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CHARLESTON DISTRICT, CORPS OF ENGINEERS  
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CHARLESTON, SOUTH CAROLINA 29403-5107

Project Management Division – Civil Works Branch

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Preview of Recommended Plan  
Charleston Peninsula, South Carolina, Coastal Storm Risk Management Study  
US Army Corps of Engineers, Charleston District,  
69A Hagood Avenue  
Charleston, South Carolina 29403-5107

**TO WHOM IT MAY CONCERN:**

This is a Preview of the Recommended Plan for the Charleston Peninsula Coastal Storm Risk Management (CSRM) Study as of January 2022. It is being made available to stakeholders and media in advance of the final FR/EIS; however, as a preview, the information provided is subject to change in accordance with the ongoing finalization of the FR/EIS. The U.S. Army Corps of Engineers (USACE) is not accepting formal comments on this document. Release of the final FR/EIS continues to be anticipated for late spring 2022.

**CIVIL WORKS PROJECT DEVELOPMENT PHASES**

Development of a USACE civil works project includes multiple phases: Feasibility; Preconstruction, Engineering and Design (PED); Construction; and, Operation and Maintenance. Each phase is governed by a formal agreement between USACE and the non-federal sponsor (NFS), in this case the City of Charleston (City). The initiation of each phase (the Construction and the Operations and Maintenance phases will be governed by a common agreement) represents a decision point for both USACE and the City.

At the outset of the Feasibility phase, the City and USACE entered into a Feasibility Cost Sharing Agreement (FCSA) which has governed the parties' obligations during this Feasibility phase. The conclusion of the Feasibility phase will be the District's recommendation in the final FR/EIS, a NEPA Record of Decision, and upon concurrence with the District's recommendation, a Chief of Engineer's Report recommending authorization by Congress. The City's willingness to complete the study is an important part of the process to enable the USACE Chief of Engineers to recommend authorization by Congress and for the study to move into PED. Two assurances are required of the City for inclusion in the Final Report Submittal Package: the City's signed letter indicating support for the recommended plan, and its Self-Certification of Financial Capability. In addition, there are two agreements which will require the City's signature for inclusion in the Final Package – the Programmatic Agreement (PA) for the treatment of historic and cultural resources, and the Memorandum of Understanding (MOU) for the treatment of aesthetic resources. By their terms, the PA and MOU do not trigger obligations on the part of the City (and other signatories) unless and until the project moves into the next (PED) phase of the project; their purpose is to document commitments regarding the handling of these resources should the project move into the PED phase.

While these assurances and commitments by the City represent important steps in bringing the Feasibility phase to a favorable conclusion, the decision to provide them for the Feasibility phase will not constitute a legal obligation on the part of the City or USACE to proceed with the

PED phase. The PED phase may only be initiated once PED funds have been appropriated by Congress, and a Design Agreement (DA) has been executed by USACE and the City. The City's decision to execute a DA with USACE will represent a commitment by the City to cost share the PED phase (the Feasibility phase has been 100% Federally-funded based on the Bipartisan Budget Act of 2018), and must be accompanied by the City's self-certification of financial capability to meet its obligations under the DA. The PED phase will address detailed engineering, technical studies, and design to include such things as continued refinements of the storm surge wall alignment, prospects for additional natural and nature-based features, specifics of cultural/historic and aesthetic mitigation, refinement of gate operation procedures, advisability of higher nonstructural measure design elevations, opportunities to incorporate additional climate change resilience and other aspects of the plan.

The multi-year PED phase is a necessary predicate to develop the project for the Construction phase, but execution of the DA does not constitute a legal obligation on either the City's or USACE's part to proceed with construction. Project construction may only commence after Congressional authorization of and construction funding for the project, the completion of PED, and the execution of a Project Partnership Agreement (PPA) between the City and USACE. The City's decision to execute a PPA with USACE (likewise accompanied by a self-certification of financial capability) will represent a commitment by the City to cost share the Construction phase, and to provide necessary Operation and Maintenance following the completion of construction.

## **HOW THE PLAN HAS CHANGED**

In April 2020, a draft integrated Feasibility Report and Environmental Assessment (FR/EA) and draft mitigated Finding of No Significant Impact that identified Alternative 3 as the Tentatively Selected Plan (TSP) was released to the public for review and comment. After review of substantive comments received on the draft FR/EA, further agency analysis, and continued refinement of the study, USACE concluded that an Environmental Impact Statement (EIS) with a Record of Decision would best fulfill NEPA compliance for this study. The March 23, 2021 Notice of Intent to prepare an EIS explained in part that preparation of an EIS would enable USACE to update and expand upon the some of the key effects analyses in the draft FR/EA, such as the positive and/or negative impacts to the cultural resources and historic properties, wetlands, visual aesthetics, aquatic and terrestrial resources, water quality, transportation, utilities, public safety, and environmental justice.

Ongoing optimization of the USACE plan has been an essential part of the USACE process. After the TSP was presented in the April 2020 draft FR/EA, multiple refinements were considered and evaluated to enhance performance and reduce costs and environmental impacts of the TSP. Most significantly, the plan no longer includes the wave attenuating structure. This feature was dropped from the plan because further analysis revealed that it did not provide inundation reduction benefits that exceeded its cost; elimination of this feature also yielded a material reduction in environmental impact. This changed the TSP from Alternative 3 to Alternative 2 (Perimeter Protection + Nonstructural) which was presented in the September 2021 draft FR/EIS.

Another notable change from the April 2020 draft FR/EA included moving the proposed storm surge wall from the marsh onto the land in some areas. This change drastically reduced not only the cost of construction (it is three to four times more expensive to build a wall in marsh than it is on land), but also the wetland impacts from 111 acres estimated in the April 2020 draft FR/EA to 35 acres in the September 2021 draft FR/EIS. Minimizing impacts to the coastal salt

marsh is preferred for the health of the ecosystem and also lowers compensatory mitigation costs.

The September 2021 draft FR/EIS incorporated aesthetic mitigation costs into the overall project cost estimate. The Study Team in collaboration with the City of Charleston, the Historical Charleston Foundation, and others performed the Visual Resources Assessment Procedure (VRAP) as described in Engineer Regulation 1105-2-100, Appendix C, section C-5. The team used the results of the assessment to develop a rough order of magnitude cost estimate (approximately \$53M) with detailed project designs awaiting the PED phase. The VRAP provides a way for USACE to determine what is reasonable for purposes of cost-sharing mitigation measures. If the City desires an aesthetic measure beyond what is determined reasonable by USACE to mitigate adverse impacts, then the City may elect to pursue such measures as betterments that are paid for by the City. USACE and the City have also developed a draft Memorandum of Understanding (MOU) to ensure a common understanding between the parties for the assessment of aesthetic resources. Among other things, the MOU states that the VRAP would be used to determine final aesthetic mitigation measures and cost share apportionment during the PED phase.

In the September 2021 draft FR/EIS, oyster reef-based living shoreline sills were presented as a feature of the TSP based on the qualitative benefits of coastal storm risk reduction services they provide. In this final FR/EIS, oyster reef-based living shoreline sills will remain in the plan at the same estimated placements and quantities as previously described, but are categorized as an environmental impact minimization measure rather than a coastal storm risk reduction feature due to the important environmental benefits they provide. During the PED phase, if quantitative analyses demonstrate that additional living shorelines or any other natural and nature-based feature can provide coastal storm risk reduction benefits, such features may be incorporated into the project provided the benefits of each feature exceed its cost (the City is responsible for all costs of features which exceed the National Economic Development plan).

The alignment of the storm surge wall along the South Carolina Port Authority (SCPA) property has been improved since the September 2021 draft FR/EIS. The SCPA engaged with USACE to optimize a segment of the storm surge wall that previously paralleled portions of East Bay and Washington Streets. The storm surge wall was moved to the eastern edge of the SCPA property, closer to the shoreline and further from historic structures. The move eliminates condemnation of private properties and provides storm surge risk reduction for any cargo stored at the port. This realignment results in lower implementation costs, higher coastal storm risk reduction benefits, and reduces the visual impact and proximity to historic structures. It is expected that the benefit-cost-ratio of 10.2 in the September 2021 draft FR/EIS will increase to 11.3 in the final FR/EIS.

## **THE RECOMMENDED PLAN**

The purpose of the Recommended Plan is to provide an optimal structural and non-structural solution set to reduce risk to human health and safety from, reduce economic damages from, and increase resilience to coastal storm surge inundation on the Charleston Peninsula. Without such protection, the risk that storm surge inundation will damage or destroy homes and businesses, undermine the foundations of transportation and utility infrastructure, and pose a serious life-safety threat all remain undiminished. The Recommended Plan would increase the resilience of the Charleston Peninsula to climate change and sea level rise by not only reducing these risks posed by of coastal storm surge inundation events, but also by enhancing the City's

ability to recover from coastal storm surge events more quickly and by reducing disruptions to the daily life on the peninsula.

Both USACE and the City acknowledge that the Recommended Plan is limited based upon the authorization for the Study to one critical piece of the overall flood risk management strategy for the City. Within the scope of their authorities and funding, both USACE and the City are committed to continuing to consider how best to synchronize the Recommended Plan and other flood risk management measures. Figure ES2, below, provides a visual depiction of the Recommended Plan.

- **Storm surge wall along the perimeter of the Peninsula:** The storm surge wall would be constructed along the perimeter of the peninsula to reduce damages from storm surge inundation. On land, the storm surge wall would be a T-wall with traditional concrete stem walls and pile supported bases. In the marsh, the storm surge wall would be a combination wall (combo-wall), which consists of continuous vertical piles on the storm surge side and battered pipe piles on the other side, connected by a concrete cap. The length of the proposed wall is approximately 8.7 miles (7.2 miles of T-wall and 1.5 miles of combo-wall). It would be strategically aligned to minimize impacts to existing wetland habitat, cultural and aesthetic resources, and private property while allowing continued operation of all ports, marinas, and the Coast Guard Station. The wall would tie into high ground as appropriate, including the shoreline at the Citadel and the existing Battery Wall. Due to its age and uncertainty about the integrity of the structure, the High Battery would be reconstructed to meet USACE construction standards and raised to provide a consistent level of performance. The proposed elevation of the storm surge wall is 12 feet North American Vertical Datum of 1988 (NAVD88).

The alignment of the wall (see Figure ES-2, below) has been optimized to minimize costs and impacts to the study area. Changes to the alignment may continue to occur during the PED phase, as appropriate. Drivers of the potential changes include, but are not limited to, additional opportunities for cost and/or impact reduction, new developments in technology or construction methodologies, results of additional engineering or design analyses, unforeseen cultural and historic resources, the presence of buried utilities not discovered during feasibility, and real estate acquisition challenges. Also, during the PED phase, changes to the storm surge wall are anticipated for the purpose of aesthetic and cultural/historic mitigation measures which could not be identified during the feasibility study because they must accompany more detailed designs.

The storm surge wall would include multiple pedestrian, vehicle, railroad, and storm (tidal flow) gates. Typically, the gates would remain open, and gate closure procedures would be initiated based on storm surge predictions from an authoritative source (such as the National Weather Service). When storm surge flooding is expected, storm gates would be closed at low tide, to keep the rising tide levels from taking storage needed for associated rainfall. For the vehicular, pedestrian, and railroad gate closings, timing of the closure would be dependent on evacuation needs and the anticipated arrival of rising water levels that close transportation arteries. Initial interior hydrology analyses indicates that five temporary and five permanent, small to medium hydraulic pump stations are justified to mitigate interior flooding impacts caused by the storm surge wall. Gate and pump operation procedures would be refined during the PED phase with input from the City of Charleston, emergency management experts, and weather experts. Specific responsibilities of the City in operating and maintaining the project will be described in an O&M Manual which will be binding on the City under the PPA

- **Natural and Nature Based Features:** In association with the storm surge wall, approximately 9,300 feet of oyster reef-based living shoreline sills would be constructed as a minimization measure to reduce impacts to natural shorelines and other resources seaward of the wall. The living shoreline sills would reduce marsh scour at the proposed storm surge wall and reduce erosion of the shoreline edge. The living shorelines would also provide other environmental benefits. The reef-based living shoreline materials/design would be determined during the PED phase.
- **Nonstructural measures:** In residential areas where construction of the storm surge wall would be impracticable due to the topography of the peninsula or other existing constraints, nonstructural measures such as elevations and floodproofing could be applied (see the detailed FAQs regarding nonstructural measures, low income and minority neighborhoods, and relocation/retreat at <https://www.sac.usace.army.mil/Missions/Civil-Works/Supplemental-Funding/Charleston-Peninsula-Study/>). Neighborhoods that have been identified for nonstructural treatment include Lowndes Point on the north-western edge of the peninsula, Bridgeview Village on the north-east edge of the peninsula, and the Rosemont community in the Neck Area of the peninsula. Approximately 100 structures have been identified for nonstructural treatment and the minimum proposed design elevation is 12 ft NAVD88. Wet floodproofing measures, such as elevation of utilities, would be applied in the Lowndes Point area because residential structures are already elevated above 12 feet NAVD88. Dry floodproofing measures would be applied to Bridgeview Village and floodproofing or elevation measures would be applied to the Rosemont neighborhood due to the nature of the construction materials and techniques used in these communities. Design elevations greater than 12 ft NAVD88 for nonstructural elevation measures will be considered during the PED phase because the nonstructural measures are not limited by the same topographic and infrastructure constraints as the storm surge wall.



Figure ES-2. The National Economic Development and Recommended Plan. Official mapping product of the Management Support Branch, Charleston District, USACE