



**DEPARTMENT OF THE ARMY**  
US ARMY CORPS OF ENGINEERS  
SOUTH ATLANTIC DIVISION  
60 FORSYTH ST, SW, ROOM 10M15  
ATLANTA, GEORGIA 30303-3490

REPLY TO  
ATTENTION OF:

CESAD-PDP

13 October 2011

MEMORANDUM FOR Commander, Wilmington District (CESAW-TS-P/Elden Gatwood)

SUBJECT: Approval of Review Plan for Integrated General Reevaluation Report and Environmental Impact Statement for Brunswick County Beaches, North Carolina

1. References:

- a. Memorandum, CESAW-TS-P, 15 August 2011, subject above.
  - b. EC 1165-2-209, Civil Works Review Policy, 31 January 2010.
2. In accordance with EC 1165-2-209, Civil Works Review Policy, 31 January 2010, the Review Plan (RP) dated January 2011, revised October 2011, for the Integrated General Reevaluation Report and Environmental Impact Statement for Brunswick County Beaches, North Carolina (enclosure), has been reviewed by this office and is approved.
3. The District should take steps to post the SAD-approved Final RP and a copy of this approval memorandum to the SAW District public internet website and provide a link to the National Planning Center of Expertise for Coastal Storm Damage Reduction (CSDR-PCX) website for their use. Before posting to the website, the names of Corps/Army employees should be removed.
4. The SAD point of contact for this action is Ms. Karen Dove-Jackson, CESAD-PDP, (404) 562-5225.

FOR THE COMMANDER:

Encl

A handwritten signature in black ink, appearing to read "Wilbert V. Paynes".

WILBERT V. PAYNES  
Chief, Planning and Policy  
Community of Practice



REPLY TO  
ATTENTION OF:

DEPARTMENT OF THE ARMY  
WILMINGTON DISTRICT, CORPS OF ENGINEERS  
69 DARLINGTON AVENUE  
WILMINGTON, NORTH CAROLINA 28403-1343

CESAW-TS-P

15 August 2011

MEMORANDUM FOR Commander, South Atlantic Division (CESAD-RBT), ATTN: Wilbert Paynes, CESAD-RBT, Rm 10M15, 60 Forsyth Street, SW, Atlanta, Georgia 30303-8801

SUBJECT: Approval of Review Plan for Integrated General Reevaluation Report and Environmental Impact Statement for Brunswick County Beaches, North Carolina

1. References.

- a. EC 1165-2-209, Civil Works Review Policy, 31 Jan 2010

2. I hereby request approval of the enclosed Review Plan for the Integrated General Reevaluation Report and Environmental Impact Statement for Brunswick County Beaches, North Carolina. The Review Plan complies with applicable policy and includes our DQC, ATR, and IEPR plans for this project.

3. The National Planning Center of Expertise for Coastal Storm Damage Reduction (CSDR-PCX) has reviewed the review plan and has no objections. A memo from the CSDR-PCX is enclosed.

3. The district will post the CESAD approved Review Plan to its website and provide a link to the CESAD for its use. Names of Corps/Army employees are withheld from the posted version, in accordance with guidance.

FOR THE COMMANDER:

A handwritten signature in cursive script that reads "Elden Gatwood".

Encl

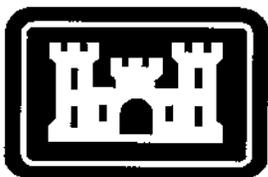
Elden Gatwood  
Chief, Planning and Environmental Branch

**Brunswick County Beaches,  
North Carolina**

**Integrated General Reevaluation Report and  
Environmental Impact Statement for Brunswick  
County Beaches, North Carolina**

**REVIEW PLAN**

**October 2011**



**US Army Corps  
of Engineers**

**Wilmington District**

## **ACRONYMS & ABBREVIATIONS**

**AFB** – Alternative Formulation Briefing  
**ATR** – Independent Technical Review  
**CESAW** – US Army Corps of Engineers, South Atlantic, Wilmington  
**CWRB** – Civil Works Review Board  
**EIS** – Environmental Impact Statement  
**FCSA** – Feasibility Cost Sharing Agreement  
**FEIS** – Final Environmental Impact Statement  
**FSM** – Feasibility Scoping Meeting  
**GRR** – General Reevaluation Report  
**HQ** – Headquarters  
**IEPR** – Independent External Peer Review  
**LOI** – Letter of Intent  
**NEPA** – National Environmental Policy Act  
**OEO** – Outside Eligible Organization  
**OVEST** -- Office of the Chief of Engineers Value Engineering Study Team  
**PCX-CSDR** – National Planning Center of Expertise for Coastal Storm Damage Reduction  
**PDT** – Project Delivery Team  
**PMP** – Project Management Plan  
**P&S** – Plans & Specifications  
**RP** - Review Plan  
**SAD** – South Atlantic Division  
**Cost DX** – Walla Walla District Directorate of Expertise for Civil Works Cost Engineering

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## 1. Introduction

This Review Plan (RP) is a collaborative product of the Project Delivery Team (PDT), the National Planning Center of Expertise for Coastal Storm Damage Reduction (PCX-CSDR) and the Walla Walla District Directorate of Expertise for Civil Works Cost Engineering (Walla Walla DX). The PCX-CSDR will manage the RP. The content of this plan follows the guidance laid out in EC 1165-2-209 – Civil Works Review Policy, from December 2009. The purpose of the RP is to identify the appropriate level and types of review that will be necessary during the development of the study. The RP is part of the study Project Management Plan (PMP), but is presented as a stand-alone document.

## References

- (1) Engineering Circular (EC) 1165-2-209, Civil Works Review Policy, 31 Jan 2010
- (2) EC 1105-2-412, Planning Models Improvement Program: Model Certification, 31 March 2011
- (3) Engineering Regulation (ER) 1110-2-12, Quality Management, 30 Sep 2006

## 2. Study Background

The *Integrated General Reevaluation Report and Environmental Impact Statement for Brunswick County Beaches, NC* (Brunswick GRR) shall be the decision document. The Brunswick County Beaches GRR is being pursued under the Corps of Engineers' Construction General (CG) Program. The project was authorized by the Flood Control Act of 1966 (PL 89-789), which states:

The project for hurricane-flood control protection from Cape Fear to the North Carolina-South Carolina State line, North Carolina, is hereby authorized substantially in accordance with the recommendations of the Chief of Engineers in House Document Numbered 511, Eighty-ninth Congress, at an estimated cost of \$12,310,000.

This General Reevaluation is being conducted in response to written requests from the Towns of Long Beach (July 13, 1994), Yaupon Beach (July 18, 1994), Caswell Beach (July 28, 1994), and Holden Beach (September 6, 1994).

The study area focus is the communities located on the two barrier islands known as Oak Island and Holden Beach. Oak Island, which is 13 miles long, is occupied by the Towns of Oak Island (formerly Long Beach and Yaupon Beach) and Caswell Beach. West of Oak Island is the island of Holden Beach, which is 11 miles long and occupied by the town of the same name. Due to the east-west orientation of the coastline, both islands face the Atlantic Ocean on the south. Other waterbodies in the vicinity include the Cape Fear River to the east, Shallotte Inlet to the west, and the Atlantic Intracoastal Waterway (AIWW) to the north. The two islands are separated by Lockwoods Folly Inlet. The study area also includes offshore borrow areas lying 1 to 8 miles from the shoreline and borrow areas in Jaybird Shoals, Lockwood Folly Inlet and Shallotte Inlet.

The two other communities for which improvements were authorized in the Brunswick County Beaches project are not included in this General Reevaluation Report (GRR). The authorized coastal storm damage reduction improvements for Ocean Isle Beach have been reevaluated, approved, and constructed. The Sunset Beach portion of the Brunswick County Beaches project remains inactive, and there has been no request for a restudy.

The Brunswick County Beaches General Reevaluation is investigating measures and plans for the single purpose of coastal storm damage reduction. The study is also documenting incidental recreation benefits. Located between Cape Romaine and Cape Fear, Brunswick County is a frequent landfall site for hurricanes and tropical storms tracking along the mid-Atlantic coast. In addition to direct land-falling storms, many other storms have passed offshore and impacted the study area. Local impacts to the study area have varied depending on the landfall location and strength of the storm.

Typical solutions considered for this study area are berm and dune beachfills using material dredged from offshore borrow sites, and in some cases building relocations, or coastal structures such as groins or breakwaters.

### 3. Key Personnel

Key PDT members are shown in the table below:

ROLE	NAME	ORGANIZATION
Project Manager	Pam Castens	CESAW-PM-C
Program Manager	Janet Hodges	CESAW-PM-P
Lead Planner	Tomma Barnes	CESAW-TS-PF
Biologist	Doug Piatkowski	CESAW-TS-PE
Cultural Resources	John Mayer	CESAW-TS-PE
Coastal/H&H	Mike Wutkowski	CESAW-TS-EC
Geotechnical	Ben Lackey	CESAW-TS-EG
Cost Engineering	John Caldwell	CESAW-TS-EE
Economist	Frank Snipes	CESAW-TS-PF
Real Estate	Belinda Estabrook	CESAS-RE-RP
Counsel	Susan Weston	CESAW-OC

The PDT also includes the non-Federal Sponsor, stakeholders, and resource agencies.

For more information regarding the RP, the project manager for the General Reevaluation study may be contacted as follows:

**Pam Castens**  
 US Army Corps of Engineers – Wilmington District  
 CESAW-PM-C  
 69 Darlington Avenue  
 Wilmington, North Carolina 28403

**Phone:** (910) 251-4671      **Fax:** (910) 251-4965  
**Email:** pamela.g.castens@usace.army.mil

**Agency Technical Review Team Leaders**

ATR will be led by PCX-CSDR, with participation by the Cost DX.

**Joseph Vietri**

National Planning Center of Expertise for Coastal Storm Damage Reduction PCX-CSDR  
US Army Corps of Engineers – North Atlantic Division  
CENAD-PSD-P

**Phone:** (718) 765-7070

**Email:** Joseph.R.Vietri@nad02.usace.army.mil

**Kim C. Callan**

Walla Walla District Directorate of Expertise for Civil Works Cost Engineering  
CENWW-EC-X

**Phone:** 509-527-7511

**Email:** Kim.C.Callan@nww01.usace.army.mil

## **4. Conduct of Review**

EC 1165-2-209 outlines four levels of review (in addition to the public review that occurs as part of the NEPA process) – District Quality Control (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Review. Additionally, as per EC 1105-2-412, all “planning models” used in the study will undergo model certification. Formal reviews generally occur for major report milestones – the Feasibility Scoping Meeting (FSM) report, the Alternative Formulation Briefing (AFB) report, the draft feasibility report, and the final feasibility report. This study does not include the FSM milestone; therefore the first major milestone will be the AFB. The following sections discuss how the various levels of review and model certification will be conducted for the Brunswick GRR study. A summary of the peer review process is included as Attachment 1.

### **District Quality Control**

DQC is an internal quality assurance process that occurs at all stages of the feasibility report development, and will be managed by Wilmington District. DQC will be performed by a team from within SAW not involved in the direct conduct of the study, and covers both technical quality, and to the extent possible, policy compliance of the document. The DQC will be conducted in accordance with the Wilmington District and South Atlantic Division (SAD) Quality Manuals.

### **Agency Technical Review**

ATR is undertaken to “ensure the quality and credibility of the government’s scientific information”. For this study, the ATR will be managed by the CSDR-PCX and the Cost DX (which solely handles review of the cost engineering aspects of the report). The ATR will be conducted by skilled and experienced personnel in another USACE District, who have not had any prior involvement with the study. The ATR team leader will be from outside of SAD. It is anticipated that expertise in the following disciplines will be required from the ATR team:

- **Plan Formulation:** The reviewer should have the ability to review the planning process which should address the Nation’s water resources needs in a systems context and explore a full range of alternatives in developing solutions. The reviewer should be able to recognize innovative solutions and the application of the full range of the Corps programs and authorities that are integral to the planning process. The reviewer should thoroughly understand the Planning Guidance Notebook (ER-1105-100) and the Water Resources Council’s Principals and Guidelines, particularly as it relates to Coastal Storm Damage Reduction studies.
- **Economics:** The reviewer should have the ability to review the economics analysis done as part of a Coastal Storm Damage Reduction project, including the analysis of recreation benefits. Reviewer should have an understanding and knowledge of the application of The Planning Guidance Notebook, ER 1105-2-100 Appendix E Sections IV (Coastal) and VII (Recreation) as well as Appendix D, Economic and Social Considerations. The reviewer will be responsible for application of the Coastal Storm Risk Management - NED Manual (under review in mid - 2010) if finalized. Additional detail for the Planning Guidance Notebook can be found in ER 1165-2-130, Federal Participation in Shore Protection.
- **Coastal Engineering:** The reviewer should have experience in the design; construction and maintenance of coastal storm damage reduction projects. He should understand the life-cycle simulation NED analysis which uses a risk and uncertainty approach, and should be familiar enough with the GRANDUC or similar modeling software to ensure the adequacy of the coastal engineering inputs into the model. The reviewer should have working experience over multiple projects with the computer models used by coastal engineers, and with the issues regarding sea level rise.
- **Environmental and NEPA Compliance:** The reviewer should be familiar with all National Environmental Policy Act (NEPA) Environmental Impact Statement (EIS) requirements as well as have experience with Endangered Species Act (ESA), Magnuson-Stevens Fishery and Conservation Management Act Essential Fish Habitat (EFH), and the Marine Mammal Protection Act (MMPA). The reviewer should have a specific knowledge and understanding of dredging and beach nourishment related impacts associated with Coastal Storm Damage Reduction projects on the Mid-Atlantic coast. Specific high value habitats of interest within the study area include, but are not limited to: inlet complex, ebb shoal, cape shoal, hard bottom, and soft bottom communities."
- **Cultural Resources:** The reviewer should have the ability to review cultural resources studies pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended and 36 CFR 800. The reviewer should thoroughly understand Appendix C-4
- 
-

(Cultural Resources) of the Planning Guidance Notebook (ER-1105-100), particularly as it relates to Coastal Storm Damage Reduction studies.

- **Geotechnical Engineering:** The reviewer should have knowledge of how coastal processes relate to geotechnical engineering, how to apply the NC Sediment Criteria to borrow materials, and coastal geology. This should include being familiar with geophysical subsurface investigation methods, the drilling and sampling process, boring logs, soil testing methods, grain size distribution data, and beach overfill ratio determination.
- **Real Estate:** The Real Estate reviewer is to have expertise in the real estate planning process for cost shared and full federal civil works projects, relocations, report preparation and acquisition of real estate interests. The reviewer should have a full working knowledge of EC 405-2-12, Real Estate Planning and Acquisition Responsibilities for Civil Works Projects and Public Law 91-646. The reviewer should be able to identify areas of the REP that are not in compliance with the guidance set forth in EC405-2-12 and should make recommendation for bringing the report into compliance. All estates suggested for use should be termed sufficient to allow project construction, and the real estate cost estimate should be validated as being adequate to allow for real estate acquisition.
- **Cost Engineering:** The reviewer must be a cost estimating specialist. It is imperative that estimates be prepared by, and reviewed under the supervision of, personnel who are competent in construction cost estimating. The reviewer must possess a working knowledge of construction of beachfill projects, and be capable of making professional determinations based on their experience.

Additional disciplines will be added as deemed appropriate throughout the course of the study. ATR will occur at all major report milestones.

## **Independent External Peer Review**

Independent External Peer Review (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 the USACE is warranted. Per EC 1165-2-209, a Type I (for project studies) IEPR is mandatory if any of the following criteria are true: the project poses a significant threat to human life, the estimated total cost of the project is greater than \$45 million, the Governor of an affected State requests a peer review by independent experts, or the Chief of Engineers determines that the project study is controversial due to significant public dispute over either the size, nature, or effects of the project or the economic or environmental costs or benefits of the project. Other considerations include whether the project will generate significant interagency interest, will entail an Environmental Impact Statement (EIS), or will include novel or precedent setting approaches. It is anticipated that the total cost for this project will be greater than \$45 million, and will also require an EIS. Therefore an IEPR will be conducted for this study. The IEPR will be managed by an Outside Eligible Organization (OEO), external to the USACE.

The IEPR reviewers should have the combined, following expertise and requisite experience:

Technical areas related to **geotechnical engineering** (1 expert):

- At least ten years of experience
- Registered professional engineer.
- M.S. or higher in geotechnical engineering.
- Demonstrated experience in geotechnical studies and design of stabilizing dunes, bluffs, and beach berms.
- Familiar with geotechnical practices used in North Carolina.

Technical areas related to **economics** (1 expert):

- At least ten years of experience
- M.S. or higher in economics.
- Experience in coastal economic evaluation and flood risk evaluation.

Technical areas related to **coastal engineering** (1 expert):

- At least ten years of experience
- M.S. or higher in engineering.
- Registered professional engineer with experience in coastal and hydraulic engineering with an emphasis on large public works projects **OR**
- Professor from academia with extensive background in coastal processes and hydraulic theory and practice.
- Familiar with USACE application of risk and uncertainty analyses in coastal storm damage reduction studies.
- Familiar with standard USACE coastal, hydrologic, and hydraulic computer models.
- Familiarity with the GRANDUC program beneficial.

Technical areas related to **environmental/biology** (1 expert):

- At least ten years of experience
- Demonstrated experience with projects on the mid-Atlantic coast of the United States.
- Knowledge of tidal salt marshes, construction impacts on the marine and terrestrial ecology of coastal regions and characterization of benthic communities
- Familiar with all National Environmental Policy Act (NEPA) EIS requirements as well as have experience with ESA, EFH, and MMPA.

Technical areas related to **plan formulation** (1 expert):

- At least ten years of experience
- Experience in coastal planning.
- Familiar with USACE plan formulation standards and procedures.

Upon conclusion of the IEPR, the OEO will provide to the District a Review Report, which will include the names and credentials of reviewers, the reviewers' charge, the nature of their review and findings and conclusions, and a verbatim copy of the reviewers' final comments. The Corps response to the report will come from the Chief of Engineers, and will include the Corps agreement or disagreement with each individual comment contained in the report, any actions taken in response to each comment, and the reason those actions are believed to satisfy the key

concerns stated in the report. Once finalized, the Corps response will be publically disseminated, however, the names and credentials of the IEPR reviewers will not be disclosed.

### **Policy and Legal Review**

Policy and legal review is conducted at all the major report milestones, in order to confirm that the study is in compliance with the appropriate laws and USACE policies. Policy review is conducted by the USACE headquarters (passed on through SAD), and legal review is handled by Wilmington District Office of Counsel.

### **Public Review/Comment**

Once completed, the Brunswick County Beaches GRR will be disseminated to resource agencies, interest groups, and the public as part of the National Environmental Policy Act (NEPA) environmental compliance review. The report will include an Environmental Impact Statement (EIS). All significant and relevant public comments will be provided as part of the review package to Peer Reviewers as they are available and may include but not be limited to: scoping letters, meeting minutes, other received letters, and emails.

### **DrChecks**

A software program useful to coordinate various document comments and responses electronically, DrChecks, will be used to conduct the ATR and IEPR.

### **Sponsor In-Kind Contributions to Study**

No in-kind contributions from the sponsor are anticipated.

### **Model Certification**

According to EC 1105-2-412 – Model Certification, models can be divided into two general categories – “planning models” and “engineering models used in planning studies”. Currently, only the first category – “planning models” need to go through the planning model certification or approval process. The Brunswick County Beaches GRR will use one model which falls into the “planning model” category, which is the Generalized Risk and Uncertainty Coastal Model (GRANDUC). GRANDUC utilizes a life cycle, risk based approach in analyzing the economics of alternative plans. GRANDUC has been used previously by Wilmington District in several previous Coastal Storm Damage Reduction studies, and its use was reviewed and approved specifically for those studies. Wilmington District will similarly be seeking an “approval for use” of GRANDUC on the Brunswick County Beaches GRR. As the Brunswick County Beaches GRR is the last Wilmington District study that will utilize GRANDUC, a full certification of the

model is not being sought. "Approval for use" of the model will be coordinated through the PCX-CSDR, although it is ultimately the USACE HQ which grants approval of a model.

The only engineering model being used on the study is S-BEACH, which has been approved for use by the USACE engineering community of practice.

## 5. Anticipated Review Schedule

REVIEW PHASE	COMPLETION DATE	
ATR of AFB Materials	November	2011
Alternative Formulation Briefing (AFB)	March	2012
ATR of Draft GRR & EIS	July	2012
HQ Policy Review of Draft GRR & EIS	October	2012
NEPA Public Review of Draft GRR & EIS	March	2013
IEPR of Draft GRR & EIS	April	2013
ATR of Final Report & EIS	August	2013
Civil Works Review Board	December	2013
Final EIS / NEPA Public Review (MSC Commanders Public Notice)	January	2014

## Attachment 1 Peer Review Plan Chart

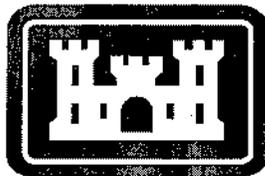
REVIEW PLAN	
FEASIBILITY PHASE	
Study Product or Milestone	Review by
Feasibility Scoping Meeting	( not part of this study)
Value Engineering Package	SAD VE Program Management PDT
Alternative Formulation Briefing	PDT, Supervisors, ATR Team
Draft GRR & EIS  Risk Analysis Cost Engineering Policy	PDT, Supervisors, ATR Team, IEPR Team, OC, Public, State and Federal Agencies  Cost DX Cost DX HQ, SAD
CWRB Review Package	PDT, Supervisors
Final GRR & EIS	CWRB, Public, State and Federal Agencies
Chief of Engineers Report	HQ→ ASA(CW)→ OMB→ Congress

**Brunswick County Beaches,  
North Carolina**

**Integrated General Reevaluation Report and  
Environmental Impact Statement for Brunswick  
County Beaches, North Carolina**

**REVIEW PLAN**

**October 2011**



**US Army Corps  
of Engineers**

**Wilmington District**

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Typical solutions considered for this study area are berm and dune beachfills using material dredged from offshore borrow sites, and in some cases building relocations, or coastal structures such as groins or breakwaters.

### 3. Key Personnel

Key PDT members are shown in the table below:

ROLE	NAME	ORGANIZATION
Project Manager	Pam Castens	CESAW-PM-C
Program Manager	Janet Hodges	CESAW-PM-P
Lead Planner	Tomma Barnes	CESAW-TS-PF
Biologist	Doug Piatkowski	CESAW-TS-PE
Cultural Resources	John Mayer	CESAW-TS-PE
Coastal/H&H	Mike Wutkowski	CESAW-TS-EC
Geotechnical	Ben Lackey	CESAW-TS-EG
Cost Engineering	John Caldwell	CESAW-TS-EE
Economist	Frank Snipes	CESAW-TS-PF
Real Estate	Belinda Estabrook	CESAS-RE-RP
Counsel	Susan Weston	CESAW-OC

The PDT also includes the non-Federal Sponsor, stakeholders, and resource agencies.

For more information regarding the RP, the project manager for the General Reevaluation study may be contacted as follows:

**Pam Castens**

US Army Corps of Engineers – Wilmington District  
 CESAW-PM-C  
 69 Darlington Avenue  
 Wilmington, North Carolina 28403

ATR is undertaken to “ensure the quality and credibility of the government’s scientific information”. For this study, the ATR will be managed by the CSDR-PCX and the Cost DX (which solely handles review of the cost engineering aspects of the report). The ATR will be conducted by skilled and experienced personnel in another USACE District, who have not had any prior involvement with the study. Preferably, the ATR team membership will also be entirely from outside of the USACE South Atlantic Division (SAD), which is the home division of the USACE Wilmington District, but at a minimum, the ATR team leader will be from outside of SAD. It is anticipated that expertise in the following disciplines will be required from the ATR team:

- **Plan Formulation:** The reviewer should have the ability to review the planning process which should address the Nation’s water resources needs in a systems context and explore a full range of alternatives in developing solutions. The reviewer should be able to recognize innovative solutions and the application of the full range of the Corps programs and authorities that are integral to the planning process. The reviewer should thoroughly understand the Planning Guidance Notebook (ER-1105-100) and the Water Resources Council’s Principals and Guidelines, particularly as it relates to Coastal Storm Damage Reduction studies.
- **Economics:** The reviewer should have the ability to review the economics analysis done as part of a Coastal Storm Damage Reduction project, including the analysis of recreation benefits. Reviewer should have an understanding and knowledge of the application of The Planning Guidance Notebook, ER 1105-2-100 Appendix E Sections IV (Coastal) and VII (Recreation) as well as Appendix D, Economic and Social Considerations. The reviewer will be responsible for application of the Coastal Storm Risk Management - NED Manual (under review in mid - 2010) if finalized. Additional detail for the Planning Guidance Notebook can be found in ER 1165-2-130, Federal Participation in Shore Protection.
- **Coastal Engineering:** The reviewer should have experience in the design; construction and maintenance of coastal storm damage reduction projects. He should understand the life-cycle simulation NED analysis which uses a risk and uncertainty approach, and should be familiar enough with the GRANDUC or similar modeling software to ensure the adequacy of the coastal engineering inputs into the model. The reviewer should have working experience over multiple projects with the computer models used by coastal engineers, and with the issues regarding sea level rise.
- **Environmental and NEPA Compliance:** The reviewer should be familiar with all National Environmental Policy Act (NEPA) Environmental Impact Statement (EIS) requirements as well as have experience with Endangered Species Act (ESA), Magnuson-Stevens Fishery and Conservation Management Act Essential Fish Habitat (EFH), and the Marine Mammal Protection Act (MMPA). The reviewer should have a specific knowledge and understanding of dredging and beach nourishment related impacts associated with Coastal Storm Damage Reduction projects on the Mid-Atlantic coast. Specific high value habitats of interest within the study area include, but are not limited to: inlet complex, ebb shoal, cape shoal, hard bottom, and soft bottom communities."
- **Cultural Resources:** The reviewer should have the ability to review cultural resources studies pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended and 36 CFR 800. The reviewer should thoroughly understand Appendix C-4

Technical areas related to **geotechnical engineering** (1 expert):

- At least ten years of experience
- Registered professional engineer.
- M.S. or higher in geotechnical engineering.
- Demonstrated experience in geotechnical studies and design of stabilizing dunes, bluffs, and beach berms.
- Familiar with geotechnical practices used in North Carolina.

Technical areas related to **economics** (1 expert):

- At least ten years of experience
- M.S. or higher in economics.
- Experience in coastal economic evaluation and flood risk evaluation.

Technical areas related to **coastal engineering** (1 expert):

- At least ten years of experience
- M.S. or higher in engineering.
- Registered professional engineer with experience in coastal and hydraulic engineering with an emphasis on large public works projects **OR**
- Professor from academia with extensive background in coastal processes and hydraulic theory and practice.
- Familiar with USACE application of risk and uncertainty analyses in coastal storm damage reduction studies.
- Familiar with standard USACE coastal, hydrologic, and hydraulic computer models.
- Familiarity with the GRANDUC program beneficial.

Technical areas related to **environmental/biology** (1 expert):

- At least ten years of experience
- Demonstrated experience with projects on the mid-Atlantic coast of the United States.
- Knowledge of tidal salt marshes, construction impacts on the marine and terrestrial ecology of coastal regions and characterization of benthic communities
- Familiar with all National Environmental Policy Act (NEPA) EIS requirements as well as have experience with ESA, EFH, and MMPA.

Technical areas related to **plan formulation** (1 expert):

- At least ten years of experience
- Experience in coastal planning.
- Familiar with USACE plan formulation standards and procedures.

Upon conclusion of the IEPR, the OEO will provide to the District a Review Report, which will include the names and credentials of reviewers, the reviewers' charge, the nature of their review and findings and conclusions, and a verbatim copy of the reviewers' final comments. The Corps response to the report will come from the Chief of Engineers, and will include the Corps agreement or disagreement with each individual comment contained in the report, any actions taken in response to each comment, and the reason those actions are believed to satisfy the key

model is not being sought. “Approval for use” of the model will be coordinated through the PCX-CSDR, although it is ultimately the USACE HQ which grants approval of a model.

The only engineering model being used on the study is S-BEACH, which has been approved for use by the USACE engineering community of practice.

## 5. Anticipated Review Schedule

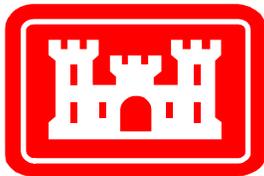
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**Brunswick County Beaches,  
North Carolina**

**Integrated General Reevaluation Report and  
Environmental Impact Statement for Brunswick  
County Beaches, North Carolina**

**REVIEW PLAN**

**October 2011**



**US Army Corps  
of Engineers  
Wilmington District**

## ACRONYMS & ABBREVIATIONS

**AFB** – Alternative Formulation Briefing  
**ATR** – Independent Technical Review  
**CESAW** – US Army Corps of Engineers, South Atlantic, Wilmington  
**CWRB** – Civil Works Review Board  
**EIS** – Environmental Impact Statement  
**FCSA** – Feasibility Cost Sharing Agreement  
**FEIS** – Final Environmental Impact Statement  
**FSM** – Feasibility Scoping Meeting  
**GRR** – General Reevaluation Report  
**HQ** – Headquarters  
**IEPR** – Independent External Peer Review  
**LOI** – Letter of Intent  
**NEPA** – National Environmental Policy Act  
**OEO**--Outside Eligible Organization  
**OVEST** -- Office of the Chief of Engineers Value Engineering Study Team  
**PCX-CSDR** – National Planning Center of Expertise for Coastal Storm Damage Reduction  
**PDT** – Project Delivery Team  
**PMP** – Project Management Plan  
**P&S** – Plans & Specifications  
**RP** - Review Plan  
**SAD** – South Atlantic Division  
**Cost DX** – Walla Walla District Directorate of Expertise for Civil Works Cost Engineering

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## 1. Introduction

This Review Plan (RP) is a collaborative product of the Project Delivery Team (PDT), the National Planning Center of Expertise for Coastal Storm Damage Reduction (PCX-CSDR) and the Walla Walla District Directorate of Expertise for Civil Works Cost Engineering (Walla Walla DX). The PCX-CSDR will manage the RP. The content of this plan follows the guidance laid out in EC 1165-2-209 – Civil Works Review Policy, from December 2009. The purpose of the RP is to identify the appropriate level and types of review that will be necessary during the development of the study. The RP is part of the study Project Management Plan (PMP), but is presented as a stand-alone document.

## References

- (1) Engineering Circular (EC) 1165-2-209, Civil Works Review Policy, 31 Jan 2010
- (2) EC 1105-2-412, Planning Models Improvement Program: Model Certification, 31 March 2011
- (3) Engineering Regulation (ER) 1110-2-12, Quality Management, 30 Sep 2006

## 2. Study Background

The *Integrated General Reevaluation Report and Environmental Impact Statement for Brunswick County Beaches, NC* (Brunswick GRR) shall be the decision document. The Brunswick County Beaches GRR is being pursued under the Corps of Engineers' Construction General (CG) Program. The project was authorized by the Flood Control Act of 1966 (PL 89-789), which states:

The project for hurricane-flood control protection from Cape Fear to the North Carolina-South Carolina State line, North Carolina, is hereby authorized substantially in accordance with the recommendations of the Chief of Engineers in House Document Numbered 511, Eighty-ninth Congress, at an estimated cost of \$12,310,000.

This General Reevaluation is being conducted in response to written requests from the Towns of Long Beach (July 13, 1994), Yaupon Beach (July 18, 1994), Caswell Beach (July 28, 1994), and Holden Beach (September 6, 1994).

The study area focus is the communities located on the two barrier islands known as Oak Island and Holden Beach. Oak Island, which is 13 miles long, is occupied by the Towns of Oak Island (formerly Long Beach and Yaupon Beach) and Caswell Beach. West of Oak Island is the island of Holden Beach, which is 11 miles long and occupied by the town of the same name. Due to the east-west orientation of the coastline, both islands face the Atlantic Ocean on the south. Other waterbodies in the vicinity include the Cape Fear River to the east, Shallotte Inlet to the west, and the Atlantic Intracoastal Waterway (AIWW) to the north. The two islands are separated by Lockwoods Folly Inlet. The study area also includes offshore borrow areas lying 1 to 8 miles from the shoreline and borrow areas in Jaybird Shoals, Lockwood Folly Inlet and Shallotte Inlet.

The two other communities for which improvements were authorized in the Brunswick County Beaches project are not included in this General Reevaluation Report (GRR). The authorized coastal storm damage reduction improvements for Ocean Isle Beach have been reevaluated, approved, and constructed. The Sunset Beach portion of the Brunswick County Beaches project remains inactive, and there has been no request for a restudy.

The Brunswick County Beaches General Reevaluation is investigating measures and plans for the single purpose of coastal storm damage reduction. The study is also documenting incidental recreation benefits. Located between Cape Romaine and Cape Fear, Brunswick County is a frequent landfall site for hurricanes and tropical storms tracking along the mid-Atlantic coast. In addition to direct land-falling storms, many other storms have passed offshore and impacted the study area. Local impacts to the study area have varied depending on the landfall location and strength of the storm.

Typical solutions considered for this study area are berm and dune beachfills using material dredged from offshore borrow sites, and in some cases building relocations, or coastal structures such as groins or breakwaters.

### 3. Key Personnel

Key PDT members are shown in the table below:

ROLE	ORGANIZATION
Project Manager	CESAW-PM-C
Program Manager	CESAW-PM-P
Lead Planner	CESAW-TS-PF
Biologist	CESAW-TS-PE
Cultural Resources	CESAW-TS-PE
Coastal/H&H	CESAW-TS-EC
Geotechnical	CESAW-TS-EG
Cost Engineering	CESAW-TS-EE
Economist	CESAW-TS-PF
Real Estate	CESAS-RE-RP
Counsel	CESAW-OC

The PDT also includes the non-Federal Sponsor, stakeholders, and resource agencies.

For more information regarding the RP, the project manager for the General Reevaluation study may be contacted as follows:

US Army Corps of Engineers – Wilmington District  
 CESAW-PM-C  
 69 Darlington Avenue  
 Wilmington, North Carolina 28403

## 4. Conduct of Review

EC 1165-2-209 outlines four levels of review (in addition to the public review that occurs as part of the NEPA process) – District Quality Control (DQC), Agency Technical Review (ATR), Independent External Peer Review (IEPR), and Policy and Legal Review. Additionally, as per EC 1105-2-412, all “planning models” used in the study will undergo model certification. Formal reviews generally occur for major report milestones – the Feasibility Scoping Meeting (FSM) report, the Alternative Formulation Briefing (AFB) report, the draft feasibility report, and the final feasibility report. This study does not include the FSM milestone; therefore the first major milestone will be the AFB. The following sections discuss how the various levels of review and model certification will be conducted for the Brunswick GRR study. A summary of the peer review process is included as Attachment 1.

### District Quality Control

DQC is an internal quality assurance process that occurs at all stages of the feasibility report development, and will be managed by Wilmington District. DQC will be performed by a team from within SAW not involved in the direct conduct of the study, and covers both technical quality, and to the extent possible, policy compliance of the document. The DQC will be conducted in accordance with the Wilmington District and South Atlantic Division (SAD) Quality Manuals.

### Agency Technical Review

ATR is undertaken to “ensure the quality and credibility of the government’s scientific information”. For this study, the ATR will be managed by the CSDR-PCX and the Cost DX (which solely handles review of the cost engineering aspects of the report). The ATR will be conducted by skilled and experienced personnel in another USACE District, who have not had any prior involvement with the study. The ATR team leader will be from outside of SAD. It is anticipated that expertise in the following disciplines will be required from the ATR team:

- **Plan Formulation:** The reviewer should have the ability to review the planning process which should address the Nation’s water resources needs in a systems context and explore a full range of alternatives in developing solutions. The reviewer should be able to recognize innovative solutions and the application of the full range of the Corps programs and authorities that are integral to the planning process. The reviewer should thoroughly understand the Planning Guidance Notebook (ER-1105-100) and the Water Resources Council’s Principals and Guidelines, particularly as it relates to Coastal Storm Damage Reduction studies.
- **Economics:** The reviewer should have the ability to review the economics analysis done as part of a Coastal Storm Damage Reduction project, including the analysis of recreation benefits. Reviewer should have an understanding and knowledge of the application of The Planning Guidance Notebook, ER 1105-2-100 Appendix E Sections IV (Coastal) and VII (Recreation) as well as Appendix D, Economic and Social Considerations. The

reviewer will be responsible for application of the Coastal Storm Risk Management - NED Manual (under review in mid - 2010) if finalized. Additional detail for the Planning Guidance Notebook can be found in ER 1165-2-130, Federal Participation in Shore Protection.

- **Coastal Engineering:** The reviewer should have experience in the design; construction and maintenance of coastal storm damage reduction projects. He should understand the life-cycle simulation NED analysis which uses a risk and uncertainty approach, and should be familiar enough with the GRANDUC or similar modeling software to ensure the adequacy of the coastal engineering inputs into the model. The reviewer should have working experience over multiple projects with the computer models used by coastal engineers, and with the issues regarding sea level rise.
- **Environmental and NEPA Compliance:** The reviewer should be familiar with all National Environmental Policy Act (NEPA) Environmental Impact Statement (EIS) requirements as well as have experience with Endangered Species Act (ESA), Magnuson-Stevens Fishery and Conservation Management Act Essential Fish Habitat (EFH), and the Marine Mammal Protection Act (MMPA). The reviewer should have a specific knowledge and understanding of dredging and beach nourishment related impacts associated with Coastal Storm Damage Reduction projects on the Mid-Atlantic coast. Specific high value habitats of interest within the study area include, but are not limited to: inlet complex, ebb shoal, cape shoal, hard bottom, and soft bottom communities."
- **Cultural Resources:** The reviewer should have the ability to review cultural resources studies pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended and 36 CFR 800. The reviewer should thoroughly understand Appendix C-4 (Cultural Resources) of the Planning Guidance Notebook (ER-1105-100), particularly as it relates to Coastal Storm Damage Reduction studies.
- **Geotechnical Engineering:** The reviewer should have knowledge of how coastal processes relate to geotechnical engineering, how to apply the NC Sediment Criteria to borrow materials, and coastal geology. This should include being familiar with geophysical subsurface investigation methods, the drilling and sampling process, boring logs, soil testing methods, grain size distribution data, and beach overfill ratio determination.
- **Real Estate:** The Real Estate reviewer is to have expertise in the real estate planning process for cost shared and full federal civil works projects, relocations, report preparation and acquisition of real estate interests. The reviewer should have a full working knowledge of EC 405-2-12, Real Estate Planning and Acquisition Responsibilities for Civil Works Projects and Public Law 91-646. The reviewer should be able to identify areas of the REP that are not in compliance with the guidance set forth in EC405-2-12 and should make recommendation for bringing the report into compliance. All estates suggested for use should be termed sufficient to allow project construction, and the real estate cost estimate should be validated as being adequate to allow for real estate acquisition.
- **Cost Engineering:** The reviewer must be a cost estimating specialist. It is imperative that estimates be prepared by, and reviewed under the supervision of, personnel who are competent in construction cost estimating. The reviewer must possess a working knowledge of construction of beachfill projects, and be capable of making professional determinations based on their experience.

Additional disciplines will be added as deemed appropriate throughout the course of the study. ATR will occur at all major report milestones.

## **Independent External Peer Review**

Independent External Peer Review (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 the USACE is warranted. Per EC 1165-2-209, a Type I (for project studies) IEPR is mandatory if any of the following criteria are true: the project poses a significant threat to human life, the estimated total cost of the project is greater than \$45 million, the Governor of an affected State requests a peer review by independent experts, or the Chief of Engineers determines that the project study is controversial due to significant public dispute over either the size, nature, or effects of the project or the economic or environmental costs or benefits of the project. Other considerations include whether the project will generate significant interagency interest, will entail an Environmental Impact Statement (EIS), or will include novel or precedent setting approaches. It is anticipated that the total cost for this project will be greater than \$45 million, and will also require an EIS. Therefore an IEPR will be conducted for this study. The IEPR will be managed by an Outside Eligible Organization (OEO), external to the USACE.

The IEPR reviewers should have the combined, following expertise and requisite experience:

Technical areas related to **geotechnical engineering** (1 expert):

- At least ten years of experience
- Registered professional engineer.
- M.S. or higher in geotechnical engineering.
- Demonstrated experience in geotechnical studies and design of stabilizing dunes, bluffs, and beach berms.
- Familiar with geotechnical practices used in North Carolina.

Technical areas related to **economics** (1 expert):

- At least ten years of experience
- M.S. or higher in economics.
- Experience in coastal economic evaluation and flood risk evaluation.

Technical areas related to **coastal engineering** (1 expert):

- At least ten years of experience
- M.S. or higher in engineering.
- Registered professional engineer with experience in coastal and hydraulic engineering with an emphasis on large public works projects **OR**
- Professor from academia with extensive background in coastal processes and hydraulic theory and practice.
- Familiar with USACE application of risk and uncertainty analyses in coastal storm damage reduction studies.

- Familiar with standard USACE coastal, hydrologic, and hydraulic computer models.
- Familiarity with the GRANDUC program beneficial.

Technical areas related to **environmental/biology** (1 expert):

- At least ten years of experience
- Demonstrated experience with projects on the mid-Atlantic coast of the United States.
- Knowledge of tidal salt marshes, construction impacts on the marine and terrestrial ecology of coastal regions and characterization of benthic communities
- Familiar with all National Environmental Policy Act (NEPA) EIS requirements as well as have experience with ESA, EFH, and MMPA.

Technical areas related to **plan formulation** (1 expert):

- At least ten years of experience
- Experience in coastal planning.
- Familiar with USACE plan formulation standards and procedures.

Upon conclusion of the IEPR, the OEO will provide to the District a Review Report, which will include the names and credentials of reviewers, the reviewers' charge, the nature of their review and findings and conclusions, and a verbatim copy of the reviewers' final comments. The Corps response to the report will come from the Chief of Engineers, and will include the Corps agreement or disagreement with each individual comment contained in the report, any actions taken in response to each comment, and the reason those actions are believed to satisfy the key concerns stated in the report. Once finalized, the Corps response will be publically disseminated, however, the names and credentials of the IEPR reviewers will not be disclosed.

## **Policy and Legal Review**

Policy and legal review is conducted at all the major report milestones, in order to confirm that the study is in compliance with the appropriate laws and USACE policies. Policy review is conducted by the USACE headquarters (passed on through SAD), and legal review is handled by Wilmington District Office of Counsel.

## **Public Review/Comment**

Once completed, the Brunswick County Beaches GRR will be disseminated to resource agencies, interest groups, and the public as part of the National Environmental Policy Act (NEPA) environmental compliance review. The report will include an Environmental Impact Statement (EIS). All significant and relevant public comments will be provided as part of the review package to Peer Reviewers as they are available and may include but not be limited to: scoping letters, meeting minutes, other received letters, and emails.

## **DrChecks**

A software program useful to coordinate various document comments and responses electronically, DrChecks, will be used to conduct the ATR and IEPR.

### **Sponsor In-Kind Contributions to Study**

No in-kind contributions from the sponsor are anticipated.

### **Model Certification**

According to EC 1105-2-412 – Model Certification, models can be divided into two general categories – “planning models” and “engineering models used in planning studies”. Currently, only the first category – “planning models” need to go through the planning model certification or approval process. The Brunswick County Beaches GRR will use one model which falls into the “planning model” category, which is the Generalized Risk and Uncertainty Coastal Model (GRANDUC). GRANDUC utilizes a life cycle, risk based approach in analyzing the economics of alternative plans. GRANDUC has been used previously by Wilmington District in several previous Coastal Storm Damage Reduction studies, and its use was reviewed and approved specifically for those studies. Wilmington District will similarly be seeking an “approval for use” of GRANDUC on the Brunswick County Beaches GRR. As the Brunswick County Beaches GRR is the last Wilmington District study that will utilize GRANDUC, a full certification of the model is not being sought. “Approval for use” of the model will be coordinated through the PCX-CSDR, although it is ultimately the USACE HQ which grants approval of a model.

The only engineering model being used on the study is S-BEACH, which has been approved for use by the USACE engineering community of practice.

## **5. Anticipated Review Schedule**

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Civil Works Review Board	December	2013
Final EIS / NEPA Public Review (MSC Commanders Public Notice)	January	2014

## Attachment 1 Peer Review Plan Chart

REVIEW PLAN	
FEASIBILITY PHASE	
Study Product or Milestone	Review by
Feasibility Scoping Meeting	( not part of this study)
Value Engineering Package	SAD VE Program Management PDT
Alternative Formulation Briefing	PDT, Supervisors, ATR Team
Draft GRR & EIS  Risk Analysis Cost Engineering Policy	PDT, Supervisors, ATR Team, IEPR Team, OC, Public, State and Federal Agencies  Cost DX Cost DX HQ, SAD
CWRB Review Package	PDT, Supervisors
Final GRR & EIS	CWRB, Public, State and Federal Agencies
Chief of Engineers Report	HQ→ ASA(CW)→ OMB→ Congress