

## REPORT SUMMARY

### Jacksonville Harbor Mile Point Navigation Study, Duval County, Florida Integrated Feasibility Report and Environmental Assessment

Feasibility Cost Sharing Agreement:	12 March 2003
Feasibility Scoping Meeting:	28 July 2004
Alternative Formulation Briefing:	25 May 2011

## STUDY INFORMATION

**Study Authority.** Resolution, Docket 2550, of House Committee on Transportation and Infrastructure adopted March 24, 1998 for Mile Point, Florida states:

Resolved by the Committee on Transportation and Infrastructure of the United States House of Representatives, That, the Secretary of the Army is requested to review the report of the Chief of Engineers on Jacksonville Harbor, Florida, published as House Document 214, Eighty-ninth Congress, 1st Session, and other pertinent reports to determine whether any modifications of the recommendations contained therein are advisable at the present time in the interest of navigation and related purposes, with particular reference to erosion of the Mile Point shoreline.

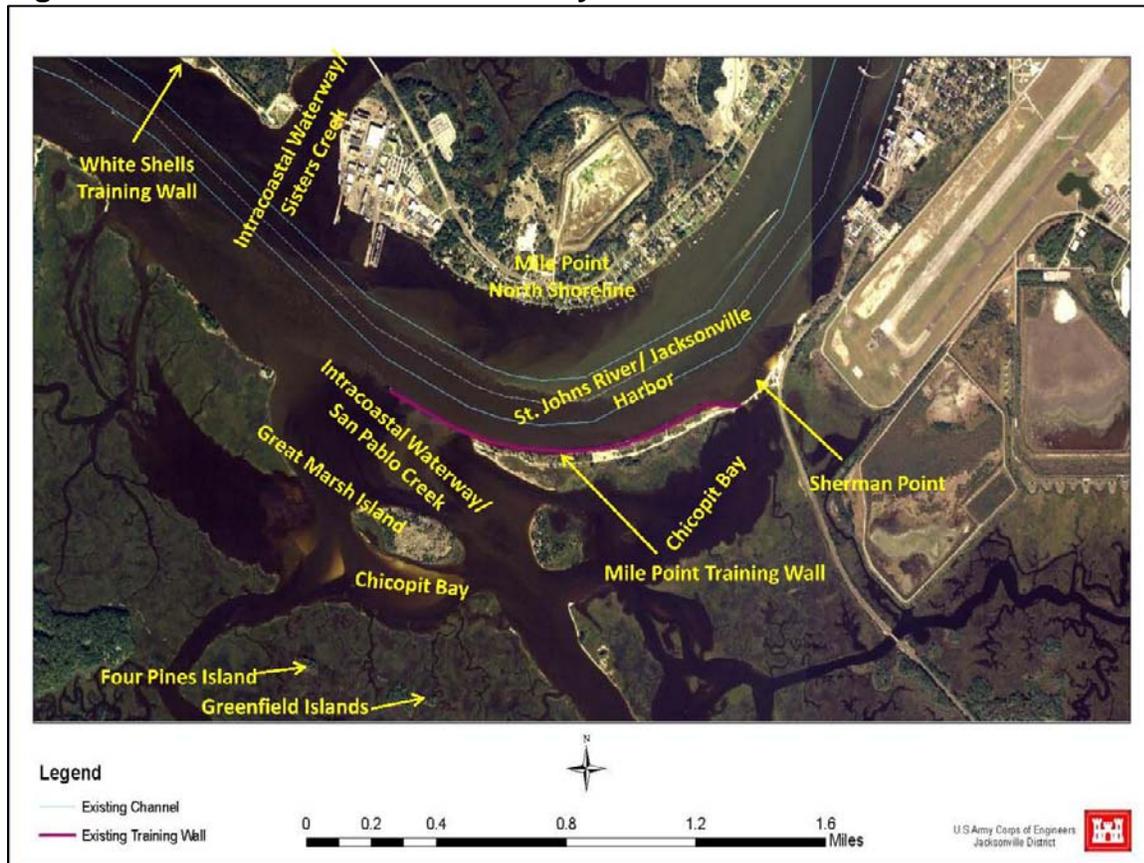
Congress added funding in the appropriations for Fiscal Year (FY) 2000 to begin the reconnaissance study which was completed in 2001. The feasibility study proceeded under that authorization in 2003.

**Study Sponsor.** The non-Federal sponsor is the Jacksonville Port Authority.

**Study Purpose and Scope.** The confluence of the St. Johns River with the IWW is known as Mile Point, an area that experiences difficult crosscurrents on the ebb tide. Due to these crosscurrents there is a navigational restriction on the ebb tide that affects all vessels that have a transit draft greater than 33 feet inbound and 36 feet outbound, inhibiting the free movement of vessel traffic. The crosscurrents at Mile Point are also of concern for erosion on the Mile Point shoreline because the Mile Point shoreline has experienced erosion. The purpose of this study is to develop and evaluate alternate plans to reduce effects of the crosscurrents on the Mile Point shoreline and recommend alternatives that would allow the St. Johns Bar Pilots to remove the restrictions to navigation for vessels transiting Jacksonville Harbor. The objective of this feasibility report is to investigate and recommend solutions to the water resources problems at Mile Point. The results of this study include documentation of environmental compliance.

**Project Location/Congressional District.** Mile Point consists of 5000 feet of shoreline located along the north shore of the St. Johns River and east of the Intracoastal Waterway (IWW). Great Marsh Island and the Mile Point Training Wall divide Chicopit Bay which is located to the south of the Mile Point erosion area (**Figure 1**). Mile Point is in the 4th Congressional District. Congressman Ander Crenshaw supports efforts to determine the cause and prevention of the erosion and navigational restrictions.

**Figure 1: Jacksonville Mile Point Study Area**



**Prior Reports and Existing Projects.** There are two navigation projects that are adjacent to the Mile Point area including a deep draft ship channel, the Jacksonville Harbor Federal navigation project, (**Figure 1**); and the Intracoastal Waterway (IWW).

**Prior Reports.**

- a. The Jacksonville District prepared an environmental assessment (EA) for placement of dredged rock at the Mile Point area. The EA titled "Shoreline Protection Structure and Alternative Placement Site Construction" evaluated placing rock from the Jax Harbor navigation project at Mile Point. The finding of no significant impact (FONSI) for that EA was signed on 20 Feb. 2003.
- b. A Continuing Authorities Program (CAP) Section 1135 study for Chicopit Bay was initiated but not completed to examine the potential for environmental improvements to the Chicopit Bay area. The Section 1135 study was put on hold pending the results of this Mile Point feasibility study.

**Existing Projects.**

- a. Jacksonville Harbor Federal Navigation Project: The Chief of Engineers Report is from 19 May 1965 recommended modification of the existing project for Jacksonville Harbor, Florida, "to provide for maintenance of the existing ocean entrance 42 and 40 feet deep, deepening of the

interior channel to 38 feet to the Municipal Docks and Terminals, and widening the channel near mile 5 and mile 7 by 100 feet and 200 feet, respectively.” The Water Resources Development Act of 1999 modified some of the project features. Recent project features from WRDA 1999 include: a 40-foot project depth from the Entrance Channel to mile 14.7, and a 38-foot project depth for cuts F and G. Channel widths vary from approximately 400 feet to 1,200 feet. Public Law 109-103, Section 129 of the FY 2006 Appropriations Act, dated 19 November 2005 authorized deepening and widening of miles 14.7 to 20 to the new project depth of 40 feet. Funding was provided through the American Recovery and Rehabilitation Act (ARRA) of 2009 and the project was completed in 2010.

The federally authorized Jacksonville Harbor project provides for Federal maintenance of an existing channel depth of 40 feet with bottom widths ranging from 400 to 1200 feet from the Atlantic Ocean to Mile 20 of the St. Johns River. The authorized widths in the Mile Point area range from 1025 feet at reach 7 to 625 feet from reaches 8 to 13 and down to 475 feet at reaches 14 to 15. All vessels transiting to the Jacksonville Port Authority (Jaxport) must pass through Mile Point area to do so. The Jacksonville Harbor Federal navigation project in the area of Mile Point consists of a 40-foot deep channel over a bottom width of 475 to 1025 feet in the St. Johns River. An important feature of the Federal navigation project which separates the St. Johns River near Mile Point from the east side of Chicopit Bay is the Mile Point training wall. The training wall extends about 6000 feet from Sherman Point past the confluence of Pablo Creek with the St. Johns River.

b. Intracoastal Waterway: The Intracoastal Waterway crosses the St. Johns River south of the Mile Point training wall at Pablo Creek and at Great Marsh Island along Sisters Creek to the north. The IWW has an authorized bottom width of 125 feet at a depth of 12 feet both on the north and south side of the river. The first Federal authorization for an Intracoastal Waterway from Jacksonville to Miami occurred in the River and Harbor Act of 21 January 1927. Using an existing private canal the USACE took possession of the waterway on 11 December 1929. That first project called for a canal 8 feet deep by 75 feet wide and has subsequently been deepened and widened. Construction began when the United States snagboat D-1 moved from the St. Johns River into Pablo Creek and headed south clearing obstructions.

c. History of the Mile Point Area: The St. Johns River originally flowed around both sides of Great Marsh Island from about Sherman Point to St. Johns Bluff as shown in the 1895 survey. At that time near Mile Point, the river was about 4000 feet wide with a shoal area. In 1892 a USACE project for improvement of the channel in the St. Johns River from a controlling depth of 12.5 feet to 18 feet received approval from the Secretary of War.

The project proposed improvement of shoal areas at Dames Point, Cedar Creek and Mile Point by means of training dikes and dredging. To expedite those improvements the citizens of Duval County obtained permission from the Secretary of War to accomplish that work at their own expense. As a result of those efforts, a navigable 18-foot channel existed by May 1894<sup>1</sup>.

From 1903 to 1907 the Jacksonville Harbor project was deepened to 24 feet. Mile Point did not seem to change during that period. By 1910 a request to deepen the harbor to 30 feet included a

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<sup>1</sup> House of Representatives Ex. Doc. 346, 53<sup>rd</sup> Congress, 3<sup>rd</sup> Session, June 3, 1896, Pages 3-4.

recommendation to continue construction of the Mile Point training wall by augmenting the small part that already existed.

That recommendation noted that the flood tide is deflected off a shell bank at Sherman Point sharply across the point of sands locally known as Mile Point, while the ebb is deflected by the outflow from Sisters Creek against Great Marsh Island. The Mile Point training wall was planned to properly train those currents into one channel and to avoid the troublesome crosscurrents from the several creeks entering the river between Great Marsh Island and Sherman Point. Construction of the Mile Point training wall must have started sometime prior to the 1910 report date since that report mentions an improvement of conditions as a result of initial construction of a small part of the training wall.

A similar situation existed approximately two or three river miles to the west of the Mile Point area along a section of the Federal channel between White Shells and St. Johns Bluff. The same 1910 document mentioned above proposed to shut off conflicting crossing currents by a training wall extending from the mouth of Clapboard Creek to Brunswick Island and then extending along the shoal between Brunswick Island and the head of White Shells training wall for the purpose of training the ebb and flood currents into one channel between St. Johns Bluff and the existing White Shells Training Wall<sup>2</sup>.

An examination of the training wall was performed in 1928.<sup>3</sup> According to that examination, the training wall ranged in height from an original design height of 6 feet above local mean low water (MLW) to areas with a height of only 0.5 feet above MLW. Maintenance work around 1931 rebuilt the training wall to an original design elevation of 6 feet above MLW.<sup>4</sup> Work began under contract on 21 April 1931 and resulted in the repair of 5,990 linear feet of the training wall. Over 18,000 tons of granite averaging in weight from 1,000 to 1,500 pounds per stone was placed in the Mile Point Training Wall.<sup>5</sup> The Mile Point Training Wall underwent maintenance work in 2001 to the eastern portions of the wall along Sherman Point. No maintenance work has been performed on the training wall since 2001.

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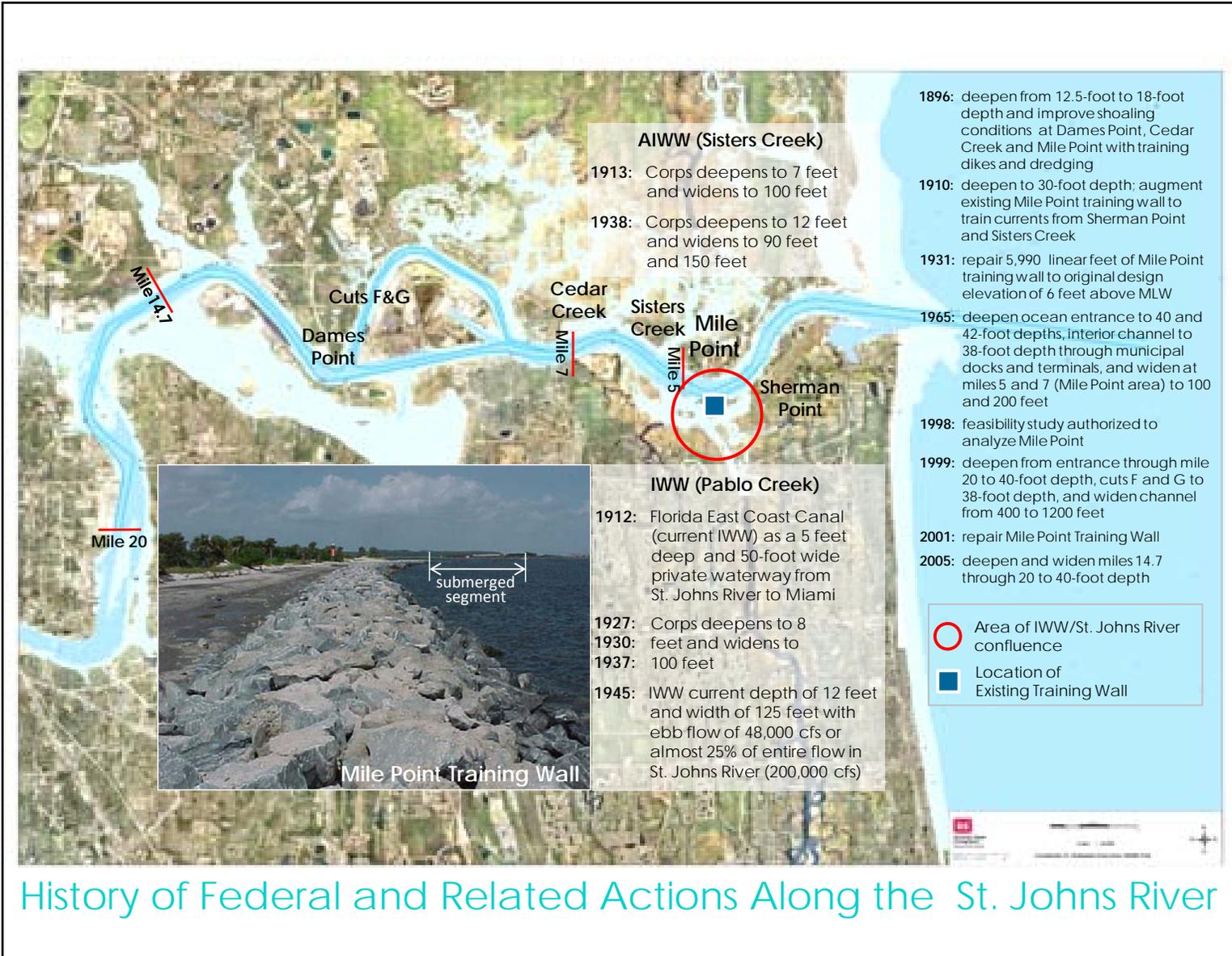
<sup>2</sup> House of Representatives Document No. 611, 61<sup>st</sup> Congress 2<sup>nd</sup> Session, January 29, 1910, Pages 17-18.

<sup>3</sup> Drawing File No. 1-9100. St. Johns River, Florida, Jacksonville to the Ocean. Examination of Training Walls & Revetments. August 20 to November 24, 1928.

<sup>4</sup> Drawing File No. 1A-8846, St. Johns River, Florida, Jacksonville to the Ocean, Proposed Repairs to Training Walls and Revetments, Mile Point Training Wall. U.S. Engineer Office, Jacksonville, Fla. November 21, 1930. To Accompany Proposal Number 31-434, Dated January 19, 1931.

<sup>5</sup> Annual Report of the Chief of Engineers, 1931, Extract. Report Upon the Improvement of Rivers and Harbors in Jacksonville, Fla., District. P. 741.

**Figure 2: History of the Mile Point Area**



History of Federal and Related Actions Along the St. Johns River

**Other Studies.** A Jacksonville Harbor General Reevaluation (GRR-II) Study is underway to evaluate deepening and widening Jacksonville Harbor. The Mile Point Feasibility Study and the GRR-II study relate to one another. Lifting the restrictions at the Mile Point shoreline, as is outlined in this report, will have a direct impact on the benefiting vessels for the GRR-II. The recommendations of this report will be included as a part of the without project condition for the GRR-II.

**Federal Interest.** A Section 905(b) (WRDA 86) Reconnaissance Analysis for The Mile Point Shoreline of Jacksonville Harbor, Duval County, Florida was complete in 2001. The analysis determined that a Federal interest exists. The feasibility cost sharing agreement was executed 12 March 2003. The study is cost shared at 50/50.

The Water Resources Development Act of 1986 (Public Law 99-662) as amended, specifies cost apportionment by project purpose for deep draft navigation projects. Federal participation in navigation projects is limited to sharing costs for design and construction of general navigation features (GNF) consisting of breakwaters and jetties, entrance and primary access channels, widened channels, turning basins, anchorage areas, locks, and dredged material disposal areas with retaining dikes. Non-Federal interests are responsible for and bear all costs for acquisition of necessary lands, easements, rights-of-way and relocations; terminal facilities; and dredging berthing areas and interior access channels to those berthing areas. For a commercial navigation project with project depths greater than 20 feet but not in excess of 45 feet, the non-Federal share for the construction is 25 percent. Lands, easements, rights-of-way, and relocations (LERRs) are 100 percent non-Federal costs.

This project meets these definitions for Federal interest. Project implementation will generate approximately \$703,000 in net benefits at a benefit-to-cost ratio of 1.4.

## **STUDY OBJECTIVES**

**Problems and Opportunities.** The existing conditions at Jacksonville Mile Point require vessels to be restricted on the ebb tide due to difficult crosscurrents at the confluence of IWW and the St. Johns River. According to the St. Johns Bar Pilots, the area of the river where the IWW crosses the St. Johns River produces crosscurrents that can actually turn an inbound, under powered ship around. The U.S. Coast Pilot describes that area as one of particular concern, describing the junction of the IWW with the St. Johns River as subject to strong and unpredictable crosscurrents at various stages of tide. The crosscurrents at Mile Point are also of concern for erosion on the Mile Point shoreline. The crosscurrents on the maximum ebb tide involves flows from the Intracoastal Waterway (48,000 cubic feet per second) south of the Mile Point Training wall that flow around the west end of the training wall in an almost perpendicular across the Federal channel (toward the north bank) and equivalent to almost 25 per cent of the entire flow in the St. Johns River (200,000 cubic feet per second). In the recent past, homeowners on the north bank of the river at Mile Point have seen severe erosion of their property and are seriously concerned about future property losses. The homeowners speculate that the cause of the erosion is due to hydrodynamic effects of dredging done by the U.S. Army Corps of Engineers, installation of the Atlantic Marine dry dock, and deterioration of the Mile Point training wall.

Opportunities are positive conditions in the study area that may result from management measures. There is an opportunity to reducing or redirecting the difficult crosscurrents in the harbor would allow the pilots to reduce or eliminate navigation restrictions impeding the free movement of vessels. Other opportunities are for beneficial use of dredged material, incidental environmental benefits, and regional economic development benefits,

**Planning Objectives.** The objective of the Mile Point Feasibility Study is to reduce the effects of the crosscurrents at the confluence of the St. Johns River with the IWW resulting in:

- 1) Eliminating the navigation restrictions on the ebb tide due to the crosscurrents at Mile Point; and
- 2) Reducing the effects of the crosscurrents on the erosion of the Mile Point shoreline

**Planning Constraints.** Constraints are restrictions that limit the planning process. Plan formulation involves meeting the study objectives while not violating the constraints. Specific study constraints include:

- 1) Atlantic Dry Dock Corporation received a permit in 2006 to add two new dry docks, one 625 feet long, and the other 853 feet long that will extend from the north shoreline to about 300 feet from the edge of the Federal channel at the intersection of the Intracoastal Waterway and the St. Johns River. Widening in this area would require purchase of a business property.
- 2) The Timucuan National Ecological and Historic Preserve now encompasses both sides of the St. Johns River along the Mile Point and White Shells training walls and Chicopit Bay areas. It contains a mosaic of salt marsh, oyster beds, and other high value environmental habitats. The project would seek avoidance of impacts to the extent practicable.
- 3) The City of Jacksonville constructed a public fishing pier from the Mile Point training wall into the St. Johns River and developed the Little Jetties Park on dredged material placed behind the Mile Point training wall. The project will seek to minimize disruption to this pier during project construction.
- 4) The public has built homes and docks on dredged material along the north shoreline of Mile Point. Project construction will seek to avoid impacting homeowners' access to their property.
- 5) Atlantic Dry Dock, per permit SAJ-1994-981-JJS, has a minimum setback criterion of a 300-foot setback from the near bottom edge of the Federal channel. This setback restricts widening on the north side of the Mile Point area. The setback criterion is a result of the U.S. Coast Guard Navigation Risk Assessment.<sup>6</sup>

## ALTERNATIVES

**Plan Formulation Rationale.** The Four Accounts are established in the Principles and Guidelines (P&G 1983) to facilitate the evaluation and display of effects of alternative plans. The national economic development (NED) account displays changes in the economic value of the national output of goods and services, the environmental quality (EQ) account displays non-

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<sup>6</sup> Atlantic Dry Dock Inc., Permit SAJ-1994-981

monetary effects on ecological, cultural, and aesthetic resources including the positive and adverse effects of ecosystem restoration plans, the regional economic development (RED) account displays changes in the distribution of regional economic activity (e.g., income and employment), and the other social effects (OSE) account displays plan effects on social aspects such as community impacts, health and safety, displacement, energy conservation and others. The NED plan must also meet the test of four additional criteria: completeness, effectiveness, efficiency, and acceptability. The criteria are used in the building of alternatives; the four accounts are used in addition to the planning objectives and constraints in evaluating alternative plans.

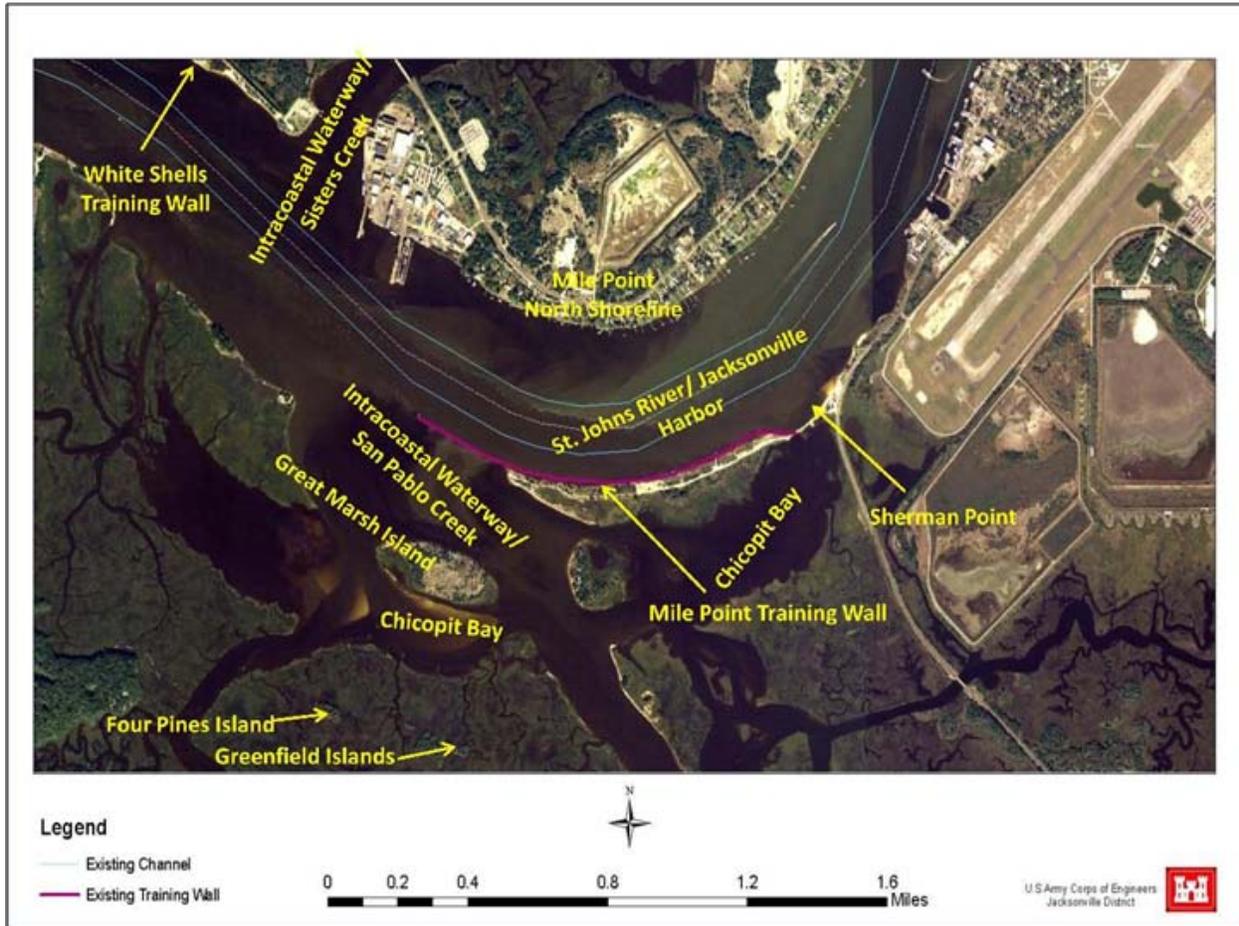
**Management Measures and Alternative Plans.** A management measure is a feature or activity that can be implemented at a specific geographic site to address one or more planning objectives. Management measures are used to create plans and can be categorized as non-structural or structural. The following measures were identified to reduce the effects of the crosscurrents on the Mile Point shoreline and restrictions to navigation for vessels transiting Jacksonville Harbor.

- 1) The following non-structural management measures were identified to reduce the effects of the crosscurrents on navigation through the Mile Point area:
  - a) Additional Tugs: Vessels to use more tugs to transit through the Mile Point area;
  - b) Light Loading: Light load larger vessels since vessels are restricted by transit draft.
- 3) The following structural management measures were identified to meet the objective of reducing the effects of the crosscurrents on the erosion of the Mile Point shoreline.
  - a) Structural Erosion Protection: Build a bulkhead, groins, beach fill, or other structures along the Mile Point shoreline on the north side of the channel.
- 4) The following structural management measures were identified to meet the objectives of elimination of the navigation restrictions on the ebb tide due to the crosscurrents at Mile Point and reduce the effects of the crosscurrents on the Mile Point shoreline.
  - a) San Pablo Creek IWW Submerged Weir: Construct a weir across the Pablo Creek section of the IWW (and the east and west ends of Chicopit Bay if modeling indicates flows diverted in those directions).
  - b) Rebuild Mile Point Training Wall: Rebuild the Mile Point training wall to its original design length and height of 5,990 feet and 6 feet above MLW.
  - c) 150 Foot Training Wall Reach Channel Widening: Widen the south side of Training Wall Reach Channel by 150 feet.
  - d) Eastern Chicopit Bay Diversion: Partially remove Jetty/Eastern Portion of the Mile Point training wall (and park) by opening the east end of Chicopit Bay (100 feet to 500 feet) and cutting a 5500-foot bypass channel.
  - e) Relocate (Reconfigure) Mile Point Training Wall: Relocate about one-half of the Mile Point Training Wall to the southwest, to widen the confluence of Pablo Creek (IWW) with the St. Johns River.
  - f) Rebuild White Shells Training Wall: Rebuild the White Shells training wall to its

original design length and height of approximately +1.0 MLW through station 67+20 (6,720 feet)<sup>7</sup>.

- g) Short Cut Widener between South buoys G25-G27: Widen the east end of Short Cut Turn - About 150 feet to the south between buoys G25-G27.

**Figure 3: Jacksonville Mile Point Geographical Area**



A No Action plan, which is the continuation of existing conditions, was also considered.

Management measures were combined to form alternatives. Alternatives were evaluated to determine the degree in which they reduce the impacts of the crosscurrents at the confluence of the IWW and St. Johns River during the ebb tide. Changes in the current velocities were tested for each of the alternatives using a two-dimensional hydrodynamic model. The modeling performed was to provide recommendations for reducing or relocating the difficult crosscurrents during the ebb flow at the confluence of the St. Johns River with the IWW. There is a direct correlation between the crosscurrents out of the IWW and the navigation restrictions enacted. Alternatives that provided a significant reduction in crosscurrents were carried forward and those that did not provide a significant reduction were eliminated.

<sup>7</sup> 1955 survey for rehabilitation of the training wall.

**Table 1: Jacksonville Mile Point – Alternative Plans**

Jacksonville Harbor (Mile Point) - Alternative Plans			
Alternative Plan	Objective Addressed	Designation	Management Measure(s)
Alternative Plan 1	Reduce Effects of the Crosscurrents at Mile Point on the Ebb Tide on the Erosion of the Mile Point Shoreline	1A	North Shoreline Groin Field
		1B	San Pablo Creek IWW Submerged Weir
		1C	Rebuild Mile Point Training Wall (Little Jetties)
		1D	Rebuilding White Shells Training wall
		1E	North Shoreline stone revetment or sheet pile bulkhead
		1F	Removal of waterward portion of Training Wall
Alternative Plan 2	Reduce Effects of the Crosscurrents on the Ebb Tide at Mile Point in order to Eliminate the Pilots' Navigation Restrictions	2	150-Foot Training Wall Reach Widening
Alternative Plan 3	Reduce Effects of the Crosscurrents on the Ebb Tide at Mile Point in order to Eliminate the Pilots' Navigation Restrictions and Reduce the Effects of the Crosscurrents on the Erosion of the Mile Point Shoreline	3A	Eastern Chicopit Bay Diversion
		3B	Relocate Mile Point Training Wall
		3C	North Shoreline Groin Field AND 150 Foot Training Wall Reach Widening
		3D	San Pablo Creek IWW Submerged Weir AND 150-Foot Training Wall Reach Widening
		3E	Rebuild Mile Point Training Wall (Little Jetties) AND 150-Foot Training Wall Reach Widening
		3F	Rebuild Mile Point Training Wall (Little Jetties) AND Rebuild White Shells Training Wall
Alternative Plan 4	Reduce Effects of the Crosscurrents on the Ebb Tide at Mile Point in order to Eliminate the Pilots' Navigation Restrictions	4	150-Foot Training Wall Reach Widening AND Short Cut Turn Widener
Alternative Plan 5	Reduce Effects of the Crosscurrents on the Ebb Tide at Mile Point in order to Eliminate the Pilots' Navigation Restrictions and Reduce the Effects of the Crosscurrents on the Erosion of the Mile Point Shoreline	5A	North Shoreline Groin Field AND 150-Foot Training Wall Reach Widening AND Short Cut Turn Widener
		5B	San Pablo Creek IWW Submerged Weir AND 150-Foot Training Wall Reach Widening AND Short Cut Turn Widener
		5C	Rebuild Mile Point Training Wall (Little Jetties) AND 150-Foot Training Wall Reach Widening AND Short Cut Turn Widener

**Table 2: Jacksonville Mile Point – Alternative Plans Screened Out Based on Results of Hydrodynamic Modeling**

Jacksonville Harbor (Mile Point) - Alternative Plans Eliminated throughout the Study				
Alternative Plan	Objective Addressed	Designation	Management Measure(s)	Basis for Elimination
Alternative Plan 1	Reduce Effects of the Cross currents on the Erosion of the Mile Point Shoreline	1A	North Shoreline Groin Field	Reduced cross currents at adjacent shoreline but not in the navigation channel.
		1B	San Pablo Creek IWW Submerged Weir	No Sig impacts on cross currents in navigation channel.
		1C	Rebuild Mile Point Training Wall (Little Jetties)	No Sig impacts on cross currents in navigation channel. <sup>1</sup>
		1D	Rebuilding White Shells Training wall	No Sig impacts on cross currents in navigation channel.
		1E	North Shoreline stone revetment or sheet pile bulkhead	No Sig impacts on cross currents in navigation channel.
		1F	Removal of waterward portion of Training Wall	Insignificant changes to magnitude and direction of cross currents.
Alternative Plan 3	Reduce Effects of the Cross currents in order to Eliminate the Pilots' Navigation Restrictions and Erosion of the Mile Point Shoreline	3A	Eastern Chicopit Bay Diversion	Reduced ebb flow by 50% but magnitude of cross currents in the channel by less than 25%. <sup>2</sup>
		3C	North Shoreline Groin Field AND 150-Foot Training Wall Reach Widening	Insignificant changes to magnitude and direction of cross currents.
		3D	San Pablo Creek IWW Submerged Weir AND 150-Foot Training Wall Reach Widening	Insignificant changes to magnitude and direction of cross currents.
		3E	Rebuild Mile Point Training Wall (Little Jetties) AND 150-Foot Training Wall Reach Widening	Insignificant changes to magnitude and direction of cross currents.
		3F	Rebuild Mile Point Training Wall (Little Jetties) AND Rebuild White Shells Training Wall	Insignificant changes to magnitude and direction of cross currents.
Alternative Plan 4	Reduce Effects of the Cross currents in order to Eliminate the Pilots' Navigation Restrictions	4	150-Foot Training Wall Reach Widening AND Short Cut Turn Widener	Insignificant changes to magnitude and direction of cross currents.
Alternative Plan 5	Reduce Effects of the Cross currents in order to Eliminate the Pilots' Navigation Restrictions and Erosion of the Mile Point Shoreline	5A	North Shoreline Groin Field AND 150-Foot Training Wall Reach Widening AND Short Cut Turn Widener	Insignificant changes to magnitude and direction of cross currents.
		5B	San Pablo Creek IWW Submerged Weir AND 150-Foot Training Wall Reach Widening AND Short Cut Turn Widener	Insignificant changes to magnitude and direction of cross currents.
		5C	Rebuild Mile Point Training Wall (Little Jetties) AND 150-Foot Training Wall Reach Widening AND Short Cut Turn Widener	Insignificant changes to magnitude and direction of cross currents.

1. The ADCP Survey measured a maximum flow of approximately 1,500 cfs over the training wall, less than five percent of the maximum ebb flow measured out of Pablo Creek.

2. The angle of the cross currents did not change significantly. This is an environmentally sensitive area.

The Non-structural alternatives were also eliminated. The non-structural alternatives of light-loading and using the tide to transit did not allow for the vessels that are currently subject to the navigation restrictions to transit without the restriction or reduce the effects of the crosscurrents on the Mile Point shoreline. The No Action alternative is not recommended as it does not provide any benefits or address any of the problems discussed in this study. The St. Johns Bar Pilots determined the use of bow/stern thrusters or available tug assistance for ships restricted by the crosscurrents at Mile Point during the maximum ebb tide flows are not effective or practical due to the vessel transit speed required to overcome the crosscurrents under those conditions. The non-structural alternative which evaluated adding additional tugs was eliminated based on this assessment.

An additional alternative known as the O&M Alternative (1F) evaluated removal of the waterward portion of the Mile Point Training Wall. This alternative was eliminated due to results of RMA10 modeling. Modeling showed only a slight benefit in the direction and

magnitude of the ebb tide velocity vector, not enough to lift the existing navigation restrictions at Mile Point. The modeling also showed an increase in the areal extent of the crosscurrents which would have potential negative impacts to navigation.

**Final Array of Alternatives.** The results of the hydrodynamic modeling of the alternatives showed that only the Relocation/Reconfiguration of the Mile Point training wall alternative demonstrated significant change in the distribution and direction of the currents within the navigation channel and it is the only alternative that met all of the study objectives. It is anticipated that the new realignment of the Mile Point training wall would produce flows coming out of the IWW from the south that are more aligned with the Federal channel. This is expected to provide a drop in water velocity in the areas north of the channel at Mile Point and slow the progression of the erosion that has occurred at the north bank of Mile Point. Ship simulation results were considered favorable by the majority of the St. Johns Bar Pilots toward reducing or eliminating the restrictions associated with the training wall crosscurrents. A widening alternative was carried forward for further investigation at the request of the St. Johns Bar Pilots. A second ship simulation was run 14-17 September 2009 to test the widening only alternative, as well as the relocation of the Mile Point training wall alternative. The pilots, after using the wideners in the simulation, stated that they felt the wideners would not reduce tidal restrictions for Mile Point. Based on the simulator runs, the pilots felt that relocation of the Mile Point training wall could reduce or eliminate tidal restrictions for Mile Point.

**Table 3: Jacksonville Mile Point – Final Alternatives Costs and Benefits**

Alternative	Benefits	Costs	AAEQ Cost	AAEQ Benefits	AAEQ Net Benefits	BCR
Reconfigure	\$52,400	\$37,300	\$1,737	\$2,440	\$703	1.40
Reconfigure & Widen	\$52,400	\$76,300	\$3,628	\$2,440	-\$1,188	0.67

**Comparison of Alternatives.** Alternative VE-3B plus Flow Improvement Channel is the Selected Plan. This alternative was evaluated and determined to be economically justified, environmentally acceptable, and is complete. In addition, a recommended 53 acres of salt marsh restoration and planting is proposed for beneficial use of dredged material and environmental mitigation. The recommended plan has the highest Net AAEQ NED benefits and also provides for over 31 acres of incidental benefits (**Table 3**).

**Recommended Plan.** The recommended plan combines the reconfiguration of the existing training wall, restoration of Great Marsh Island which is the least cost disposal option, and the creation of a flow improvement channel in Chicopit Bay.

1. The training wall reconfiguration includes removal of the western 3110 feet of the existing Mile Point training wall and the construction of a relocated Eastern Leg training wall of approximately 2050 feet. Total estimated quantity of material to be excavated is approximately 889,000 cubic yards (cy). All usable stone material recovered from the existing training wall will be stockpiled for use in either the West or East Leg of the relocated training wall and all other material excavated will be placed as beneficial use in the Salt Marsh Mitigation Area at Great Marsh Island and as foundation for the relocated training wall. It is estimated that approximately 14,600 cy of armor stone can be

recovered for reuse purposes; however, additional geophysical exploration is needed to more precisely ascertain the exact quantities of stone available for reuse.

The East Leg training wall incorporates a larger scour apron (25') than the West Leg (10') due to the predicted permanent shift of stronger currents in Pablo Creek towards the east especially during the ebb tide. Channel migration of the IWW is anticipated and realignment of the channel to deep water may become necessary. The relocated East Leg consists of building approximately 2050 feet of training wall tying into the existing structure on Helen Cooper Floyd Park and the West Leg consists of building approximately 4250 feet of training wall across the breakthrough at Great Marsh Island. Estimated quantities associated with the East Leg are 26,900 cy of armor stone and 11,900 cy of bedding stone, and for the West Leg are 5,670cy of concrete (567 units at 10 cy/unit) and 32,000 square yards of geotextile fabric for bags and tubes to be filled with 40,500 cy of excavated material. Both legs will incorporate the use of a total of approximately 34,900 sy of filter fabric.

2. The least cost disposal method is to restore the breakthrough at Great Marsh Island by placing dredged material at the Island and constructing an approximate 4250 foot Western Leg training wall. Restoration of this area provides an opportunity to address impacts caused by the physical decay of the ecosystem through erosion of natural habitat caused by the crosscurrents. Great Marsh Island is closer than Buck Island, which results in a substantial cost savings, approximately \$9 million according to a value engineering study, by reducing pumping distance of dredged material and allows for use of a smaller dredge and less pipeline. Without the project, Great Marsh Island will continue to erode. Restoring Great Marsh Island is both the least cost alternative for dredged material and also provides 53 acres of salt marsh restoration. This alternative provides incidental environmental benefits in addition to providing mitigation for the 8.15 acres of impacted by the training wall removal.



3. The Flow Improvement Channel (FIC) would be constructed to offset any adverse effects that would be caused by closing off the breakthrough of Great Marsh Island. If Great

Marsh Island is restored and the FIC is not built, then water quality is expected to be degraded within Chicopit Bay due to non-point source pollution loadings from the upstream watershed not being flushed out of the hydrological system. This would occur because the restoration would close off the recently formed channel through the eroded portion of Great Marsh Island, which now flushes the bay. The FIC would allow for improved water quality and environmental stability of the project area by potentially improving the flushing of sediment and other waterborne constituents into the adjacent Intracoastal Waterway. The construction of the FIC would also restore the historic channel through Chicopit Bay which has silted in with eroded material from Great Marsh Island. The FIC consists of dredging a channel 80 feet wide and 6 feet deep for a length of approximately 3620 feet through Western Chicopit Bay. Dredged material from the FIC would be placed back into the Great Marsh Island restoration area.

Relocation of the Mile Point training wall is the only alternative that provides for a redirection and reduction of the ebb flow currents from the Mile Point shoreline and allows for the St. Johns Bar Pilots to lift the restrictions to navigation.

**Figure 4: Recommended Plan Relocation (Reconfiguration) of the Mile Point Training Wall with Flow Improvement Channel**



**Environmental Operating Principles.** The U.S. Army Corps of Engineers-Environmental Operating Principles (EOPs) were considered during each step of the plan formulation process. Scoping letters were sent out in 2004 and 2008 to stakeholders soliciting views and comments regarding environmental and cultural resources, study objectives, and important features within the study area. A Notice of Availability for the Draft Integrated Feasibility Study and Environmental Assessment was mailed to interested parties on 07 July 2011. Copies of the draft report was made available in selected libraries within the study area and placed on the District website, along with other pertinent study documents. A public workshop was held on 15 August 2011. Taking into consideration the views expressed by all the stakeholders, and in conformity with the EOPs, the PDT selected a plan which provides the best balance of environmental sustainability and national economic development benefits.

## **Agency Technical Review / Independent External Peer Review.**

**ATR:** An external Agency Technical Review (ATR) was performed by a multi-disciplinary team consisting of technical staff from the USACE POH and SAM Districts. The ATR team membership and the scope of ATR work were coordinated with the USACE National Deep Draft Navigation Planning Center of Expertise (DDNPCX). In total, 14 comments were provided to SAJ, all comments were resolved.

In general, the ATR team found that the information presented in the report describing the plan formulation and evaluation supported the selection of the recommended plan. As stated in the ATR Certification, “The Agency Technical Review (ATR) for the Jacksonville Harbor (Mile Point) Final Feasibility Report and Environmental Assessment (FFR&EA), dated September 2011, was conducted from 21 September 2011 to 7 October 2011. Certification of Agency Technical Review is hereby certified.”

**IEPR:** Exclusion granted 23 September 2011.

## **EXPECTED PROJECT PERFORMANCE**

**Project Costs, Equivalent Annual Costs and Benefits.** The Recommended Plan, Relocation of the Mile Point Training wall, provides NED benefits from alleviating the navigation restrictions, incidental environmental benefits from restoring Great Marsh Island, and incidental erosion benefits from reducing the effects of the crosscurrents on the adjacent shoreline. The Recommended Plan has a benefit-to-cost ratio (BCR) of 1.4 with AAEQ Net Benefits of \$0.7 million. AAEQ Benefits equal \$2.44 million and AAAEQ Costs equal \$1.74 million. **Table 4** outlines the project costs.

Approximately 51.2 acres of land are under the control of the U.S. Navy. The U.S. Army Corps of Engineers will coordinate with the U.S. Navy for a license that will allow removal of the real property (uplands). Additionally, the Federal government has navigational servitude over submerged lands impacted by the proposed project. The non-Federal sponsor (Jacksonville Port Authority) owns lands in the vicinity of the proposed project, but those lands will not be impacted by the proposed project. The Nature Conservancy, Inc. owns lands in the vicinity of the proposed project that will not be negatively impacted. The Nature Conservancy, Inc. is familiar with the proposed project and has indicated their support for the project.

**Table 4: Cost Summary**

(October 1, 2011 Price Levels and FY12 discount rate)			
Cost Summary			
Relocation (Reconfiguration) + Flow Improvement VE-3B+FIC			
	Total Cost	Federal Share	Non-federal Share
<b>General Navigation Features</b>	20-45 ft.	75%	25%
Mobilization	\$2,378,000	\$1,783,000	\$594,000
Dredging and Disposal <sup>1</sup>	\$6,687,000	\$5,015,000	\$1,672,000
Turbidity and Endangered Species Monitoring	\$451,000	\$338,000	\$113,000
Bank Stabilization, Dikes & Jetties (Reconfigured Training Wall)	\$19,299,000	\$14,474,000	\$4,825,000
<b>Environmental Mitigation</b>	\$3,088,000	\$2,316,000	\$772,000
Salt Marsh Mitigation	\$1,592,000	\$1,194,000	\$398,000
Oyster Bed Mitigation	\$565,000	\$424,000	\$141,000
Biological Survey	\$488,000	\$366,000	\$122,000
Mitigation Monitoring	\$443,000	\$332,000	\$111,000
Planning, Engineering, and Design	\$2,087,000	\$1,565,000	\$522,000
Construction Management (S&I)	\$1,910,000	\$1,433,000	\$478,000
<b>Subtotal Construction of GNF</b>	\$35,900,000	\$26,924,000	\$8,976,000
Lands and Damages.	\$99,000	\$74,000	\$25,000
<b>Total Project First Costs</b>	\$35,999,000	\$26,998,000	\$9,001,000
Aids to Navigation <sup>2</sup>	\$431,000	\$431,000	\$0
Credit for non-Federal LERR <sup>3</sup>	-	\$13,000	(\$13,000)
10% GNF Non-Federal <sup>4</sup>	-	(\$3,590,000)	\$3,590,000
<b>Total Cost Allocation</b>	\$36,430,000	\$23,852,000	\$12,578,000
<b>AAEQ Benefits</b>			\$2,440,000
<b>AAEQ Costs</b>			\$1,737,000
<b>AAEQ Net Benefits</b>			\$703,000
<b>Benefit-to-Cost Ratio (BCR)</b>			1.40
1. Includes Pipeline Dredging Cost.			
2. Navigation Aids - 100% Federal			
3. Real Estate Costs: Credit is given for the incidental costs borne by the non-Federal sponsor for lands, easements, rights of way and relocations per Section 101 of WRDA 86. The Federal real estate acquisition/ incidental costs include the project real estate planning, review, and incidental (license) costs between the Navy and the USACE.			
4. The Non-Federal Sponsor shall pay an additional 10% of the costs of GNF, pursuant to Section 101 of WRDA 86. The value of LERR shall be credited toward the additional 10% payment.			

**Cost Sharing.** The Water Resources Development Act of 1986 (Public Law 99-662) as amended, specifies cost apportionment by project purpose for deep draft navigation projects. Federal participation in navigation projects is limited to sharing costs for design and construction of general navigation features (GNF) consisting of breakwaters and jetties, entrance and primary

access channels, widened channels, turning basins, anchorage areas, locks, and dredged material disposal areas with retaining dikes. Non-Federal interests are responsible for and bear all costs for acquisition of necessary lands, easements, rights-of-way and relocations; terminal facilities; and dredging berthing areas and interior access channels to those berthing areas.

Title I Section 101 of WRDA 1986 requires the project sponsor to bear a percentage share of harbor construction for project components that are cost shared (general navigation features, mitigation) that varies according to the range of water depths where work is to be done. That cost share is paid during construction.

For a commercial navigation project with project depths greater than 20 feet but not in excess of 45 feet, the non-Federal share for the construction is 25 percent. The percentage applies as well to mitigation and other work cost shared the same as general navigation features. Lands, easements, rights-of-way, and relocations (LERRs) are 100 percent non-Federal costs. Operation and maintenance of the general navigation features with a 100 percent commercial vessel navigation project are a 100 percent Federal responsibility. The cost share is paid during construction. The project sponsor will pay an additional amount equal to 10 percent of the total construction cost for general navigation features. This may be paid over a period not to exceed thirty years, and LERRs may be credited against it. **Table 4** summarizes the cost sharing percentages. **Table 5** shows the total cost sharing summary of the NED plan.

**Table 5: Cost Sharing**

Feature	Federal Cost % <sup>1</sup>	Non-Federal Cost % <sup>1</sup>
<b>General Nav. Features (GNF)</b>	<ul style="list-style-type: none"> <li>• 90% from 0' to 20'</li> <li>• 75% from 20' to 45'</li> <li>• 50% 46' and deeper</li> </ul>	<ul style="list-style-type: none"> <li>• 10% from 0' to 20'</li> <li>• 25% from 20' to 45'</li> <li>• 50% 46' and deeper</li> </ul>
GNF's costs for this project include: mobilization, all dredging costs, and all disposal area construction costs.		
<b>Navigation Aids</b>	<ul style="list-style-type: none"> <li>• 100%</li> </ul>	<ul style="list-style-type: none"> <li>• 0%</li> </ul>
<b>Operation and Maintenance</b>		
GNF	<ul style="list-style-type: none"> <li>• 100% except cost share 50% costs for maint. &gt; 45 feet</li> </ul>	<ul style="list-style-type: none"> <li>• 0% except cost share 50% for maint. &gt; 45 feet</li> </ul>
Mitigation	<ul style="list-style-type: none"> <li>• 75%</li> </ul>	<ul style="list-style-type: none"> <li>• 25%</li> </ul>
<small>(1) The Non-Federal Sponsor shall pay an additional 10% of the costs of GNF over a period of 30 years, at an interest rate determined pursuant to Section 106 of WRDA 86. The value of LERR shall be credited toward the additional 10% payment.</small>		

**Project Implementation.** The U. S. Army Corps of Engineers is responsible for budgeting for the Federal share of construction costs for all future work for Federal projects. Federal funding

is subject to budgetary constraints inherent in the formation of the national civil works budget for a given fiscal year. The USACE would perform the necessary preconstruction engineering and design needed prior to construction. The U.S. Army Corps of Engineers, as the responsible lead agency for the Jacksonville Harbor Navigation Project will coordinate with the U.S. Navy the license of impacted real property. Cost sharing will be in accordance with WRDA 1986, as amended, subject to the availability of appropriations and concurrence with the coastal zone consistency determination.

The non-Federal sponsor for the project is the Jacksonville Port Authority. Non-Federal sponsor is responsible for all costs for acquisition of necessary lands, easements, rights-of-way and relocations. Title I Section 101 of WRDA 1986 requires the project sponsor to bear a percentage share of harbor construction for project components that are cost shared (general navigation features, mitigation) that varies according to the range of water depths where work is to be done. That cost share is paid during construction. For a commercial navigation project with project depths greater than 20 feet but not in excess of 45 feet, the non-Federal share for the construction is 25 percent. Lands, easements, rights-of-way, and relocations (LERRs) are 100 percent non-Federal costs. Operation and maintenance of the general navigation features with a 100 percent commercial vessel navigation project are a 100 percent Federal responsibility. The project sponsor will also pay an additional amount equal to 10 percent of the total construction cost for general navigation features. This may be paid over a period not to exceed thirty years, and LERRs may be credited against it.

**Operation, Maintenance, Repair, Rehabilitation, and Replacement (OMRR&R).** Based on model investigations and current measurements, the resulting bottom current velocities from the relocated training wall legs and excavation and removal of a portion of the existing training wall and entire surrounding area to -13 feet MLW are of such magnitude to expect little deposition to occur in either of the channels. The Chicopit Bay Flow Improvement Channel is also not expected to require maintenance dredging. Prior to the breakthrough of Great Marsh Island, a natural channel existed in the same location as the proposed Flow Improvement Channel. The historical maps on **Figures 8-10** of the main report show water depths up to 10 feet due to tidal flushing of Chicopit Bay, as well as freshwater runoff from the neighboring creeks. Once Great Marsh Island is restored, the water from Greenfield and Mount Pleasant Creeks, as well as the large volume of water within Chicopit Bay's tidal prism, will flush in and out through the Flow Improvement Channel. It is reasonable to expect the water velocities in the channel to be sufficient to prevent shoaling within the channel.

Numerical hydrodynamic modeling of the proposed channel improvements and recommended features for the Mile Point project shows changes to current vectors (velocities and direction) under flood and ebb tide. Numerical modeling results indicate that the dangerous crosscurrents exiting the IWW southern channel under ebb tide will be redirected to more closely parallel the alignment of the Federal navigation channel instead of being focused toward the erosion prone areas along the northern shoreline of Mile Point, thus reducing the effects of the crosscurrents on the erosion of the Mile Point shoreline.

There is a 5 year monitoring plan included in the Mitigation Plan that will monitor the Great Marsh Island restoration and the Flow Improvement Channel.

**Key Social and Environmental Factors.** The recommended plan would impact 8.15 acres of salt marsh at Helen Cooper Floyd Park. Mitigation to offset this loss would be performed by restoring 18.84 acres of salt marsh which historically occurred at nearby Great Marsh Island. As a beneficial use of dredged material, the USACE will attempt to restore the entire eroded breakthrough at the island, up to 53 acres of marsh, providing a significantly higher increase of salt marsh acreage. It is recommended to plant the entire restoration area (up to 53 acres) with spartina alterniflora on 3-foot centers. A monitoring plan is in place to monitor the restoration of Great Marsh Island and the Flow Improvement Channel up to 5 years.

**Stakeholder Perspectives and Differences.** Stakeholders such as non-governmental organizations and the public were given the opportunity to attend and provide their views at a public workshop. In addition to the public workshop two scoping letters were sent out; dated 4 August 2004 and 31 March 2008. Stakeholders and interested parties have also been provided the opportunity to voice their comments, concerns, and issues during the Public Comment period for the Draft Integrated Feasibility Report and Environmental Assessment. The majority of comments were positive and supportive of the recommendations of the selected plan. The key concerns were involving the Flow Improvement Channel in relation to recreational boating access and water quality. Monitoring the water quality of the FIC for up to 5 years has been added to the Mitigation Plan, which already has a 5 year monitoring plan for the restoration of Great Marsh Island.

**Environmental Compliance.** The NEPA document for this project is an EA. The Draft EA was coordinated with the Draft Feasibility Report as an integrated document. All public comments were incorporated into the Final EA. A Draft FONSI has been included in the report submittal package.

**Certification of Peer, Agency, Cost and Legal Review.**

IEPR Certification	Exclusion Granted 23 September 2011
ATR Certification	11 October 2011
Cost Certification	29 March 2011
Legal Review Certification	4 October 2011