

How Does the USACE Plan Compare with Recommendations in the Dutch Dialogues Report?

The Dutch Dialogues (DD) Charleston Report recommendations provide a framework for addressing several sources of flooding across a large area. Successful implementation of such a large, complex undertaking requires that it be divided into manageable parts and that those parts be continuously coordinated. Implementation of the DD recommendations will require many plans focused on different facets of the overall framework, with multiple proponents working in parallel at various scales ranging from single plots of land to the entire region.

Within the framework of the DD Report, the USACE Plan could be called the “Peninsula Perimeter Protection” sub-plan. It is focused on addressing one primary source of flooding – storm surge – in one geographic area – the Peninsula. In the DD Report, Steven Slabbers, Bosch Slabbers Landscape Architects, wrote, “...we see the Peninsula eventually becoming a polder, providing perimeter protection against the outside water. There is no alternative over the long term.” One of the key recommendations of the DD Report is “Work Towards a No-Regrets Polder Approach,” which states: “An integrated water system with perimeter protection that allows the peninsula to be operated as a polder, or low-lying hydrologic unit, is the recommended long-term strategy.” The long term need for perimeter protection cannot be eliminated by the other recommendations in the DD Report.

The USACE Plan is focused on perimeter protection against storm surge because Federal laws and policies preclude the use of USACE funding to address local flooding caused by rainfall runoff or high groundwater. Consequently, the USACE Plan cannot implement many of the other DD recommendations. However, if the USACE Plan provides the majority of funding for perimeter protection, which is one of the most expensive facets of the DD recommendations, that may allow more local resources to be directed toward implementing other DD recommendations to complete the overall framework.

Although the USACE Plan cannot directly implement all facets of the DD recommendations, it must be coordinated with the overall framework because all sources of flooding are interconnected. The following table shows the relationship between the USACE Plan and specific DD Report recommendations.

	Dutch Dialogues Report	USACE Plan	Discussion
Scope (geographic):	<ul style="list-style-type: none"> • The Charleston Peninsula: <ul style="list-style-type: none"> ▪ Lockwood Corridor/Medical District (west side) ▪ New Market & Vardell’s Creek Area (east side) • Johns Island • Church Creek & West Ashley 	<ul style="list-style-type: none"> • The Charleston Peninsula 	The Charleston Peninsula was identified as the USACE study area due to the focus on coastal areas in the study authority, the March 7, 2018 request from the City of Charleston for a flood risk management study of the Charleston Peninsula, and the peninsula’s significant vulnerability to storm surge inundation.
Scope (flood hazards):	<ul style="list-style-type: none"> • Storm surge • Rainfall/storm water • High tide nuisance flooding • Groundwater 	<ul style="list-style-type: none"> • Storm surge 	<ul style="list-style-type: none"> • The study authority is focused on the purpose of hurricane (or storm) protection and related purposes. • USACE regulation and policy recognize that effective flood risk management is a shared responsibility and that the construction of storm water and groundwater management infrastructure are local responsibilities. • High tide nuisance flooding does not result in enough damages to warrant federal participation.
Coastal Zone Recommendations	<i>Region-wide Engineered Hurricane Protection System: A coastal surge risk reduction system consisting of man-made surge barriers across major regional watersheds is not feasible at this time.</i>	The Charleston Harbor Storm Surge Barrier System was screened from consideration due to the cost and complexity of such a system.	Both efforts advise against a regional surge barrier system.

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	<p><i>Nature-Based Adaptation Strategies:</i> The City and County should identify and allocate municipal, county, state, federal and private or non-profit resources to natural and nature-based projects in the City / County / region that restore and improve the natural protective and adaptive processes of sand dunes, barrier islands, coastal marshes, wetlands, and intertidal ecosystems that reduce storm surge impacts and allow for long-term sea-level rise adaptation.</p>	<ul style="list-style-type: none"> • Construction of reef-based living shorelines are proposed where suitable. • Existing marsh areas within the wall alignment would be protected and used as water storage areas for interior drainage. 	<ul style="list-style-type: none"> • Living shorelines are proposed as a mitigation feature to reduce environmental impacts associated with the USACE plan and enhance overall marsh resilience. • Other nature-based strategies were considered but did not meet USACE’s threshold for substantially reducing major storm surge damages; however, USACE encourages local implementation of such strategies. • Some of the natural features recommended for the Coastal Zone in the Dutch Dialogues Report do not occur in the USACE study area (e.g., sand dunes and barrier islands). USACE already has other projects underway in the Coastal Zone such as the Folly Beach Coastal Storm Risk Management Project.
Peninsula Recommendations	<p><i>Work Towards a No-Regrets Polder Approach:</i> An integrated water system with perimeter protection that allows the peninsula to be operated as a polder, or low-lying hydrologic unit, is the recommended long-term strategy. As sea levels rise, so will the need to store water to pump over the sea defense line.</p>	<p>A storm surge wall would be constructed along the perimeter of the peninsula to reduce damages from storm surge inundation.</p>	<ul style="list-style-type: none"> • The storm surge wall in the USACE Plan would effectively create an urban polder. • The USACE Plan will include interior drainage (storage/pumping) components to manage storm water flows that would be blocked by the wall.

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	<p><i>Perimeter Protection Must Be Multifunctional and Beautiful:</i></p> <ul style="list-style-type: none"> • The importance of the Perimeter Protection Study cannot be overstated, and any perimeter protection alignment must be logical, practical, and forward-looking. • Ensure that perimeter protection intersects in a logical, sensitive way with the Historic District. • Certain alignments will create important storm water storage opportunities and help manage groundwater. • All alignments should take a multiple benefit approach. 	<ul style="list-style-type: none"> • Sections of the proposed storm surge wall would be fitted with walkways and railings to provide additional recreational opportunities. • Policy requires that USACE must focus on function, but options to blend the storm surge wall with the city’s visual character will be considered through consultation with the State Historic Preservation Office. • Existing marshes and other low areas within the wall alignment would be used as temporary storm water storage areas for interior drainage. 	<p>The City of Charleston can opt to pay for betterments that would make the storm surge wall more visually appealing.</p>
	<p><i>Decouple High and Low Ground Water Systems:</i></p> <ul style="list-style-type: none"> • Managing storm water at the top of the watershed will alleviate pressures for immediate drainage on low ground. • A peninsula-wide groundwater management assessment is needed. 	<p>No recommendation regarding storm water management.</p>	<ul style="list-style-type: none"> • Storm water and groundwater management are local responsibilities. • Effective storm water management would complement the USACE plan in a storm surge situation.
	<p><i>Work at All Scales – from Dips to Deep Tunnels:</i></p> <ul style="list-style-type: none"> • Decouple deep-tunnel system from shallow drainage systems. • Dips and swales in streets should be strategically eliminated. 	<p>No recommendations regarding storm water management.</p>	<ul style="list-style-type: none"> • Storm water management is a local responsibility. • Locally implemented measures to reduce or slow runoff would complement the USACE Plan by reducing the need for pumping.

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	No recommendation for or against a wave attenuation structure.	A wave attenuation structure would be constructed offshore from the Battery.	<ul style="list-style-type: none"> The purpose of the wave attenuation structure is to reduce loading on the Battery Wall and reduce the effect of waves overtopping during storm events. The wave attenuation structure reduces the wall height necessary to address storm surge flooding.
	<i>Emphasize Historical Connections:</i> The historical street grid, in which the City connected high-ground to low-ground and to the rivers with its transparency, order, and canopy of trees, should be reinforced.	<ul style="list-style-type: none"> USACE will ensure that visual and architectural values are protected to the extent possible through the application of the Secretary of the Interior’s Standards for the Rehabilitation of Historic Buildings. Adverse visual effects on cultural resources will be mitigated through such things as interpretive signage, educational programs, informative web sites, donation of preservation easements, or contributions to preservation funds. 	Impacts to cultural resources are analyzed and addressed through consultation with the State Historic Preservation Office and other consulting parties as required by the National Historic Preservation Act.
	<i>Flood Adaptations for Historic Structures:</i> Accommodate the elevation of historic buildings where warranted in order to improve resiliency for our historic district and ensure their very survival.	Nonstructural measures such as relocations, buyouts, elevations, and floodproofing are recommended in areas where structures would continue to incur damages from storm surge after the wall has been constructed.	Some of the structures identified for nonstructural treatments in the USACE Plan are historic, therefore Design Guidelines developed by the Charleston Board of Architectural Review would be consulted.
Peninsula Eastside Recommendations	<i>Expose & Celebrate Waterways:</i> Daylighting Newmarket Creek watershed near the Lowline should be studied.	No recommendation. The study considered measures that would restore historical creeks but they were screened because they did not reduce storm surge risk.	Restoration of historical creeks would be a good option for the city to improve storm water drainage issues, which is a local responsibility.
	<i>Prioritize High Ground:</i> Any new public housing in this zone must be built on high ground.	No recommendation regarding public housing.	Land use, building codes, zoning and other regulatory policies are the responsibility of local government.

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	<i>Add Water to Public Spaces:</i> All public spaces in Eastside should be assessed for water storage and infiltration opportunities.	No recommendation. The study considered measures that would use public spaces for water storage opportunities but they were screened because they did not reduce storm surge risk.	Storm water management is a local responsibility.
	<i>Development Guidelines:</i> Limit development in the lowest portions of the Cooper Redevelopment Zone.	USACE will require the City to prepare a floodplain management plan as a cooperation requirement for the project.	<ul style="list-style-type: none"> • Land use, building codes, zoning and other regulatory policies are the responsibility of local government. • As part of the National Flood Insurance Program, the City is required to regulate development in flood zones. • USACE encourages the city to implement low-impact development to complement the USACE Plan.
	<i>Coordinate Drainage and Perimeter Protection:</i> The City should ensure robust storm water runoff management is created and drainage to the river/outfall is ensured, probably via pumps and collecting basins.	<ul style="list-style-type: none"> • Permanent and temporary interior drainage pump stations are included in the USACE Plan. • USACE analyses consider the capacity of the city's existing drainage system and proposed drainage improvements. 	Both efforts recommend an interior drainage system to complement the storm surge wall.
	<i>Pilots, Projects, Programs, and Partnerships:</i> The City should pilot water storage and street retrofits. Rainproof-type pilots should be encouraged or mandated. Curriculum in city schools could be oriented to development of water literacy.	No recommendation regarding these local actions.	The recommended smaller-scale local actions would complement the USACE Plan.
Charleston Medical District (CMD)	<i>Establish a Flood Resilience Coordinating Committee:</i> CMD should establish an inter-institution CMD Flood Resilience Coordinating Committee.	No recommendation regarding this local action.	The recommended local action would complement the USACE Plan.

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	<i>Understand the Cost of Doing Nothing:</i> CMD institutions should perform an investment value analysis to assess current risks and recent loss and impact patterns.	The No Action Alternative / Future Without Project scenario describes future conditions if no action is taken by USACE to address coastal storm surge risks on the Charleston Peninsula.	Storm frequency and storm damage modeling in the USACE report could be used to inform the Medical District's risk analysis.
	<i>Develop Real-Time Forecasting Capability:</i> CMD and/or the City should develop or improve real-time flood forecasting tools for CMD emergency vehicles, employees, patients and the public.	No recommendation regarding CMD forecasting capability.	Storm water management is a local responsibility.
	<i>Advocate for Multiple-Benefit Perimeter Protection:</i> Alignment of perimeter protection should enable additional storm water storage and groundwater management.	The USACE Plan will include interior drainage (storage /pumping) components to manage storm water flows that would be blocked by the wall.	Wall alignment will consider interior drainage requirements, costs, and environmental effects.
	<i>Anticipate Changing Conditions:</i> CMD flood risk reduction strategies must incorporate projected climate changes and their impacts upon access and operations.	<ul style="list-style-type: none"> The USACE report includes an analysis of an intermediate sea level rise (SLR) scenario and its effect on the study area with and without the proposed USACE project. The final report will also include analyses of low and high SLR scenarios. Most sections of the proposed storm surge wall can be adapted (made taller) if deemed necessary in the future. 	<ul style="list-style-type: none"> The USACE planning process requires forecasting conditions over a 50 year planning horizon, including relative sea level rise, hydrology, and environmental trends. In addition to requirements to evaluate impacts from SLR, USACE must evaluate climate change impacts to rainfall intensity.
	<i>Create Resilient Connections:</i> The report includes recommendations regarding the CMD Greenway, additional access to/through CMD, connectivity between neighborhoods, Gadsden Creek, and a Westside planning framework.	Connections to the Battery Promenade and future pedestrian bridge along the Ashley River Bridge are important considerations in determining the specific wall alignment.	Land use, building codes, zoning and similar regulatory policies are the responsibility of local government.

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Johns Island Recommendations	<ul style="list-style-type: none"> • <i>Do No Harm</i> • <i>Conserve & Protect Natural and Cultural Assets</i> • <i>Respect Elevation</i> • <i>Update Johns Island Plan with a Regional Perspective</i> • <i>Maintain and Improve Overland Drainage</i> • <i>Use Market-Based Tools</i> 	<ul style="list-style-type: none"> • No recommendations for Johns Island. 	Johns Island is not included in the USACE study area.
Church Creek Recommendations	<ul style="list-style-type: none"> • <i>Judo, not Boxing</i> • <i>Develop Watershed-Based Plans</i> • <i>Protect & Sustain Intertidal Zones</i> • <i>Detain & Infiltrate</i> • <i>Integrate Parks, Water Storage & Historical Landscapes</i> 	<ul style="list-style-type: none"> • No recommendations for Church Creek. 	Church Creek is not included in the USACE study area.
People	<ul style="list-style-type: none"> • Kingdom of the Netherlands • The City of Charleston • USACE • Historic Charleston Foundation • Medical University of South Carolina • The Nature Conservancy • Waggoner & Ball • The Water Institute of the Gulf • American Flood Coalition • Charleston Water System • Clemson Design Center Charleston 	<ul style="list-style-type: none"> • The City of Charleston • USACE • Historic Charleston Foundation • Medical University of South Carolina • The Nature Conservancy • College of Charleston • AECOM • Davis & Floyd, Inc. • Charleston County • State Historic Preservation Office • Advisory Council on Historic Preservation • National Park Service • South Carolina Department of Transportation • U.S. Coast Guard • Multiple state and federal natural and cultural resource agencies 	Several representatives of various agencies and organizations participated in both efforts.