

LAN 06-1.13

January 29, 2002

Mr. David K. Roach
 Florida Inland Navigation District
 1314 Marcinski Rd.
 Jupiter, FL 33477

RE: Update and Revision to the Phase II Site Documentation for Site DU-3 & 4 and MSA 300E
 (DU-20)

INVOICE

Invoice No.:	3600	Service Through:	January 27, 2002
Project No.:	C1986-010-05	Contract Amount:	\$ 70,701.00
Terms:	Net upon receipt	Billed To Date:	\$ 65,535.37
Federal ID No.:	59-2850478	Contract Balance:	\$ 5,165.63
Work Order No.:	01-02	Unbilled Retainage:	\$ 3,276.76

Engineering Services Performed According to Percentage Completion Schedule:

Contract Amount	\$ 70,701.00
Percent Complete	92.69 %
<hr style="width: 50%; margin-left: auto; margin-right: 0;"/>	
Total Fee Earned	\$ 65,535.37
Amount Previously Billed	56,130.73
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Invoice Subtotal	\$ 9,404.64
Less: 5.00% Retainage	470.23
<hr style="width: 50%; margin-left: auto; margin-right: 0;"/>	
TOTAL DUE NOW	\$ 8,934.41

Summary of Work Performed (See attached)

Please Remit to:

Taylor Engineering, Inc.
 9000 Cypress Green Drive
 Suite 200
 Jacksonville, FL 32256

For billing questions, please call
 Laura at 352/394-0741.

**Phase II Document Revision, Sites DU-3&4/MSA 300E, Duval County
Summary of Work Performed**

January 2002

Taylor Engineering staff first met on site with Mr. Gary Ellis of Gulf Archaeology Research Institute as he and his staff flagged the archaeological site's boundaries, immediately followed by a survey crew to locate the flagging and tie the archeological boundaries to the overall site boundary. We later received a draft copy of the site's boundary survey, including the boundaries of the archeological site, compared the surveyed boundary with the earlier sketches of the site included in the archeological report, and discussed with the archeologist discrepancies between the two depictions of the archeological site. Notably, the surveyed site boundaries appear less restrictive to FIND's intended use of the site than the archeologist's earlier sketches. On September 18th, following completion of fieldwork for the contracted boundary and topographic surveys, we received a draft version of the completed survey. The draft survey remains under review until we have completed the redesign of the combined sites.

Earlier, on July 26th, a biologist/engineer team from Water & Air Research and Taylor Engineering conducted the environmental survey and field inspection of the combined sites. On October 1st, we received the draft environmental report based on the survey and field inspection and have since completed our review of that report. We have completed the engineering on our preliminary design to combine the two sites and avoid the documented archeological site's surveyed boundaries and have completed first drafts of the site's revised Phase II documents. We will soon be forwarding these documents to the FIND for final review.

Rec'd _____

JUL 27 1995

FLORIDA INLAND
NAVIGATION DISTRICT

July 21, 1995

Mr. Art Wilde
Executive Director
Florida Inland Navigation District
1314 Marcinski Road
Jupiter, Florida 33477

RE: Phase I Environmental Audit for Dredged Material Management Area BV-4B

Dear Mr. Wilde:

Enclosed for your review, please find two copies of the draft report for the above referenced environmental audit.

BV-4B occupies land formerly used for citrus production. The majority of the groves on site are now fallow and overgrown. Two sheds on the site contain equipment remaining from citrus production. Agricultural chemicals have been applied to the site in the past. Trash is scattered on some parts of the site.

Although these indications of past usage are present, the audit found no apparent indication that significant amounts of hazardous material remain on the site. A Phase II environmental audit is not recommended.

We will prepare a final copy of this report upon receipt of any FIND review comments. Please call if you have any questions.

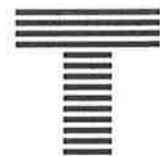
Sincerely,



R. Bruce Taylor, Ph.D., R.E.
President

:blm

enclosures



Engineering Narrative
BV-4B Dredged Material Management Area

This narrative summarizes the documents comprising the dredge and fill permit application package for the development of Dredged Material Management Area BV-4B. The BV-4B facility will provide a continuing material management capability to service the maintenance requirements of the northern half of Reach II of the Intracoastal Waterway (ICWW) in Brevard County, Florida. This reach extends 11.94 miles from the vicinity of Mims, to the NASA Parkway (ICWW mile 134.07 to mile 146.01).

The submission of this application package represents an intermediate step towards the completion of the second phase of a two phased program element addressing the maintenance requirements of the Intracoastal Waterway in Brevard County, Florida. This element is part of a fifteen year program sponsored by the Florida Inland Navigation District to develop a long-term dredged material management plan for the Intracoastal Waterway along the entire east coast of Florida. Phase I of the Brevard County program element, which is documented in four reports included as Attachments 1 through 4 to this permit application, developed basic plan concepts for the continuing management of maintenance material dredged from the Intracoastal Waterway in Brevard County, defined short and long term program needs based on a comprehensive examination of historical dredging records for the project area, and identified suitable centralized sites which satisfy these needs based on preliminary environmental, engineering, and operational criteria. Phase II consists of the gathering of detailed, site specific information required for the preparation and submission of permit applications for the primary material management areas identified in Phase I. In addition, Phase II also addresses the preliminary design of the site containment facilities; the acquisition of these sites (where appropriate), through negotiated purchase or condemnation, by the Florida Inland Navigation District; and the construction and continuing operation and maintenance of these sites to provide a permanent material management capability for the Intracoastal Waterway in Brevard County, Florida.

No attempt is made in this narrative to recount, in detail, the information contained in the documents which accompany the permit application. Rather, this narrative is designed to assist the reviewer in organizing this information, while emphasizing the engineering considerations and design specifications presented in the attached permit drawings (Attachment 5). In addition to the permit drawings and the Phase I reports already mentioned, the permit application package for the BV-4B dredged material management area includes: Attachment 6, boundary and easement surveys for the site, providing completeness, as well as the legal description necessary for acquisition; Attachment 7, a topographic survey, documenting pre-construction topography and drainage patterns, and providing information necessary for site design,

volumetric calculations, and grade analysis; Attachment 8, a sub-surface and soils report, identifying site foundation conditions and in-situ construction material suitability, as well as locating the water table on-site; Attachment 9, an environmental report, documenting existing environmental conditions, including vegetation communities and wildlife habitats, and serving to guide the configuration of the containment area within the site so as to avoid, to the greatest extent possible, the most sensitive environmental areas; and Attachment 10, a site specific management plan, ensuring that the containment area will continue to be operated in an efficient manner without undue conflicts with adjacent off-site land use, and allowing the site to be maintained as a permanent facility.

The BV-4B material management area comprises 101.01 acres located approximately one-half mile east of Mims. It lies approximately 1,600 feet west of the Indian River (Attachment 5, Sheet 1 of 5). It is bounded on the north by Cuyler Street and on the east by Hammock Trail. Lands north of Cuyler Street currently contain active citrus groves (221), while lands to the east of Hammock Trail are presently undeveloped. Lands to the south and west of the site contain a mixture of citrus groves (221) and fallow croplands (261). Sparse residential development lies approximately 400 feet south of the southern site boundary. Soils on the site consist predominantly of poorly drained varieties including, Bradenton fine sand, Felda sand, Immokalee sand, and Pompano sand. An area of excessively drained Paola fine sand lies along the western property line. No historical or archaeological sites are recorded for this property, based on a review of the Florida Master Site File.

Based on the analysis of historical dredging requirements and recent shoaling presented in the Phase I (plan development) report for Brevard County (Attachment 1), the projected 50-year disposal requirement for Reach II is 1,415,219 cubic yards (cy). This requirement will be met by the construction of two material management areas, one located near each end of the reach. The BV-4B facility, located at the northern end of the reach, is designed to provide a storage capacity equivalent to one half of the reach requirement.

Detailed environmental information for the BV-4B material management area is provided in the attached environmental report (Attachment 9). Site vegetation consists mainly of active citrus groves (221) and fallow croplands (261). Notable features include four stands of mixed hardwoods (438), and five small inland ponds (616) interspersed throughout the site (Attachment 5, Sheet 5 of 5).

Construction of the BV-4B facility will be carried out in two phases. The first phase will include the clearing of all vegetation within the containment area and fence line, the installation of a security fence

around the site perimeter, and the construction of an on-site access road. This phase will be completed as soon as practical following site acquisition. The second phase of site preparation will consist of the construction of the containment basin, and the installation of the outlet structures and other design features. This phase of site preparation is subject to the scheduling and budget priorities of the Jacksonville District Corps of Engineers and therefore may not immediately follow the completion of the initial site clearing and fencing. However, the site will be secured by a fence and security procedures will be in place prior to the commencement of excavation, grading, and dike construction. Each element of site preparation and construction is discussed in detail in the site management plan (Attachment 10).

The total acreage of BV-4B is 101.01 acres. Preliminary site design includes a 300 foot wide buffer area surrounding the containment basin (Attachment 5, Sheet 2 of 5). All of the wetlands previously described will lie within this buffer area and therefore will not be impacted by the containment basin construction. It is anticipated that citrus production will continue in portions of the buffer area under lease agreement between FIND and ~~the former property owners~~.

local ~~area~~ citrus growers

To obtain the required material storage capacity within the BV-4B containment basin of 48.14 acres, it will be necessary to construct dikes to a crest elevation of 15 feet (+25.5 ft NGVD) above the existing mean site elevation of +10.5 ft NGVD (Attachment 5, Sheets 2 and 3 of 5). The material to construct the dikes will be obtained by excavating the containment basin interior and perimeter ditches. Based on a conservative dike cross-section design including side slopes of 1V:3H and a dike crest width of 12 feet, 191,184 cy of material will be required. An additional 2,286 cy will be required for ramps to provide equipment access to the interior of the containment basin. The basin interior will be excavated to a mean elevation of +7.8 ft NGVD, or 2.70 feet below the existing site grade. Excavation will be set back 20 feet from the inside toe of the dikes, maintaining the same 1V:3H side slope. When the containment basin is filled to its capacity of 771,031 cy, the surface of the deposition layer will be a minimum of 4.0 feet below the dike crest, thereby providing the required 2.0 feet of freeboard and 2.0 feet of ponding depth.

The dredged material will be pumped as a slurry to the material management area via a pipeline. Each dredging operation will require the placement and retrieval of both supply and return pipelines. The location of the pipeline routes is shown in Attachment 5, Sheet 4 of 5. The pipelines will be placed within a 60 foot wide easement which extends approximately 1,668 feet from the ICWW to the eastern site boundary, where it adjoins the site at the northeastern property corner. Within the site boundary, the inlet

pipeline will be routed along the eastern and southern sides of the containment dike, entering the basin near its southwest corner by passing over the dike crest (Attachment 5, Sheet 2 of 5).

Decanting of the ponded water will be accomplished by a parallel arrangement of four corrugated metal half-pipes, located in the northeast corner of the containment area, diagonally opposite the slurry inlet (Attachment 5 Sheet 2 of 5). Each half-pipe will provide for the release of effluent over a sharp-crested weir section of a minimum length of 9 feet, for a total minimum crest length of 36 feet. The weir crest height will be adjustable by means of removable flash boards. The range of adjustment will extend from a minimum elevation of +3.30 ft NGVD, the excavated basin interior grade in the vicinity of the weirs, to a maximum elevation of +23.5 ft NGVD, or 15.7 feet above the mean excavated grade (13.0 feet above the mean site elevation). The minimum weir crest elevation facilitates the control of stormwater runoff prior to dredging operations, while the maximum elevation facilitates control of the final elevation of the deposition layer surface. The four weirs are to be connected by a manifold, with a single outlet pipe passing under the dike. Following the easement described above, the outlet pipeline will return the supernatant to the Indian River.

As stated above, the minimum length of the weir crest for the BV-4B containment basin is 36 feet. This specification is derived from results obtained from the Selective Withdrawal Model developed by the U.S. Army Corps of Engineers' Waterways Experiment Station (WES), and represents the weir crest length required to maintain the depth of withdrawal less than the minimum ponding depth of 2.0 feet. For this and all succeeding calculations, it has been assumed that an 24 inch O.D. dredge, (discharge velocity of 16 ft/sec, a volumetric discharge of 6,430 c.y./hr, and a 20/80 solids/liquid slurry mix) would be used for future channel maintenance. However, the physical constraints of the channel will most likely dictate the use of a 16 to 18 inch O.D. dredge. Analysis of weir performance based on nomograms developed at the COE Waterways Experiment Station (WES) under the Dredged Material Research Program (DMRP) (Walski and Schroeder, 1978) indicates that these design parameters may be expected to produce an effluent suspended solids concentration of 0.63 g/l, assuming a minimum average ponding depth of 2 feet. Translation of suspended solids concentration to a measure of turbidity on which Florida water quality standards are based is highly dependent on the suspended material characteristics. However, WES guidelines (Palermo, 1978) indicate that the above stated effluent quality will satisfy the state water quality standards. Should effluent quality deteriorate below the ambient conditions of the receiving waters, steps shall be taken to decrease effluent turbidity. These include intermittent dredge operation, increased ponding depth, or the use of turbidity curtains surrounding the site outlet weirs.

The BV-4B material management area is located adjacent to a public roadway (Cuyler Street), therefore a separate ingress-egress easement will not be required. Road access to the site will be provided via a driveway connection to Cuyler Street at a point near the northwestern site corner (Attachment 5, Sheet 2 of 5).

A system of perimeter ditches will be constructed at a 20 foot setback from the outside toe of the containment dike to control stormwater runoff from the exterior face of the containment dike, perimeter road, and portions of the buffer area. These ditches will also provide a means for intercepting any horizontal migration of saltwater from the interior of the containment area. Preliminary analysis indicates that at a minimum depth of 3.0 feet, the ditches will provide adequate conveyance for the 25 year storm runoff.

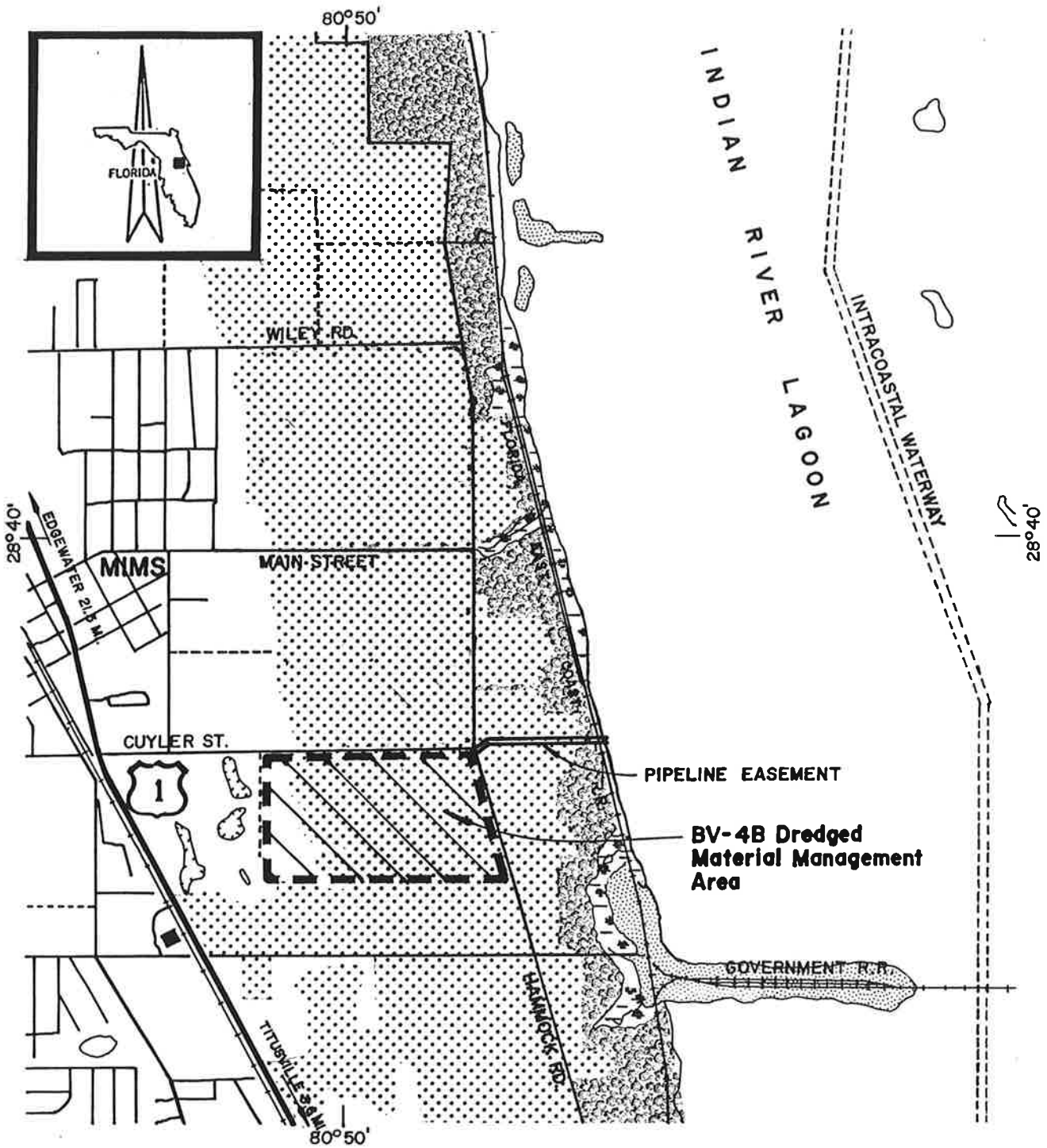
Finally, an analysis of containment area efficiency was performed to determine the minimum operational ponding depth required for adequate solids retention performance and acceptable effluent quality. The projected performance of the basin is highly dependent on the physical characteristics of the sediment to be dredged. The characteristics of the sediment to be dredged within Reach II were derived from the findings of a county-wide study of Indian River sediments conducted by Trefry et al. (1990). The data presented in this study were analyzed with respect to the most recent ICWW channel survey data (1987). From this analysis it was determined that 30.9 percent of the in-place volume of shoal sediments within Reach II is made up of fines, that is, sediments less than 0.074 mm grain size diameter. Organics, which represent a small component of the fines, make up only 4.7 percent of the total shoal volume. However, the Trefry report also indicates that some areas of the ICWW channel within Reach II contain deposits of fine-grained sediments in excess of 30 cm thick. Dredging these areas could result in short periods during which the sediments entering the containment basin contain up to 60 percent fines. Therefore, to ensure that the containment basin is able to meet or exceed all effluent discharge and water quality criteria, its design is based on the "worst-case" assumption that the dredged material contains 60 percent fines. Based on this conservative design criterion, an associated zone settling velocity was then determined from an empirical relationship between the percentage of fine-grained material and settling behavior. This settling velocity was then used to determine the retention time needed to provide adequate basin performance.

Retention time is directly related to the depth of ponded water maintained within the basin. The preliminary design of the containment basin provides for a minimum 2.0 foot ponding depth. That is, at capacity the containment dike will retain 2.0 feet of ponding plus 2.0 feet of freeboard above the maximum

deposition surface. Analysis of the hydraulic characteristics of the proposed containment area indicates that a 2.0 foot ponding depth will provide a maximum retention time of 21.33 hours during the period in which the flow over the weir balances the liquid discharge of the dredge. In comparison, the time required for the suspended sediment to settle out of the withdrawal depth of 2.0 feet is 3.34 hours, based on the zone settling velocity derived above. Research by the U.S. Army Waterways Experiment Station (WES) under the Dredged Material Research Program (DMRP) (Shields et al., 1987) indicates that to account for field conditions, the required settling time of the dredged material should be multiplied by a factor of 2.25. Thus, the calculated maximum retention time of 21.33 hours provided by a 2 foot ponding depth exceeds the adjusted required settling time of 7.52 hours by a factor of 2.84. Therefore, a 2.0 foot minimum ponding depth for the BV-4B containment basin will provide adequate retention to maintain the required effluent quality. However, ponding depths should be maintained above the 2.0 foot minimum whenever possible. The recommended operational ponding depth for Site BV-4B is 4.0 feet, with a maximum ponding depth of 5.0 feet. The use of a 4.0 foot operational ponding depth results in a basin retention time of 42.66 hours, thereby providing an additional margin of safety, and ensuring that the clarified supernatant released from the BV-4B containment basin will meet state water quality standards.


REFERENCES

- Palermo, M.R., R.L. Montgomery, and M.E. Poindexter, "Guidelines for Designing, Operating, and Managing Dredged Material Containment Areas", Technical Report DS-78-10, Dec. 1978, U.S. Army Engineer Waterways Experiment Station, CE, Vicksburg, MS.
- Shields, F.D., Jr. E.L. Thackston, and P.R. Schroeder, "Design and Management of Dredged Material Containment Areas to Improve Hydraulic Performance", Technical Report D-87-2, June 1987, U.S. Army Corps of Engineers Waterways Experiment Station, CE, Vicksburg, Mississippi.
- Trefrey, J.H., S. Metz, R.P. Trocine, N. Iricanin, D. Burnside, N.C. Chen, and B. Webb, "Design and Operation of a Muck Sediment Survey", Technical Report SJ30-SP3, April, 1990, Department of Oceanography and Ocean Engineering, Florida Institute of Technology, Melbourne, FL.
- Walski, T.M. and P.R. Schroeder, "Weir Design to Maintain Effluent Quality from Dredged Material Containment Areas", Technical Report D-78-18, May 1978, U.S. Army Engineer Waterways Experiment Station, CE, Vicksburg, MS.



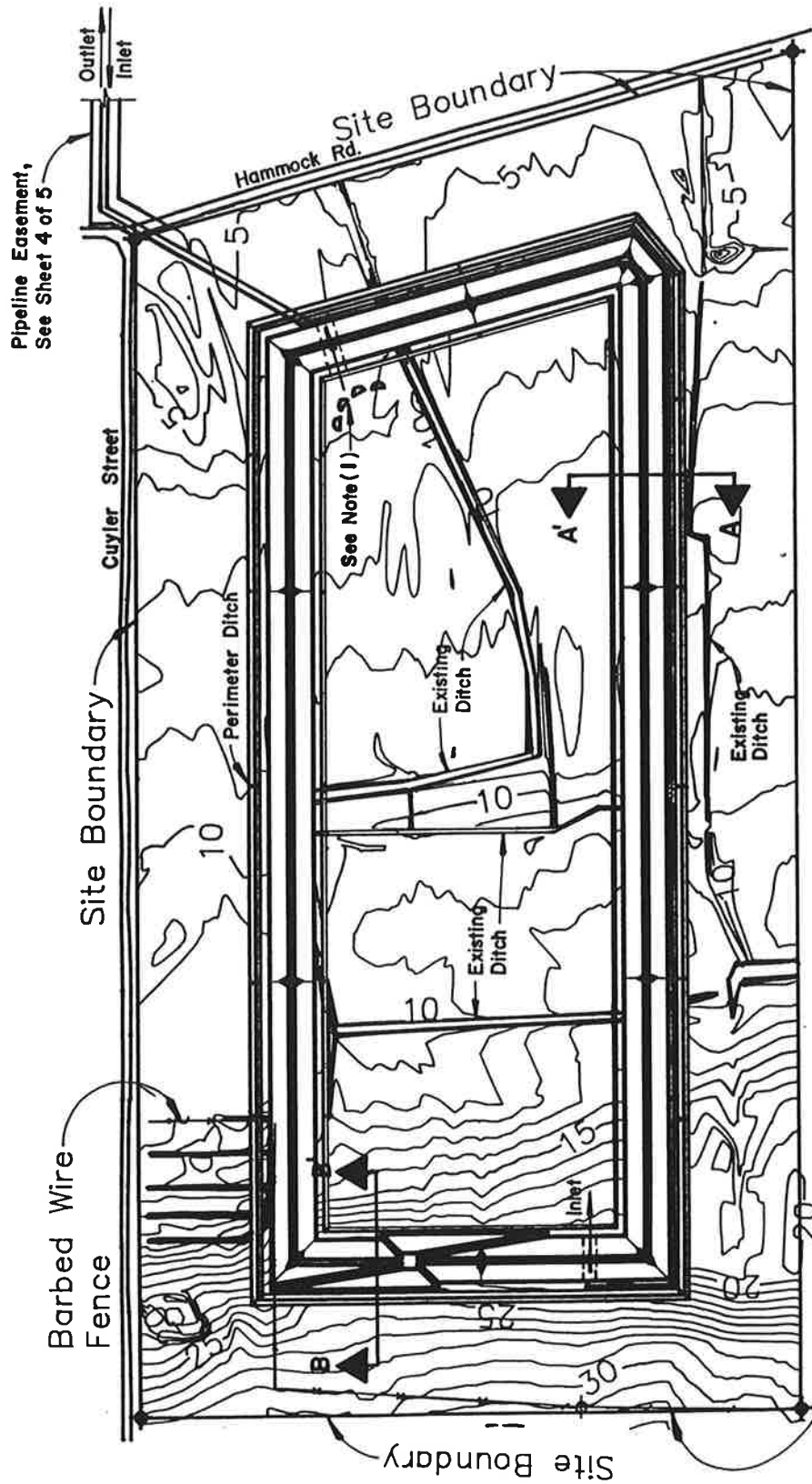
REFERENCED
USGS MIMS QUADRANGLE
1949, REVISED 1970



**TAYLOR ENGINEERING INC**
9086 CYPRESS GREEN DRIVE
JACKSONVILLE FLORIDA 32216

**Location of BV-4B Dredged
Material Management Area,
Brevard County, Florida**

PROJECT	C-9004
REVISION	
SHEET	1 of 5
DATE	June, 1992



Notes:

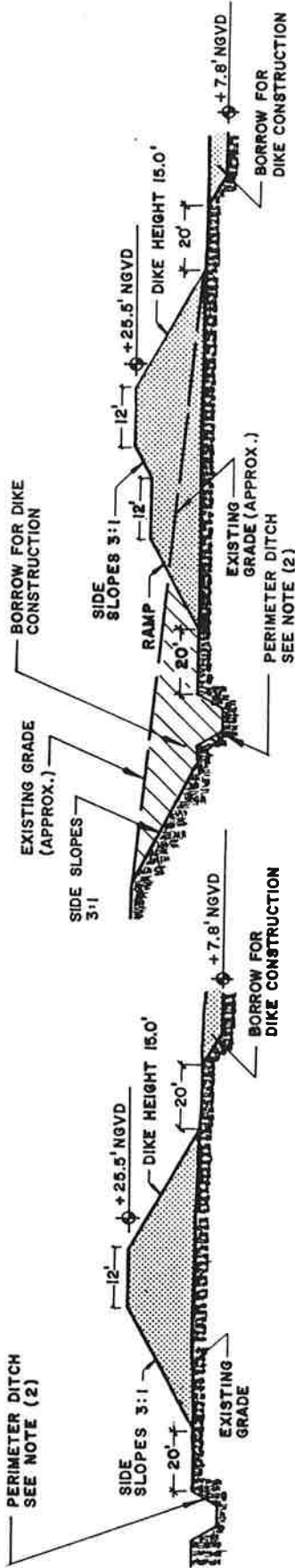
1. Weirs: Four 8ft. dia. CM Half-Pipes With Removable Flash Boards Adj. From +15.7ft. Above Grade to Below Grade (With Connecting Manifold.)
2. Containment Area:
 Within Outside Toe of Dike: 48.14 Acres
 Within Inside Toe of Dike: 34.01 Acres
 Capacity: 771,031 Cubic Yards
3. Sections A-A', B-B' See Sheet 3 of 5.
4. Elevation Datum: NGVD of 1929
5. Area Outside Dike Within Site Boundary to be a Buffer of Existing Vegetation.
6. ♦ Indicates Core Boring Locations.



TAYLOR ENGINEERING INC
 9086 CYPRESS GREEN DRIVE
 JACKSONVILLE, FLORIDA 32256

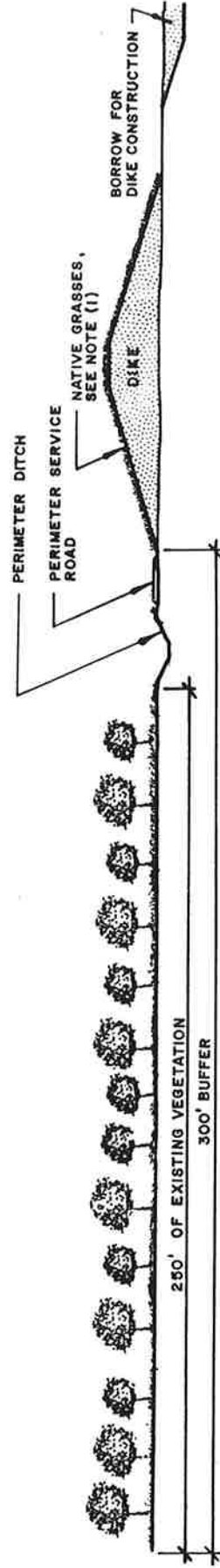
Site Plan
BV-4B Dredged Material Management Area
Brevard County, Florida

PROJECT	C-9004
REVISION	
SHEET	2 of 5
DATE	June, 1992



SECTION A-A'
N.T.S.

SECTION B-B'
N.T.S.



DISPOSAL AREA - VEGETATION PLAN
N.T.S.

- NOTES:
- TYPICAL SPECIES INCLUDE:
 - PASPALUM VAGINATUM
 - SPARTINA PATENS
 - SPOROBOLUS SPECIES
 - PERIMETER DITCH:
 - SIDE SLOPE: 3:1
 - BOTTOM WIDTH: 5'
 - MEAN INVERT ELEV: 7.5'
 - BOTTOM SLOPE AS REQUIRED FOR DRAINAGE

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JACKSONVILLE, FLORIDA 32256

Typical Dike and Ramp Sections, Vegetation Plan
BV-4B Dredged Material Management Area
Brevard County, Florida

PROJECT	C-9004
REVISION	
SHEET	3 of 5
DATE	June, 1992

INDIAN RIVER
Approx. M.H.W.

100 ft. R/W F.E.C.

Railroad

Pipeline Easement, Approximate Length 1,635 ft.

60'

Cuyler Street

Hammock Rd.

BV-4B Dredged Material
Management Area

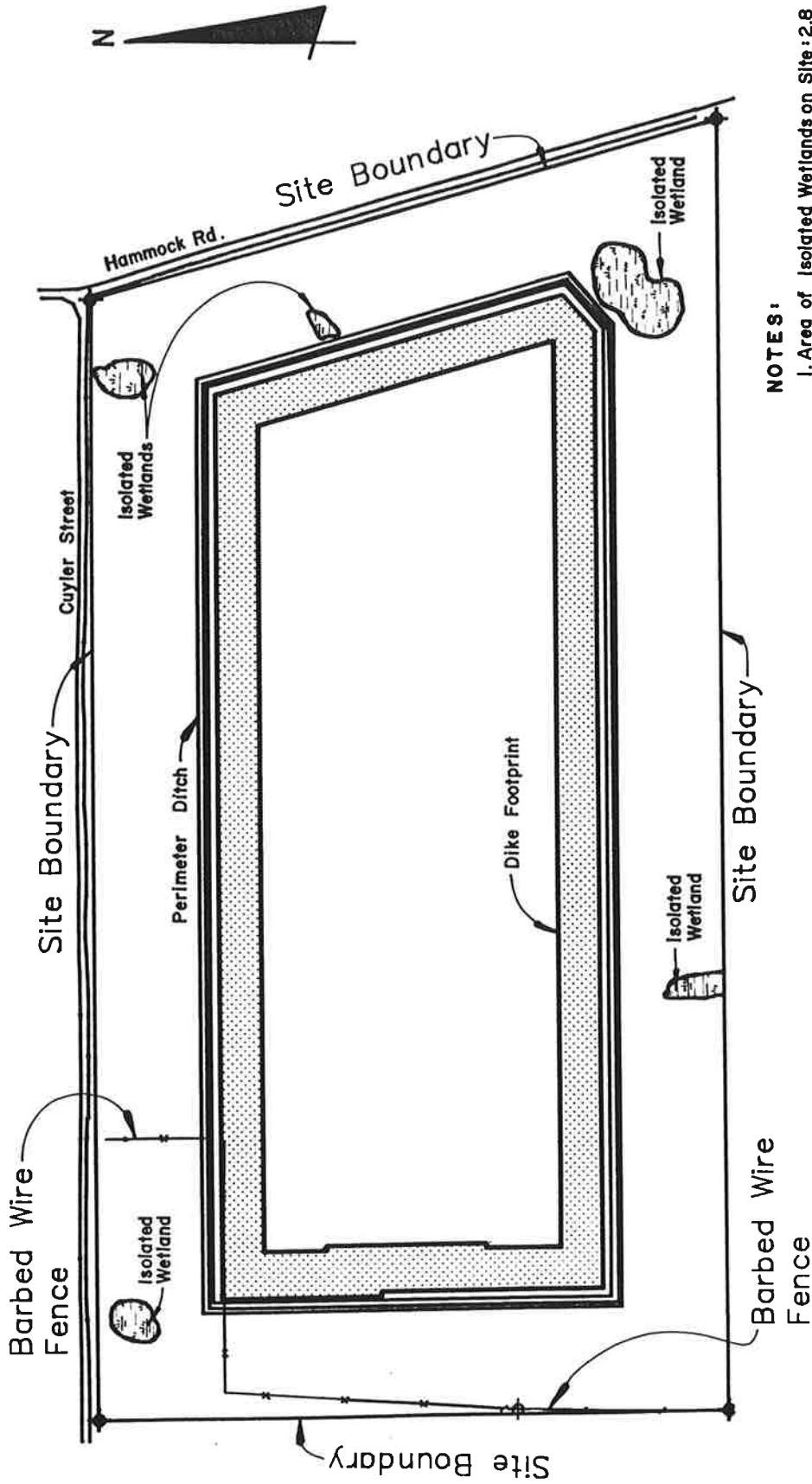


PROJECT	C-9004
REVISION	
SHEET	4 of 5
DATE	June, 1992

Pipeline Easement
BV-4B Dredged Material Management Area
Brevard County, Florida

TAYLOR ENGINEERING INC
9086 CYPRESS GREEN DRIVE
JACKSONVILLE, FLORIDA 32256





NOTES:

- 1. Area of Isolated Wetlands on Site: 2.8 Acres
- Area of Isolated Wetlands Impacted: 0 Acres



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 9086 CYPRESS GREEN DRIVE
 JACKSONVILLE, FLORIDA 32256

Wetlands Map
BV-48 Dredged Material Management Area
Brevard County, Florida

PROJECT	C-9004
REVISION	
SHEET	5 of 5
DATE	June, 1992

Rec'd

JUL 20 1992

FLORIDA INLAND
NAVIGATION DISTRICT

July 17, 1992

Mr. Art Wilde
Executive Director
Florida Inland Navigation District
1314 Marcinski Road
Jupiter, Florida 33477

RE: Final Project Documents for Dredged Material Disposal Site BV-4B

Dear Mr. Wilde:

Enclosed are two copies of the following draft documents for site BV-4B:

- o Engineering Narrative and Permit Drawings
- o Site Management Plan
- o Cost Report

We look forward to receiving your comments.

Sincerely,



R. Bruce Taylor, Ph.D., P.E.
President

:blm

enclosures