

# SOUTHERN ENVIRONMENTAL LAW CENTER

Telephone 843-720-5270

525 EAST BAY STREET, SUITE 200  
CHARLESTON, SC 29403-6655

Facsimile 843-414-7039

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## **VIA E-MAIL**

Wesley Wilson  
Project Manager  
U.S. Army Corps of Engineers  
Environmental & Planning Office  
69A Hagood Avenue  
Charleston, SC 29412  
[Wesley.B.Wilson@usace.army.mil](mailto:Wesley.B.Wilson@usace.army.mil)  
[Chs-Peninsula-Study@usace.army.mil](mailto:Chs-Peninsula-Study@usace.army.mil)

**Re: Draft Feasibility Report / Environmental Assessment and Proposed Draft Finding of No Significant Impact for the Charleston Peninsula Coastal Flood Risk Management Study, Charleston, South Carolina**

Dear Mr. Wilson:

The Charleston District of the U.S. Army Corps of Engineers (“Corps”) is in the process of performing a feasibility study to evaluate storm surge risk reduction measures for the Charleston Peninsula in the City of Charleston (“the City”). According to the Corps, the goal is to reduce risks to health, safety, and economic damages from coastal storm surge inundation on the Peninsula. On April 20, 2020, the Corps released to the public its integrated Draft Feasibility Report / Environmental Assessment (“EA”) to present the results of the study to date and to analyze impacts of the proposed measures on the environment.

The Corps is proposing a nearly eight-mile long seawall around the perimeter of the Charleston Peninsula built to elevation 12 feet North American Vertical Datum of 1988 (“NAVD88”), approximately three feet higher than the current height of the High Battery seawall and more than seven feet higher than the pavement along Lockwood Drive. This seawall would require at least five pump stations to pump water outside of the wall, and would be accompanied by a 4000-foot long wave attenuating structure in the Charleston Harbor. In total, the project would impact nearly 111 acres of marsh.

The Southern Environmental Law Center (“SELC”), on behalf of the Coastal Conservation League, Charleston Waterkeeper, the South Carolina Wildlife Federation,

Audubon South Carolina, and the South Carolina Environmental Law Project (collectively, the “Conservation Groups”), submits these comments on the above-referenced project. The Conservation Groups recognize the historical, cultural, economic, and environmental significance of peninsular Charleston and the desire to protect it from climate change impacts, including sea level rise and more powerful storms. Downtown Charleston is one of the most unique urban areas in the country, and the Corps’ study, which purports to protect the City, its citizens, and future generations from an existential threat, demands the highest level of community engagement and rigorous review by the public.

### **Introduction and Summary of Concerns**

In general, we have identified a number of significant flaws and concerns with respect to the Corps’ draft EA, which threaten to undermine the study and squander the opportunities presented by this process. By failing to explain and disclose relevant and important information about this project to the public, the Corps has effectively deprived the public of the chance to engage on this proposal in a meaningful way at a time when the opportunity for public engagement has already been made far more challenging by the COVID-19 pandemic. The problems with the draft EA, which are described more fully in the body of this document, include, but are not limited to, the following:

- The Corps has inexplicably determined in its draft EA that this project is not significant enough to trigger the most robust level of review under the National Environmental Policy Act (“NEPA”). Instead of preparing an Environmental Impact Statement (“EIS”), which represents the “heart” of NEPA and requires the Corps to rigorously explore and objectively evaluate a reasonable range of alternatives, the Corps has concluded that this seawall will not have a “significant” impact on the human environment, and that the study is not deserving of the highest level of NEPA review. The Corps’ conclusion is puzzling given that the agency has elected to prepare an EIS for similar Coastal Storm Risk Management studies in other areas of the country.
- The proposed seawall would encircle one of the most significant and best-preserved collections of historical sites anywhere in the country, including the Charleston Old and Historic District and hundreds of properties listed on the National Register of Historic Places (“NRHP”). Dozens of these properties, including the historic district itself, are designated as National Historic Landmarks (“NHLs”) and thus receive the highest degree of protection under federal law. Pursuant to Section 110(f) of the National Historic Preservation Act (“NHPA”), the Corps must “undertake such planning and actions as may be necessary to minimize harm” to NHLs. 54 U.S.C. § 306107. Because the current proposal would result in the destruction, modification, or impairment of NHLs and other

historical sites, the Corps must prepare a full EIS to thoroughly examine and describe its plans to avoid and minimize harm to these unparalleled resources.

- The draft EA erroneously focuses on traditional “grey infrastructure” solutions. Grey infrastructure typically refers to human-engineered infrastructure for water resources, such as concrete seawalls, bulkheads, and groins. Grey infrastructure differs from nature-based solutions or green infrastructure that could deliver multiple benefits, including buffering from storms and flood storage capacity. Instead of building a single-purpose, uniform wall, the Corps should carefully evaluate solutions that include multiple benefits and are tailored to the unique needs of different areas of the Peninsula. Importantly, although the Corps repeatedly says in the EA that it is focused on addressing only storm surge as opposed to the multiple sources of flooding that threaten the City, the congressional authorization for this study is broader than storm surge alone. Further, in evaluating potential solutions for the City, the Corps is required under federal law to select the least damaging practicable alternative—a test which the Corps has failed to meet in its draft EA.
- Key data and assumptions presented in the EA are incomplete or inaccurate, which has impeded the Corps’ development and selection of alternatives. For example, the EA ignores important sources of flooding on the Peninsula, such as the changing nature of storms that dump more rain, chronic tidal flooding, and rising waters that encroach upon the City via its low-lying drainage system. Relatedly, the Corps has failed to properly account for sea level rise by relying on a sea level rise scenario that is inconsistent with planning metrics used by the City and declining to use the most up-to-date data that incorporates the full range of risk that sea level rise poses to the City. As discussed below, there are serious implications of underestimating sea level rise, including the possibility of selecting and designing a solution here that will have an exorbitant, record-setting cost, yet may fail to attain the stated goals of actually addressing storm surge.
- In violation of NEPA, the EA does not adequately explain the direct and indirect effects of this proposal. In particular, the Corps has failed to sufficiently disclose or explain potential adaptation measures for communities within the City that are proposed to be left outside of the seawall. We are particularly concerned about the manner in which working class communities that have historically borne the brunt of environmental harms are excluded from the seawall perimeter. The exclusion of these communities from the seawall perimeter combined with the lack of detail regarding alternative adaptation solutions for these neighborhoods demonstrates that the Corps has not appropriately considered environmental justice issues. Similarly, the Corps has not adequately evaluated nor explained the potential for damages to communities west of the Ashley River or east of the Cooper River due to wave deflection and altered water circulation

patterns from the seawall. Likewise, the EA does not sufficiently consider the risks of catastrophic failure and overtopping of the seawall or the risk that the seawall will promote a false sense of security on the Peninsula, thereby inducing risky growth inside of the wall. The EA also fails to adequately disclose the impacts to ecological resources and describe how the Corps proposes to mitigate the impacts of its proposal, including the plan to mitigate for extensive impacts to wetlands.

- Finally, the Corps relies heavily on an economic analysis that is biased toward costly, environmentally damaging grey infrastructure when less expensive, nature-based solutions are available. The Corps' analysis of alternatives prematurely excludes solutions without providing the necessary comparison of potential benefits, costs, and damages. Moreover, the projected cost of the proposal is incomplete and likely underestimated – a critical flaw that threatens to skew the Corps' economic conclusions. The Corps has also failed to evaluate the greater benefits to the community and the environment from multi-functional, nature-based solutions to flooding.

In sum, there is no silver bullet for solving Charleston's flooding woes, but with a price tag this massive, the Corps should take a more holistic approach to solving problems relating to coastal storms and flooding, and should select solutions that create greater benefits for the community. The nearly \$2 billion proposal from the Corps, of which the City would have to pay just over a third of the total cost, is focused solely on a single resilience problem: defending the Peninsula from storm surge. While storm surge is an obvious and major concern, Charleston faces many more ongoing, chronic flood threats that interact with and reinforce storm surge, including rising seas infiltrating the City through its low lying drainage system, chronic tidal flooding, and intensifying rain events. These are threats that affect the entire City and are getting worse with time; the Corps cannot effectively study storm surge in isolation from these other related sources of flooding.

By evaluating multiple causes of flooding, including updated sea level rise projections, the Corps and the City would be better able to weigh alternatives with the potential to address coastal storms and flooding more holistically. Addressing multiple problems and providing for co-benefits that improve quality of life, sustain economic growth, and continue to draw people to Charleston would improve the benefit-cost ratio and better justify this undertaking. Because a one-size-fits-all solution does not match the varied neighborhoods and fabric of the Charleston Peninsula, the Corps should assess solutions on a neighborhood basis to ensure each part of the City is receiving flood mitigation that matches the need and fabric of the community. This could help determine, for example, where a concrete wall would be most appropriate, and where nature-based solutions and other adaptations could serve a similar purpose.

Only a year ago, the citizens of Charleston chose a broader approach than just a wall, adopting the “Dutch Dialogues” as guiding principles for living with water and adapting to the City’s changing relationship with water. The proposed wall design is limited by the Corps’ unduly narrow approach to this project and is therefore inconsistent with the Dutch Dialogue principles. That said, we remain hopeful that this process and the discussions that will continue between the Corps, Charleston’s leaders, and, most importantly, the City’s residents will result in an approach that addresses the proposal’s shortcomings and results in effective solutions for intensifying coastal storms and flooding. The best way to ensure that this study arrives at the optimal recommendation for Charleston and all its citizens is to engage in a robust review that is commensurate with the magnitude of this proposal. For this reason and others, it is imperative that the Corps prepare a full EIS under NEPA.

**I. Pursuant to NEPA and Its Implementing Regulations, the Corps Must Prepare an EIS for This Proposal.**

This may be the single most significant construction project in the history of the City of Charleston, and it could set precedent for coastal flood management projects up and down the Atlantic Coast. Although this project purports to address an existential threat to the City, the Corps has at least preliminarily determined that a mere EA is sufficient to analyze the impacts of the proposal. As an “action-forcing” statute, NEPA is designed to ensure that the public and decision-makers are provided with the information they need to make a considered decision about the best path forward, and to ensure that the agency has carefully and fully contemplated the environmental effects of its proposed action. 40 C.F.R. § 1502.1; *N.C. Wildlife Fed’n v. N.C. Dep’t of Transp.*, 677 F.3d 596, 601 (4th Cir. 2012) (quoting *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 350 (1989)). The Corps’ proposal here is a major federal action that would significantly affect the human environment, and a full EIS is required.

The purpose of NEPA is “[t]o declare a national policy which will encourage productive and enjoyable harmony between man and his environment.” 42 U.S.C. § 4321. Through NEPA, Congress declared its desire that federal agencies “use all practical means and measures . . . to create and maintain conditions under which man and nature can exist in productive harmony.” 42 U.S.C. § 4331. In order to achieve these goals, NEPA demands (1) thoughtful, informed agency decisionmaking and (2) making information available to the public at a meaningful time. 40 C.F.R. § 1502.14; *see Robertson*, 490 U.S. at 339 (“NEPA guarantees that the relevant information will be made available to the larger audience that may also play a role in both the decisionmaking process” and “provide[ ] a springboard for public comment.”); *Webster v. U.S. Dep’t of Agric.*, 685 F.3d 411, 421 (4th Cir. 2012). By focusing the agency’s attention on the environmental consequences of its proposed action, NEPA “ensures that important effects will not be overlooked or underestimated only to be discovered after resources have been committed or the die otherwise cast.” *Robertson*, 490 U.S. at 349.

The heart of NEPA requires that federal agencies prepare a “detailed” EIS on any “major Federal actions significantly affecting the quality of the human environment.” 42 U.S.C. § 4332(C). The “significance” of the proposed action is determined by evaluating both the context of the action and the intensity of the impact. 40 C.F.R. § 1508.27. Intensity refers to the severity of the activity as revealed through the consideration of ten factors, many of which would apply to this proposal:

- (1) “Impacts that may be both beneficial and adverse”;
- (2) The “degree to which the proposed action affects public health or safety”;
- (3) “Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas”;
- (4) “The degree to which the effects on the quality of the human environment are likely to be highly controversial”;
- (5) “The degree to which the possible effects on the human environment are highly unknown or involve unique or unknown risks”;
- (6) “The degree to which the action may establish a precedent for future actions with significant effects”;
- (7) The cumulative impacts of the activity on the environment;
- (8) “The degree to which the action . . . may cause loss or destruction of significant scientific, cultural, or historical resources”;
- (9) “The degree to which the action may adversely affect any endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973”; and
- (10) “Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.”

*Id.* § 1508.27(b). “An action may be ‘significant’ if one of these factors is met.” *Ctr. for Biological Diversity v. Nat’l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1220 (9th Cir. 2008). Furthermore, “[a] determination that significant effects on the human environment will in fact occur is not essential” for an EIS to be required; “[i]f substantial questions are raised whether a project *may* have a significant effect upon the human environment, an EIS must be prepared.” *Sierra Club v. U.S. Forest Serv.*, 843 F.2d 1190, 1193 (9th Cir. 1988) (emphasis added); *see also Steamboaters v. F.E.R.C.*, 759 F.2d 1382, 1393 (9th Cir. 1985) (stating that an agency “must supply a convincing statement of reasons why potential effects are insignificant.”).

**A. Consideration of the intensity factors clearly supports the need for an EIS here.**

The Corps failed to adequately evaluate the “significance” factors listed in 40 C.F.R. § 1508.27(b). Without properly analyzing these factors, as required by NEPA, the Corps has prematurely concluded that its alternatives “would not cause significant adverse effects on the quality of the human environment . . . .” EA at 239. An actual analysis of these factors reveals that the environmental impacts of the proposal would inevitably be significant, thus requiring the Corps to prepare a detailed EIS. 42 U.S.C. § 4332(C); *see also Wildlands v. Woodruff*, 151 F. Supp. 3d 1153, 1167 (W.D. Wash. 2015) (finding agency violated NEPA and vacating EA where agency failed to prepare an EIS and failed to take a hard look at significant issues).

*Public Health and Safety (Factor 2)*

An agency must prepare an EIS for a proposed action that “affects public health and safety.” 40 C.F.R. § 1508.27(2). Because safeguarding public health and safety is the *primary motivation* for this proposal, an EIS is needed to ensure that the Corps discloses and considers all of the potential benefits and consequences.

The EA notes that “[f]looding in urban areas can cause serious health and safety problems” through drowning, hazardous chemical exposure, fire, water supply contamination, and other phenomena. EA at 41–42. Storm surge events also restrict access to critical facilities, such as fire stations, police stations, and medical facilities, and evacuation routes. EA at 42. Whereas the proposed seawall and wave attenuator seek to minimize these risks, they may also have unintended negative ramifications for public health and safety. For example, the seawall could induce flooding in surrounding communities by deflecting storm surge, EA at 145, and exacerbate flooding on the Peninsula in cases of catastrophic failure or overtopping of the wall. The seawall may also contribute to an exaggerated sense of security among the public, encouraging more development within the perimeter and putting more lives and property at risk in major storm events.

None of these risks is sufficiently analyzed in the EA.<sup>1</sup> Further, because the study only addresses storm surge and no other sources of coastal storm flooding, the Corps must explain to what extent the proposed seawall would reduce health and safety risks, and how much flooding risk would persist after its construction.

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<sup>1</sup> Although the Corps has committed to studying storm surge deflection and releasing its report for public comment in 2021, that comes at the tail end of its planned three-year process. Such a potentially consequential study not be relegated to an afterthought, but should inform the development and selection of alternatives under NEPA.

#### *Likely to Be Highly Controversial (Factor 4)*

A project is considered “highly controversial” under NEPA when “a substantial dispute exists as to the size, nature or effect of the major federal action . . . .” *Rucker v. Willis*, 484 F.2d 158, 162 (4th Cir. 1973); *see* 40 C.F.R. § 1508.27(4). As explained throughout these comments, the Corps’ proposal clearly meets the standard for a “highly controversial” action, and a full EIS is needed to more thoroughly evaluate the points of disagreement.

The Conservation Groups dispute many fundamental features of this proposal, including, but not limited to:

- the comprehensiveness of the Corps’ approach;
- the assumptions, constraints, and data underlying the Corps’ development and selection of alternatives;
- the impact of the project on aquatic resources, wildlife, historic and cultural resources, and surrounding communities; and
- the estimated costs and benefits of the proposed alternative, especially compared to eliminated alternatives.

For example, the Corps’ stated objective for the study—to address storm surge inundation—is unnecessarily narrow and ignores other disruptive types of flooding associated with coastal storms. *See infra* Section II.A. The Corps also relies on outdated and likely underestimated sea level rise data, *see infra* Section II.B, and does not adequately consider unintended consequences such as wave deflection and overtopping, *see infra* Section III.B-C. As a result, it is likely that the proposed seawall and wave attenuator would continue to leave the Peninsula exposed to major flood risks. *See Wildlands*, 151 F. Supp. 3d at 1165 (requiring the agency to produce an EIS where significant disagreement existed regarding the effectiveness of removing gray wolves to address depredation).

#### *Highly Unknown (Factor 5)*

The effects of a project are “highly unknown” “where the government employs new techniques, the techniques are unique to the region, or they are experimental such that the results are unpredictable.” *American Wild Horse Campaign v. Zinke*, 353 F. Supp. 3d 971 (D. Nev. 2018); *see* 40 C.F.R. § 1508.27(5). In those circumstances, agencies must produce an EIS to resolve uncertainty or prevent speculation on potential effects of its action through further data collection. *Wildlands*, 151 F. Supp. 3d at 1165 (quoting *Native Ecosystems Council v. U.S. Forest Serv.*, 428 F.3d 1233, 1240 (9th Cir. 2015)). Here, the Corps has proposed a project without precedent in type, scale, and scope in the Charleston area and, indeed, in the South Atlantic region. Given the novelty of the proposal, there is enormous uncertainty about its



potential effects—on historic resources, on wetlands and aquatic resources, and on surrounding communities.

The NRHP nomination form for the Charleston Old and Historic District expansion documents the historic relationship that the City has with the Charleston Harbor.<sup>2</sup> Viewsheds, historic port-related structures, homes, and the Battery seawall itself are all identified as contributing resources to the district.<sup>3</sup> The scale and materiality of the proposed seawall would forever impair the historic character of, and sight lines to, these resources, and construction of the wall itself may necessitate demolition or modification of historic structures. Further, if storm surge overtops the proposed seawall, the trapped floodwaters could have devastating effects on the structures inside its boundaries—especially compared to alternatives that would address *both* storm surge and internal drainage.

In addition to historic resources, the seawall could have adverse impacts on surrounding communities by deflecting storm surge and inducing flooding and erosion in those areas. *See infra* Section III.B. Although the Corps has pledged to evaluate this risk, the results of that study will not be made available until early 2021, just a few months before the final EA is expected. Such a potentially impactful study should not be rushed through the NEPA process, but should be subject to public scrutiny and carefully considered by the Corps throughout the alternatives development and selection process. Additionally, the potential effects to the Rosemont and Bridgeview Village communities due to their exclusion from the seawall perimeter are not understood and have not been evaluated. *See infra* Section III.A. Finally, the Corps has not sufficiently addressed the impacts of the proposal on Essential Fish Habitat and threatened and endangered species. *See infra* Section III.F. Critical analysis and documentation on these issues, including the Biological Assessment, the Essential Fish Habitat Assessment, and the NOAA conservation recommendations, are completely missing from the EA. EA Appendix F at 7, 8, 53.

The uncertainty surrounding project effects is compounded by the unique characteristics of the Peninsula itself. Nearly one-third of the Peninsula that is proposed to be encircled by the seawall features neighborhoods constructed in the nineteenth and early twentieth centuries on reclaimed land. After decades of settlement of the fill materials used to create the land, these neighborhoods have little-to-no permeable surface and experience frequent flooding events from stormwater pooling in low-lying areas and extreme high tides coming onto the Peninsula at low elevations. These vulnerable neighborhoods warrant solutions that will address multiple types of flooding, especially since these sources of flooding often combine in coastal storms to produce more intense impacts. As discussed in Section II.A, though, the proposed seawall and wave attenuator would target only one source of flooding—storm surge—at the exclusion of others.

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<sup>2</sup> National Park Service, “National Register of Historic Places Inventory – Nomination Form: Old and Historic Charleston” (Dec. 27, 1977), <https://npgallery.nps.gov/GetAsset/4d312c27-ae03-4287-884b-dc59ca7f68b1>.

<sup>3</sup> *Id.*

Rather than evaluate the effects of its proposal in detail now—so as to resolve the substantial uncertainty—the Corps justifies its EA/FONSI based on studies and mitigation measures which are either too vague to properly scrutinize or entirely undeveloped at this stage. *See infra* Section III.F. The EA assures that these studies and mitigation plans will occur at some future date. But by that time, the Corps will have completed or nearly completed its scheduled NEPA process, and the opportunity for the public to comment on this information and influence the Corps’ ultimate decision will be greatly reduced. *See* 40 C.F.R. § 1500.1(b) (“NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken.”).

#### *Precedent for Future Actions (Factor 6)*

The Charleston study has the potential to “establish precedent for future actions with significant effects” and thus merits further consideration in an EIS. 40 C.F.R. § 1508.27(6). Including this study, the Corps initiated 14 Coastal Storm Risk Management (“CSRM”) studies along the Atlantic coast between 2014 and 2019. These studies began as a response to the devastation of Hurricane Sandy in 2012, after which the Corps conducted a two-year study of coastal storm and flood risk along the North Atlantic Coast.<sup>4</sup> The Corps identified nine high-risk areas between Maine and Virginia, and since that time, has expanded its CSRM feasibility studies to regions outside of the North Atlantic, including Miami-Dade Back Bay, the Florida Keys, and the Charleston Peninsula.

These studies, individually and collectively, could dramatically and permanently alter the Atlantic Coast and the communities along it. Faced with the intensifying impacts of climate change, coastal communities are seeking experiential resources and examples from similarly situated communities to guide their own adaptation plans. If authorized, the Corps’ proposal for Charleston would set a precedent of addressing future coastal threats through single-purpose, large-scale grey infrastructure projects. As one of the first major climate adaptation projects in the Southeast, there is particular potential for this project to carry precedential weight within the region. Therefore, the study warrants a full EIS and the additional analysis and public scrutiny that accompanies that process.

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<sup>4</sup> U.S. Army Corps of Engineers, “North Atlantic Coast Comprehensive Study: Resilient Adaptation to Increasing Risk” (Jan. 2015), <https://www.nad.usace.army.mil/CompStudy/>.

*Unique Characteristics of the Geographic Area, Destruction of Significant Cultural and Historic Resources, and Adverse Effect on Endangered or Threatened Species (Factors 3, 8, and 9)*

An agency must prepare an EIS for an action with unique geographic characteristics, such as “proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.” 40 C.F.R. § 1508.27(3). Separately but relatedly, an EIS is needed when an action “may adversely affect any endangered or threatened species,” *id.* § 1508.27(9), or “cause loss or destruction of significant scientific, cultural, or historical resources,” *id.* § 1508.27(8). The Corps’ proposed alternative here ticks all of these boxes.

As noted in the EA, the study area contains a remarkable 197 historic and cultural resources that have been listed on the NRHP, determined eligible for listing on the NRHP, or require additional investigation to determine NRHP eligibility. EA at 107. The Charleston Old and Historic District, which the proposed seawall would encircle, is designated an NHL and contains 30 structures that are individually designated NHLs. EA at 108. NHLs receive the highest level of protection under federal law: Pursuant to Section 110(f) of the NHPA, agencies must “undertake such planning and actions as may be necessary to minimize harm” to them. 54 U.S.C. § 306107. In addition to known historic and cultural resources, there are untold numbers of undiscovered or unrecorded historic and cultural resources in the project area, including potential submerged resources in the Charleston Harbor Naval Battlefield. EA at 23, 111. The Corps’ proposal would forever impair these irreplaceable resources by destroying and modifying historic structures during construction, intruding on the visual setting, and disturbing terrestrial and submerged archaeological sites. EA at 23, 186–87.

The study area for the proposal also contains unique and important aquatic resources, including recreational and commercial fisheries and habitat for five federally listed threatened and endangered species. EA at 96. The salt marshes and estuarine tidal creeks around Charleston, which NOAA has designated Essential Fish Habitat, are particularly important to supporting invertebrate and fish species in their juvenile stages. EA at 98. More than 75 percent of the U.S. commercial catch and even more of the recreational catch complete at least part of their life cycles in estuaries.<sup>5</sup> The proposed seawall would destroy or impair portions of these ecologically critical areas, including more than 100 acres of saltmarsh wetlands. EA at 173; *see Friends of Back Bay v. U.S. Army Corps of Eng’rs*, 681 F.3d 581, 589 (4th Cir. 2012) (finding marsh communities are unique and ecologically critical as well as “globally rare”). The full extent of these impacts is unknown and will not become known until the project goes through the Pre-Construction Engineering and Design (“PED”) phase. EA at 172. Because the PED phase will

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<sup>5</sup> National Oceanic and Atmospheric Administration, “Why are Estuaries Important? The Economy and Environment,” [https://oceanservice.noaa.gov/education/tutorial\\_estuaries/est02\\_economy.html#:~:text=Estuaries%20provide%20habitat%20for%20more,year%20to%20the%20U.S.%20economy.](https://oceanservice.noaa.gov/education/tutorial_estuaries/est02_economy.html#:~:text=Estuaries%20provide%20habitat%20for%20more,year%20to%20the%20U.S.%20economy.)

begin only *after* the Corps finalizes its EA, the public will be precluded from ever knowing or commenting on the full extent of the project's impacts to aquatic resources and wetlands.

All of the aforementioned significance factors point to the need for the Corps to conduct an EIS for the Peninsula study.

**B. The Corps has elected to prepare an EIS for other similar Coastal Storm Risk Management studies.**

As discussed above, the Corps initiated 14 CSRMs along the Atlantic coast from 2014 to 2019 to evaluate and formulate plans for future storm risk and sea level change. For at least 10 of these studies, the Corps has either prepared or signaled an intent to prepare an EIS rather than an EA as it has here. A brief review of these other studies reinforces just how unusual and arbitrary the Corps' decision is not to prepare an EIS for this proposal.

The wetland impacts predicted in the Charleston EA exceed those in multiple CSRMs studies where the Corps has opted for an EIS. For instance, the Norfolk CSRMs Integrated Final Report/EIS states that storm surge barriers and floodwalls would impact only four acres of tidal and intertidal wetlands.<sup>6</sup> The Miami-Dade Back Bay CSRMs report anticipates similarly "minor to moderate impacts to jurisdictional wetlands" and potential impacts to no more than 2,000 square feet of mangroves.<sup>7</sup> By comparison, the proposed alternative in the Charleston EA would adversely impact "[u]p to approximately 111 acres of saltmarsh wetlands." EA at 173. The Charleston EA discounts these wetlands impacts, claiming that "there are not extensive natural resources present" because the Peninsula is highly urbanized, EA at 23; however, Norfolk and Miami are as urbanized as, if not more urbanized than, the Peninsula and still garnered EISs.

Several CSRMs studies have also justified the need for an EIS based on impacts to cultural and historic resources. In EISs for Norfolk,<sup>8</sup> the South Shore of Staten Island,<sup>9</sup> and

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<sup>6</sup> U.S. Army Corps of Engineers, "Final Integrated City of Norfolk Coastal Storm Risk Management Feasibility Study/Environmental Impact Statement," at viii (Sept. 2018), <https://usace.contentdm.oclc.org/digital/collection/p16021coll7/id/5490/>.

<sup>7</sup> U.S. Army Corps of Engineers, "Miami-Dade Back Bay Coastal Storm Risk Management Draft Integrated Feasibility Report and Programmatic Environmental Impact Statement," at 291, 376 (May 2020), <https://usace.contentdm.oclc.org/utis/getfile/collection/p16021coll7/id/14453>, 376.

<sup>8</sup> U.S. Army Corps of Engineers, "Final Integrated City of Norfolk Coastal Storm Risk Management Feasibility Study/Environmental Impact Statement," at 281 (Sept. 2018), <https://usace.contentdm.oclc.org/digital/collection/p16021coll7/id/5490/>.

<sup>9</sup> U.S. Army Corps of Engineers, "South Shore of Staten Island, New York Coastal Storm Risk Management Feasibility Study Report," at 7-25 (Dec. 2016), [https://www.nan.usace.army.mil/Portals/37/docs/civilworks/projects/ny/coast/StatenIsland/SOUTH%20SHORE%20STAT%20UPDATE/2\\_FINALFeasibilityMainRptDec16.pdf?ver=2017-03-13-091038-217](https://www.nan.usace.army.mil/Portals/37/docs/civilworks/projects/ny/coast/StatenIsland/SOUTH%20SHORE%20STAT%20UPDATE/2_FINALFeasibilityMainRptDec16.pdf?ver=2017-03-13-091038-217).

Miami-Dade Back Bay,<sup>10</sup> for example, the Corps predicted significant adverse impacts or the potential for adverse impacts to cultural resources and historic properties. By contrast, in cases where the Corps has produced an EA/FONSI, such as the Fairfield and New Haven CSRM Study, the proposed action would cause no or minimal cultural resource impacts.<sup>11</sup> Here, the proposed seawall and wave attenuator would result in the destruction, modification, or impairment of potentially *hundreds* of archeological sites and historic structures, including dozens of NHLs and the Charleston Old and Historic District. EA at 107–08. An EIS is needed to fully evaluate and weigh these significant impacts against the proposal’s other environmental effects and purported benefits.

**C. The heightened requirements of an EIS will help yield a better, more informed decision by the Corps.**

The Corps has stated publicly that the Charleston study does not merit an EIS (1) because its effects do not meet the threshold of “significance” and (2) because the current EA is sufficiently detailed to substitute for an EIS. The first justification, as discussed above, is clearly incorrect on the facts. The second justification is clearly incorrect as an interpretation of NEPA. Under NEPA and its implementing regulations, “an EA and an EIS serve very different purposes.” *Sierra Club v. Marsh*, 769 F.2d 868, 875 (1st Cir. 1985). As the Ninth Circuit explained:

An EA simply assesses whether there will be a significant impact on the environment. An EIS weighs any significant negative impacts of the proposed action against the positive objectives of the project. Preparation of an EIS thus ensures that decision-makers know that there is a risk of significant environmental impact and take that impact into consideration. As such, an EIS is more likely to attract the time and attention of both policymakers and the public.

*Anderson v. Evans*, 371 F.3d 475, 494 (9th Cir. 2004). “No matter how thorough, an EA can never substitute for preparation of an EIS, if the proposed action could significantly affect the environment.” *Id.*; see also *Sierra Club*, 769 F.2d at 875 (refusing to accept “EAs as a *substitute* for an EIS—despite the time, effort, and analysis that went into their production”).

One especially critical difference between an EA and an EIS is the obligation to evaluate alternatives. Whereas any EIS or EA must “incorporate a range of reasonable alternatives . . . the

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<sup>10</sup> U.S. Army Corps of Engineers, “Miami-Dade Back Bay Coastal Storm Risk Management Draft Integrated Feasibility Report and Programmatic Environmental Impact Statement,” at 253, 255 (May 2020), <https://usace.contentdm.oclc.org/utils/getfile/collection/p16021coll7/id/14453>.

<sup>11</sup> U.S. Army Corps of Engineers, “Fairfield & New Haven Counties Coastal Storm Risk Management Feasibility Study Draft Integrated Report and Environmental Assessment,” viii (Dec. 2019) <https://www.nae.usace.army.mil/Portals/74/docs/Topics/FairField/Draft-Main-Report-EA-13DEC2019.pdf>.

*depth* of discussion and analysis required is different depending on whether the document is an EIS or an EA.” *W. Watersheds Project v. Bureau of Land Mgmt.*, 721 F.3d 1264, 1274 (10th Cir. 2013) (emphasis in original). An EIS must present alternatives to the proposed action so as to “provid[e] a clear basis for choice among options by the decisionmaker and the public.” 40 C.F.R. § 1502.14. Accordingly, an EIS must “[r]igorously explore and objectively evaluate all reasonable alternatives,” explain any alternatives eliminated from consideration, “[d]evote substantial treatment to each alternative considered in detail,” “include reasonable alternatives not within the jurisdiction of the agency,” address the “alternative of no action,” and discuss “appropriate mitigation measures not already included in the proposed action or alternatives.” *Id.* § 1502.14(a)-(f). By contrast, an EA must include only “brief discussions . . . of the environmental impacts of the proposed action and alternatives” to the action. *Id.* § 1508.9(a)-(b).

As discussed in Section IV below, the Corps devoted insufficient consideration to project alternatives before settling on the proposed seawall and wave attenuator; those alternatives warrant more detailed analysis in an EIS.

## **II. The Data and Assumptions Presented in the EA Are Incomplete or Inaccurate, Impeding the Informed Development and Selection of Alternatives.**

### **A. The EA ignores important sources of coastal storm flooding on the Peninsula that relate to coastal storms other than storm surge due to an unnecessarily narrow study objective.**

The Corps “may not define the objectives of its action in terms so unreasonably narrow that only one alternative . . . would accomplish the goals of the agency’s action.” *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 196 (D.C. Cir. 1991). This would “circumvent the requirement [in NEPA] that relevant alternatives be considered.” *City of New York v. Dep’t of Transp.*, 715 F.2d 732, 743 (2d Cir. 1983). Instead, the agency must take a hard look at factors related to the stated purpose and then “define goals for its action that fall somewhere within the range of reasonable choices.” *Citizens Against Burlington*, 938 F.2d at 196.

Here, the Corps’ stated objectives are to reduce risk to human health and economic damage from coastal *storm surge* inundation on the Charleston Peninsula. EA at 44. While storm surge poses a serious threat to the Peninsula, it is just one cause of the City’s broader coastal storm and flooding problems. Due to the study’s limited scope, extreme rainfall and associated stormwater runoff, tidal flooding, groundwater inundation, and compound events are excluded from consideration in the design and function of this project. By examining storm surge in isolation from these other sources of flooding that work together to threaten the Peninsula, the Corps risks the possibility of recommending solutions that are ineffective or even

counterproductive. The Corps must expand its study to consider and develop more comprehensive solutions to coastal storms and flooding.

Importantly, there is no indication that Congress intended to restrict the Corps' study authority to storm surge in a vacuum. Pursuant to Section 110 of the Rivers and Harbors Act of 1962, the Corps is authorized to study "the entire Coast of South Carolina in the interests of beach erosion control, hurricane protection and related purposes." EA at 27. The terms "hurricane protection" and "related purposes" encompass not only storm surge, but also other sources of flooding that are associated with and exacerbated by coastal storms, including heavy rainfall, tidal conditions, and groundwater inundation.<sup>12</sup> The Bipartisan Budget Act of 2018, meanwhile, broadly appropriated funding for the Corps "to prepare for flood, hurricane and other natural disasters . . ." EA at 28. This more expansive interpretation of the Corps' study authority is reinforced by other CSRM studies along the Atlantic coast. For example, in Norfolk, the Corps' study was designed to "address flooding damages due to coastal storm events"<sup>13</sup>; in Miami-Dade Back Bay, the Corps sought "to reduce coastal flood risk and increase resiliency"<sup>14</sup>; and in the South Shore of Staten Island, the Corps' objective was to manage "the risk of damages from storm surge flooding" and "the residual flood damage from rainfall events."<sup>15</sup>

### *1. Present and Future Flooding Concerns*

The EA acknowledges that Charleston is exposed to various types of flooding; however, it does not go into detail as to the causes, nor does it assess alternatives that would provide more comprehensive solutions to coastal storms and flooding. The City is already experiencing the effects of climate change and the multiple drivers of flooding risk on the Peninsula should not be ignored. Charleston experienced 89 minor tidal flooding events in 2019, shattering the record set in 2015 of 58 minor tidal flooding events.<sup>16</sup> Since this project was put out for public comment, two extreme rainstorms have inundated the City with stormwater, dropping as much as five inches of rain over just two to three hours in some areas.<sup>17</sup> Hurricane season started early in

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<sup>12</sup> We do not ask that the Corps solve ordinary urban drainage problems, *see* ER 1105-2-100, Section 3-3.b.(6), but that the Corps account for the unique risk posed by these other sources of flooding in connection with coastal storms.

<sup>13</sup> U.S. Army Corps of Engineers, "Final Integrated City of Norfolk Coastal Storm Risk Management Feasibility Study/Environmental Impact Statement," at 18.

<sup>14</sup> U.S. Army Corps of Engineers, "Miami-Dade Back Bay Coastal Storm Risk Management Draft Integrated Feasibility Report and Programmatic Environmental Impact Statement," at 7.

<sup>15</sup> U.S. Army Corps of Engineers, "South Shore of Staten Island, New York Coastal Storm Risk Management Interim Feasibility Study for Fort Wadsworth to Oakwood Beach Final Report," at vi (Oct. 2016), <https://www.nan.usace.army.mil/Missions/Civil-Works/Projects-in-New-York/South-Shore-of-Staten-Island/>.

<sup>16</sup> Bo Petersen and Mikaela Porter, "Charleston and the South Carolina Coast Flooded a Record 89 Times in 2019," *POST AND COURIER* (Jan. 2020), [https://www.postandcourier.com/news/charleston-and-the-south-carolina-coast-flooded-record-times-in/article\\_7c18ee5e-2e3b-11ea-8784-23ddbc8d4e0c.html](https://www.postandcourier.com/news/charleston-and-the-south-carolina-coast-flooded-record-times-in/article_7c18ee5e-2e3b-11ea-8784-23ddbc8d4e0c.html).

<sup>17</sup> Sara Coello and Thomas Novelty, "Record-breaking Rainfall Floods Charleston Area with Nearly 6 Inches Soaking James Island," *POST AND COURIER* (Apr. 2020), [https://www.postandcourier.com/news/record-breaking-rainfall-floods-charleston-area-with-nearly-6-inches-soaking-james-island/article\\_21c85e94-862e-11ea-b8d3-](https://www.postandcourier.com/news/record-breaking-rainfall-floods-charleston-area-with-nearly-6-inches-soaking-james-island/article_21c85e94-862e-11ea-b8d3-)

2020, and on the last week of May, Charleston residents woke up to an unexpected tropical storm making landfall, bringing several inches of rain to the area and flooding streets.<sup>18</sup>

As touched on in the EA, Charleston is set to see tidal flooding events half the days of the year before the middle of the century. EA at 142. In a climate scenario where today's emission levels remain constant, the number of extreme rain storms in the Southeast will increase by two to three times the historic average by the end of the 21st century.<sup>19</sup> Before the end of the century, throughout the Southeast, extreme summer thunderstorms that typically result in 100-year floods events are expected to drop between 40 percent and 80 percent more rain than today.<sup>20</sup> While the number of hurricanes is not expected to change, climate change conditions will strengthen tropical systems and bring about larger hurricanes with heavier rainfall and more destructive wind and storm surges.<sup>21</sup> Warmer air and sea temperatures, along with altered ocean current and air circulation patterns, will provide more energy to these storm systems,<sup>22</sup> increasing the destructive potential of August storms, for example, by 40 to 50 percent.<sup>23</sup>

The narrow scope of this study precludes the Corps from designing the project to effectively address coastal storms and multiple sources of flooding and from sufficiently taking into account compound events and future conditions. Given the combined effects of climate change and the City's existing drainage problems, the Corps cannot effectively consider Charleston's flooding problems in isolation from one another. These problems are extensive and funds to address them are limited. As noted in the Final Report of the Dutch Dialogues, "single purpose infrastructure is a poor investment."<sup>24</sup> Therefore, the Corps should expand its study objectives to consider more holistic solutions. In order to maximize limited resources, this study should take the approach embraced by the City in the Dutch Dialogues. It is in the best interests of the City, as the non-federal sponsor of the project, to ensure that its investment generates

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0f988a634e29.html and Tony Bartelme, "Rising Waters: Forget About Climate Change, the Real Story is Climate Speed," POST AND COURIER (May 2020), [https://www.postandcourier.com/rising-waters/forget-about-climate-change-the-real-story-is-climate-speed/article\\_b0785be0-8e2f-11ea-bc3f-3bd7afe8bdf2.html](https://www.postandcourier.com/rising-waters/forget-about-climate-change-the-real-story-is-climate-speed/article_b0785be0-8e2f-11ea-bc3f-3bd7afe8bdf2.html).

<sup>18</sup> Fleming Smith, "Tropical Storm Bertha Develops Unexpectedly, Causes Rain, Flooding in Charleston Area," POST AND COURIER (May 2020), [https://www.postandcourier.com/news/tropical-storm-bertha-develops-unexpectedly-causes-rain-flooding-in-charleston-area/article\\_f1654e1e-a000-11ea-898e-0b93c5eacaec.html](https://www.postandcourier.com/news/tropical-storm-bertha-develops-unexpectedly-causes-rain-flooding-in-charleston-area/article_f1654e1e-a000-11ea-898e-0b93c5eacaec.html).

<sup>19</sup> U.S. Global Change Research Program, "Precipitation Change in the United States," CLIMATE SCIENCE SPECIAL REPORT: FOURTH NATIONAL CLIMATE ASSESSMENT, Volume I at 207-230, <https://science2017.globalchange.gov/chapter/7/>.

<sup>20</sup> Andreas F. Prein et al., "Increased Rainfall Volume from Future Convective Storms in the US," Nature Climate Change 7, at 880-884 (2017), <https://www.nature.com/articles/nclimate3168>.

<sup>21</sup> U.S. Global Change Research Program, "Extreme Storms," CLIMATE SCIENCE SPECIAL REPORT: FOURTH NATIONAL CLIMATE ASSESSMENT, Volume I at 207-230, <https://science2017.globalchange.gov/chapter/7/>.

<sup>22</sup> Global Fluid Dynamics Laboratory, "Global Warming and Hurricanes," NOAA (2020), <https://www.gfdl.noaa.gov/global-warming-and-hurricanes/>.

<sup>23</sup> Barry D. Keim et al., "Spatial and Temporal Variability of Coastal Storms in the North Atlantic Basin." MARINE GEOLOGY, 210, at 7-15 (2004), <http://faculty.fgcu.edu/twimberley/EnviroPol/EnviroPhilo/Spatial.pdf>.

<sup>24</sup> Waggoner and Ball et al., "Dutch Dialogues Charleston," at 38 (Sept. 2019), <https://www.dutchdialoguescharleston.org/>.



multiple benefits for Peninsula residents, rather than just partially solving one problem while potentially exacerbating others.

## **B. The EA fails to properly account for sea level rise.**

“To take the required ‘hard look’ at a proposed projects’ effects, an agency may not rely on incorrect assumptions or data,” including outdated data, in its environmental analysis. *Native Ecosystems Council v. U.S. Forest Serv.*, 418 F.3d 953, 964 (9th Cir. 2005); *see also Lands Council v. Powell*, 395 F.3d 1019, 1031 (9th Cir. 2005) (finding the data relied upon by the agency “too outdated to carry the weight assigned to it”); 40 C.F.R. § 1500.1(b) (“Accurate scientific analysis, expert agency comments, and public scrutiny are essential to implementing NEPA.”). The agency must also provide “up-front disclosures of relevant shortcomings in the data or models.” *Lands Council*, 395 F.3d at 1032.

The EA acknowledges the reality of “continued or accelerated rise in the sea level in the Charleston area” through the end of the century driven by climate change. EA at 49. However, the Corps erroneously limited the data used to evaluate how sea level rise will affect this project, falling short of their own internal procedures and requirements under NEPA. In these ways, the EA does not properly examine the project’s vulnerability to sea level rise.

### *1. The Corps is not using the most up-to-date data.*

The EA utilizes an outdated sea level rise scenario that undershoots the rates of sea level rise projected by the latest research. The Corps published three relative sea level rise scenario curves—Low, Intermediate, and High—for major tide gauges along the U.S. coast in 2013 (“USACE 2013 curves”). The USACE 2013 curves were novel at their release because they were some of the first to assess localized sea level rise along the entire U.S. coast. However, these curves are based on projections originally created by the National Research Council in 1987.<sup>25</sup> More up-to-date sea level rise scenarios are available. Two major federal reports have since superseded and improved upon the USACE 2013 work. One report was co-authored by the Corps in 2016,<sup>26</sup> and more recently, in 2017 the National Oceanic and Atmospheric Administration (“NOAA”) released new scenarios of sea level rise to inform the 4<sup>th</sup> National

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<sup>25</sup> U.S. Army Corps of Engineers, “Incorporating Sea Level Change in Civil Works Programs,” Appendix B at 14 (June 2019), [https://www.publications.usace.army.mil/Portals/76/Users/182/86/2486/ER\\_1100-2-8162.pdf?ver=2019-07-02-124841-933](https://www.publications.usace.army.mil/Portals/76/Users/182/86/2486/ER_1100-2-8162.pdf?ver=2019-07-02-124841-933).

<sup>26</sup> John A. Hall et al., “Regional Sea Level Scenarios for Coastal Risk Management: Managing the Uncertainty of Future Sea Level Change and Extreme Water Levels for Department of Defense Coastal Sites Worldwide,” U.S. DEPARTMENT OF DEFENSE STRATEGIC ENVIRONMENTAL RESEARCH AND DEVELOPMENT PROGRAM (2016), <https://www.serdp-estcp.org/Program-Areas/Resource-Conservation-and-Resiliency/Infrastructure-Resiliency/Regional-Sea-Level-Scenarios-for-Coastal-Risk-Management>.

Climate Assessment.<sup>27</sup> This effort incorporated and improved upon previous work from NOAA, the Corps, the U.S. Environmental Protection Agency, the U.S. Geological Survey, and academia.

Corps Guidance ER 1100-2-8162, Incorporating Sea Level Change in Civil Works Programs (“SLR Guidance”), directs the Corps to use the USACE 2013 curves to evaluate the “direct and indirect physical effects of projected future sea level change across the project life cycle in managing, planning, engineering, designing, constructing, operating, and maintaining [Corps] projects....”<sup>28</sup> The SLR Guidance allows for the Corps to incorporate other sea level rise curves into their analysis, in addition to the USACE 2013 curves, in order to properly evaluate how projects may be affected by sea level rise.<sup>29</sup>

For purposes of the EA, the Corps elected to use only the USACE 2013 Intermediate curve, which projects 1.13 feet of sea level rise by 2075. The EA briefly acknowledges the newer NOAA 2017 sea level rise projections of the 4<sup>th</sup> National Climate Assessment and references the tidal flooding projections therein; however, the EA does not incorporate the updated sea level rise data in the consideration of direct or indirect impacts or in the engineering of the seawall project. For comparison, the 2013 USACE Intermediate curve is roughly equal to the NOAA 2017 Intermediate-Low scenario. In order to not exceed the NOAA 2017 Intermediate-Low scenario, the globe would have to succeed in major greenhouse gas emission reductions to keep the global average temperature from rising above 2°C compared to the pre-industrial average.<sup>30</sup> This would effectively require global greenhouse gas emissions to be neutralized before mid-century. Based on emissions trends and the absence of a comprehensive effort to address climate change, this scenario is becoming less achievable. As of 2017 the globe had already warmed to 1°C above the average pre-industrial global temperature, and current emission promises under the Paris Accord would amount to approximately 3°C total warming even if they were fulfilled.<sup>31</sup>

The Corps does not acknowledge these shortcomings of the data they have chosen to use nor do they provide justification for why more updated sea level rise scenarios, such as the NOAA 2017 scenarios, were excluded from their analysis.

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<sup>27</sup> National Oceanic and Atmospheric Administration, “Global and Regional Sea Level Rise Scenarios for the United States,” U.S. Department of Commerce (2017), [https://tidesandcurrents.noaa.gov/publications/techrpt83\\_Global\\_and\\_Regional\\_SLR\\_Scenarios\\_for\\_the\\_US\\_final.pdf](https://tidesandcurrents.noaa.gov/publications/techrpt83_Global_and_Regional_SLR_Scenarios_for_the_US_final.pdf).

<sup>28</sup> U.S. Army Corps of Engineers SLR Guidance (June 2019).

<sup>29</sup> U.S. Army Corps of Engineers SLR Guidance (June 2019), Appendix B at 15. [https://www.publications.usace.army.mil/Portals/76/Users/182/86/2486/ER\\_1100-2-8162.pdf?ver=2019-07-02-124841-933](https://www.publications.usace.army.mil/Portals/76/Users/182/86/2486/ER_1100-2-8162.pdf?ver=2019-07-02-124841-933).

<sup>30</sup> Intergovernmental Panel on Climate Change, “Fifth Assessment Report: Summary for Policymakers,” (2014), [https://ar5-syr.ipcc.ch/topic\\_summary.php](https://ar5-syr.ipcc.ch/topic_summary.php).

<sup>31</sup> Intergovernmental Panel on Climate Change, “Special Report: Global Warming of 1.5 degrees Celsius,” (2018), <https://www.ipcc.ch/sr15/>.

2. *The Corps is not utilizing the full range of its own data.*

The SLR Guidance requires “[p]lanning studies and engineering designs over the project life cycle, for both existing and proposed projects, [to] consider alternatives that are formulated and evaluated for the entire range of possible future rates of sea level curves.”<sup>32</sup> However, in this EA the Corps has only evaluated the alternatives using one (Intermediate) sea level curve. This approach is only considered appropriate when the rate of sea level rise does not vary significantly between the curves in a given location or when a change in the amount of sea level rise will not adversely affect the performance of the project, per the SLR Guidance.<sup>33</sup> Neither of these conditions applies in this case. The USACE 2013 High curve projects over 3 feet of sea level rise by 2075 in Charleston, nearly 2 feet higher than the USACE 2013 Intermediate curve used in the EA—a significant difference with the potential to alter project design and performance.

The omission of the higher curve limits comparison and consideration of how the project will be affected by more than one scenario of sea level rise. Per the SLR Guidance, “analysts shall consider what effect higher relative sea-level rise rates could have on design alternatives, economic and environmental evaluation, and risk. The analysis shall include...intermediate and high rates, which include future acceleration of sea-level rise.” As described above, the USACE 2013 Intermediate curve is likely an underestimation of the amount of sea level rise the Charleston coast will actually see and does not account for accelerated sea level rise with continued high emissions. However, the USACE 2013 High curve follows close to the more realistic NOAA 2017 Intermediate-High scenario, which accounts for continued high emissions in the near future and increased contributions from land ice melt.<sup>34</sup>

The Corps did not provide adequate justification for why the USACE 2013 High scenario was not considered in this EA. Considering the USACE 2013 High sea level curve in addition to the NOAA 2017 scenarios would provide a more holistic and representative depiction of sea level rise risk in association with this project, and align the EA closer to the City’s sea level rise planning metrics.

3. *The Corps’ sea level rise scenario is inconsistent with planning metrics used by the City.*

After consulting with experts at NOAA and assessing the most up-to-date findings on relative rates of sea level rise, the City chose to plan for 2 to 3 feet of local sea level rise by 2070

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<sup>32</sup> U.S. Army Corps of Engineers Guidance (June 2019) at 2.

<sup>33</sup> *Id* at 3.

<sup>34</sup> NOAA 2017 at 21.

in the most recent Flooding and Sea Level Rise Strategy adopted in 2019.<sup>35</sup> This projection falls along the Intermediate and Intermediate-High scenarios produced by NOAA and the federal Interagency Task Force as part of the 2018 4<sup>th</sup> National Climate Assessment.<sup>36</sup> As the Corps acknowledges in the EA, the City uses 3 feet as a planning threshold for significant, long-term investments such as infrastructure. Despite referencing the City's Sea Level Rise Strategy and the higher sea level rise projections it includes, the EA does not describe how sea level rise beyond 1.13 feet would affect the study's conclusions.

*4. Underestimating sea level rise has serious implications for the study.*

By relying on outdated, likely inaccurate sea level rise data, the Corps risks designing an expensive project that is unable to achieve its stated objectives. Underestimating the amount of sea level rise that will take place could have major consequences for this proposal. First, the Corps does not account for how the tide gates will operate when, due to sea level rise, high tide exceeds today's ground level. With even relatively low amounts of sea level rise, the water line will rise above the base of the wall in some areas, especially along the low-lying western edge of the Peninsula, requiring the tide gates to remain permanently closed. Attempting to seal out the sea in such a way would likely create a bowl effect, similar to problems experienced in New Orleans, and would place a significant part of the City below the water line and at risk of flooding if significant machinery within the wall malfunctions. Should the seawall create a bowl effect, it would be very difficult to remove water from the City.<sup>37</sup> Even before sea levels rise above ground level, it can be expected that regular high tide flooding will require increasingly frequent gate closures. Increased closure of the tide gates would incur additional environmental and community impacts that should be evaluated.

Further, if the Corps does not take appropriate sea level rise scenarios into consideration, it is possible that the functional and structural integrity of the proposed seawall could be compromised. Higher sea level rise increases the risk of overtopping during storm events, a risk which the EA does not adequately evaluate. With an increased risk of overtopping, the capacity of the proposed pumping system will need to be designed to handle additional pumping needs. Higher sea level rise could also increase the costs of the project by necessitating replacing the seawall after construction to withstand a more significant storm event and sea-level rise condition.

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<sup>35</sup> City of Charleston, "Flooding and Sea Level Rise Strategy," (February 2019), <https://www.charleston-sc.gov/1981/Flooding-Sea-Level-Rise-Strategy>.

<sup>36</sup> NOAA 2017 at 21.

<sup>37</sup> Carlos Bergfeld, "Big Easy's Bowl Shaped Topography, Poor Levee Systems May Hamper Drainage Effort," DAILY TOREADOR (Sept. 2005), [http://www.dailytoreador.com/archives/big-easys-bowl-shaped-topography-poor-levee-systems-may-hamper-drainage-effort/article\\_7237bf9f-a124-5a7f-b609-b95c56ace8fe.html](http://www.dailytoreador.com/archives/big-easys-bowl-shaped-topography-poor-levee-systems-may-hamper-drainage-effort/article_7237bf9f-a124-5a7f-b609-b95c56ace8fe.html).

Increased sea level rise also introduces a new source of flooding in the form of groundwater inundation. One regional assessment in the San Francisco Bay Area found that on average, when inundation models account for rising groundwater along with sea level rise, the amount of land area affected by flooding more than triples.<sup>38</sup>

By limiting consideration of sea level rise to one low scenario, the Corps impedes its own ability to evaluate the many direct and indirect effects of sea level rise on the proposal and to design solutions that will effectively protect against future coastal storms and flooding.

*5. The Corps should consider a longer timeframe of impact.*

In addition to considering a higher range of sea level rise scenarios, the Corps should evaluate how sea level rise will affect this project outside of the 50-year time frame outlined in the EA. The EA acknowledges that sea level rise will impact the City beyond the timeline assessed in the study. EA at 49. However there is no discussion of how the wall will function or what will be required to replace or adapt the wall after 2075. Because the proposed seawall represents a significant long-term investment to address a long-term problem, it is critical that the Corps consider how the project fits into a post-2075 adaptation plan for the City.

We recommend that sea level rise scenarios accounting for more than 1.13 feet be considered early in the optimization and design of the project to ensure a long-term solution for the Peninsula and to avoid the pitfalls of constructing an obsolete project. It is important to consider a sufficient range of sea level rise scenarios before the PED phase so that the City and the public understand the full financial commitment of the proposal and can prepare for additional levels of sea level rise not addressed by the seawall.

**C. The proposal would not fully resolve the risk of storm surge on the Peninsula.**

While the Corps has limited the project purpose to reducing damages from storm surge, for the reasons described below, the proposed seawall and wave attenuator will not fully solve storm surge risk on the Peninsula. The EA must disclose these facts and explain the shortcomings of the Corps' proposal to the public.

The EA fails to convey the significant risks that storm surge would still pose to the Peninsula even if the seawall and wave attenuator are built by excluding several key considerations from the storm surge analysis. First, as noted above, the Corps inadequately considered sea level rise and therefore understates the amount of sea level rise that should be added to storm surge. Second, storm surge models used in the EA do not account for the tide

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<sup>38</sup> Ellen Plane et al., "A Rapid Assessment Method to Identify Potential Groudwater Flooding Hotspots as Sea Levels Rise in Coastal Cities," *WATER*, 11 (2019), <https://www.mdpi.com/2073-4441/11/11/2228/pdf>.

phase at the time of landfall. A high tide can add several feet to storm surge: “[T]he tide range in Charleston is up to 6 feet, suggesting that the tide phase at the time of landfall may significantly influence surge levels produced by a given storm.” EA Appendix B3 at 27. For example, in 2017, Hurricane Irma was so destructive, in part, because it made landfall at high tide. Accounting for tides and rainfall in addition to storm surge significantly increases the likelihood of a certain sized storm overtopping the wall by giving the storm surge a higher launching point.

Due to these and other factors, extreme tropical cyclones would still pose significant risk to the Peninsula even after construction of this project. For example, the seawall would be overtopped with a 1% annual chance, or 100-year, storm surge and two feet of sea level rise, not accounting for rain or tides. EA Appendix B3 at 27. As discussed below, the EA does not explain how the project or Peninsula would be affected in an overtopping scenario. *See supra* III.C. Based on the recent history of storms in Charleston and along the South Carolina coast, the risk of extreme storms and overtopping is very real—and increases as the sea level rises. The EA notes that the elevation of the proposed seawall is approximately 8 feet lower than the elevation of the peak surge that Hurricane Hugo would have brought if the northern section of the storm, with the largest surge, had hit Charleston Harbor.<sup>39</sup> EA at 40. It is not a matter of if, but when another hurricane the size of Hugo strikes Charleston. It is important for the City to understand how the project would affect the movement of water during a major storm, with the potential to overtop the seawall, within the perimeter of the wall and in surrounding areas.

#### **D. The Corps must provide the public with the results of the independent peer review.**

As the Corps acknowledges in the EA, this study must be reviewed under the Independent External Peer Review (“IEPR”) process established by the Water Resources Development Act of 2007. 33 U.S.C. § 2343.<sup>40</sup> The IEPR process must be carried out concurrently with the study—“beginning on the date of the signing of the feasibility cost-sharing agreement” and ending “not more than 60 days after the last day of the public comment period for the draft project study,” unless the Chief of Engineers determines that more time is necessary. 33 U.S.C. § 2343(b)-(d). The Corps provides IEPR plans online and is required by law to provide the public with information on the timing of the IEPR, the entity chosen for the IEPR, and the names and qualifications of the IEPR panel members. 33 U.S.C. § 2343(c). We

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<sup>39</sup> Hugo brought a storm surge of 20 feet above mean sea level to Bulls Bay, but because this area was largely undeveloped it suffered less monetary damage than Charleston.

<sup>40</sup> The study triggers mandatory IEPR because it evaluates a civil works project that will cost well over \$200 million and that is highly controversial. 33 U.S.C. § 2343(a). The study satisfies both of the controversy triggers as (1) “there is a significant public dispute as to the size, nature, or effects of the project,” and (2) “there is a significant public dispute as to the economic or environmental costs or benefits of the project.” 33 U.S.C. § 2343 (a)(4).

strongly urge the Corps to disclose this information and to disclose the results of the IEPR in a timely fashion so that the public can review them before the next comment deadline.

### **III. The EA Does Not Adequately Explain the Direct and Indirect Effects of the Proposal, Including Methods to Mitigate Those Effects.**

NEPA and its implementing regulations require an agency to disclose and consider the direct and indirect effects and the cumulative impact of its proposed actions. Direct effects “are caused by the action and occur at the same time and place,” whereas indirect effects “are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable.” 40 C.F.R. § 1508.8(a)-(b). “Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over time.” *Id.* § 1508.7.

As presented in the EA, the Corps’ analysis of project effects and mitigation measures is vague, incomplete, and, in parts, entirely absent. The failure to disclose this information detracts from the public’s understanding of, and ability to comment meaningfully on, the proposal. It also casts doubt on the Corps’ ability to make an informed alternative selection, especially since the agency must select the least damaging practicable alternative. *See infra* Section IV.C.

#### **A. The proposal excludes lower income and minority communities from the seawall perimeter, without detailing adaption measures to protect them or addressing environmental justice issues.**

The Corps must assess whether its proposal would impose “disproportionately high and adverse effects . . . on minority or low-income areas” in accordance with Executive Order 12898. EA at 135. The obligation to consider environmental justice impacts “is not merely a box to be checked” by the agency; it should guide the project’s development to a more equitable outcome. *Friends of Buckingham v. State Air Pollution Control Bd.*, 947 F.3d 68, 92 (4th Cir. 2020). Here, the Corps has provided little detail on why it excluded the Rosemont and Bridgeview Village communities, both within City boundaries on the Peninsula, from the seawall perimeter. These communities have been shut out from decisions on large-scale infrastructure projects affecting their neighborhoods in the past, and it is incumbent on the Corps not to repeat those mistakes. Though the EA claims that the proposed seawall “does not favor any socioeconomic group,” EA at 154, the reality is that most of the neighborhoods proposed to be included in its perimeter are

wealthy and predominantly white.<sup>41</sup> Meanwhile, the communities slated for non-structural adaptation are low- and moderate-income areas.

Rosemont is a predominantly Black neighborhood that is surrounded by former industrial sites with a legacy of land and water pollution. Residents were majorly impacted by the decision in the 1960s to construct Interstate 26 through a large portion of the neighborhood, displacing scores of homes and limiting access to the area. Access is also frequently blocked by standing water due to nuisance flooding and rain events. Rosemont remains a tightknit community where many longtime residents have passed down their homes from generation to generation. Social cohesion is a critical factor to consider when developing solutions for flooding in this community. Given the history of the area and the close bonds among residents, it would be immensely challenging to relocate this community to higher ground without destroying its enduring social fabric. The Corps must engage the residents of Rosemont now to create a robust adaptation plan that reflects their desires while ensuring the same level of protection as citizens on the rest of the Peninsula.

Bridgeview Village is a publicly-funded, privately-owned low-income community. Unlike Rosemont, which features a high degree of homeownership, Bridgeview Village is a community of renters characterized by high turnover rates. That said, Bridgeview Village remains one of the few options for low-income housing on the Peninsula. Like Rosemont, Bridgeview Village is located near former industrial sites such as Laurel Island, a capped landfill that, until recently, housed Charleston County's recycling center. The community is accessible only by a few points of entry, which are often obstructed by standing water from nuisance flooding and rain events. The residential structures that comprise Bridgeview Village are slab-on-grade apartment buildings, which are susceptible to flooding and present unique adaptation challenges.

In 1996, the City removed more than 150 public housing units from the Peninsula with the demolition of the Ansonborough Homes community, following damage from Hurricane Hugo and the discovery of carcinogens in the soil. That area has since been redeveloped with luxury housing, rightfully giving rise to suspicion that market-rate developments might replace other nearby public housing projects. This would further displace low-income residents from the Peninsula. Therefore, Bridgeview Village warrants an adaptation plan to ensure that low-income residential units will be maintained and safe from coastal storms and associated flooding.

## **B. The Corps must fully evaluate and disclose potential impacts to neighboring communities via wave deflection.**

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<sup>41</sup> David Slade, "RACIAL SHIFT: Charleston Peninsula's Makeup Reverses in 30 Years, with Blacks Leaving for Suburbs, Area Becoming Two-thirds White," POST AND COURIER (Mar. 28, 2011). [https://www.postandcourier.com/news/racial-shift-charleston-peninsulas-makeup-reverses-in-30-years-with-blacks-leaving-for-suburbs-area/article\\_69581977-ef00-5f6c-b969-edb7104344bb.html](https://www.postandcourier.com/news/racial-shift-charleston-peninsulas-makeup-reverses-in-30-years-with-blacks-leaving-for-suburbs-area/article_69581977-ef00-5f6c-b969-edb7104344bb.html).



The EA does not include sufficient modeling or study of the damaging effects of the proposed project, such as how deflected wave energy may affect the neighboring communities of West Ashley, Mount Pleasant, and/or James Island. The potential for harm to nearby communities as a result of this seawall is a significant issue. The Corps must thoroughly assess the effects of deflection in individual storms, in addition to the cumulative effects from multiple storms over time; otherwise, there is a risk that the proposed project will simply shift damaging storm surge from the Peninsula onto surrounding developed areas. Likewise, the potential for deflected wave energy to scour and erode nearby natural areas must be studied and disclosed to the public.

Even the limited information on this point in the EA is inconsistent and lacking. For example, the results of the draft study on the proposed breakwater's influence on wave action are unclear, at best. Figure 44 in Appendix B4 indicates that, while the proposed breakwater near the end of the Peninsula would reduce wave heights directly in front of the Battery, as indicated by the lighter blue color on the model output, the structure would increase wave heights along the adjacent James Island shoreline, as indicated by the yellow color on the model output. EA Appendix B4 at 36. However, in the EA itself, the Corps states that "surge deflecting off the breakwater would not induce flooding on surrounding communities." EA at 145. For starters, these types of significant inconsistencies must be resolved. Moreover, far more analysis is needed to evaluate the impacts of the Corps' preferred alternative on circulation patterns in the harbor and potential harm to surrounding urban, suburban, and natural areas.

### **C. The EA does not sufficiently consider the risks of catastrophic failure and overtopping of the seawall.**

Extreme tropical cyclones would still pose significant risk to the Peninsula even after the construction of this project. The seawall would be overtopped with a 1% annual chance, or 100-year, storm surge and two feet of sea level rise, not accounting for rain or tides. EA Appendix B3 at 27. The EA notes that in the event of an overtopping or tide gate failure, the flood levels would likely be similar to the no action alternative; however, there are no details provided to support this statement. Successive overtoppings can weaken a seawall structure and foundation over time, so it is necessary to understand the individual and cumulative risks of overtopping.<sup>42</sup> The engineering appendices mention overtopping as a structural issue that should be considered in the design phase. Given the risk posed to the public in the event of an overtopping, the Corps must provide meaningful information on how the wall would perform in the event of an overtopping. That information must come *during* this NEPA process and *before* the agency finalizes its preferred alternative, not in the subsequent PED phase.

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<sup>42</sup> Climate Technology Centre and Network, "Seawalls," UN ENVIRONMENT PROGRAMME, <https://www.ctc-n.org/technologies/sea-walls>.

Additionally, the project as proposed would rely on a series of tide gates to keep water out of the perimeter and pump stations to move water out. The Corps notes that the effectiveness of the pumps is still being assessed, yet this project is already reliant on significant pump infrastructure operating without technical mishaps. EA at 163. Engineered water systems that are highly reliant on pumps and mechanical components to function are prone to failures in significant rain or flood events. Last summer New Orleans' pumps malfunctioned after the city's systems were overwhelmed from responding to a single extreme rain event.<sup>43</sup> Even if operating effectively, it would take time for pumps to move water out of the Peninsula. The EA must disclose the risks associated with the reliance on pump stations and mechanical tide gates in addition to a contingency plan for recovery and response in the event of a failure.

**D. The EA does not consider the risk presented from indirect impacts such as induced growth and stormwater runoff.**

The EA currently fails to consider the potential for induced growth within the perimeter of the seawall. The EA acknowledges the potential for increased property values as a result of this project but does not detail any risk associated with induced growth. One study on the effectiveness of seawalls against tropical cyclones in Japan found that seawalls may contribute to a false sense of security, encouraging additional development in vulnerable areas behind the seawall and reducing evacuation rates during storm events.<sup>44</sup> An EA for a seawall prepared by the Fish and Wildlife Service identified induced growth and increased population density as indirect effects.<sup>45</sup> In recent coverage of the New Orleans seawall, a Corps official warned against communities growing complacent behind a seawall.<sup>46</sup> The EA at issue here has not addressed the risk associated with induced growth. It is crucial that this project does not impede progress on hazard mitigation or create a false sense of security.

Although the Corps states that "mitigation for adverse impacts to stormwater runoff will be investigated," the EA does not assess how the project would affect the movement of stormwater off the Peninsula during a rain event. EA at 31. While basic stormwater management is purportedly the responsibility of the local government, any potential for this project to

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<sup>43</sup> Heath Allen, "Multiple Issues Reported at Pumps During New Orleans Rain, Flooding Event," WDSU (July 2019), <https://www.wdsu.com/article/voltage-issue-internal-issue-caused-2-of-4-pumps-at-station-five-to-fail-during-flooding-event/28409665>.

<sup>44</sup> Roshanak Netaghi et al., "Statistical Analysis of the Effectiveness of Seawalls and Coastal Forests in Mitigation Tsunami Impacts in Iwate and Miyagi Prefectures," PLOS ONE 11(8), (Aug. 2016), <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4980023/>.

<sup>45</sup> Fish and Wildlife Service, "Environmental Assessment: Midway Seawall Long-Term Maintenance Project," (April 2018), [https://www.fws.gov/uploadedFiles/Region\\_1/NWRS/Zone\\_1/Midway\\_Atoll/Sections/News/News\\_Items/DRAFT%20Midway%20Seawall%20EA%20042018%20\(1\).pdf](https://www.fws.gov/uploadedFiles/Region_1/NWRS/Zone_1/Midway_Atoll/Sections/News/News_Items/DRAFT%20Midway%20Seawall%20EA%20042018%20(1).pdf).

<sup>46</sup> Umair Irfan, "New \$1.1 Billion Seawall Protects New Orleans Against Major Storms but May Cultivate Complacency," EE NEWS (May 2014), <https://www.eenews.net/stories/1059999621>.

contribute to a bathtub effect and retain stormwater, or tax existing stormwater infrastructure, within the wall perimeter must be evaluated. Any risks or new hazards this wall would indirectly affect should be clearly outlined and provided for public review. We urge that nature-based solutions are incorporated to mitigate any alterations to stormwater flow created by the presence of the seawall.

#### **E. The EA does not adequately describe mitigation for the project effects.**

NEPA requires that the Corps provide “a reasonably complete discussion of possible mitigation measures” in its environmental review. *See Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 333 (1989). The agency’s analysis must demonstrate that it took a “hard look” at possible mitigating factors; a “perfunctory description” or “mere listing” of mitigating measures is not sufficient to meet this standard. *See Okanogan Highlands All. v. Williams*, 236 F.3d 468, 473 (9th Cir. 2000).

The Corps assures the public that it will eventually develop avoidance and minimization measures and compensatory mitigation measures to ensure that the adverse impact is “less than significant.” EA at 24. However, the current EA provides almost no detail on how the Corps intends to offset the significant cultural, environmental, and community impacts of the proposed action. The lack of even a “perfunctory description” of mitigation measures prevents the public from assessing the proposal’s net impact and determining whether that impact is “less than significant.”

##### *1. Wetlands*

Corps Civil Works projects must meet the same wetlands mitigation standards as are required by the Corps Regulatory program. Section 2036(a) of Pub.L. 110-114 (Nov. 8, 2007). The Corps and the U.S. Environmental Protection Agency published, “Compensatory Mitigation for Losses of Aquatic Resources” (the “Mitigation Rule”) in 2008 to implement best practices and improve the success and effectiveness of aquatic resource mitigation plans. Like an applicant for a Section 404 permit under the Clean Water Act, the Corps must first complete all practicable avoidance and minimization requirements prior to considering compensatory mitigation.

The draft compensatory wetlands mitigation plan outlined in Appendix F is largely conceptual and lacking in important details, preventing the public from weighing the merits of the plan in a meaningful way. The Corps has identified approximately 26 acres of tidal wetlands that will be directly impacted by the proposal and 85 acres of tidal wetlands that will be indirectly affected. EA at 173. The loss of function from a total 111 acres of tidal wetlands is a significant impact. The Corps has yet to identify whether the mitigation will be completed through Permittee Responsible Mitigation or through the purchase of credits from an approved mitigation bank. For such a significant loss of wetlands, the public must have the opportunity to

comment on the full compensatory mitigation plan to ensure the mitigation plan is in the public interest and achieves no net loss of wetland resources per the Mitigation Rule.

## 2. *Cultural and Historic Resources*

The EA acknowledges that the proposed seawall and wave attenuator will likely impact cultural and historic resources, including potentially hundreds of NRHP-listed sites. The project may necessitate acquisition, demolition, and modification of historic structures; obstruct and alter viewsheds and sight lines to historic districts; and disturb terrestrial and submerged archaeological sites. EA at 23. However, the Corps has proposed no minimization or avoidance measures for these impacts and intends to defer these critical decisions until *after* project approval. EA at 23. This is unacceptable. In the words of the National Park Service, Charleston is “a locus for the modern preservation movement,” thanks to the dedicated efforts of its residents, organizations, and government over more than a century.<sup>47</sup> The Corps should not shut these individuals and groups out of such an impactful project by pushing its mitigation analysis to a post-NEPA date.

The need to evaluate mitigation *now* is especially important in light of the proposal’s potential impacts to NHLs. As discussed in Section I.A.5, the study area includes dozens of NHLs, which receive the highest degree of protection under Section 110(f) of the NHPA. Whenever an action may “directly and adversely affect” an NHL, the Corps is required to “undertake such planning and actions as may be necessary to minimize harm” to it. 54 U.S.C. § 306107. “Direct” effects include not only on-premise destruction or alteration, but also visual impacts. *Nat’l Parks Conservation Ass’n v. Semonite*, 916 F.3d 1075, 1088–89 (D.C. Cir. 2019). The viewshed impacts of the proposed 12-foot high seawall would directly and adversely affect the integrity of the NHL-designated Charleston Old and Historic District. EA at 188. However, the EA makes no mention of Section 110(f) and its heightened mitigation requirements, and does not propose any “planning” or “actions” to reduce the impacts of the seawall to an acceptable level. The Corps must address this necessary mitigation before selecting a project alternative; otherwise, it risks committing resources to a project whose harms may ultimately prove too extensive or too costly to adequately minimize or avoid.

## 3. *Aquatic Resources*

The proposed seawall and wave attenuator would adversely affect Essential Fish Habitat, EA at 238, and could potentially impact any of the five federally threatened and endangered species found in the Charleston Harbor, EA at 96. The EA commits to studying impacts to these aquatic resources and proposing mitigation measures in the final EA. EA at 98. But for now, the

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<sup>47</sup> National Park Service, “Charleston and Preservation” (last updated Feb. 22, 2018), <https://www.nps.gov/articles/charleston-and-preservation.html>.

public is stuck with placeholders where that important analysis should be. The Corps has not yet shared the Biological Assessment, the Essential Fish Habitat Assessment, the NOAA conservation recommendations, or any environmental correspondence for the proposal. EA Appendix F at 7, 8, 53. In other words, the EA deprives the public of even the slightest opportunity to comment on the proposal’s ecological impacts and potential mitigation for those impacts. Assuming the Corps does not release this information until the final EA, it is likely that the public will never have an opportunity—and certainly not a meaningful opportunity—to comment on these issues. The failure to disclose this analysis now undermines the letter and the spirit of NEPA, and the Corps must correct course by putting these documents up for public comment, preferably in an EIS.

#### **IV. The EA’s Narrow Focus on Grey Infrastructure Eliminates Nature-Based Solutions That Would Deliver Multiple Benefits to the Peninsula.**

Because the Corps will ultimately need to produce an EIS for this project, it must comply with the heightened standard under NEPA for evaluating alternatives. NEPA directs agencies to prepare “a detailed statement” on alternatives to the proposed federal action. 42 U.S.C. § 4332(C)(iii). This alternatives analysis “is the heart of the environmental impact statement.” 40 C.F.R. § 1502.14. “Without substantive, comparative environmental impact information regarding other possible courses of action, the ability of an EIS to inform agency deliberation and facilitate public involvement would be greatly degraded.” *New Mexico ex rel. Richardson v. Bureau of Land Management*, 565 F.3d 683, 708 (10th Cir. 2009). To that end, an EIS must “[r]igorously explore and objectively evaluate all reasonable alternatives,” including “the alternative of no action” and “reasonable alternatives not within the jurisdiction of the lead agency.” 40 C.F.R. § 1502.14. “The ‘existence of a viable but unexamined alternative renders an environmental impact statement inadequate.’” *Resources Ltd. v. Robinson*, 35 F.3d 1300, 1307

##### **A. The EA devotes insufficient consideration to non-structural and nature-based solutions.**

Along with the no action alternative, the Corps retained only two nearly identical alternatives for further study in the EA—(1) perimeter protection with some non-structural measures and (2) perimeter protection with some non-structural measures and a wave attenuator. We feel that advancing only these two options misses an important opportunity to integrate nature-based solutions into the City’s protection strategy. As discussed in Section II.A above, the Corps’ singular focus on storm surge ignores other types of flooding on the Peninsula and, consequently, ignores alternatives that would protect against coastal storms and flooding more effectively. For example, the EA identifies historic creeks and parks as potential solutions to internal drainage issues and tidal flooding—both major causes of flooding on the Peninsula. EA at 15–16. But because these nature-based alternatives are allegedly less effective against storm

surge, the Corps eliminated them from consideration with only cursory analysis. EA at 15–16. Similarly, the Corps dismissed non-structural solutions because they “would not address flooding that limits access to critical facilities, emergency services, and evacuation routes.” EA at 15. What this statement overlooks is that non-structural measures are designed to remove emergency-level risks altogether, thereby removing the need to move through induced emergency conditions.

The Corps’ alternatives analysis suffers from another major shortcoming: It considers non-structural and nature-based measures only in isolation rather than as integrated components of a broader solution. This is contrary to Congress’s express directive to the Corps “to consider the use of both traditional and natural infrastructure alternatives, alone *or in conjunction with* each other, if those alternatives are practicable.” Section 1149 of Pub.L. 115-270, 33 U.S.C. §2282 note (Oct. 23, 2018) (emphasis added). For example, coordinated buyouts of highly vulnerable properties, which would reduce the number of structures most readily exposed to storm surge and sea level rise, were considered separately from nature-based infrastructure such as living berms, which could effectively buffer against storm surge and wave action. Relatedly, natural features could be integrated into traditional grey infrastructure to make it ecologically beneficial. This was recently demonstrated by the Living Breakwaters project in Staten Island, New York; the project combines approximately 3,200 feet of near-shore breakwaters with active oyster restoration and other habitat enhancements to support physical resilience as well as biodiversity and protective ecosystems.<sup>48</sup>

### **B. A multi-layer approach would make the Peninsula more resilient to storm surge and other flooding events.**

It is true that no single non-structural or nature-based alternative will be sufficient to address coastal storms and flooding on the Peninsula. After all, even the proposed seawall and wave attenuator would not solve all of Charleston’s flooding woes. But when deployed together, non-structural measures and nature-based infrastructure have proven more cost-effective than grey infrastructure at reducing flood damages, even without taking into account the multiple co-benefits and ecosystem services that can be derived by integrating natural solutions in protection schemes. Research published in 2018 shows the average benefit-cost ratio for nature-based solutions along the Gulf Coast is 3.5, compared to 0.26 for levees/dikes and 0.73 for home elevations.<sup>49</sup> A 2014 study likewise found that natural systems are the least costly and most

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<sup>48</sup> Governor’s Office of Storm Recovery, “Learn More about the Living Breakwaters Project,” New York State, <https://stormrecovery.ny.gov/learn-more-about-living-breakwaters-project>.

<sup>49</sup> Borja G. Reguero et al., “Comparing the Cost Effectiveness of Nature-Based and Coastal Adaptation: A Case Study from the Gulf Coast of the United States,” PLOS ONE 13, no. 4 (Apr. 11, 2018), <https://doi.org/10.1371/journal.pone.0192132>. That study found that restoring wetlands along the Gulf could prevent \$18.2 billion in losses at a cost of \$2 billion; restoring oyster reefs could prevent \$9.7 billion in losses at a cost of \$1.3 billion; and restoring barrier islands could prevent \$5.9 billion in losses at a cost of \$1.2 billion. *Id.*

efficient way to control flooding.<sup>50</sup> Nature-based shoreline restoration projects in North Carolina and California have withstood intense wave action while nearby grey infrastructure took on damage and were inundated in the same storms.<sup>51</sup>

A layered approach to resilience on the Peninsula could deliver flood reduction benefits that a seawall alone cannot, and could avoid or reduce some of the most severe potential consequences of the current proposal. In combination with structural measures, nature-based solutions could address not only storm surge, but also internal drainage problems, tidal flooding, and groundwater inundation, thus enhancing resilience to multiple causes of flooding during coastal storm events. EA at 15–16. Further, as discussed in Section III.C, a single barrier solution runs the risk of catastrophic failure: Overtopping of the seawall, mechanical failure, and surge deflection could leave the Peninsula defenseless against storm surge and could actually exacerbate the effects of flooding within and outside of the perimeter. A multi-layer defense system, on the other hand, has the ability to withstand coastal storms and flooding more effectively and more reliably. Even the EA admits that “[r]esiliency increases when there are multiple layers incorporated in any risk management project,” including “structural, nonstructural, and natural and nature-based” measures. EA at 51. The Corps, unfortunately, has not taken even its own advice in the current proposal.

Natural infrastructure in South Carolina is already providing incredible value to coastal communities. Floodplains of the Waccamaw River and swamplands just north of Conway reduce flooding by up to 1.5 feet for floods up to a 200-year event, and provide an average of \$6.14 million in avoided damage annually.<sup>52</sup> Structures impacted by Hurricane Florence in the Pee Dee saw an average of \$47,000 less damage due to water storage by upstream floodplains. Following Hurricane Florence, a floodplain area of about 156,000 acres around the Great Pee Dee, Little Pee Dee, and Lynches rivers stored enough water to fill over half a million Olympic-sized swimming pools.<sup>53</sup> Because the floodplain absorbed this extreme flooding and slowly released the water over 10 days, downstream Georgetown County weathered the storm without major flooding.

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<sup>50</sup> Will Allen, et al., “Green Infrastructure Vision: Version 2.3: Ecosystem Service Valuation,” The Conservation Fund, 13-15 (2014), <https://datahub.cmap.illinois.gov/dataset/c303fd2e-beaf-4a75-a9ec-b27c6da49b69/resource/028c9b69-bb19-425e-bb92-3d33656bea4c/download/tcfcmappgiv23ecosystemservicesfinalreport201412v2.pdf>.

<sup>51</sup> Jean Judge et al., “Surfers’ Point Managed Shoreline Retreat Project, Case Studies of Natural Shoreline Infrastructure in Coastal California: A Component of Identification of Natural Infrastructure Options for Adapting to Sea Level Rise (California’s Fourth Climate Change Assessment,” The Nature Conservancy, at 9-15 (2017), [https://scc.ca.gov/files/2017/11/tnc\\_Natural-Shoreline-Case-Study\\_hi.pdf](https://scc.ca.gov/files/2017/11/tnc_Natural-Shoreline-Case-Study_hi.pdf).

<sup>52</sup> *Id.*

<sup>53</sup> One acre-foot is equal to 1,613.3 cubic yards, so the forest stored approximately 1,936,000,000 cubic yards. An Olympic swimming pool is 3300 cubic yards. This means the floodplain stored enough water to fill over 586,665 Olympic swimming pools. Williams et al., “Hurricane Florence Flooding in Georgetown County: A Qualitative Exploration of the Interactions of Estuary and Tidal River,” JOURNAL OF SC WATER RESOURCES (2019).

Recognizing the benefits nature-based solutions provide, communities around the country have steered traditional flood-control infrastructure projects in more innovative directions:

- In northern California, the Napa Valley Flood Control Project is using a community-developed “living river” plan to reduce flood damages along the flood-prone Napa River. This Corps civil works project scaled back the Corps’ originally-proposed floodwalls and levees to terraced marshes, wider wetland barriers, and restored riparian zones. These nature-based solutions work alongside a concrete wall in downtown Napa, in a floodplain cleared by targeted buyouts of vulnerable properties, and expand into a natural storage area downstream of the town.<sup>54</sup> The project will restore more than 650 acres of high-value tidal wetlands of the San Francisco Bay Estuary while protecting 2,700 homes, 350 businesses, and over 50 public properties from 100-year flood levels, saving \$26 million annually in flood damage costs.<sup>55</sup> Though only partially complete at the time, the project was credited for lowering flood levels by about 2 to 3 feet during the 2006 New Year’s Day flood.<sup>56</sup>
- In Florida, the Corps is using wetland restoration in the Upper St. John’s River floodplain to provide important flood damage reduction benefits. The backbone of this project is restoration of 200,000 acres of floodplain which will hold more than 500,000 acre-feet of water—enough to cover 86 square miles with 10 feet of water—and will accommodate surface water runoff from a more than 2,000 square mile area. The Corps predicts that this \$200 million project will reduce flood damages by \$215 million during a 100-year flood event, and provide average annual benefits of \$14 million.<sup>57</sup>
- In coastal New York, restoration of wetlands and lands adjacent to 19 stream corridors in Staten Island “successfully removed the scourge of regular flooding from southeastern Staten Island, while saving the City \$300 million in costs of constructing storm water sewers.”<sup>58</sup> Some 400 acres of freshwater wetland and riparian stream habitat has been restored along 11 miles of stream corridors that collectively drain about one third of Staten Island’s land area. A 2018 study commissioned by the City of New York found that using “hybrid infrastructure” that combines natural and grey infrastructure could

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<sup>54</sup> Barry Eberling, “20 Years of Flood Control: The Remaking of the Heart of Napa,” NAPA VALLEY REGISTER (July 2018), [https://napavalleyregister.com/news/local/years-of-flood-control-the-remaking-of-the-heart-of/article\\_97beaf3e-c2e1-5fb2-aea0-969386b23426.html#tracking-source=home-top-story](https://napavalleyregister.com/news/local/years-of-flood-control-the-remaking-of-the-heart-of/article_97beaf3e-c2e1-5fb2-aea0-969386b23426.html#tracking-source=home-top-story).

<sup>55</sup> Napa County California, “Creating Flood Protection,” <https://www.countyofnapa.org/1096/Creating-Flood-Protection>.

<sup>56</sup> *Id.*

<sup>57</sup> U.S. Army Corps of Engineers, “Agencies Complete One of the Largest Wetlands Restoration Projects in History,” (Aug. 2016), <https://www.saj.usace.army.mil/Media/News-Releases/Article/925965/agencies-complete-one-of-the-largest-wetland-restoration-projects-in-history/>.

<sup>58</sup> Cooper Union Institute for Sustainable Design, “The Staten Island Bluebelt: A Study In Sustainable Water Management” <http://cooper.edu/isd/news/waterwatch/stateniland>.



save Howard Beach, Queens \$225 million in damages in a 100-year storm while also generating important ecosystem services.<sup>59</sup>

- In Texas, restoration of a 178-acre urban wetland—formerly an abandoned golf course—acted as a sponge to store 100 million gallons of water during Hurricane Harvey, protecting 150 homes in Houston’s Clear Lake community from serious flooding. This project will store up to a half billion gallons of water and protect up to 3,000 homes when it is completed in 2021.<sup>60</sup>
- In Oregon, the Portland Bureau of Environmental Services restored 63 acres of wetland and floodplain habitat, restored 15 miles of Johnson Creek, and move structures out of high risk areas to reduce flood damages in the Johnson Creek neighborhood. In January 2012, when heavy rainfall caused Johnson Creek to rise two feet above its historic flood stage, the restored site held the floodwaters, keeping nearby homes dry and local businesses open. An ecosystem services valuation of the restored area found that the project would provide \$30 million in benefits (in 2004 dollars) over 100 years through avoided property and utility damages, avoided traffic delays, improved water and air quality, increased recreational opportunities, and healthy fish and wildlife habitat.<sup>61</sup>

The EA notes that development pressures have degraded, and will continue to degrade, natural resources on the Peninsula, EA at 51; this project has the potential to stop and even reverse that trend, but not as currently proposed. The Corps’ summary dismissal of non-structural and nature-based solutions was arbitrary and premature. The agency must take a hard look at these alternatives in an EIS.

### **C. The Corps should tailor solutions to the unique needs and conditions of discrete areas of the Peninsula.**

The Charleston Peninsula includes multiple neighborhoods and districts with unique levels of exposure to flooding and coastal storm events. The current plan treats the entire Peninsula as one cohesive unit, rather than acknowledging the different challenges and adaptation needs in the City’s districts. By breaking down the study area into smaller blocks along the perimeter of the Peninsula, the Corps could consider various approaches and solutions tailored to the unique needs of the City’s distinct districts. Doing so would provide opportunities to incorporate more nature-based solutions that could solve other flooding and drainage problems in these areas, in addition to providing storm surge protection.

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<sup>59</sup> The Nature Conservancy, “Urban Coastal Resilience: Valuing Nature’s Role,” (2015), <https://www.nature.org/content/dam/tnc/nature/en/documents/urban-coastal-resilience.pdf>.

<sup>60</sup> Exploration Green, 2018, <https://www.explorationgreen.org/>.

<sup>61</sup> Naturally Resilient Communities, “Johnson Creek Restoration, Portland, Oregon,” <http://nrcsolutions.org/johnson-creek-restoration-portland-oregon/>.

Recognizing the distinct needs across districts and the value of targeted solutions, the Dutch Dialogues assessed multiple focus areas within the City. Based on these separate evaluations, the project team suggested different adaptation strategies for the East Side of the Peninsula and the Medical District. This area-specific approach is consistent with the Corps' methodology in the Norfolk and the Miami-Dade CSRM studies, which broke down the agency's analysis and proposals by district. The more customized approach to those CSRM studies resulted in the inclusion of more nature-based solutions, in concert with traditional grey infrastructure, to provide new and greater project benefits. By contrast, the Corps' proposal here reflects a single-minded approach to Charleston's flooding problems, one which ignores differences in the physical and social landscape across the Peninsula.

Fortunately, there is still time to guide this project in a direction that better suits Charleston's actual needs and more adequately responds to Charleston's unique geographic, environmental conditions, and historic development patterns.

#### **D. The Corps has not selected the least damaging practicable alternative.**

The Corps must comply with the substantive and analytical requirements of Section 404 of the Clean Water Act, 33 U.S.C. § 1344, and the Section 404(b)(1) Guidelines ("Guidelines"), 40 C.F.R. Part 230. 33 C.F.R. § 336.1. The Guidelines expressly apply to the Corps' "civil works program," 40 C.F.R. § 230.2(a), and require that the Corps select the least environmentally damaging practicable alternative, *id.* § 230.10(a). The Guidelines provide significant protection to wetlands, and the degradation or destruction of wetlands "is considered to be among the most severe environmental impacts covered by these Guidelines." 40 C.F.R. § 230.1(d). The Corps must consider, among other things, whether its actions modify "the capacity of wetlands to retain and store floodwaters and to serve as a buffer zone shielding upland areas from wave actions, storm damage and erosion." 40 C.F.R. § 230.41(b).

Given the significant public benefits wetlands provide, the Corps must avoid wetland impacts to the greatest extent possible<sup>62</sup> and take all appropriate and practicable steps to avoid and minimize adverse impacts to waters of the United States. 40 C.F.R. § 230.91(c)(2). Tidal wetlands are a particularly important subset of wetlands. The Corps' Charleston District classifies tidal wetlands as primary priority areas where "adverse impacts . . . should be avoided and minimized to the maximum extent practicable."<sup>63</sup> Due to the importance of these habitats to

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<sup>62</sup> The Corps must evaluate whether proposals for Section 404 permits comply with the public interest test, which is based on probable impacts, including cumulative impacts, to safety, wetlands, flood hazards, floodplain values, land use, and the needs and welfare of the people, among other considerations. 33 C.F.R. § 320.4(a)(1).

<sup>63</sup> Charleston District U.S. Army Corps of Engineers, "Guidelines for Preparing a Mitigation Plan," at 31 (2010), [https://www.sac.usace.army.mil/Portals/43/docs/regulatory/Guidelines\\_for\\_Preparing\\_a\\_Compensatory\\_Mitigation\\_Planf.pdf](https://www.sac.usace.army.mil/Portals/43/docs/regulatory/Guidelines_for_Preparing_a_Compensatory_Mitigation_Planf.pdf).

our coastal ecosystem and communities, we urge the Corps to consider alternative seawall alignments which reduce the impact to tidal wetlands while providing community protection.

The current EA does not disclose sufficient information on each of the alternatives considered to compare their respective impacts and to discern which is the least environmentally damaging. As described in Section III above, the Corps has yet to provide the public with a complete account of the direct and indirect impacts of even its preferred alternative. While the Corps initially considered a broad array of alternatives, it eliminated most without assessing their respective impacts and benefits and costs. This is especially true of non-structural and nature-based alternatives, which are most unlike the proposed seawall and are most useful for comparison purposes. Non-structural and nature-based solutions would be far less environmentally damaging than an 8-mile long seawall; in fact, they could deliver net *benefits* to the environment by restoring natural systems. Therefore, it is the Corps' duty under the Guidelines to analyze these alternatives in detail and to demonstrate that they are not practicable before screening them out. The EA's cursory dismissal of non-structural and nature-based solutions does not satisfy that requirement.

**V. The Corps' Economic Analysis Is Biased Toward Costly, Environmentally Damaging Grey Infrastructure When Less Expensive, Nature-Based Solutions Are Available.**

With an estimated benefit-to-cost ratio ("BCR") of 2.3, the EA identifies Alternative 3 as "the plan that reasonably maximizes net National Economic Development (NED) benefits, consistent with protecting the Nation's environment." EA at 20. The Corps' selection of Alternative 3, however, is founded on incorrect or, at minimum, incomplete data about the costs and benefits of all project alternatives, especially non-structural and nature-based solutions. The EA does not sufficiently explain cost estimates and the assumptions and data supporting them, and the Corps eliminated green infrastructure alternatives—either alone or in conjunction with grey infrastructure—before it could quantify their costs and benefits. Further, the Corps has a long, well-documented history of cost overruns, which deserves special scrutiny here since the estimated \$1.7 billion price tag for a 7.8-mile long seawall and a 4,000-foot long wave attenuator appears low. Because the Corps will select the alternative with the highest BCR, any shortcomings in its cost and benefit projections will have huge ramifications for taxpayers, the City of Charleston, Peninsula residents, and the environment.

**A. The costs and benefits of the proposal are incomplete and likely inaccurate.**

Between investment costs and annual operation and maintenance ("O&M") costs, the Corps estimates the average annualized cost of Alternative 3 at \$80,222,000, compared to average annualized benefits of \$174,640,000. EA at 20. There is a high probability, though, that the Corps has underestimated the true cost of the proposed seawall and overstated its benefits.

To begin, the Corps fails to provide sufficient explanation and justification for its cost estimates in the EA. For example, the EA projects that O&M costs for Alternative 3 will average \$5,594,000 per year, yet the Corps does not disclose the inputs it used to reach that number.<sup>64</sup> EA at C-64. In fact, the Corps has not even developed O&M procedures for the project yet, EA at 229, so it is perhaps unsurprising that the associated costs are likewise undeveloped. Further, the EA does not explain what assumptions the Corps made or why it made those assumptions in calculating O&M costs across the life of the project. For example, at what frequency does the Corps assume major repairs will be needed due to severe storms or the age of the structure? Why does the Corps believe that the wave attenuator will not require any O&M simply because it is composed of stones? EA Appendix C at 63. Appendix B of the EA directs the public to the Cost Engineering sub-appendix for more information on cost estimates, but that sub-appendix is not provided on the project website. EA Appendix B at 69. Finally, the Corps has not considered how its \$98 billion backlog of civil works projects could delay funding and construction of the Charleston project, likely resulting in exponential cost increases.<sup>65</sup>

These deficiencies are especially concerning in light of the Corps' poor track record with cost projections. A 2013 U.S. Government Accountability Office ("GAO") report found that at least two-thirds of the 87 Corps flood control projects budgeted for construction between FY2004 and FY2012 experienced cost overruns.<sup>66</sup> Overruns were caused by, among other things, design changes, underestimated costs, contract cost changes, and delays in federal funding.<sup>67</sup> For example, when Congress first authorized the Rio de Flag flood control project in 2000, the Corps estimated the cost of the project at \$24 million.<sup>68</sup> According to the City of Flagstaff engineer, the City knew, even then, that the actual cost would be much greater than \$24 million, and true to expectations, cost estimates have since ballooned to \$121 million—a 404 percent increase—as the final design for the project nears completion.<sup>69</sup> This story has played out time and time again with Corps projects—from the Olmsted Lock and Dam project, whose actual cost exceeded estimates by more than \$2 billion<sup>70</sup>; to the Lower Mon project, whose estimated cost has

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<sup>64</sup> The O&M costs are of special concern to Peninsula residents and the City of Charleston since the City will be solely responsible for funding those expenditures. EA at 223.

<sup>65</sup> Congressional Research Service, "Army Corps of Engineers: FY2020 Appropriations" (Dec. 23, 2019).

<sup>66</sup> U.S. Government Accountability Office, "Army Corps of Engineers: Cost Increases in Flood Control Projects and Improving Communication with Nonfederal Sponsors," GAO-14-35, at 11 (Dec. 2013).

<sup>67</sup> *Id.* at 12–17.

<sup>68</sup> Adrian Skabelund, "As Designs Solidify, True Financial Cost of Rio de Flag Project Become Clear," Arizona Daily Sun (Oct. 13, 2019), [https://azdailysun.com/news/local/as-designs-solidify-true-financial-cost-of-rio-de-flag-project-becomes-clear/article\\_9459c2c7-f5c1-5fb9-8c49-375277654a32.html](https://azdailysun.com/news/local/as-designs-solidify-true-financial-cost-of-rio-de-flag-project-becomes-clear/article_9459c2c7-f5c1-5fb9-8c49-375277654a32.html).

<sup>69</sup> *Id.*

<sup>70</sup> Pamela Glass, "Thirty Years and \$3 Billion Later, Olmsted Lock and Dam Set to Open," WorkBoat (July 31, 2018), <https://www.workboat.com/news/government/thirty-years-and-3-billion-later-olmsted-lock-and-dam-to-open-in-october/>.

increased 260 percent since authorization<sup>71</sup>; to the Turkey Creek Basin project, whose estimated cost has risen from \$43 million to \$108 million<sup>72</sup>.

As with its cost estimates, there is reason to suspect that the Corps' benefit estimates are inaccurate based on its error-prone history. The GAO has found that a number of major Corps studies "overstated benefits, and therefore did not provide a reasonable basis for decision-making" because they "were fraught with errors, mistakes, and miscalculations, and used invalid assumptions and outdated data."<sup>73</sup> According to the GAO, these problems are pervasive at the Corps, and "the Corps' track record for providing reliable information that can be used by decision makers . . . is spotty, at best."<sup>74</sup>

Because the Corps selects, and Congress funds, projects based on their BCR, it is absolutely critical that the cost and benefit projections for each alternative are as accurate as possible. The Corps' estimates for the proposed seawall and wave attenuator are likely inaccurate and, at minimum, incomplete and require further consideration before the agency can declare this proposal feasible. Ultimately, it is taxpayers and the City of Charleston who will be left to foot the bill if, as has happened so often in its history, the Corps' estimates are wrong and costs balloon during project design and construction. The agency must take all efforts and consider all alternatives to ensure that this does not occur.

**B. Nature-based solutions would offer multiple benefits to the community and the environment, likely at a lower cost than the Corps' proposal.**

Whereas the Corps at least attempted to estimate the costs and benefits of structural alternatives, it declined to conduct any economic analysis at all on non-structural and nature-based solutions.

As discussed in Section IV.A, the Corps mistakenly eliminated alternatives such as creek restoration, park improvements, and property relocation or buyouts because, *individually*, they would not meet the study objectives. EA Appendix C at 54. What the Corps should have considered, instead, was whether a *combination* of non-structural and nature-based solutions—together with more limited structural measures—could more cost-effectively address coastal storms and flooding on the Peninsula than the proposed seawall and wave attenuator. Multiple studies and projects across the country, including in coastal regions, have confirmed that natural

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<sup>71</sup> U.S. Army Corps of Engineers, "Project Fact Sheet," Monongahela River Locks and Dams 2, 3, and 4 Project (Lower Mon), <https://www.lrp.usace.army.mil/Missions/Planning-Programs-Project-Management/Key-Projects/Lower-Mon-Project/>.

<sup>72</sup> GAO 2013 at 39.

<sup>73</sup> U.S. Government Accountability Office, "Corps of Engineers: Observations on Planning and Project Management Processes for the Civil Works Program," GAO-06-529T, at 5 (Mar. 15, 2006).

<sup>74</sup> *Id.* at 12.

infrastructure can exceed the flood reduction benefits of grey infrastructure and at much lower costs. *See supra* Section IV.A. Further, as acknowledged in the EA, nature-based alternatives have the potential to address more sources of flooding on the Peninsula that just storm surge, including internal drainage issues and tidal flooding. EA at 15–16. Therefore, incorporating these solutions into the existing proposal could deliver even greater flood reduction benefits.

Not only are non-structural and nature-based alternatives generally more cost-effective than grey infrastructure at controlling flood damages, they provide other valuable benefits to communities and the environment that grey infrastructure does not. On this point, the EA suffers from a major shortcoming: The only project benefits included in the Corps’ calculations are reduced flood damages to structures and contents on the Peninsula, EA Appendix C at 62–63, but that measure ignores the multiple benefits that natural solutions would deliver. For example, natural infrastructure increases the effectiveness and resilience of structural measures by buffering against storms.<sup>75</sup> It also eliminates the risks of catastrophic failure and overtopping of floodwalls, which are so serious that the Association of State Floodplain Managers has urged communities to use non-structural measures whenever possible and limit construction of levees to a “last resort.”<sup>76</sup> Finally, nature-based solutions enhance ecosystem services and maximize desirable recreational opportunities, EA at 44, providing direct and indirect benefits such as water purification, wildlife habitat, multimodal transportation, and nature-based tourism.<sup>77</sup>

The EA unfairly favors grey infrastructure by declining to even evaluate the costs and benefits of non-structural and nature-based solutions. The Corps must now give these alternatives due consideration, calculating not only their direct flood reduction benefits but also the myriad other resilience, ecological, and community benefits discussed above.

### **Conclusion**

For all of the reasons discussed above, it is clear that an EIS is required for this project under NEPA. It is also undeniable that an EIS is the best vehicle for engaging Charleston and its citizens and ensuring that this study arrives at the most effective suite of solutions for addressing coastal storms and flooding. The preparation of an EIS would give the Corps the opportunity to delineate missing information, such as impacts to environmental justice communities, harm to ecological and cultural resources, and the impacts of deflected wave energy, to name a few.

The proposed wall design is also limited by the Corps’ unduly narrow scope and approach and does not meet the City’s needs. By assessing multiple different causes of

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<sup>75</sup> Greg Browder et al., “Integrating Green and Gray: Creating Next Generation Infrastructure,” World Bank Group and World Resources Institute (2019), <https://openknowledge.worldbank.org/handle/10986/31430>.

<sup>76</sup> Association of State Floodplain Managers, “National Flood Policy Challenges, Levees: The Double-edged Sword,” at 5 (adopted Feb. 13, 2007).

<sup>77</sup> Greg Browder et al., “Integrating Green and Gray: Creating Next Generation Infrastructure.”

flooding—including updated sea level rise projections and the ways that these sources of flooding interact with and compound one another—the Corps and the City would be better equipped to weigh alternatives with the potential to more effectively address more powerful coastal storms and flooding and create co-benefits that improve the quality of life in Charleston. Appropriate consideration of nature-based solutions would increase the project’s benefit-cost ratio and better justify this undertaking. Because a one-size-fits-all solution does not match the varied neighborhoods and fabric of the Charleston Peninsula, the Corps should assess solutions on a neighborhood basis to ensure each part of the City is receiving flood mitigation that matches the need and fabric of the community.

We appreciate the opportunity to comment on this proposal. We plan to remain engaged throughout the optimization process, and we look forward to contributing to effective solutions that address the City’s needs and contribute to larger resilience efforts. Should you have any questions about our remarks, please do not hesitate to contact the undersigned.

Sincerely,



Christopher K. DeScherer  
Managing Attorney  
Southern Environmental Law Center

CC (via email only):

Pace Wilber, NMFS  
Kelly Laycock, EPA Region 4  
Susan Davis, SCDNR  
Mark Caldwell, USFWS  
Chuck Hightower, DHEC  
Blair Williams, DHEC  
Mark Wilbert, City of Charleston  
Laura Cantral, Coastal Conservation League  
Jason Crowley, Coastal Conservation League  
Andrew Wunderley, Charleston Waterkeeper  
Sara Green, SC Wildlife Federation  
Justin Stokes, South Carolina Audubon  
Amy Armstrong, SC Environmental Law Project