



**DEPARTMENT OF THE ARMY**  
NORTH ATLANTIC DIVISION, CORPS OF ENGINEERS  
FORT HAMILTON MILITARY COMMUNITY  
GENERAL LEE AVENUE, BLDG 301  
BROOKLYN, NY 11252

REPLY TO

CENAD-PD-CS

15 January 2015

MEMORANDUM FOR Commander, Philadelphia District, US Army Corps of Engineers,  
ATTN: CENAP-PL-PS

SUBJECT: Federal Interest Determination (FID) for the Continuing Authorities Program (CAP), Section 205 project for the Delaware Bayshore, New Jersey (Downe Township, Fortescue and Grandys Beach) Project

1. References:

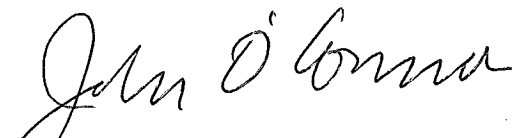
- a. CENAP-PL-PS memorandum dated 09 October 2014
- b. CENAD-PD-CS memorandum, dated 10 October 2014

2. The Philadelphia District (NAP) requested approval of the Federal Interest Determination (FID) Report for the proposed Continuing Authorities Program (CAP), Section 205 project for the Delaware Bayshore, New Jersey (Downe Township, Fortescue and Grandys Beach) project (Reference 1.a.).

3. The North Atlantic Division (NAD) concurs with the District's finding of Federal Interest.

4. The District should mark the completion of this milestone in P2 and the CAP database.

5. The point of contact for this action is Mr. Christopher Ricciardi, Ph.D. Mr. Ricciardi may be reached at 347-370-4534.

  
JOHN O'CONNOR, P.E.  
NAD CAP Program Manager  
Civil Works Integration Division

Encl.

cc: Mr. Joseph Forcina, Chief, SCMD  
Mr. Wilson Miller, SCMD

FEDERAL INTEREST DETERMINATION  
SECTION 205 CONTINUING AUTHORITY  
FLOOD RISK MANAGEMENT STUDY

**Delaware Bayshore, NJ (Downe Township)  
(Fortescue and Gandys Beach)**



PREPARED BY:  
DEPARTMENT OF THE ARMY  
CORPS OF ENGINEERS  
PHILADELPHIA DISTRICT

October 2014  
Revised November 2014

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**Delaware Bayshore, NJ (Downe Township)  
(Fortescue and Gandys Beach)  
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ATTACHMENT – Letter of Support from Downe Township

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**CAP SECTION 205  
DELAWARE BAYSHORE, NJ (DOWNE TOWNSHIP)  
(FORTESCUE AND GANDYS BEACH)  
FEDERAL INTEREST DETERMINATION**

**1. Project Name:** Delaware Bayshore, NJ (Downe Township), (Fortescue and Gandys Beach), Continuing Authority Program (CAP) Section 205 Flood Risk Management Study (P2# 402328).

**2. Congressional Delegation:** Senators Robert Menendez and Cory Booker (NJ), Representative Frank LoBiondo (NJ-2).

**3. Project Purpose and Description:**

This Federal interest determination is authorized under Section 205 of the CAP which provides for projects to address flood risk management. Funding for this CAP investigation has been provided by Public Law 113-2, the Disaster Relief Appropriations Act of 2013 approved January 29, 2013.

Hurricane Sandy made landfall on October 29, 2012 as a “post-tropical cyclone” with wind speeds of 90 mph, causing extensive flooding, beach erosion, and coastal damage along the shorelines of Delaware, New Jersey, and New York. The remnants weakened over Pennsylvania, degenerating into a remnant trough on October 31. As Sandy made landfall on the New Jersey coast, it generated intense onshore winds, waves, and a storm surge that was augmented by astronomical spring tides associated with the full moon of October 29th. The combined effects of wind, waves, and elevated tidal water levels led to significant erosion damage to the Delaware Bayshore.

According to National Flood Insurance Program (NFIP) data provided by FEMA, over 91 flooded structures and \$13 million in total damages were reported as a result of Hurricane Sandy in the Delaware Bay shore area of Downe Township, Cumberland County.

As a result, Downe Township submitted a letter to the Philadelphia District requesting USACE assistance in evaluating hurricane, coastal storm and flood risk management projects at four locations on the Delaware Bay shoreline impacted by Hurricane Sandy. A subsequent meeting was held with the Mayor and the Township asked that the Corps focus its efforts on the bay front communities of Fortescue and Gandys Beach and the local improvements desired for those communities (see Attachment).

This Federal interest determination will address flood risk management based on these two bay front communities’ vulnerability to storm damages. Problems identified in the study area include 1) long term shoreline erosion as a result of natural forces and 2) storm damage vulnerability with potential for storm-induced erosion, inundation and wave attack exacerbated by long term erosion. The objective of this investigation is to identify at least one policy compliant solution of scope appropriate for CAP and determine whether future Federal interest in feasibility is warranted.

#### 4. Existing Conditions

##### General Setting

Cumberland County's southern edge consists of 40 miles of coastline along the Delaware Bay with a scattered handful of communities. These communities support Cumberland County's only economic, residential and recreational opportunities on the Delaware Bay. These areas cover less than four miles of coastline but generate an estimated \$200 million yearly - a significant amount for an economically depressed region. Some of these communities have existed for centuries but all suffer from decades of neglected infrastructure and lack of investment. That weakness was revealed in the extensive structural damage super storm Sandy caused to homes and businesses in Fortescue and Gandys Beach. This damage coupled with the lack of resilient infrastructure threatens the future of these places to rebuild and move forward as viable communities. These communities provide the only access to the Delaware Bay for residents and visitors along this section of the bay coastline.

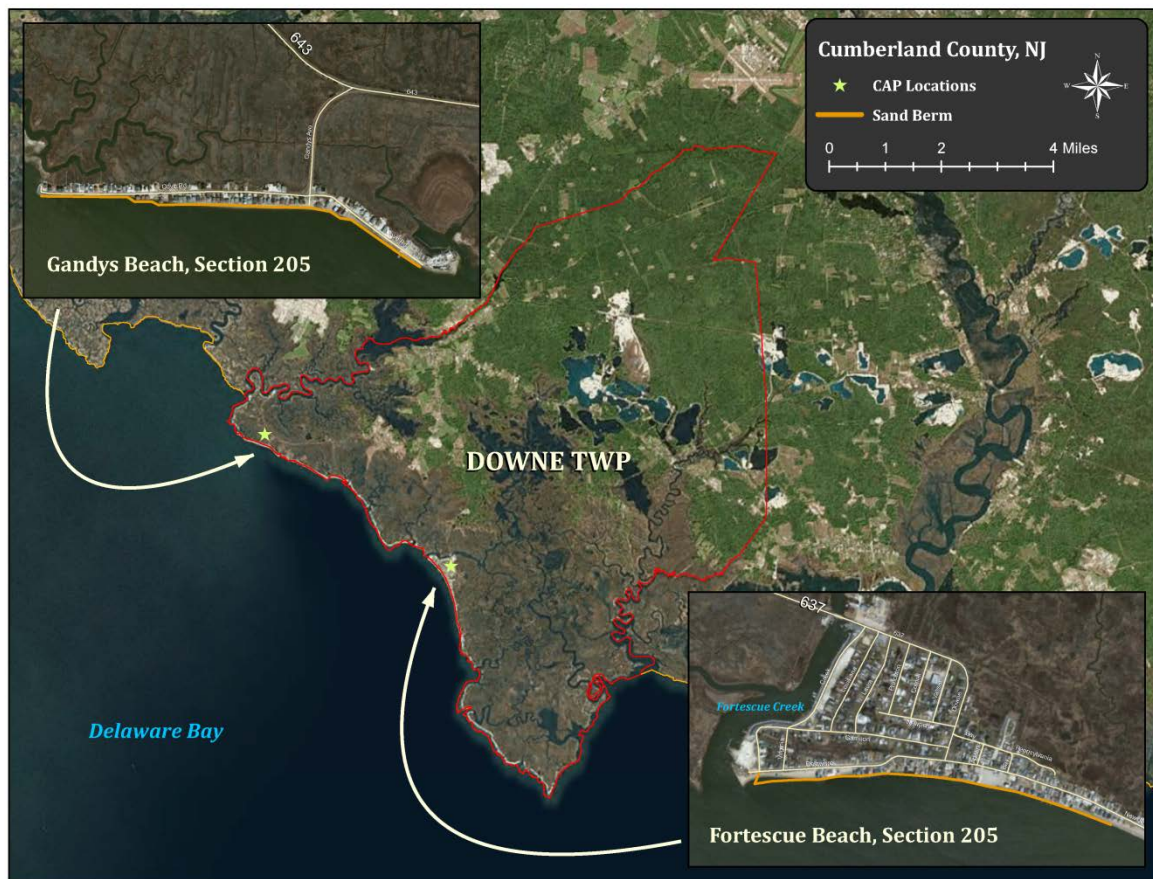
Downe Township is located on the Delaware Bay in southeastern Cumberland County, New Jersey (**Figure 1**). The Township is a community of approximately 53 square miles and is home to several historic mixed use villages which include: Dividing Creek, Newport, Money Island, Fortescue and Gandys Beach (**Figure 2**). These small villages share in the cultural, social and economic heritage of many of the other communities on the Bayshore. In Downe Township, three bay beach communities, including Fortescue and Gandys Beach provide 80% of the township's property tax base.



**Figure 1: Location of Downe Township within New Jersey**



The Fortescue and Gandys Beach developed shore lines are fronted by a collection of sea walls and bulkheads dating back many years. Several feet of vertical beach erosion has occurred in front of the walls and bulkheads. These protective structures represent a collection of individual efforts by owners in both construction and maintenance of the shoreline. Concrete is used in some even though the form of the structures varies considerably. Others use material such as steel and vinyl sheet piling, timber, cinderblocks, concrete rubble and various sizes of stone. Materials are used in many combinations and proportions. Erosion threatens to undermine the structures. Material washes out from underneath and behind them, threatening failure to the lots and then the houses behind the structures. The protective structures are increasingly subject to failure due to scouring at the toe and washout of material from behind. Ultimately the homes behind the protective structures will be lost during a storm of sufficient severity.



**Figure 2: Locations of Fortescue and Gandys Beach in Downe Township**

The study area has also experienced erosion damage due to localized minor seawall/bulkhead failures. Most of these damages have occurred as a result of waves and elevated water levels during storms at locations where progressive beach erosion has exposed the bulkhead or seawall toe. Exposure of the structure toe during storms allows upland soil to be displaced, and several homes have incurred structural damage due to washout of supporting soil from behind a protective structure.



### Hydraulic Setting

There is no National Oceanic and Atmospheric Administration (NOAA) tide gauge in Cumberland County. The NOAA Cape May, NJ Tide Gage (Station ID 8536110, located at Cape May – Lewes Ferry: Cape May Terminal) at the mouth of the Delaware Bay is the reference record for historical storm surge on the County bayshore. The top ten highest water levels recorded since the Cape May Tide Gage was established in 1965 are listed in **Table 1**. No adjustment to water surface elevation has been made for sea level rise in this table.

**Table 1: Top Ten Highest Water Levels at Station 8536110**

Rank	Elevation (Ft NAVD 88)*	Storm	Return Period (Years)	Date
1	5.87	Hurricane Sandy	65	10/29/2012
2	5.79	Hurricane Gloria	47	9/27/1985
3	5.67	Nor'easter	29	10/29/2011
4	5.64	Nor'easter	27	10/25/1980
5	5.53	Nor'easter	18	12/11/1992
6	5.52	Nor'easter	18	1/4/1992
7	5.50	Nor'easter	16	3/3/1994
8	5.37	Nor'easter	11	8/28/2011
9	5.25	Nor'easter	7	10/14/1977
10	5.17	Nor'easter	6	2/5/1998

\*Adjusted from MHHW to NAVD 88 in feet.

A tide gage operated by the US Geological Survey (01413038) on the Maurice River at Bivalve, NJ, north-northwest of Station 8536110 and three miles south of the Downe Township shore line recorded Hurricane Sandy's maximum water level as 7.0 ft NAVD 88.

### Environmental Setting

The study area is located in Cumberland County, the middle of three counties bordering the Delaware Bay in New Jersey. The bayshore is characterized as an irregular, low, eroding salt marsh coast with isolated small beaches occasionally backed by low dunes and wetlands.

The study area is an important nesting beach for horseshoe crabs and an important migratory stopover point for shorebirds that forage on these eggs. Delaware Bay ranks as the largest spring staging site for shorebirds in eastern North America. Staging sites such serve to link wintering areas with breeding grounds, and are critical to the survival of hundreds of thousands of migrating shorebirds. Principal species include yellowlegs (*Totanus melanoleucus*), dowitcher (*Limnodromus griseus*), dunlin (*Calidris alpina*), sanderling (*Calidris alba*), semipalmated sandpiper (*Calidris pusilla*), ruddy turnstone (*Arenaria interpres*), least sandpiper (*Calidris minutilla*) and the red knot (*Calidris canutus rufa*), a Candidate species.

The birds arrive to the shores of the Delaware Bay in early May from the coast of Brazil, Patagonia, Tierra del Fuego, Chile, Peru, Suriname, Venezuela, and the Guyanas. They reach

the bay depleted of their energy reserves after several days of nonstop flight, traveling up to 5,000 miles. On the beaches, the birds feast on horseshoe crab eggs for approximately two weeks to fuel their northward migration from the bay to their Arctic nesting grounds.

### Cultural Setting

The study area is located along the eastern shore of the Delaware River in an area that became an important regional center of maritime activity during the seventeenth, eighteenth and nineteenth centuries. Significant historic maritime and military sites are located near the study area. These include the approximate location of Fort Elfsborg (Elsinboro Point), Fort DuPont (Delaware City), Fort Delaware (Pea Patch Island) and Fort Mott (Finns Point), the entrance to the Chesapeake and Delaware Canal at Delaware City, the Ice Harbors at Port Penn and Reedy Island, and Salem Cove -- the site of intense nineteenth century shell fishing activity.

Historic maritime activity within the project area was almost exclusively transient as most commercial vessels were passing the area in route to northern ports such as Wilmington and Philadelphia, or south along coastal networks linking the Delaware River ports and New York with other ports from Maine to Central and South America. Over the years, many types of ships and vessels have wrecked while enroute up and down the river. Adverse river conditions, storms, treacherous northeast winds and swift tidal currents caused the loss of dozens of documented sailing vessels, steamships, barges, tugs and large modern ships in the Delaware River. A variety of potential submerged cultural resource types in the project vicinity could date from the first half of the seventeenth century through the Second World War.

Cultural resources in the area are dominated by fishing and sand mining. Fortescue was established in the 1700s and is the self-proclaimed “Weakfish Capital of the World” hosting many fishing “party boats”, making it the economic and recreational hub of Downe Township. The township is also one of the oldest in the state, and some of the first settlers came to this area. The oyster industry has a long history and cultural traditions that are unique. Ecotourism and recreational/commercial activities like bird watching, fishing and crabbing are important to the economy and culture of the Township. Without well-maintained access to bayside communities like Fortescue and Gandys Beach, and long term stabilization plans for these areas, economic and cultural losses would be significant in a county already ranked as the poorest in New Jersey. Placement of beachfill along the front of the existing seawalls and bulkheads is not expected to impact any significant cultural resources. Prior to any work being conducted in this area, a more detailed site specific cultural resources survey would be necessary. In addition, the presence of any submerged cultural resources within offshore areas would require further investigation.”

## 5. Problems and Opportunities

There is significant flood and storm damage potential along the Fortescue and Gandys Beach communities of Downe Township due to coastal storm surge, wave overwash, erosion and overland flooding of the developed Delaware Bay shoreline. Increased large storms such as Hurricane Sandy combined with low land elevations and sea level change place Fortescue and Gandys Beach at increasing risk for more frequent flooding (**Photos 1-8**). Due to these factors storm damages predicted for the fifty year planning horizon for these locations will likely be substantial. Opportunities to reduce storm damage by a combination of structural and non-

structural measures exist in Fortescue and Gandys Beach.

## **6. Plan Formulation**

This initial assessment involved reviewing existing conditions, communicating with local stakeholders, proposing alternatives, preparing preliminary designs, and conducting cost and benefits analyses to determine the feasibility of federal storm damage protection for two Delaware Bayshore areas of Downe Township. The existing information available for review was developed through coordination with the Township and information and reports prepared by FEMA and the USEPA. A site inspection was performed on March 6, 2014 with the project delivery team (PDT).

For this initial assessment, one structural measure at each location to manage storm damage was evaluated. Further study will address an array of potential alternatives. Coordination with the regulatory agencies and NEPA compliance will occur during the feasibility study.

## **7. Alternative Plans**

The alternative plans presented in this section provide a basis for the cost estimate and economic analysis provided in **Section 8** for each location. These designs reduce the risk of coastal storm damage related to public health, safety, and property in the Delaware Bayshore area of Downe Township. The designs reflect a preliminary level of detail, using data provided through coordination with the Township, NJDEP, FEMA and the USEPA. A more detailed analysis will be conducted should the study proceed to the Feasibility Phase.

The alternative plans consist of beachfill for a length of 4000 feet immediately in front of the developed shoreline along Fortescue (**Figure 3**) and 3500 feet along Gandys Beach (**Figure 4**). The proposed berm at each location would be constructed at elevation 7 ft. NAVD 88 with a top width of 50 feet and a 10 to 1 slope (**Figure 5**) to reduce flooding, coastal storm surge, wave overwash, and erosion of residential properties and public infrastructure. These preliminary design parameters were selected based on the Oakwood Beach, NJ CSDR project approximately twenty five miles north-northwest of Downe Township. The berm would be constructed by truck hauling from local commercial borrow areas. Truck fill was selected as the method of construction because of the high cost of mobilization of dredging plant to the Delaware Bay locations and the availability of nearby sand sources for the estimated 100,000 and 115,000 cys of material respectively, for Gandys Beach and Fortescue.

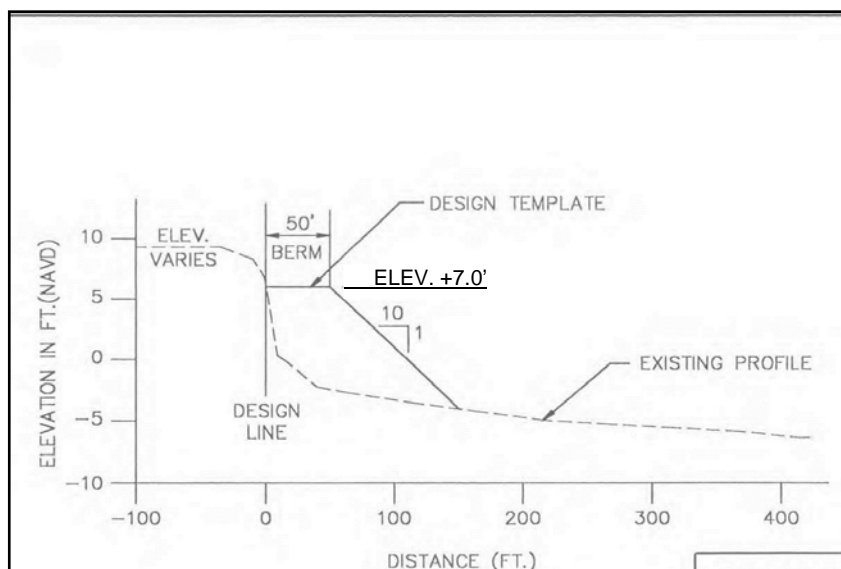
The analysis did not include a determination of the current condition of existing bulkheads and shore protection structures in the area, in part because the damages and economic benefits analysis are based on FEMA National Flood Insurance Program data which exclude damage claims for those types of structures. Storm water drains to the inshore meadows in both areas so there are no storm water outfall extensions required in the project areas. There are six public access paths to the beach at Fortescue which will be enhanced by local interests with a National Fish and Wildlife Foundation Grant from the US Fish and Wildlife Service.



**Figure 3: Proposed beach fill at Fortescue**



**Figure 4: Proposed beach fill at Gandys Beach**



**Figure 5: Proposed berm profile for Fortescue and Gandys Beach**

Existing environmental conditions would be improved as the beachfills will provide habitat for horseshoe crabs. The New Jersey Division of Fish and Wildlife and the American Littoral Society have plans to improve horseshoe crab nesting habitat and marsh by restoring beaches immediately north of Fortescue and Gandys Beach. They are also working with Downe Township and NJDOT to remove rubble and restore the beach alongside New Jersey Avenue in Fortescue. The Nature Conservancy is also doing marsh restoration near Gandys Beach. The proposed federal flood risk management project will complement these efforts.

The proposed project involves beach fill along a developed shoreline. The project area has been previously disturbed through construction of existing bulkheads, docks and piers. U.S. Fish and Wildlife Service’s Information, Planning, and Conservation System (IPAC) website (<http://ecos.fws.gov/ipac/>) indicates several federally listed species within the project area including the Red Knot (*Calidris canutus rufa*). There are no known wetlands, SAV or shellfish beds within the proposed project limits. No potential direct and in-direct adverse impacts should occur to wetlands, SAV and shellfish beds as result of the construction and staging work. While there are significant acres of wetlands in the adjacent vicinity of the project area, the proposed project would, at worst, only cause temporary disruption and will ultimately protect the area from further erosion. Impacts associated with the construction process, such and noise and air quality issues, would be temporary in nature. Any environmental and cultural impacts from alternatives considered during the feasibility study will be fully evaluated in the associated NEPA document to be completed during the feasibility phase.”

**Tables 2 & 3** present the estimated project implementation costs for Fortescue and Gandys Beach.

**Table 2: Alternative Plan Cost Estimate - Fortescue**

Description	Estimated Amount	Federal	Non-fed
Planning, Engineering and Design (PED)	\$182,484	\$118,615	\$63,869
Construct 4,000' berm w/50' top width; El. 7' NAVD88	\$2,433,113	\$1,581,523	\$851,590
Construction Management (S&A)	\$139,736	\$90,828	\$48,907
LERRD* (*State/Township owned lands)	0	0	50,000
Total Estimated Amount	\$2,805,333	\$1,790,966	\$1,014,367
			\$1000 annual O&M

Note: Feasibility study costs are not included in the table. Total feasibility study costs are estimated at \$600,000 and include conducting an Independent External Peer Review (IEPR) at an estimated cost of \$110,000.

**Table 3: Alternative Plan Cost Estimate – Gandys Beach**

Description	Estimated Amount	Federal	Non-fed
Planning, Engineering and Design	\$159,673	\$103,788	\$55,886
Construct 3,500' berm w/50' top width; El. 7' NAVD88	\$2,128,973	\$1,383,832	\$745,141
Construction Management (S&A)	\$123,618	\$80,352	\$43,266
LERRD* (*State/Township owned lands)	0	0	50,000
Total Estimated Amount	\$2,462,264	\$1,567,972	\$894,292
			\$1000 annual O&M

Note: Feasibility study costs are not included in the table. Total feasibility study costs are estimated at \$600,000 and include conducting an Independent External Peer Review (IEPR) at an estimated cost of \$110,000.

### Real Estate Considerations

The proposed beach fill would be located adjacent to privately-owned shoreline and on tidelands of the State of New Jersey. The non-Federal Sponsor (NFS) has no existing easement or real property interest for the construction, operation or maintenance of the proposed beach berm. There are privately-owned bulkheads and piers in the project area, which will not be acquired.

Approximately 300 privately-owned parcels in Fortescue and 80 parcels in Gandys Beach exist in the project area. The total project would be approximately 4000 linear feet and 120 feet wide for a footprint of approximately 11 acres in Fortescue and 3500 linear feet and 120 feet wide for a 10 acre footprint in Gandys Beach. Required areas below the Mean High Water Line are held by the State of New Jersey and subject to Navigation Servitude and will not be acquired.

Administrative costs for survey, title, appraisal and negotiations/closings, as well as nominal land payments for the approximately 21 acres would be nominal. This is estimated to cost approximately \$50,000 including a 15% contingency for each location. A Real Estate Plan will be developed during the feasibility phase of study.

## **8. Economic Assessment**

This preliminary economic assessment examined the potential economic benefits of constructing a Federal project that would reduce flood risk to public health, safety, and property in the Downe Township (Fortescue and Gandys Beach) study area. This economic assessment was conducted at a preliminary level of detail using data provided by FEMA. A more detailed analysis will be conducted should the study proceed to the feasibility phase. This assessment follows USACE guidance for estimating National Economic Development benefits as contained in ER 1105-2-100, April 2000, Appendix E, Section III – Flood Damage Reduction. All benefits are estimated in annual terms. All costs and benefits are in fiscal year (FY) 2014 price levels.

### Project Benefits

The primary category of benefits for this project is reduction of inundation damages. Due to lack of accurate historical damage data, these benefits were based on the expected annual damages prevented that are reflected through the development of a damage-frequency model and weighted at 2014 price levels. To compute Average Annual Damages (AAD), frequencies from H&H were applied for the historic flood events incurred in 2012 (Sandy), 2011, and 2010, and then apportioned the total FEMA NFIP Paid Claims Building and Contents from the 2012, 2011, and 2010 storm events for Downe Township to Fortescue and Gandys Beach by the percentages of the township's total assessed valuation (Fortescue-68.9%, Gandys Beach-22.3%). The 2014 assessment data by total township, Fortescue, Gandys Beach, and Money Island was provided to the District from FEMA.DHS. **Tables 4** and **5** describe the output relationship and the expected average annual damages at Fortescue and Gandys Beach respectively. Results are sensitive to the storm event frequencies that have been applied in the economic analysis. Average annual damages estimated for Fortescue and Gandys Beach are \$715,538 and \$231,586, respectively.



**Table 4: Average Annual Damages–Fortescue**

Frequency (Year Event)	Frequency Interval	Damages*	Average Damages*	Weighted Damages*
500		\$32,673,069		
	<b>0.00800</b>		<b>\$27,227,558</b>	<b>\$217,820</b>
100		\$21,782,046		
	<b>0.01000</b>		<b>\$16,336,535</b>	<b>\$163,365</b>
50		\$10,891,023		
	<b>0.02000</b>		<b>\$7,260,682</b>	<b>\$145,214</b>
25		\$3,630,341		
	<b>0.02667</b>		<b>\$2,496,247</b>	<b>\$66,567</b>
15		\$1,362,153		
	<b>0.03333</b>		<b>\$795,106</b>	<b>\$26,504</b>
10		\$228,059		
	<b>0.23333</b>		<b>\$191,198</b>	<b>\$44,613</b>
3		\$154,336		
	<b>0.66667</b>		<b>\$77,168</b>	<b>\$51,445</b>
1		\$0		
	<b>0.998</b>			
Average Annual Damages = \$715,528				

\*2014 Price Levels and applying FEMA NFIP paid claims for buildings and contents. Per fema.dhs.gov: NFIP paid claims for Fortescue = 68.9% of 2014 Assessment Value for Downe Township.

**Table 5: Average Annual Damages–Gandys Beach**

Frequency (Year Event)	Frequency Interval	Damages*	Average Damages*	Weighted Damages*
500		\$10,574,883		
	<b>0.00800</b>		<b>\$8,812,403</b>	<b>\$70,499</b>
100		\$7,049,922		
	<b>0.01000</b>		<b>\$5,287,442</b>	<b>\$52,874</b>
50		\$3,524,961		
	<b>0.02000</b>		<b>\$2,349,974</b>	<b>\$46,999</b>
25		\$1,174,987		
	<b>0.02667</b>		<b>\$807,929</b>	<b>\$21,545</b>
15		\$440,871		
	<b>0.03333</b>		<b>\$257,342</b>	<b>\$8,578</b>
10		\$73,813		
	<b>0.23333</b>		<b>\$61,883</b>	<b>\$14,439</b>
3		\$49,952		
	<b>0.66667</b>		<b>\$24,976</b>	<b>\$16,651</b>
1		\$0		
	<b>0.998</b>			
Average Annual Damages = \$231,586				

\*2014 Price Levels and applying FEMA NFIP paid claims for buildings and contents. Per fema.dhs.gov: NFIP paid claims for Gandys Beach = 22.3% of 2014 Assessment Value for Downe Township.

Project Costs

The construction and annual costs of the proposed improvement plan are shown in **Tables 6** and **7**. The cost estimates considered planning, engineering, and design (PED), project construction, and construction management (S&I). The cost of the project over a 50 year period of analysis is annualized, with payment occurring at the end of the year immediately preceding the base year. Construction costs were estimated to be \$2,755,333 and \$2,412,264 at Fortescue and Gandys Beach respectively. Annual costs were determined using the FY 2014 Federal interest rate for water resources projects of 3.50 percent.

**Table 6: Project Costs - Fortescue**

<b>Average Annual Costs</b>			
<b>Initial (with IDC), \$1000 Ann. O&amp;M, at 3.5% , 50 yrs</b>			
<b>FORTESCUE</b>		<b>CFR, 50, 3.5%</b>	<b>ANNUALIZED</b>
<b>Initial</b>	\$2,755,333	0.0426337	\$117,470
<b>IDC</b>	\$48,218	0.0426337	\$2,056
<b>O&amp;M</b>			\$1,000
<b>AAC</b>			\$120,526

**Table 7: Project Costs – Gandys Beach**

<b>Average Annual Costs:</b>			
<b>Initial (With IDC), \$1000 Ann. O&amp;M, At 3.5% , 50 Yrs</b>			
<b>Gandys Beach</b>		<b>CRF, 50, 3.5%</b>	<b>Annualized</b>
<b>Initial</b>	\$2,412,264	0.0426337	\$102,844
<b>IDC</b>	\$42,215	0.0426337	\$1,800
<b>O&amp;M</b>			\$1,000
<b>AAC</b>			\$105,644

This analysis focused only on the physical damages to private and public buildings. Not included are non-physical damages, location benefits, intensification benefits, or employment benefits. These additional benefit categories will be further evaluated should the study proceed to the feasibility phase. **Table 8** lists the combined benefits and costs for the project alternative along with benefit-to-cost ratio (BCR) sensitivities for Downe Township.

The with-project condition benefit analysis applied a range of scenarios encompassing three levels of potential damage reduction. Reductions of 75%, 50%, or 25% from the without project condition base were assessed. All three scenarios provide positive benefit-cost ratios.

**Table 8: BCR Sensitivities for Downe Township**

	<b>AAB</b>	<b>AAC</b>	<b>BCR</b>
<b>75%</b>	<b>\$710,336</b>	<b>\$226,170</b>	<b>3.1</b>
<b>50%</b>	<b>\$473,557</b>	<b>\$226,170</b>	<b>2.1</b>
<b>25%</b>	<b>\$236,779</b>	<b>\$226,170</b>	<b>1.0</b>

As a proxy to characterize a reasonable reconnaissance level estimate of project effectiveness from the proposed plan for the Downe Township communities, an authorized (and soon to be constructed) Delaware Bay shoreline project at Oakwood Beach NJ in Elsinboro Township, approximately 25 miles northwest of Downe Township, has been reviewed for comparison. Project performance of the recommended plan for Oakwood Beach was estimated in the authorizing document to be able to prevent 58.5% of total average annual without project condition storm damages. Applying this 58.5% factor as a reasonable proxy for Downe Township, for the Federal Interest Determination study phase, results in the following Benefit-Cost Ratio result (rounded):

Downe Township

AAB= \$554,000

AAC= \$226,000

BCR= 2.4

**9. Study Findings:**

It is in the Federal interest to pursue a feasibility study for flood risk management along the Delaware Bay shorelines of Fortescue and Gandys Beach in Downe Township, NJ. The Downe Township study area has a preliminary benefit-to-cost ratio greater than one.

**10. Recommendations:**

The benefit/cost analyses of the proposed alternatives indicate Benefit to Cost Ratios (BCRs) greater than one. Pursuing further study of the Downe Township study area is warranted.

**11. Independent External Peer Review (IEPR):**

NAP has coordinated with the USACE National Planning Center for Coastal Storm Risk Management to discuss a risk-based decision analysis. At this initial level of investigation, it will be assumed that Type 1 IEPR will occur. Upon continuation of the feasibility study and further gathering of information, a risk-based decision analysis will be prepared to determine whether or not IEPR is applicable. Should it be concluded that IEPR is not applicable; a waiver will be requested at that time. The costs associated with a Type I IEPR have been included with the estimated feasibility costs.

**12. Views of the Non-Federal Sponsor:**

Downe Township and the State of New Jersey, the potential non-Federal sponsors, support

further investigation into the preliminary alternatives developed for flood risk management improvements on the Delaware Bay shoreline. This is demonstrated through coordination of this initial investigation with the Township and the New Jersey Department of Environmental Protection (NJDEP). Additionally, both NJDEP and the Township have indicated they are willing to participate in the cost-shared feasibility report and serve as a local sponsor for such an effort.

**13. Views of Federal and State Agencies and Interested Organizations:**

The views of Federal and state agencies will be solicited upon further study.

**14. Conclusion/Determination of Federal Interest:**

Based on the cost estimates and economic analysis in this report, there are sufficient benefits to warrant Federal interest in continuing into the feasibility study phase. In order to proceed with the study, the Federal government and the non-Federal sponsor, Downe Township and the NJDEP will need to execute a Feasibility Cost Sharing Agreement (FCSA) setting forth responsibility for completing the study.

The costs of the feasibility phase above the first \$100,000 would be cost shared 50/50 between the Federal government and the non-Federal sponsor. Completion of the study would take about two years, subject to funding. If the final analysis indicates that the Federal participation in construction is feasible and in the Federal government’s interest, the Government will seek to enter into a Project Partnership Agreement (PPA) with the non-Federal sponsor and seek cost shared funds for project design and implementation.

**15. Milestones:**

In accordance with the June 12, 2014 memorandum from North Atlantic Division, **Table 9** provides milestone estimates for the feasibility study.

*Table 9: Milestone Table*

Milestone	Schedule (Day-Month-Year)
CW080-FCSA Submittal to MSC	3-December-2014
CW090-FCSA Approval	1-January-2015
CW130-FCSA Execution	2-February-2015
CW150-Draft Feasibility Report Submittal to MSC	1-March-2016
CW150-Final Feasibility Report Submittal to MSC	1-September-2016
CW170-Feasibility Report Approval	1-November-2016



**Photo 1: Damage following Hurricane Sandy in Fortescue**



**Photo 2: Damage following Hurricane Sandy in Fortescue**





**Photo 3: Damage following Hurricane Sandy in Fortescue**



**Photo 4: Damage following Hurricane Sandy in Fortescue**



**Photo 5: Damage following Hurricane Sandy in Gandys Beach**



**Photo 6: Damage following Hurricane Sandy in Gandys Beach**





**Photo 7: Damage following Hurricane Sandy in Gandys Beach**



**Photo 8: Damage following Hurricane Sandy in Gandys Beach**

ATTACHMENT - LETTER OF SUPPORT FROM DOWNE TOWNSHIP



*Established 1772*

*Nature lover's paradise*

November 25, 2013

Peter R. Blum, PE  
Chief, Planning Division  
U.S. Army Corps of Engineers  
Wanamaker Building  
100 Penn Square East  
Philadelphia, Pennsylvania 19107

**Re: Letter of Intent - Request for Assistance for Areas Impacted by Hurricane Sandy  
U.S. Army Corps of Engineers Continuing Authorities Program  
Township of Downe, Cumberland County, New Jersey**

Dear Mr. Blum:

This letter requests assistance from the U.S. Army Corps of Engineers (Corps) under the Continuing Authorities Program (CAP). We understand that if the Corps determines there to be a Federal interest in this project, a non-Federal sponsor must agree to cost-share the feasibility study and construction.

Downe Township is located on the Delaware Bay in southeastern Cumberland County, New Jersey. The Township is a community of approximately 53 square miles and is home to several historic mixed use villages which include: Dividing Creek, Newport, Money Island, Gandy's Beach and Fortescue. These small villages share in the cultural, social and economic heritage of many of the other communities on the Bayshore.

We respectfully request that the Corps evaluate the reconstruction of various bulkheads and the construction of beach protection projects along the bay in Downe Township that were damaged by Superstorm Sandy and other storms.

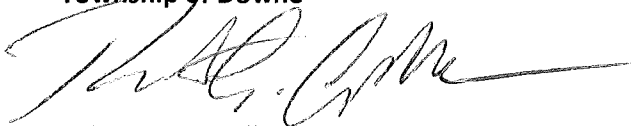
In 2012, the Township officials and their professionals prepared a PowerPoint presentation that summarized the local needs and this presentation can be found at: [http://downetwpnj.org/Recreation%20Department/DT%20Imp%20Plan%20Ovrvw%20Pres%2092412.p](http://downetwpnj.org/Recreation%20Department/DT%20Imp%20Plan%20Ovrvw%20Pres%2092412.pdf)  
[df](http://downetwpnj.org/Recreation%20Department/DT%20Imp%20Plan%20Ovrvw%20Pres%2092412.p). This presentation summarizes the coastal improvements needed to secure the coastal villages located in Downe Township. More specifically, the improvements include:

Dividing Creek – Maple Avenue – bulkheads and other improvements - \$6,398,300  
Fortescue - rock jetty, bulkhead improvements, beach replenishment - \$10,372,050  
Money Island – bulkheads, rock jetty, and other improvements - \$4,028,350  
Gandy's Beach – beach replenishment, bulkheads, rock jetty, etc. - \$8,964,750

The Township has secured funding from the Federal Emergency Management Agency, New Jersey Department of Environmental Protection, and New Jersey Department of Community Affairs for bulkhead at Gandy's Beach and Money Island but much additional work is needed.

We look forward to working with you in the future. Should you need additional information, please do not hesitate to contact Jim Rutala at 609.743.0354.

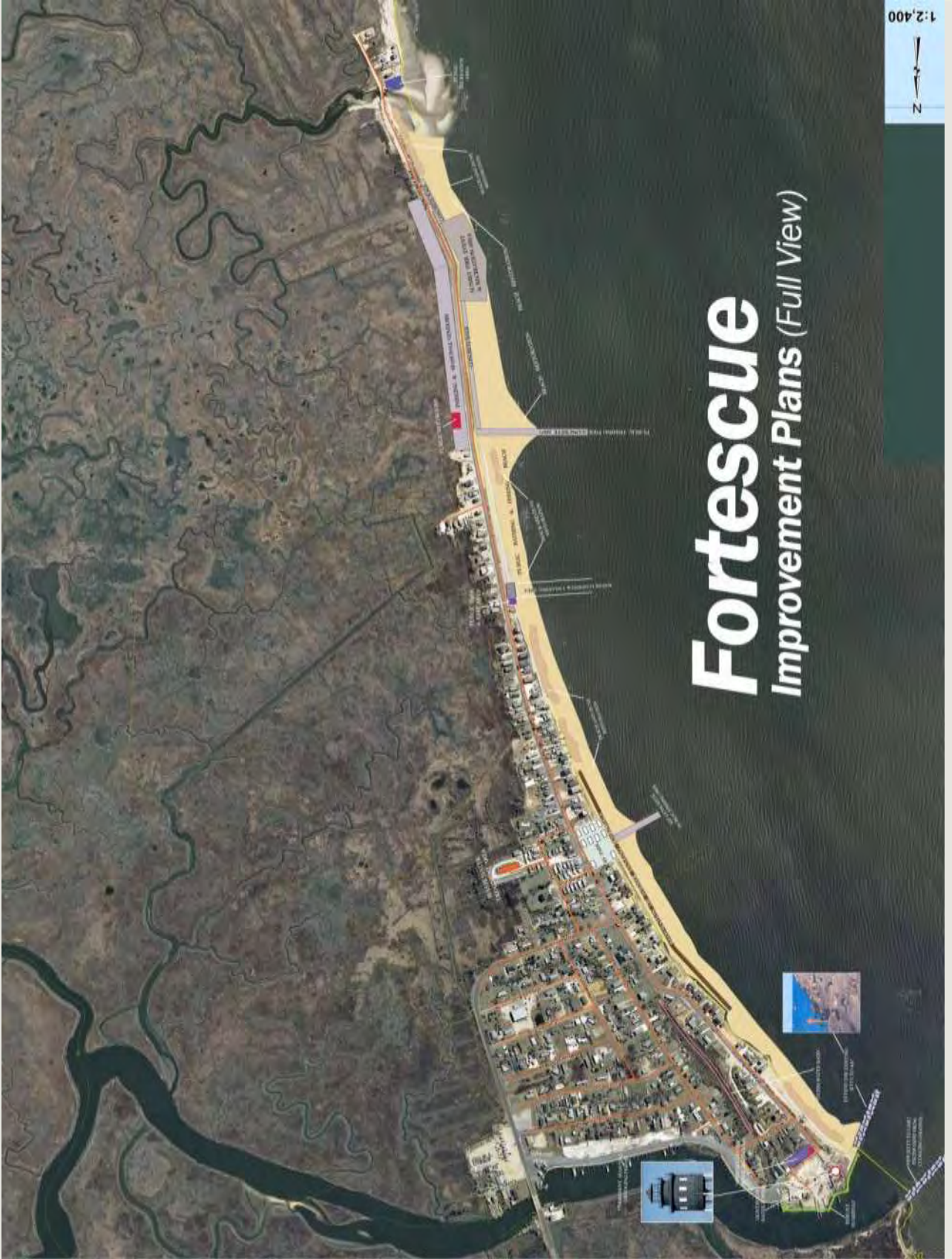
Sincerely,  
**Township of Downe**

A handwritten signature in black ink, appearing to read 'Robert Campbell', with a long horizontal flourish extending to the right.

Robert Campbell  
Mayor

Cc: Jane L. Jablonski, USACE  
Erik J. Rourke, USACE  
David Battistini, Municipal Engineer  
James M. Rutala, Rutala Associates





# Fortescue

## Improvement Plans (Full View)



PORTLAND  
STREET

WATERFRONT  
DEVELOPMENT





# Fortescue

## Improvement (East)

PUBLIC PARK & REST AREA

PUBLIC BATHING & FISHING BEACH

PUBLIC RESTROOMS

PARKING & SEASONAL VENDORS

CONCRETE WALK

SUNSET PIER EVENT & RECREATION AREA

BEACH RESTORATIONS

SOUTH COAST BEACH RESTORATIONS

JUCIEBECK RECREATION AREA

KAYAK LOADING & UNLOADING AREA

PUBLIC FISHING PIER (CONCRETE 600')









# Gandy's Beach

Improvement Plans (Full View)

Gandy's Beach  
1:1,200 | Source: NCDOT and CCCG

# Gandy's Beach Improvement (West)







INSTALL A LIGHT FACILITY  
TO LIGHT UP THE BEACH AT NIGHT  
OVER THE EXISTING FACILITY

Gandy Ave

# Gandy's Beach Improvement (East)

TO WALK BEACH  
PLANT PLANTS TO IMPROVE  
BEACH WALKWAY

WATER & WASTE  
TREATMENT  
PLANT

WALKWAY  
IMPROVEMENTS

NEW DESIGN AREA

APPLY A POLYURETHANE  
BEACH SURFACING TO  
IMPROVE BEACH

WALKWAY  
IMPROVEMENTS

MARKING IN LANTERN  
PATTERNING AREA

WALKWAY  
IMPROVEMENTS

