

FLORIDA INLAND NAVIGATION DISTRICT BROWARD COUNTY DEEPENING PROJECT DREDGING CHALLENGES: PERMITTING THE DREDGING OF THE INTRACOASTAL WATERWAY, DANIA CUTOFF CANAL, AND THE NEW RIVER IN BROWARD COUNTY

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ABSTRACT

Since 2005, the Florida Inland Navigation District (FIND), local sponsor for the 650.2 km (404 mi) federally authorized Florida Atlantic Intracoastal Waterway (ICWW) and 157.7 km (98 mi) of the Okeechobee Waterway (OWW), has embarked on a plan to dredge portions of the ICWW, Dania Cutoff Canal (DCC), and the New River in Broward County. The three dredging areas, which span roughly 18.7 km (11.6 mi) of channel, have encountered vastly different permitting and construction-related constraints. These constraints stem from local, state, and federal regulations due to increased awareness of environmental and navigation issues. Agencies seeking to protect the environment or to justify expenditure of public money have made securing dredging permits increasingly difficult and expensive, especially in Florida's high growth and urbanized southeastern corridor.

Major permitting challenges associated with these three dredging areas stem from (1) removing nearly 677,396 m³ (864,000 cy) of limestone, sand, and fine sediments; (2) adjusting for significant navigation restrictions due to natural channels and existing infrastructure; (3) avoiding hard coral and submerged aquatic vegetation, specifically *Halophila johnsonii* *Eiseman* (Johnson's seagrass) impacts; and (4) coordinating permit modifications based on the selected contractor's dredging method. Challenges associated with the contractor's dredging method include the efficient dewatering of sediments removed mechanically via an environmental clamshell bucket and the discharge of effluent from the dredged material management area (DMMA). In addition to these major challenges, the designated DMMA — a roughly 24,281 m² (6.0 ac) site (located on the Port Everglades property) — comes with an array of sediment quality and dewatering concerns.

While feasibility investigations and permitting processes for these dredging areas began at roughly the same time, to date only the DCC dredging area has received permits and progressed to the contracting phase. Taylor Engineering has since applied for and received a permit modification for the DCC project based on the selected contractor's revised dewatering plan. The FIND anticipates construction of the DCC dredging area to begin by early 2012. Efforts to permit the ICWW and New River dredging areas continue.

Keywords: Dredged material management, seagrass, channel design, environmental regulation, dewatering

INTRODUCTION

To appreciate fully the current permitting environment requires an understanding of the wide-open and unregulated 132-year history of dredging in the ICWW channel. After all, those were the days when the Florida Legislature authorized entrepreneurs to "Drain the Everglades" and the Florida Legislature made great efforts to do just that.

However, with the continuous passage of more stringent environmental legislation, the working landscape of the FIND has changed dramatically. To give this modest evolution in our understanding of the environmental consequences degrading wetlands and creating spoil islands some perspective requires a longer, more textured backdrop, which begins with the original creation of the 650.2 km (404 mi) long ICWW.

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The ICWW, a continuous and connected system of sheltered inland channels, provides a conduit for commercial barge and pleasure boat traffic along Florida's east coast. The entire Atlantic Intracoastal Waterway extends nearly 2,414 (1,500 mi) between Trenton, New Jersey, on the Delaware River and Miami, Florida. Channel depths range between 3.05 m (10 ft) and 3.66 (12 ft) at mean low water (MLW); channel bottom widths span 27.43 m (90 ft) or more. The route includes deep draft ship channels on the Delaware River, the Chesapeake and Delaware Canal, and Chesapeake Bay to Norfolk, Virginia. South from Norfolk, the maintained waterway extends to depths of 3.66 (12 ft) MLW and traverses natural sounds, bays, rivers and man-made cuts through coastal Virginia, North Carolina, South Carolina, Georgia, and Florida.

In Florida, the ICWW follows coastal rivers and lagoons through the resorts of Jacksonville Beach, St. Augustine, and Daytona Beach, close by the John F. Kennedy Space Center in Cape Canaveral, and through the cities of Cocoa, Melbourne, Vera Beach, Fort Pierce, Stuart, Palm Beach, Fort Lauderdale, and many other southeastern Florida cities to Miami Beach and Miami.

Construction of the ICWW was the natural outgrowth of a desire to connect the chain of rivers, lakes, and lagoons along Florida's east coast into a continuous navigable waterway. However, the ICWW is an extremely diverse system with equally diverse maintenance requirements. Near St. Augustine, 35.41 km (22 mi) of waterway traverse open and naturally deep water that has never required maintenance. In Flagler County, 4.83 km (3 mi) of channel traverse a variety of environs, from a solid rock channel bed to salt marsh estuaries several miles wide to shallow coastal lagoons and lakes, and finally to man-made cuts through high and dry upland.

The Florida East Coast Canal Company conducted the original construction under an 1874 Florida Statute, which provided grants of land to railroad and canal companies. Actual construction began in 1881 on a channel, which provided a 15.24 m (50 ft) wide (bottom width) channel with a depth of 1.53 m (5 ft) at mean lower low water (MLLW) extending from Jacksonville to Miami. Work ended in 1912 but with the dimensions of the channel never fully attained. Channel maintenance was rare. The tolls charged for passage on the ICWW never covered operating costs. In 1923, the Florida East Coast Canal Company went into receivership, even in the absence of environmental restraints to impede construction operations. At the time, the canal company just removed the sand and silt from the channel and dropped it in the nearest convenient place, usually in the water adjacent to the channel.

Soon after the canal company failure, the Chambers of Commerce of the Florida east coast united to promote legislation for the improvement and maintenance of the waterway as a federal responsibility. In 1927, due to this local interest and feasibility surveys by the U.S. Army Corps of Engineers (USACE), Congress passed the Rivers and Harbors Act that authorized the ICWW as a federal project.

The Florida Legislature created the Florida Inland Navigation District (FIND) in May 1927 as a special taxing district consisting of the 11 east coast counties from Duval to Dade. The enacting statute provided for a board of 11 commissioners (now 12, with the addition of Nassau County to FIND's purview in 2004), one from each county, and gave FIND executive powers to comply with the stipulations of the Congressional legislation authorizing the ICWW from Jacksonville to Miami. After World War II, Congress authorized a deeper and wider channel. Since 1965, the ICWW generally has a constructed width of 38.1 m (125 ft) and a depth of 3.66 (12 ft) at MLW south to Fort Pierce and thence a 3.05 m (10 ft) MLW depth south to Miami.

In its role as a special taxing district, the FIND became the sponsoring agency to cooperate with the federal government and to provide rights-of-way, disposal areas, and to alter bridges, cables, pipelines, and other structures in the right-of-way as required by navigation. The Jacksonville District USACE constructed Florida's portion of the ICWW and maintains the federal channel in cooperation with the FIND. In these respects, the FIND is a unique entity: No other state has a separate agency that raises tax money to help the USACE manage the Atlantic Intracoastal Waterway.

The ICWW requires continued maintenance dredging to provide the prescribed project depths for those commercial and recreational interests. Moreover, dredging the ICWW means the FIND must identify acceptable sites on which to dispose the dredged material. In the mid-1970s, new environmental laws and regulations came into being that forever changed the ICWW dredging practices. Dredging contractors could no longer pump the dredge slurry out a pipe or mechanically dump the dredged material into adjacent waters. These new laws expanded the FIND's need to acquire additional upland properties appropriate for the design and construction of dredged material management sites. The operative word, "appropriate," subsumes the notion that regulatory agencies would have a commanding voice in the permitting of these activities.

This backdrop brings us to within the realm of current environmental and construction regulations. This realm, and the FIND's understanding of its implications, explains Taylor Engineering's role with this state agency. The FIND realized that to fulfill its mission, it required the services of an engineer with the foresight to look long-range at the USACE's inevitable requirement to build agency-approved facilities to contain dredged material that, until a few years before, it could dispose in open waters, the ocean, or wetlands.

Since 1986, Taylor Engineering, Inc. has worked with the FIND, the local sponsor of ICWW and the 157.7 km (98 mi) east coast section of the Okeechobee Waterway (OWW), to prepare and implement long-term dredged material management plans for 807.9 km (502 mi) of federal navigation channel. This work has required close coordination with the USACE, federal, state, and local permitting agencies, local governments and, through numerous public workshops, local citizens' groups. In 1997, FIND demonstrated its satisfaction with the company's work quality by retaining company CEO, Dr. R. Bruce Taylor, P.E. as its District Engineer.

While the FIND's efforts include navigation planning, channel design, and dredging engineering, the primary program objective is to locate, obtain, design, and permit diked dredged material management sites capable of handling projected 50-year maintenance dredging requirements in 12 Florida counties. During this effort, Taylor Engineering has designed, permitted, and performed construction administration for dikes in both coastal and inland areas. In total, the company has undertaken the role of engineer in more than 50 dredged material management projects along Florida's east coast.

PROJECT OBJECTIVES AND STRATEGY

As noted, the Broward County Deepening Project (the Project) comprises three dredging areas have encountered vastly different permitting and construction-related constraints. These constraints stem from local, state, and federal regulations due to increased awareness of environmental and navigation issues. Agencies seeking to protect the environment have made securing dredging permits increasingly difficult and expensive, especially in Florida's high growth and urbanized southeastern corridor.

With these challenges in mind, the FIND developed separate objectives and a corresponding strategy to meet objectives for each area. In general, the FIND and Taylor Engineering take great care to integrate their projects with the natural environment. Taylor Engineering has significant experience with the full range of environmental issues commonly encountered during coastal, marine, and waterfront projects including environmental permitting (federal, state, and local), submerged land lease issues, habitat and impact assessment, mitigation design and long-term monitoring, and field data collection and analysis. Most of Taylor Engineering's water resource projects have required environmental investigations and assessments, environmental permitting, and coordination with state and federal environmental and regulatory agencies. Taylor Engineering has a clear understanding of permitting issues involved and, over the years, Taylor Engineering has developed valuable professional relationships with federal, state, and local regulatory agencies.

To secure permits in the current regulatory climate, the Taylor Engineering project manager along with the FIND Executive Director, David Roach first develop a project strategy that includes careful and specific resolution of the each technical issue and development of public support. Part of this strategy involves transformation of negative agency perceptions associated with dredging projects. Successful dealings with regulatory agencies and stakeholders depends on transparency and close cooperation between all team members — in the case of the Broward County Deepening Project, these members included FIND administration and the FIND Board of Commissioners, Taylor Engineering and its subcontractors, Port Everglades (the DMMA entity), and finally the dredging contractor.

Technical issue resolution focuses on answering agency questions and anticipating other related concerns to produce a channel engineering design that minimize initial and maintenance dredging, environmental impacts, and required mitigation. The conceptual alternatives analysis for channel design considered

- channel footprint and dredge volume
- benefit of the proposed design on local marine industries and recreational boaters
- dredge spoil disposal alternatives
- seagrass and hard coral impacts – direct and indirect
- other impacts to smalltooth sawfish, manatees, and state and county parks

The strategy also includes significant agency involvement in the development of the plans, coordination of state and federal agency efforts to maintain consistency of project understanding, and efforts to explore every avenue identified by the agencies to solve permitting issues. We identify to the agencies the approach we intend to take and what analyses we intended to conduct to support that approach. The agencies reviews draft results of all products, and subsequent discussions further clarify their concerns. To shorten the review process, revisions to analyses and reports follow only after both written and verbal communications occur.

We also altered the typical permit agency-permit applicant relationship, in which consultants provide the primary interactions with agency staffs, present and defend a proposed project design in an often-adversarial process. The applicant became a major player in the permit application process. The FIND director focused on developing positive relationships with specific members of the involved regulatory community, and serving as a strong link to his commission and the involved public. He provided invaluable leadership and support during permit application negotiations. On occasion, a FIND board member would also participate in discussions. Working closely with the FIND Executive Director, the Taylor Engineering project manager provided support for this relationship-building effort while the FIND Executive Director managed overall project relations with state and federal agencies. He made sure that the agencies became familiar with the abilities of the key team members, remained aware of project activities and schedules, and ensured that agency questions (formal and informal) received timely and appropriate responses. As necessary and appropriate, specific experts worked directly with agency experts to resolve technical issues. These ongoing contacts, a series of meetings, and several field trips provided agency staffs the opportunity to provide positive input to the project. As a net result, the Project met engineering and scientific criteria as well as regulatory standards and public approval.

TECHNICAL ANALYSES: THE FOUNDATION OF PROJECT DESIGN

Our focus now returns to the specific permitting and construction challenges associated with three Broward County Deepening dredging areas. As noted above, the three dredging areas include portions of the ICWW, DCC, and the New River in Broward County (see Figure 1). The three dredging areas span roughly 18.7 channel km (11.6 mi) and account for removing nearly 677,396 m³ (864,000 cy) of limestone, sand, and fine sediments.

A long-term series of bathymetric surveys and aerials collected from the dredging areas, coupled with results of previous dredging projects within the general project area, provided engineers with a basic understanding of the physical processes at work in the project area. Existing seagrass, hard coral, and mangrove data also provided a basis for quantifying channel alternatives. Disposal options considered possible disposal locations, required equipment to reach each location, and environmental impacts associated with those alternatives.

The project team knew that state and federal regulatory agencies are sensitive to the public benefits of and support for (or opposition to) the projects they permit. The FIND knew that the boating public and the marine industry already supported the channel-deepening project. However, the FIND had never developed a record of this support for submission to the agencies. To document this support, the project team developed and implemented a survey of local marine industries. Survey results provided a measure of the degree the local industries help boaters and repair boats damaged on the shoals as well as the industry opinions concerning the benefits of a channel through the shoals. The FIND enlisted the local recreational boaters' association to develop a petition supporting the project. All these documents became part of the public record. The combination of these efforts provided regulatory agency staff with written evidence that positive agency recommendations would receive public support.

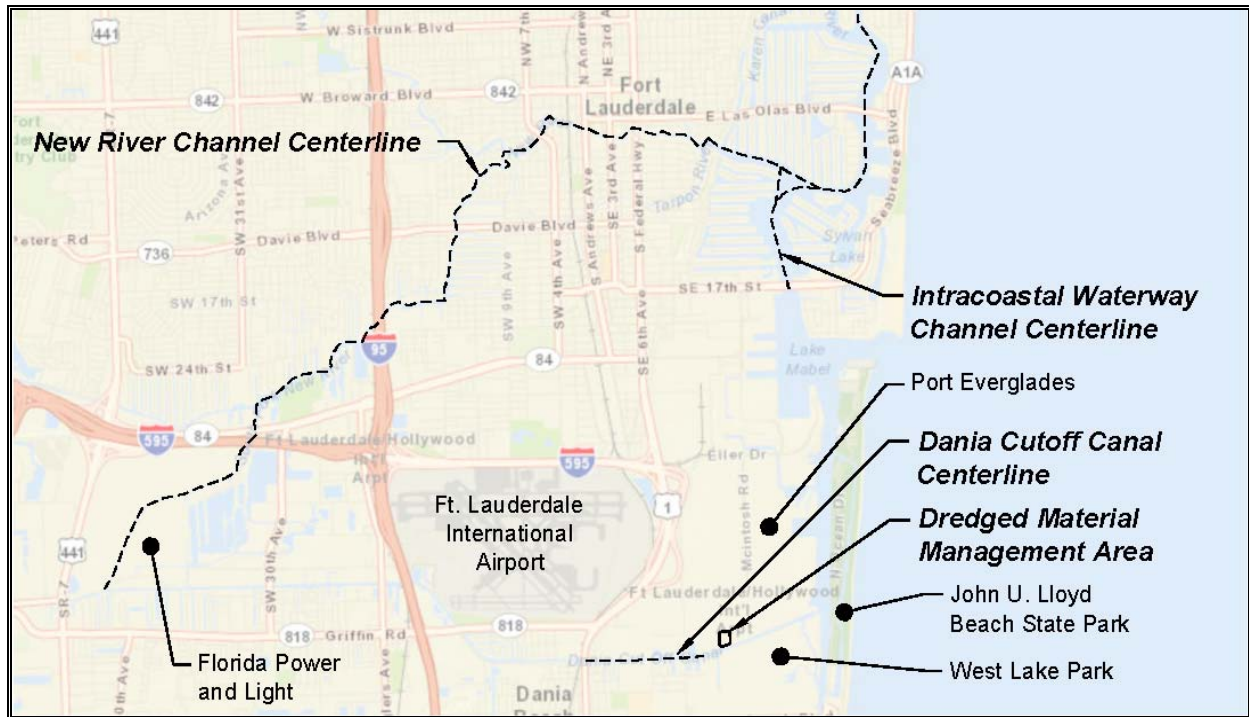


Figure 1. Broward County deepening project overview.

Once Taylor Engineering had identified an initial set of issues based on the above analysis, preliminary discussions with federal, state, and local agencies further narrowed the options to solve each of the issues. Before initiating the formal permitting process for any dredging project, Taylor Engineering generally conducts extensive field investigations to understand the agency concerns and shape the project design. Typically, these field investigations include

- a detailed hydrographic survey
- sub-bottom profile survey or investigation
- subsurface geotechnical investigations (core borings)
- physical and sediment chemistry analysis
- natural resources information review

For the Broward County Deepening project, Taylor Engineering used the results of the technical efforts to narrow solutions down to the final plan:

- Careful and detailed description of the seagrass beds and hard corals became the prime focus of the fieldwork. The channel routes identified sought the “zero direct impact” and “best navigation” case
- Sediment modeling demonstrated that the new channel templates would not cause additional shoal erosion or require frequent / regular maintenance dredging
- Sediment quality and chemical testing results and subsequently the monitoring producers prescribed for the actual dredging confirmed that the FIND’s proposed dredging and dredged material handling methods would not pose a hazard to the environment through sedimentation (turbidity) or the dewatering of the dredged material (discharge from the DMMA)
- Taylor Engineering and the FIND established a construction administration processes to include immediate (same-day) problem evaluation, resolution, and recording; data recording of daily monitoring results; and weekly management meetings

Specifically for the DCC, Taylor Engineering used

- the Environmental Fluid Dynamics Code to develop a hydrodynamic water quality model. Model results demonstrated that the proposed channel design would not significantly change area temperature, salinity, turbidity, total suspended solids conditions, or water residence times (flushing behaviors).

- a comprehensive multifaceted contingency mitigation plan with seagrass restoration, public education, and water quality improvement components satisfied state and federal mitigation objectives for the project and the dredging area

PROJECT DESCRIPTION AND LOCATION

The sections that follow describe the three dredging areas and the DMMA. As a word of note, the entire Broward County deepening project will require mechanical dredging due to the large quantity of limestone, estimated at nearly 412,860 m³ (540,000 cy), and the need to use Port Everglades as an offloading site. The designated DMMA is a roughly 24,281 m² (6.0 ac) site located on the Port Everglades property (see Figure 1). Currently, two potential locations are available for final disposal — Waste Management, Inc. of Florida located in Pompano Beach and the Tutor Perini Marine jobsite located at the Ft. Lauderdale airport.

New River

The New River dredging area begins at the confluence of New River and the ICWW. The dredging area extends approximately 12.71 km (7.9 mi) past Tarpon Bend (the convergence of the New River and Tarpon River) upstream along the South Fork of the New River to the junction of the New River and the Dania Cutoff Canal near the Florida Power and Light (FP&L) power plant. The proposed project incorporates a 2.09-km (1.3-mi) long section of federally authorized channel in the New River. The design template for the present authorized federal channel, which connects the project to the ICWW, provides a 30.48 m (100 ft) wide (bottom width) channel with a depth of 2.44 m (8 ft) at MLLW. The recommended dredge template (-4.27 m (-14 ft) MLW depth, 30.48 m (100 ft) wide channel bottom where possible, and channel wideners as needed for safe navigation) translates into 366,986 cubic m³ (480,000 cy) of required dredging. In addition to natural resources issues, the dredge template reflects a compromise between navigational requirements and existing obstructions to navigation — specifically, overcoming the depth restriction imposed by Henry E. Kinney Tunnel along US Highway 1, which passes under the New River. Currently this portion (dredging area) of the Broward County Deepening project remains in the feasibility stage.

Atlantic Intracoastal Waterway

The ICWW deepening dredging area extends nearly 4.51 km (2.8 mi). The project begins at the 17th Causeway Bridge over the ICWW (approximately Cut BW-49, Station 26+50 of the ICWW) just north of the Port Everglades Northport Garage and Convention Center northward to a point about 1,219.2 m (4,000 ft) north of the Las Olas Boulevard (State Road 842) Bridge (Cut BW-37, Station 0+00 of the ICWW). Current project depths within the ICWW deepening project channel range from -3.05 m (-10 ft) to -7.92 m (-26 ft) MLW. The proposed deepening project calls for a dredging depth of -5.18 m (-17 ft) MLW or a project depth of -4.57 m (-15 ft) MLW with 0.61 m (2 ft) of overdredging. At its greatest width, the channel will maintain an authorized main channel bottom with of 38.1 m (125 ft) and up to nearly 22.86 m (75 ft) of authorized wideners over the existing federally maintained ICWW channel (see Figure 2).

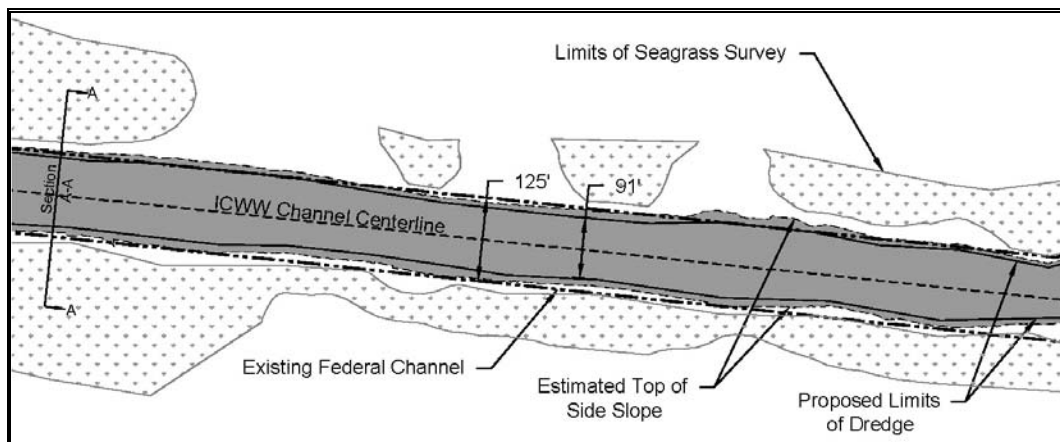


Figure 2. Intracoastal waterway dredging template and natural resources mapping.

To avoid hard coral and seagrass, the FIND has reduced the channel bottom width to less than 22.86 m (75 ft) in some areas. However, the average bottom width of the channel will span nearly 33.53 m (110 ft) (see Figure 3). The recommended dredging template volume, 216,369 m³ (283,000 cy) of required dredging, reflects a compromise between navigational requirements and existing natural resources — specifically, the avoidance of seagrasses and hard corals.

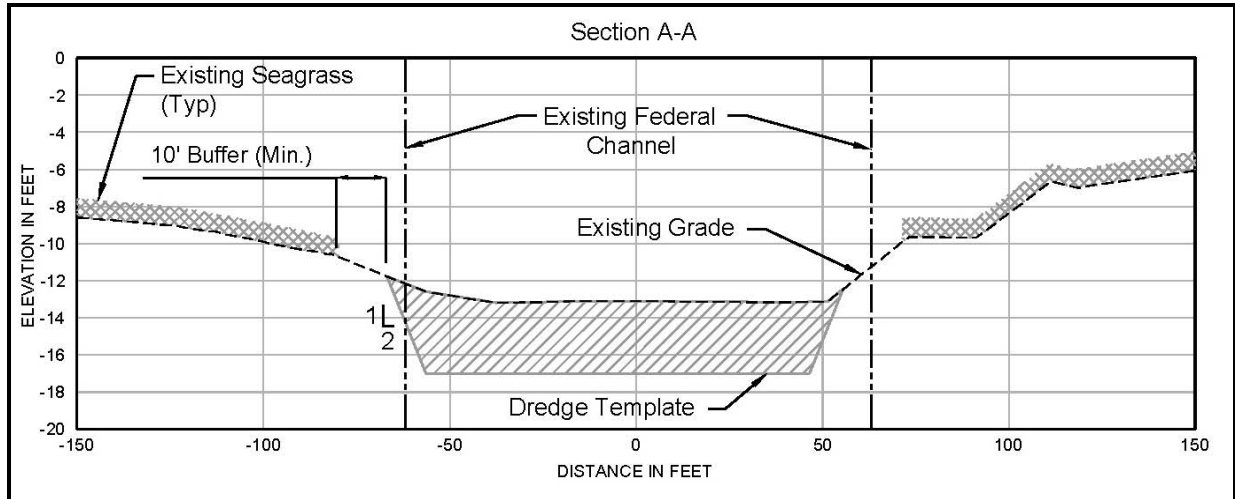


Figure 3. Intracoastal waterway dredging template cross section.

The FIND has received an Environmental Resource Permit (ERP) to deepen the ICWW from the Florida Department of Environmental Protection (FDEP) and is currently consulting with the USACE and Broward County Environmental Protection and Growth Management Department over contingency mitigation issues. The FIND anticipates receiving permits from these permitting agencies by the summer of 2012.

Dania Cutoff Canal

The DCC dredging area begins at the southwestern end of Port Everglades near the Ports expansion of the Southport Intermodal Complex and extends westward approximately 1.45 km (0.9 mi) to the canal’s intersection with US Highway 1. The proposed channel width varies from 42.67 m (140 ft) near Port Everglades to 17.07 m (56 ft) near the US Highway 1 Bridge. The channel has a dredging depth of -5.18 m (-17 ft) MLW (project depth of -4.57 m (-15 ft) MLW and 0.61 m (2 ft) of overdredging) until approximately Station 45+00. The channel width then ascends at a 1 vertical to 20 horizontal slope to meet existing grade at approximately Station 47+00 -2.44 m (-8 ft) MLW to avoid erosion and scour issues at the base of the US Highway 1 Bridge piers. The final dredging template volume, 77,984 m³ (102,000 cy) of required dredging, reflects a compromise between navigational requirements, natural resources, and existing structures. Specifically, the dredge template avoids impacts to the shallow mangrove shoreline, and compensates for the US Highway 1 Bridge and existing facilities.

The FIND has received permits to deepen the DCC from all three regulatory agencies (FDEP, USACE, and the Broward County Environmental Protection and Growth Management Department). Each permit establishes proper handling measures for the mixture of limestone, sand, and fine sediments within the dredging template; accounts for significant navigation restrictions due to natural channels and existing infrastructure; avoids natural resources; and specifies the selected contractor’s dredging method (approved via permit modifications). The permit modifications include the efficient dewatering of sediments removed mechanically via an environmental clamshell bucket and the discharge of effluent from DMMA, which comes with an array of sediment quality and dewatering requirements.

DANIA CUTOFF CANAL PROJECT DESIGN: DREDGED MATERIAL MANAGEMENT

The DCC permit establishes proper handling measures for the mixture of limestone, sand, and fine sediments within the dredging template. Taylor Engineering and the FIND established the proscribed dredging and dewatering methods through the same proactive and cooperative permitting method with significant input from Port Everglades environmental and administrative staff and the selected dredging contractor.

As authorized in the modified FDEP DCC permits for the project, the contractor will load dredged material from the bottom of the DCC into barges for transport via push boats to the DMMA. The contractor will tie the loaded material barges alongside an equipment barge with a backhoe excavator fitted with a hydraulic clamshell bucket. In addition to the backhoe, the contractor will employ a 36-in.-wide belt conveyor situated on the deck of the equipment barge. The belt conveyor will allow the contractor to span over the mangroves along the shoreline of the DMMA and extend over the southern dike of the DMMA.

With the loaded material barge secured alongside the equipment barge, the contractor will use the backhoe with the hydraulic clamshell bucket to excavate dredged material from the material barge into a steel hopper that will feed the conveyor.

The conveyor will discharge the material into the “material settling pond” subdivision. Once the material begins to build up under the conveyor discharge point, a front-end loader will move the material within the material settling pond area for initial dewatering and then into the “stockpile area” to the north for final draining and loading onto sealed dump trucks. The contractor will employ the described process of all dredged material.

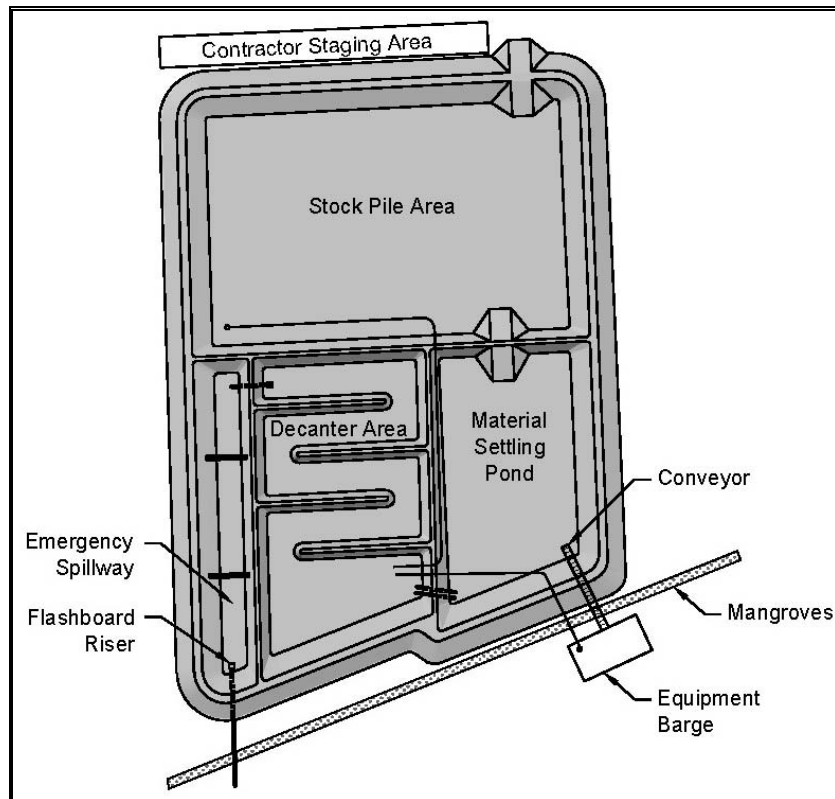


Figure 4. Dredged material management area layout.

Water that collects in the material settling pond will gravity feed to two corrugated metal pipe flashboard weir risers connected to two 0.762 m (30 in) corrugated metal pipes that will discharge into the “decanter area.” As depicted in the DMMA layout drawing (Figure 4), the DMMA design will allow suspended sediments to settle out of the water column by slowing the flow rate through the decanter via interior baffle berms. Water will travel via conveyor from the decanter area through an elevated drain consisting of a single 0.762 m (30 in) corrugated metal pipe and across two trip dams for final discharge into the DCC via an elevated drain/riser structure and a single 0.762 m (30 in), corrugated metal pipe. Results of a detailed mangrove resources survey dictated the placement of the overflow structure (Figure 5).

The DMMA design calls for the DMMA to collect stormwater. The contractor will control stormwater by using a riser structure with adjustable riser boards. The contractor can raise the riser by adding boards as necessary to raise

the elevation of discharge yet still allow overflow during a major storm event. After a rain event, the contractor will remove the riser boards one at a time to allow water to weep out slowly into the DCC (within the area protected by a floating turbidity barrier). This process will give sediment time to settle and thus prevent avoid excessive turbidity.

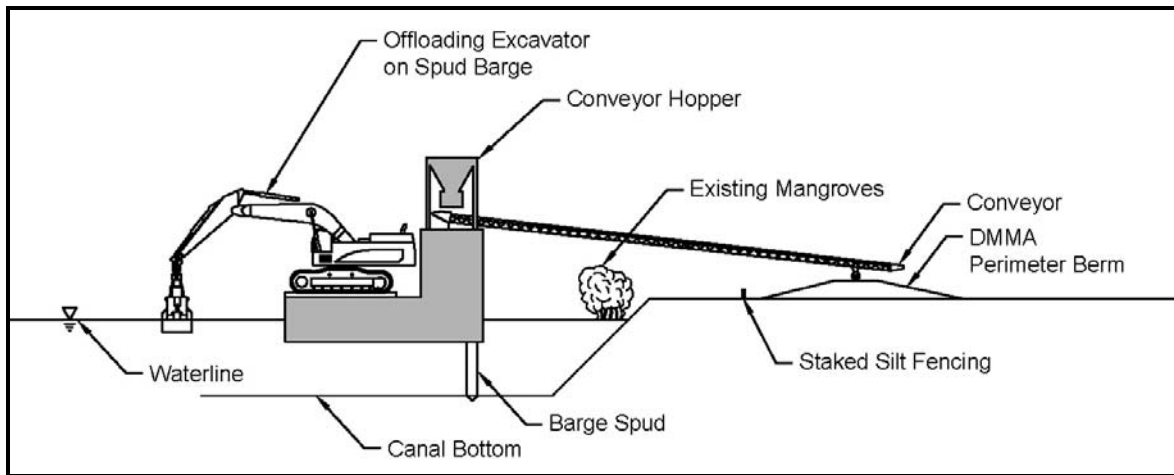


Figure 5. DMMA equipment barge cross-section.

The contractor will pump any standing water in the watertight material barges directly into the decanter area. Any other wet material that comes off the conveyor will work its way from the material settling pond to the decanter area. In conformance with FDEP permit modification, before allowing initial discharge of water from the DMMA, the contractor will collect and test water samples adjacent to the DMMA and background DCC samples for testing by a certified lab for the identified contaminants. The contractor will also collect and test turbidity samples for compliance. Once the contractor has obtained passing test results, discharge will begin.

Dump trucks dredge will haul material that the contractor has relocated into the stockpile area in the northern portion of the DMMA. Pumps will convey any remaining water collected in this area to the decanter area for final settling.

SUMMARY

As part of its mission as the local sponsor of the federally authorized Florida Atlantic Intracoastal Waterway (ICWW) and the east coast section of the Okeechobee Waterway (OWW), the Florida Inland Navigation District (FIND) is seeking to dredge portions of the ICWW, DCC, and the New River in Broward County. While permitting the Broward County Deepening Project, the FIND and Taylor Engineering, Inc. have encountered vastly different permitting and construction-related constraints. The bulleted items below summarize the key facts and lesson learned in this paper.

- An analysis of the 132-year history of the dredging of the ICWW reveals a dramatic change in the legislative viewpoint of large-scale dredging projects. The canal began with the Florida Legislature's sponsoring a private company canal development by authorized the Florida Cabinet to grant to the canal company thousands of acres of state land for every mile of canal constructed and further gave the company the right to collect tolls, all without any environmental restraints to impede construction operations.
- The 85-year old history of the FIND as a special taxing district is unique. Florida is the only state that has a separate agency that raises tax money to help the USACE manage the Atlantic Intracoastal Waterway. Despite its unique role, the FIND must still develop dredging plans that meet the regulatory agencies requirements. Developing and successfully executing a deepening project in the highly regulated permitting climate requires a high degree of cooperative effort and persistence in the resolution of what may appear initially as intractable problems and extremely protective public policy positions.

- New environmental laws and regulations established since the mid-1970s expanded the FIND's need to acquire additional upland properties appropriate for the design and construction of dredged material management sites.
- This shift in federal, state, and local permitting constraints has allowed regulatory agencies to command a greater voice in the permitting of dredging projects. Ultimately leading the FIND to realize that to fulfill its mission, it required the services of an engineer with the foresight to look long-range at the USACE's inevitable requirement to build agency-approved facilities to contain dredged material.
- The FIND's primary program objective is to locate, obtain, design, and permit diked dredged material management sites capable of handling projected 50-year maintenance dredging requirements in 12 Florida counties. However, those efforts now also include navigation planning, channel design, and dredging engineering along with dredged material management.
- Securing federal, state, and local dredging permits has become increasingly difficult and expensive, especially in Florida's high growth and urbanized southeastern corridor
- To secure permits in the current regulatory climate, the Taylor Engineering and the FIND first develop a project strategy that includes careful and specific resolution of the each technical issue, and development of public support. In the case of the Broward County Deepening Project, while the current permitting climate has made securing dredging permits increasingly difficult and expensive, the FIND has found success through close cooperation between all of the team members: the FIND administration and the FIND Board of Commissioners, the selected dredging contractor, the project engineer, and subcontractors. Ensuring dredging and dredged material handling methods would not pose a hazard to the environment through sedimentation or the dewatering of the dredged material required working closely with Port Everglades and the dredging contractor.
- Because the FIND understands that these regulations are rooted in the regulatory agencies duty to protect the environment or to justify expenditure of public money, the FIND has adopted a proactive project strategy. This strategy includes careful and specific resolution of the technical issues, development of public support, and transformation of negative agency perceptions associated with dredging projects.
- Broward County Deepening Project permitting and construction-related constraints range from dealing with large quantities of varying materials (limestone, sand, and fine sediments) to significant infrastructure obstacles, including several bridges on the New River and DCC and the Henry E. Kinney Tunnel along US Highway 1
- The FIND developed a record of support from the boating public and the marine industry for the channel-deepening project. These efforts provided regulatory agency staff with written evidence that positive agency recommendations would receive public support. Although, demonstration of public understanding and support does not alter the permitting requirements, it increases the projects visibility. With increased visibility allows the reviewer to see the project in a larger context that includes but goes beyond regulatory limits.
- The FIND, as the managing partner of the Broward County Deepening Project, will provide most of the project funding. Broward County and the City of Dania Beach are each funding partners. In addition, Port Everglades has provided the property for the DMMA. The FIND estimates that the DCC portion of the project alone will increase marine economic output by the addition 24 to 38 new jobs and \$3.6 to \$9.2 million per year into the local economies. The FIND strongly believes these economic benefits justify the DCC construction cost of roughly \$7.1 million.

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