of analysis. Berm designs are adaptable to changes in water level due to climate change (sea level rise), with opportunities to incorporate additional volume and/or berm elevation as part of regularly scheduled renourishment operations.

